51-75 Bradford Street and 20 Checkley Street

Urban Transportation Considerations

Prepared For: Barrie Lakeshore Developments

December 2019



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1.0 INTRODUCTION

BA Group has been retained by Barrie Lakeshore Developments to provide urban transportation advisory services in relation to the proposed development at the municipal addresses 51, 53, 55 & 75 Bradford Street and 20 Checkley Street in the City of Barrie (the 'site').

The project is a mixed-use development on the Barrie waterfront that proposes residential, retail, and hotel uses across four towers to be built and occupied over 15 to 20 years. A reduced scale site plan is provided in **Appendix A** illustrating the first phase and full buildout of the site**.**

1.1 SITE LOCATION

The site location is illustrated in **Figure 1**.

The study area is generally located between Bradford Street to the west, Lakeshore Drive to the east, Checkley Street to the north, and Bunker's Creek to the south. The site is located with the city's Urban Growth Centre.

1.1.1 Existing Site

The existing site has access via Bradford Street and is currently vacant. The site is an irregular-shape that is bounded by Bunkers Creek to the south, condominium and commercial buildings to the north, Bradford Street to the west and Lakeshore Drive to the east.

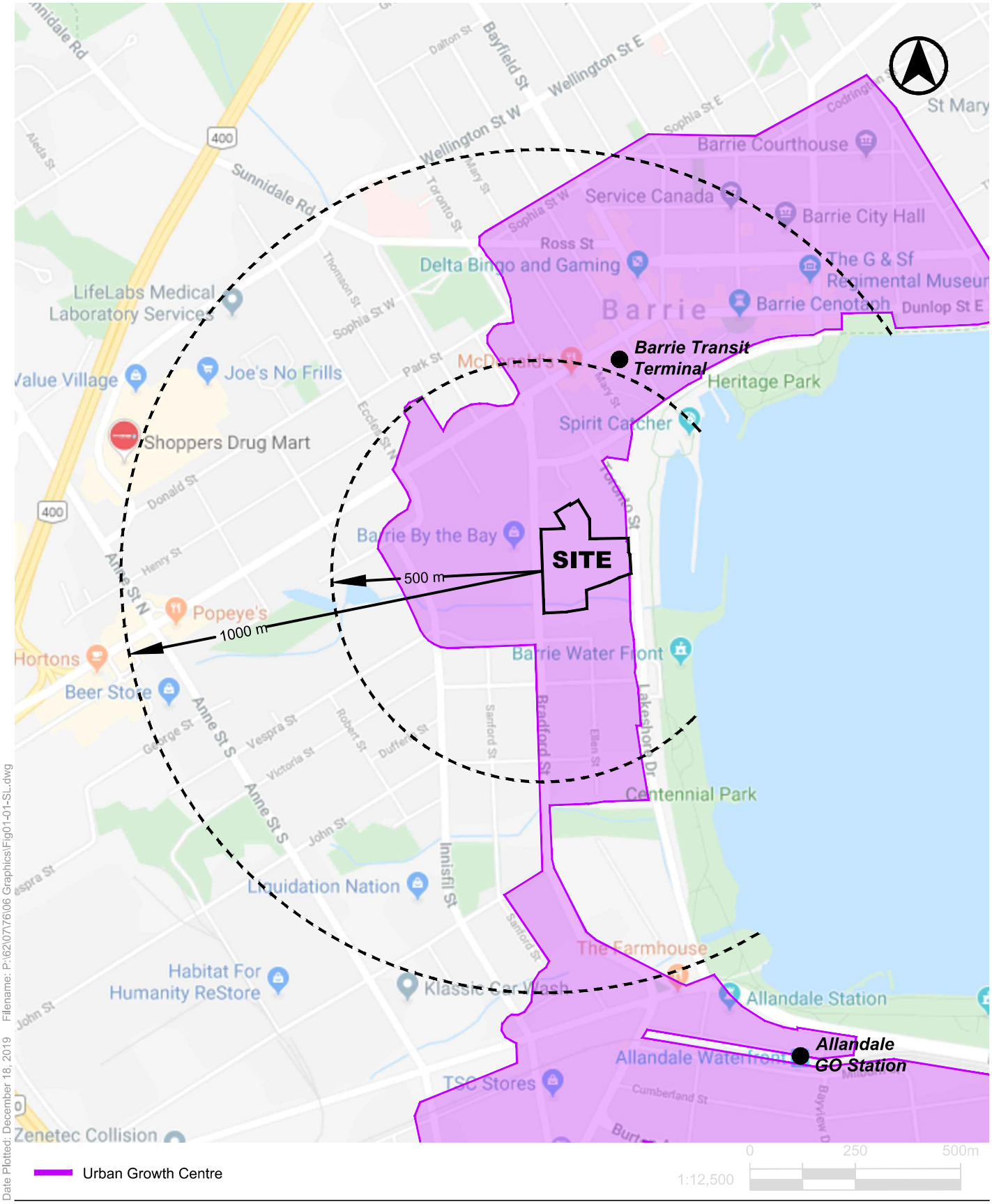
1.2 THIS STUDY

This urban transportation advisory report forms part of the Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) applications to permit redevelopment of the site as proposed.

This report provides an assessment of the transportation related aspects of the site, including:

- a summary of the existing site land uses and proposed development programme;
- a review of the area transportation context;
- an overview of key transportation related design elements of the development site plan including parking provisions;
- an overview of the key transportation demand management measures for the site;and
- a review of traffic operations on the area road system following development of the proposed building and other upcoming developments and the ability of the future area road network to acceptably accommodate forecast traffic levels across all modes.

The City of Barrie has a number of planned improvements for the area surrounding the site, notably improvements to transit connectivity, new active transportation links, and road network improvements along Bradford Street and Lakeshore Drive identified in their Transportation Master Plan (TMP). The City's plans will provide significantly improved connectivity and mobility options for future site residents, employees, and visitors. The improvements outlined in the TMP as they relate to the site study area are outlined in Section 2.0 of this report.



SITE LOCATION

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51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 1

2.0 DEVELOPMENT PROPOSAL

The current development plans for the site contemplate 1,900 residential apartment units, 3,371 square metres (m^2) of retail, and a 152 room hotel with 465 m^2 of restaurant space across three buildings.

The site is planned to be constructed in phases over approximately 15 to 20 years. A breakdown of each development phase and site statistics is provided in Table 1 and the site plan is illustrated in **Figure 2** and **Appendix A**.

TABLE 1 SITE STATISTICS

	Time	Residential	Hotel	Retail
Phase 1: Tower 1	0 - 4 years	332 units	152 rooms[1]	-
Phase 2: Tower 2	4 to 8 years	1,104 units	-	2,370 m^2
Phase 3: Tower 3	8 to 12 years			
Phase 4: Tower 4	12 to 16 years	464 units	-	1,001 m^2
Total	**15 to 20 years**	**1,900 units 149,854 m^2 GFA**	**152 rooms[1] 10,459 m^2 GFA**	**3,371 m^2 GFA**

Notes:
1. The hotel will include a 465 m^2 restaurant.

Phase 1 contains hotel, restaurant, and residential uses and will partially construct the internal road network serving the site. Phases 2 onward propose residential and retail uses, and will complete the construction of the internal road to Bradford Street.

2.1 SITE ACCESS AND VEHICLE CIRCULATION

There are three primary vehicular access points proposed for the site as demonstrated on the current development plans. There is an internal private road that connect the access points on Bradford Street and Checkley Street. The internal road provides connectivity and access to pick-up/drop-off, parking, and loading for the site.

2.1.1 Phased Vehicular Access

The primary vehicular access for all parking facilities and loading activity is facilitated by a private street network connection between Bradford Street and Checkley Street. Right turns access is also provided along Lakeshore Drive. The vehicular access conditions for each phase are generally described below:

- Phase 1 (0 to 4 years): right turns access to Lakeshore Drive and access to Checkley Street where there is full-moves access to/from Simcoe Street via an unsignalized intersection.

  The internal road network will be built from Checkley Street's existing terminus to the extent of Building 1 in order to facilitate loading access, parking access, and access to a temporary surface parking lot that will be located behind Building 1 prior to the construction of Phase 2.

- Phase 2 and 3 (4 to 12 years years): right turns access to Lakeshore Drive, full-moves access to Checkley Street, and an extension of the internal private road network to Bradford Street. Access at Bradford Street is proposed to be an unsignalized access that restricts left-in movements from Bradford Street until such time that the property on the west side of Bradford Street redevelops.

  In the event that the property on the west side of Bradford Street redevelops within the Phase 2 and 3 time frame, full-moves signalized access would be warranted and recommended to serve properties on both sides of Bradford and is consistent with the planned growth, character and access conditions for the Bradford Street corridor.

- Phase 4 (12 to 16 years): Consistent with access conditions described for Phase 2 and 3. A full-moves signal at Bradford Street is anticipated and recommended to support full buildout.

2.2 PEDESTRIAN ACCESS AND CIRCULATION

The movement of pedestrians on (and through) the site will be facilitated by an internal network of sidewalks. An enhanced continuous pedestrian connection is proposed between Bradford Street and Lakeshore Drive, with opportunities for a controlled pedestrian crossing and relocated transit stop at the future signalized intersection of Bradford Street.

The internal pedestrian walkways will provide a direct, mid-block pedestrian connection through the site that is wider than typical sidewalk standards and provides a direct connection between Bradford Street and the waterfront.

2.3 VEHICLE AND BICYCLE PARKING

Vehicular parking is provided within the podium of each building. Phase 1 will provide parking within the building podium and in a temporary surface parking lot on site. Access to the various parking facilities for each building is provided via the internal road network.

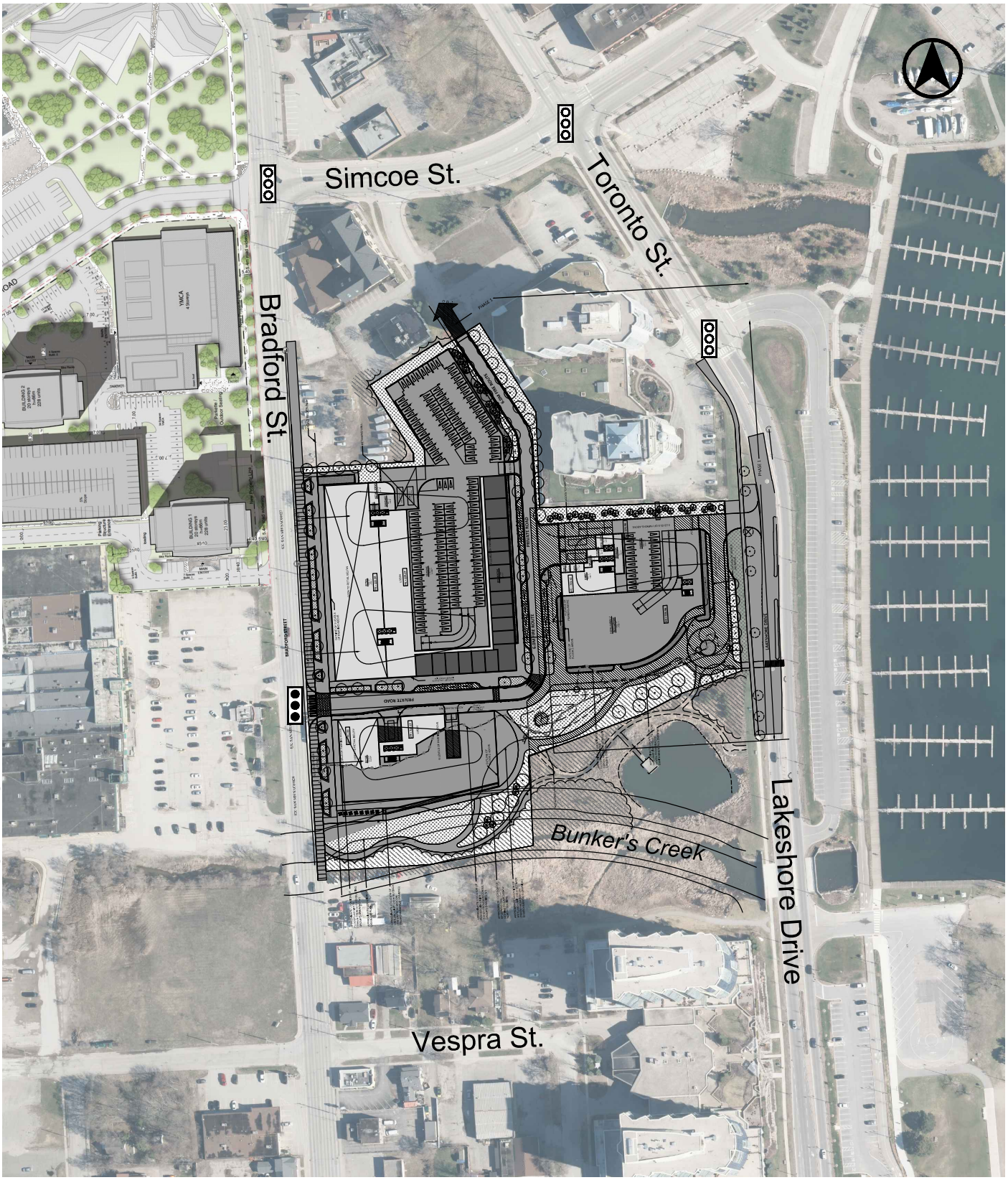
A temporary parking lot is proposed to support Phase 1 to allow flexibility in the phased construction of parking for the site. This lot can be accessed via an internal road that is partially constructed in Phase 1.

Parking supply and phased construction of parking as part of the development proposal are discussed further in Section 4.0**.**

As part of the transportation demand management (TDM) measures for the site, bicycle parking spaces will be provided for the proposed development. A summary of these provisions is provided in Section 6.0.

2.4 LOADING AND SERVICING

Loading spaces will be provided for the proposed development, accessed via the internal road network. Loading provisions are briefly discussed in Section 5.0. Further details about the supply, location, design and function will be provided in subsequent site plan applications to the City.



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SITE PLAN

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51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 2

3.0 TRANSPORTATION CONTEXT

3.1 ROAD NETWORK

Figure 3 illustrates the existing lane configurations and traffic control. Existing road network and future road network and classifications are illustrated in the Transportation Master Plan (TMP) excerpts provided in **Figure 4** and **Figure 5**.

3.1.1 Existing Road Network

3.1.1.1 Bradford Street

Bradford Street is an arterial road that runs generally north-south along the western property of the site, extending from Dunlop Street West in the north to Tiffin Street in the south where it becomes Essa Road. It has a four-lane cross-section with two lanes of traffic in both directions. The posted speed limit on the road is 50 km / hour. No on-street parking is permitted.

Bradford Street is planned to be widened to accommodate cycle tracks, a centre left turn lane / median, and high-occupancy vehicles lanes to support future core transit routing. Further details about these improvements are outlined in Section 3.2.2.

3.1.1.2 Simcoe Street

Simcoe Street is a major collector road that runs generally east-west, extending from Bradford Street in the west to Lakeshore Mews / Barrie North Shore Trail in the east. In proximity to the site, the road has a four-lane cross-section with two lanes of traffic in both directions and auxiliary turn lanes at key intersections. No on-street parking is permitted.

3.1.1.3 Lakeshore Drive / Toronto Street

Lakeshore Drive / Toronto Street is a parkway road that follows the waterfront within the vicinity of the site and has restricted access and special design considerations due to its parkland surroundings. The road runs generally north-south, extending from Grove Street East in the north to Minet's Point Road in the south where it becomes Hurst Drive.

In proximity to the site, the road ranges has a two-lane cross-section with auxialiary turn lanes at key intersections. Street parking is permitted along certain sections of the street, south of Victoria Street. Off-street paid public parking lots operated by the City of Barrie are located along the length of the waterfront on the east side of Lakeshore Drive – Toronto Street.

Lakeshore Drive recently underwent improvements, which included the construction of medians that separate vehicular lanes of traffic improvements to the waterfront multi-use trail and waterfront parking areas.

According to the TMP, Lakeshore Drive is proposed to form one of two core transit routes adjacent to the site. Further details about this planned transit improvement are provided in Section 3.2.2.

3.1.1.4 Checkley Street

Checkley Street is a local street the runs generally north-south, extending from Simcoe Street in the north to approximately 70 metres south of Simcoe Street where the road terminates. The road has a two-lane cross-section with two lanes of traffic in both directions.

3.1.2 Future Road Network

The City of Barrie's Transportation Master Plan (TMP) sets the framework for future road improvements within the area surrounding the site. The improvements address future roadway capacity constraints when considering the projected growth in Barrie and look to improve facilities for transit and active transportation.

The City's planned future road network is illustrated in excerpts from the TMP in **Figure 4** and **Figure 5**.

3.1.2.1 Bradford Street

The TMP identifies the following improvements along Bradford Street:

- A 5-lane cross-section including two-way left turn or median to be implemented by 2026 to 2031;
- High Occupancy Vehicle (HOV) lanes between Simcoe Street and Tiffin Street by 2041 to provide connections between major transit hubs, the Downtown Barrie Terminal and Allandale Waterfront GO Station. The HOV lanes will be in the curbside lanes for use by transit vehicles and vehicles carrying two or more people; and,
- Cycle tracks between Dunlop Street and Tiffin Street.

The TMP also identifies the corridor of Bradford Street, between Simcoe Street and Tiffin Street as a potential location for further studies to validate lane improvements and the impacts of incorporating Active Transportation and HOV facilities.

The OP (January 2018) identifies an ultimate right-of-way width of 31 metres for Bradford Street. Engineering staff identified that this will require an associated 5.5 metre conveyance along the site property line.

The TMP (April 2019) more recently identifies the ultimate right-of-way width to be 34 metres by 2041. Engineering staff identified that this will require an associated 1.5 metre future widening in addition to the 5.5 metre conveyance in order to allow a future widening of the roadway.

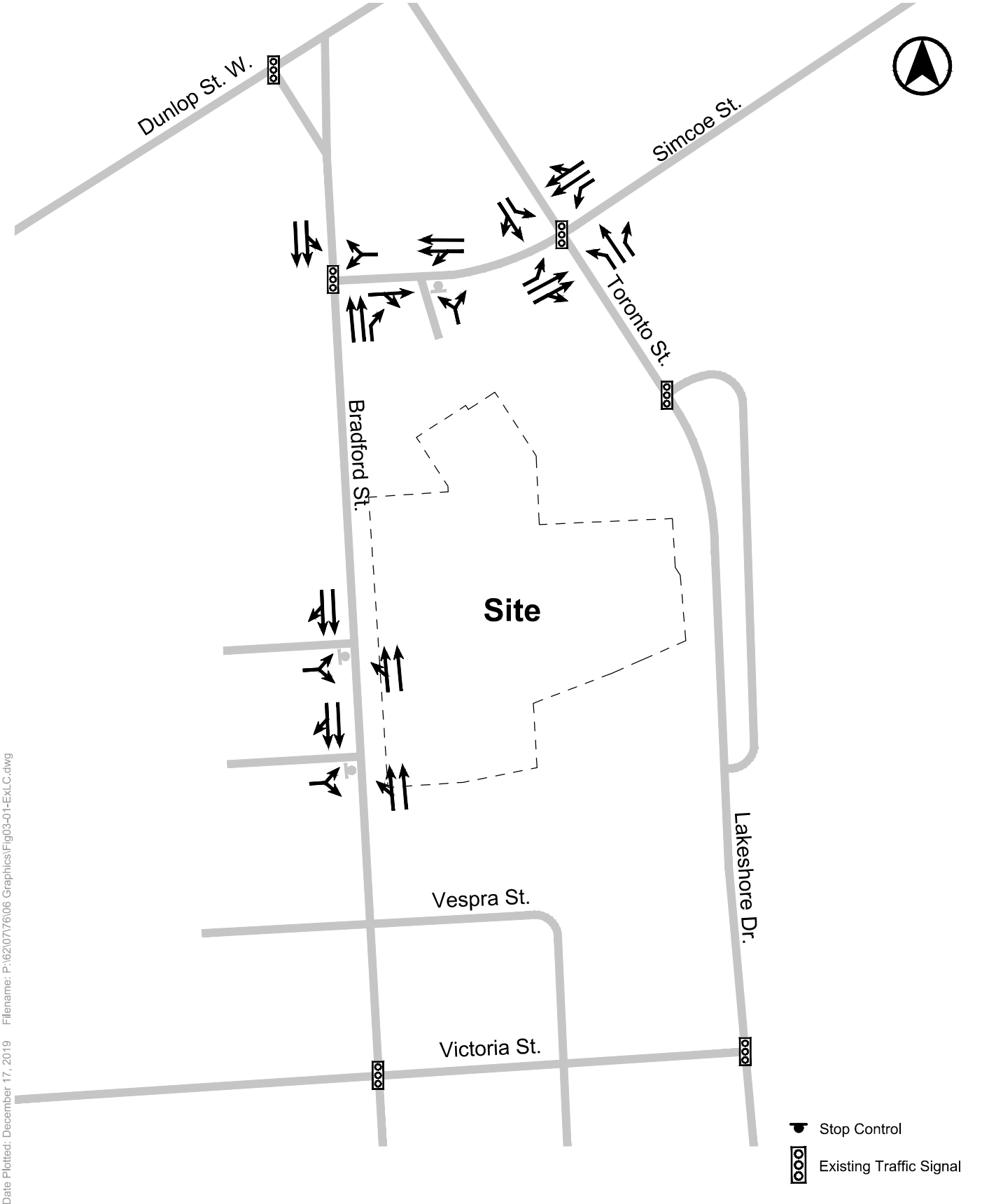
The site plans illustrate a 7 metre future widening to represent the combined conveyance and widening identified in the OP and TMP.

3.1.3 Lakeshore Drive

Lakeshore Drive recently underwent improvements, which included the construction of medians that separate vehicular lanes of traffic improvements to the waterfront multi-use trail and waterfront parking areas.

No additional lanes vehicular lanes are proposed in the TMP within the vicinity of the site and the ultimate right-of-way of Lakeshore Drive (2041) is 27 metres.

Transit improvements are proposed in the TMP for Lakeshore Drive as described in Section 3.2.2.



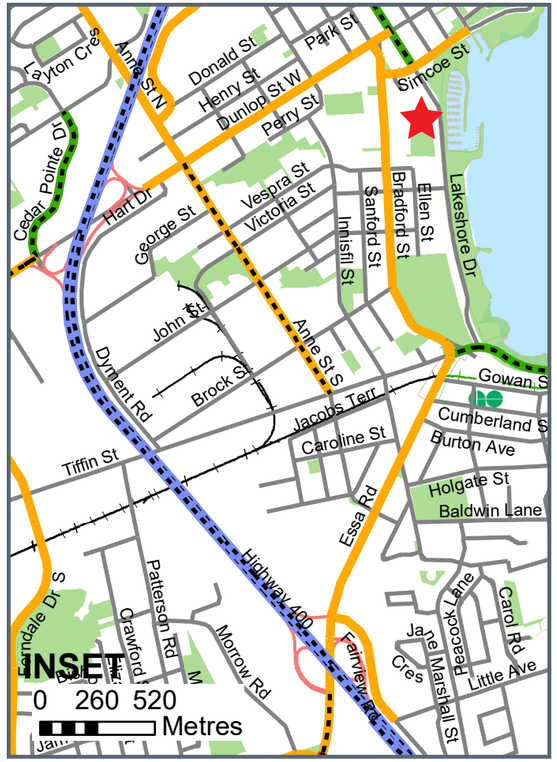
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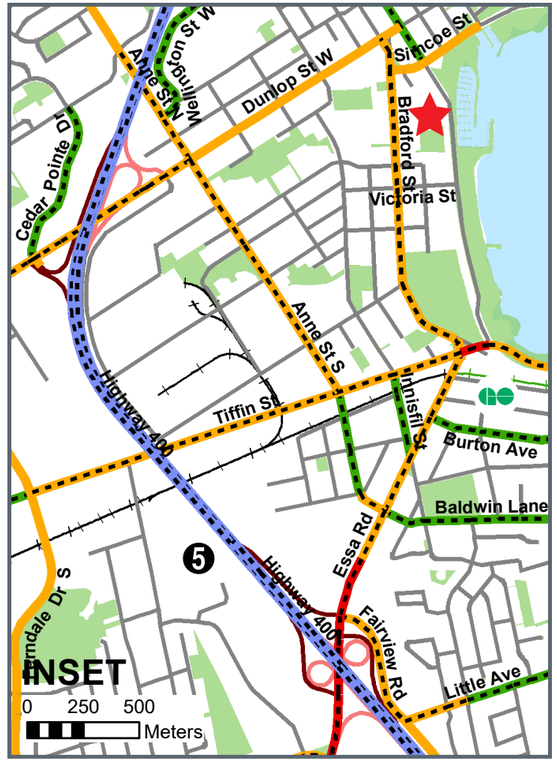
EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL

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51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 3









EXISTING ROAD NETWORK

TMP Figure 3-9

Transportation Features

- 10 Lanes with Continuous Median (MTO 2017 TESR)
- 8 Lanes with Continuous Median (MTO 2017 TESR)
- 7 Lanes (including TWLTL or Median)
- 6 Lanes with Continuous Median (MTO)
- 6 Lanes
- 5 Lanes (including TWLTL or Median)
- 4 Lanes
- 3 Lanes (including TWLTL or Median)
- 2 Lanes
- 2 Lanes (Ramp)
- 1 Lane (Ramp)

PROPOSED PREFERRED ROAD NETWORK
2031

TMP Figure ES-5 & 5-9

- Existing Grade Seperation
- New Grade Separation
- GO Station
- GO Transit Railway
- BCRY Railway

PROPOSED PREFERRED ROAD NETWORK
2041

TMP Figure ES-4 & 5-5

FUTURE RIGHT-OF-WAY
2041

TMP Figure 6-1

Right-of-Way Width (m)

- 24
- 27
- 29
- 30
- 34
- 41

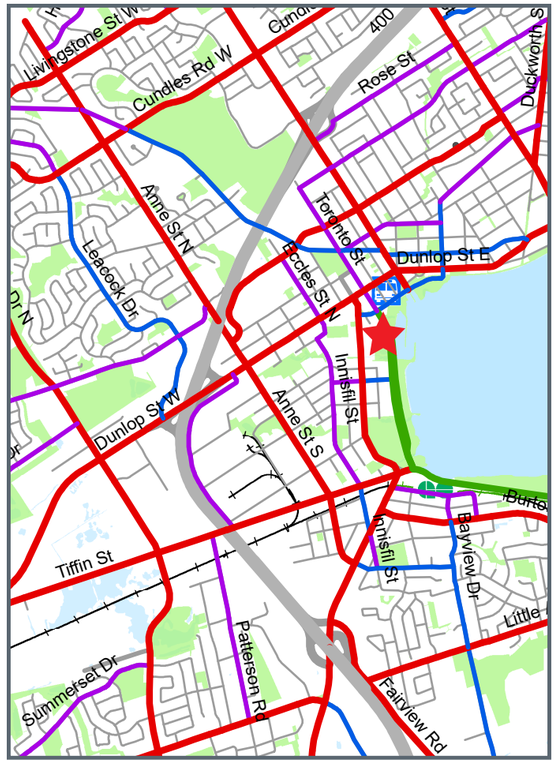
Site: 51-75 Bradford and 20 Checkley Street

EXCERPTS FROM THE TRANSPORTATION MASTER PLAN, PROPOSED ROAD NETWORK

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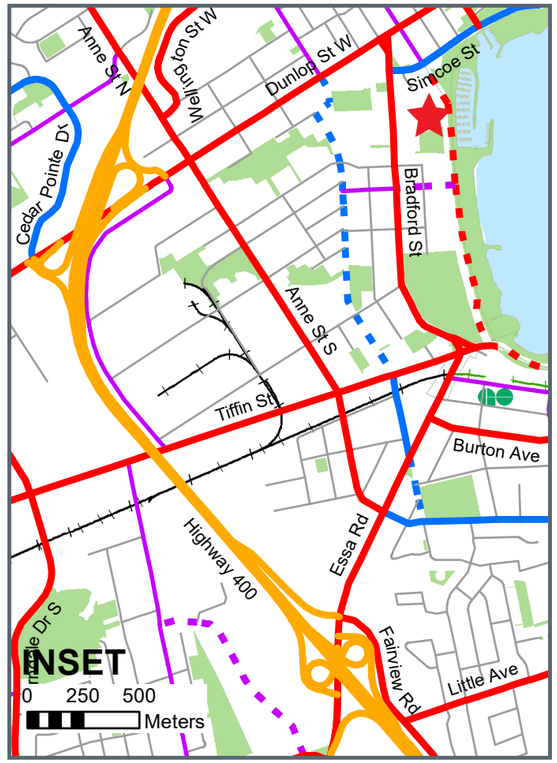
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Figure 4



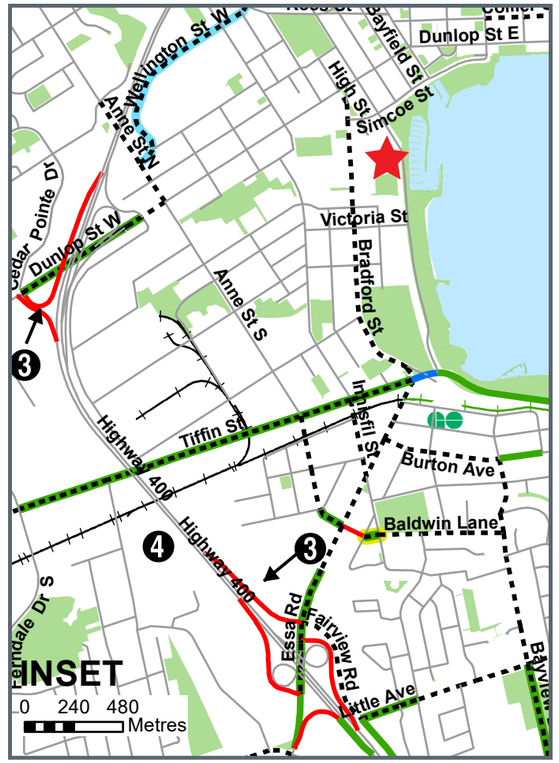
EXISTING ROADWAY CLASSIFICATIONS

TMP Figure 3-8



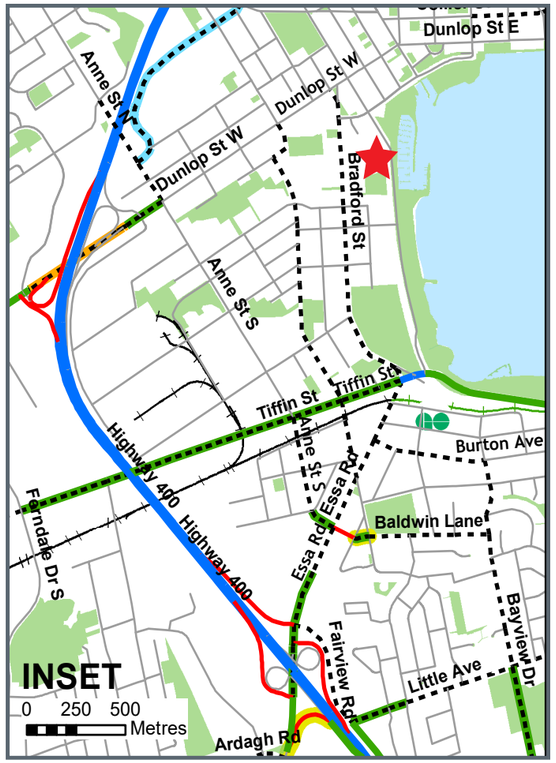
ROAD CLASSIFICATION, PREFERRED NETWORK
2041

TMP Figure 5-4



CHANGE IN VEHICLE LANES FROM 2016, PROPOSED PREFERRED NETWORK
2031

TMP Figure 5-10



CHANGE IN VEHICLE LANES FROM 2016, PROPOSED PREFERRED NETWORK
2041

5-6S

Classification Types
- Arterial
- Major Collector
- Minor Collector
- Parkway
- Provincial Freeway
- Provincial Highway
- Local Street
- Proposed Change

Transportation Facilities
- GO Station
- Barrie Bus Terminal
- BCRY Railway
- GO Transit Railway

Transportation Features
- Add 7 Lanes (including TWLTL or Median)
- Add 5 Lanes (including TWLTL or Median)
- Add 4 Lanes
- Add 3 Lanes (including TWLTL or Median)
- Add 2 lanes (one direction)
- Add 2 Lanes
- Add 1 Lane
- Add TWLTL or Median
- No Change
- Remove 2 Lanes; Add TWLTL
- Remove 1 Lane
- New Road

New Rail Grade Separation
- New Grade Separation
- GO Station
- GO Transit Railway
- BCRY Railway

❸ Add additional lane to on-ramp proposed by City of Barrie TMP
❹ Highway 400 is assumed to remain the current 6 lanes. The timeframe for future widening needs to be confirmed by MTO

Site: 51-75 Bradford and 20 Checkley Street

EXCERPTS FROM THE TRANSPORTATION MASTER PLAN, ROAD CLASSIFICATION AND LANE CHANGES

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Figure 5

3.2 TRANSIT NETWORK

The existing site transit context is illustrated in **Figure 6.** Existing and future transit network conditions for the broader area are illustrated in the Transportation Master Plan (TMP) excerpts provided in **Figure 7**.

Having access to a wide range of local and regional transit routes in an area that is planning to provide for significant transit investment allows for residents, visitors, and employees to opt for travel that is non auto-dependent.

3.2.1 Existing Transit Network

The City of Barrie is well connected by local and growing regional transit options that provide service between Barrie and other parts of Ontario.

The site in close proximity to:

- six local Barrie Transit bus routes on Bradford Street, Innisfil Street, and Dunlop Street with stops located along the site boundary;
- the Barrie Bus Terminal located approximately 350 metres from the site that is served by local Barrie Transit, GO Transit regional bus service, and Ontario Northland / Greyhound Canada inter-regional bus services; and,
- the Allendale Waterfront GO train station that is approximately 1 kilometre south of the site. This station is currently served by:
    - 7 morning weekday southbound trains, 7 evening northbound trains; and,
    - 3 weekend morning southbound trains, 3 weekend afternoon northbound trains.

A summary of the local and regional routes operating within the vicinity of the site, including transit lines, service frequencies and a brief description of each route, are provided in **Appendix B**.

3.2.2 Future Transit Network

3.2.2.1 Local Transit Improvements

The City of Barrie's TMP establishes plans for its future transit system in order to support population and employment forecasts, meet future transit mode share targets, and enhance the conventional transit system.

The City's planned future transit network is illustrated in excerpts from the TMP in **Figure 7.**

The 2041 preferred transit network includes a core network and a supporting route network:

- Core Networks: will have direct connections between significant landmarks and will have a frequency of 10-minute service during peak commuting periods with reduced frequency during off peak periods.
- Supporting Networks will have a frequency of 20-minute service during peak commuting periods with reduced frequency during off peak periods. Supporting networks will connect to core routes and minimize the amount of walking for transit access.

Bradford Street and Lakeshore Drive have been identified as corridors for three core transit routes surrounding the site.

The 2041 system will also implement a Transit Priority network by proposing HOV lanes along several roads in Barrie, including Bradford Street. The Bradford Street HOV lane will improve transit connections between the Downtown Barrie Terminal and Allandale Waterfront GO Station.

The site is well positioned relative to planned transit corridor improvements, as it will have access to core transit routes on both the Bradford Street and Lakeshore Drive corridors, with Bradford Street being served by two core routes and prioritizing transit with the planned HOV lanes.

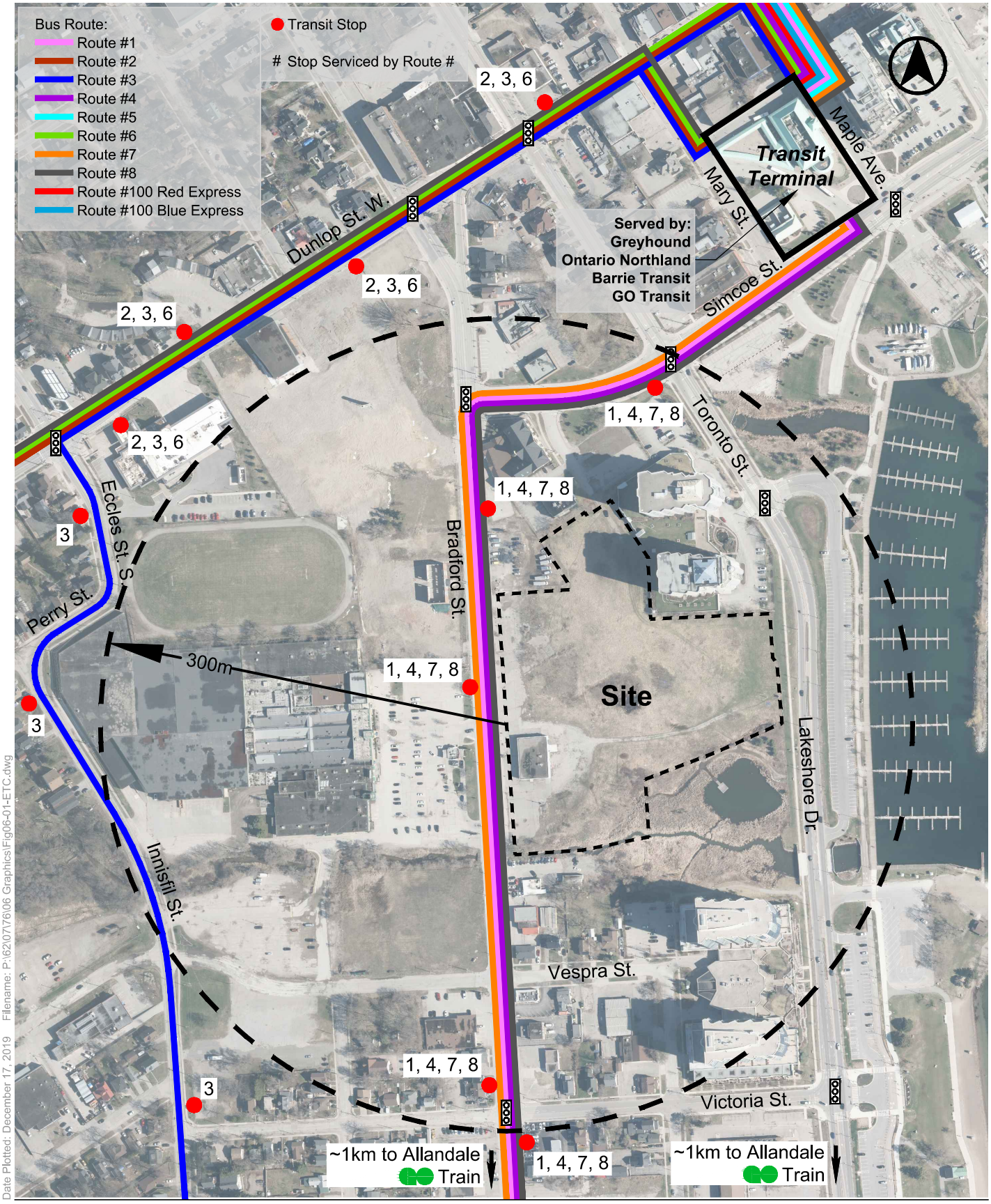
These routes will connect the site with the Downtown Barrie Terminal and Allandale Waterfront GO Station, providing high frequency service during the morning and afternoon peak periods.

3.2.2.2 Regional Transit Improvements

Metrolinx is proposing to improve GO Transit train service to Barrie by adding all-day and weekend two-way 60-minute service frequencies between Toronto and the Allandale Waterfront GO Station, with 30-minute peak hour peak direction service frequencies on weekdays.

3.2.2.3 Site Transit Facilities

The City's transit authority is proposing to add a bus stop adjacent the site, the location of which is to be finalized as part of subsequent site plan applications. Based on a review of existing and future transit facilities and proposed facilities planned for the site, it would be appropriate relocate the existing northbound bus stop on Bradford to the proposed signalized Bradford intersection once Bradford is reconstructed or connected with the site. This will provide an opportunity to provide a far-side transit stop, close proximity to a signal controlled sidewalk, and direct access to the enhanced pedestrian walkway that connects Bradford Street and the waterfront.



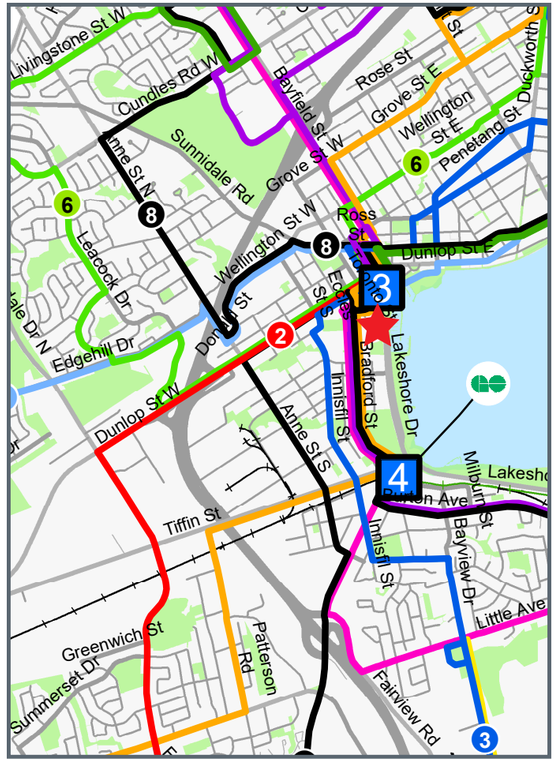
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EXISTING TRANSIT CONTEXT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 6

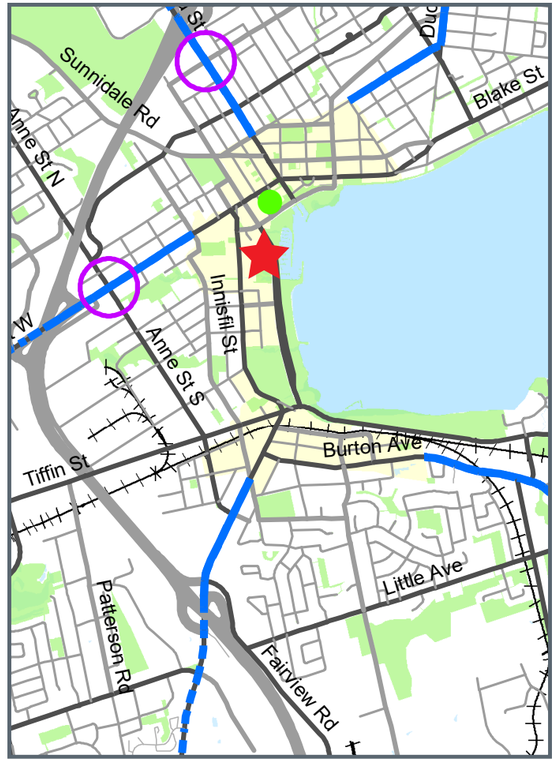


EXISTING BARRIE TRANSIT SYSTEM MAP

TMP Figure 3-4

Transit Routes

- 8 RVH / Yonge - Crosstown / Essa
- 8 SS Bear Creek (Special Service)
- 3 Georgian / Painswick
- 6 Letitia / College
- 5 Blake / Edgehill
- 7 Bell Farm / Bear Creek
- 100 Express to G.C. / G.M. / D.T.
- 1 Georgian Mall / Welham
- 4 East Bayfield / South GO
- 4 LS East Bayfield / South GO (Limited Service)
- 2 Dunlop / Park Place
- 11 Lockhart



FUTURE PLANNED GROWTH AREAS

TMP Figure 1-2

Existing Transit Hub

- 3 Downtown Terminal
- 4 Allandale/Waterfront GO Station

New Transit Hub

- Transit Priority Features

Intensification Node

- Major Transit Stations (50-120 Units per ha)
- Primary Node/Major Transit Node (50-120 Units per ha)
- Secondary Node (50-120 Units per ha)

Intensification Corridor

- Primary Corridor (50 Units per ha)
- Secondary Corridor (50 Units per ha)



PROPOSED TRANSIT ROUTE NETWORK - CONCEPT

2041

TMP Figure 5-1

Transportation Features

- GO Station
- BCRY Railway
- GO Transit Railway
- Protection for Active Transportation and / or Transit Corridor

Transit Routes

- Core Routes
- Support Routes
- Business Service
- Optional Business Service (2041)
- Highway 400 Express Route



PROPOSED HOV LANES AND TRANSIT PRIORITY FEATURES

TMP Figure ES-2 & 5-8

Transportation Features

- HOV (Leftmost Lane) (MTO 2017 TESR)
- HOV (Rightmost Lane)
- Protected HOV beyond 2041 (Rightmost Lane)
- Roads without HOV

Site: 51-75 Bradford and 20 Checkley Street

EXCERPTS FROM THE TRANSPORTATION MASTER PLAN, PROPOSED TRANSIT IMPROVEMENTS

BA Group

51-75 Bradford and 20 Checkley Street
6207-76 December 2019

Figure 7

3.3 ACTIVE TRANSPORTATION NETWORK

The existing and future site active transportation context is illustrated in **Figure 8.**

Existing and future active transportation network and sidewalk network conditions for the broader area are illustrated in the Transportation Master Plan (TMP) excerpts provided in **Figure 9**.

3.3.1 Existing Active Transportation Network

The site is located along the waterfront in close proximity to Downtown Barrie. There are numerous recreational, retail, restaurant and employment uses within walking or cycling distance from the site. The existing active transportation network and sidewalks support traveling to and from the site by walking or cycling.

An existing multi-use trail runs along the perimeter of Kempenfelt Bay. The multi-use trail can be accessed from the site via Lakeshore Drive, and provides a connection to Downtown Barrie via Simcoe Street and the Allandale Go Station via Victoria Street. At the end of the trail on Simcoe Street, the trail connects with the Barrie North Shore Trail that continues along the perimeter of the bay.

In the vicinity of the site, sidewalks are provided along the major road corridors. Sidewalks are provided on both sides of Bradford Street and Simcoe Street. Lakeshore Drive has a continuous sidewalks on the west side of the parkway and a continuous multi-use trail on east side of the parkway along the waters' edge.

3.3.2 Future Active Transportation Network

The City of Barrie's TMP proposes the expansion of the existing cycling and multi-use trail network to provide options to encourage residents and visitors to use active transportation for a range of trip types and purposes.

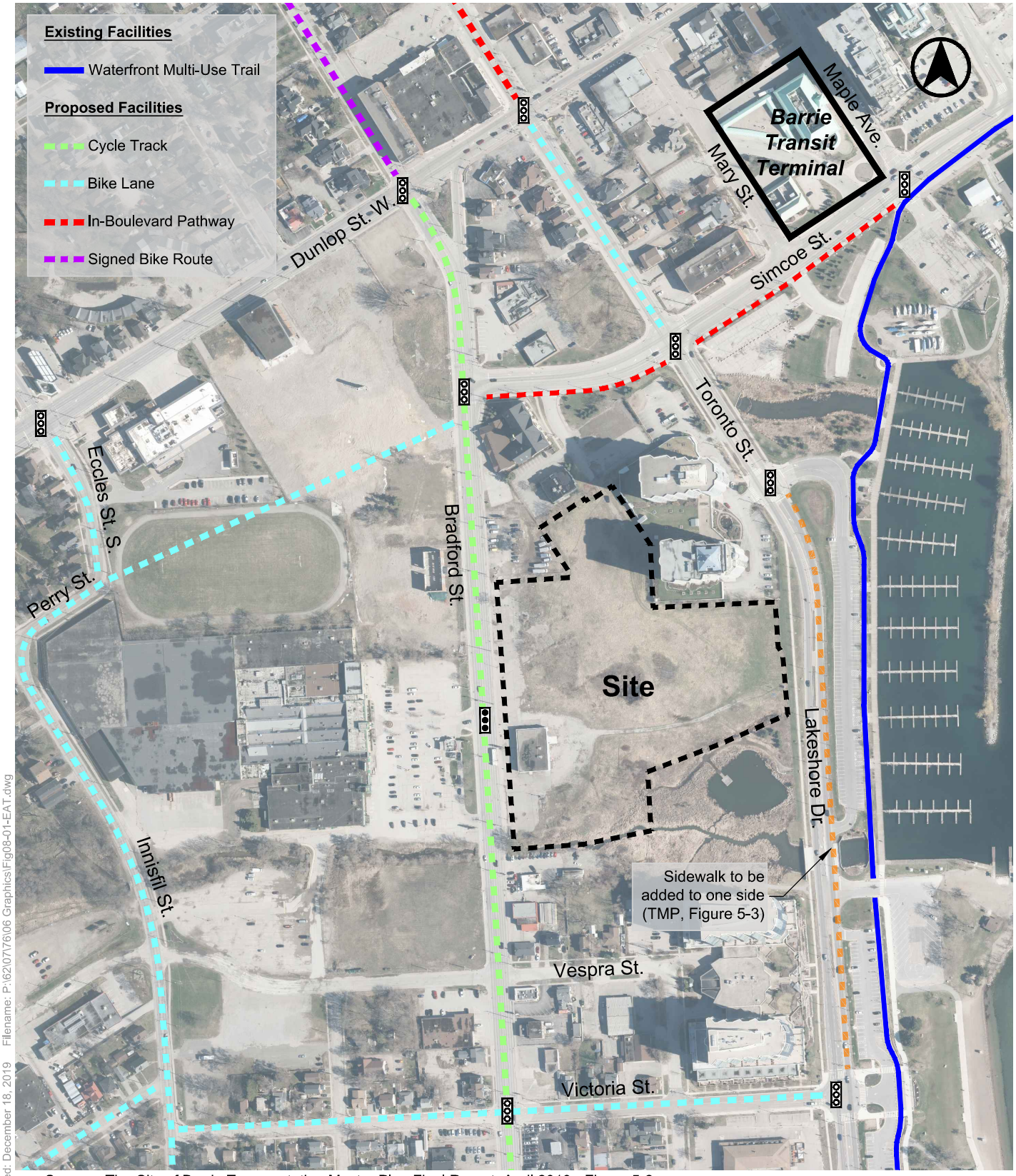
The active transportation network strategy was designed in parallel with on-going work as part of the City's Trail Master Plan. The proposed improvement outlined in the TMP in close proximity to the site include:

- Cycle tracks on Bradford Street (Dunlop Street West to Tiffin Street);
- In-boulevard pathway on Simcoe Street (Bradford Street to Waterfront Multi-Use Trail)
- Bike lanes on Victoria Street (Anne Street South to Lakeshore Drive)
- Bike lanes on Innisfil Street (Perry Street to Adelaide Street)
- Sidewalk added on one side of Lakeshore Drive (Victoria Street to the signal at 2 Toronto Street)

The expanded pedestrian and cycling infrastructure will further support and encourage residents, employees and visitors of the site to travel using non-automobile means of transportation.

3.3.2.1 Site Active Transportation Facilities

The proposed development will provide an enhanced pedestrian connection between Bradford Street and Lakeshore Drive, facilitating movement between these two important corridors and the waterfront. Internal sidewalks are also proposed throughout the development providing a convenient and connected pedestrian experience. Bicycle parking will also be provided on the site for residents, visitors, and employees of non-residential uses.



Source: The City of Barrie Transportation Master Plan Final Report, April 2019 - Figure 5-2.

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EXISTING AND FUTURE AREA ACTIVE TRANSPORTATION CONTEXT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 8



CYCLING AND MULTI-USE TRAIL NETWORK

TMP Figure ES-2 & 5-2



SIDEWALK AND MULTI-USE TRAIL NETWORK

TMP Figure ES-3 & 5-3

Existing Facilities
- Waterfront Multi-use Trail
- In-Boulevard Pathway
- Buffered Bike Lane
- Bike Lane
- Paved Shoulder
- Signed Bike Route
- Off-road Trail

Proposed Facilites
- In-Boulevard Pathway
- Cycle Track
- Buffered Bike Lane
- Bike Lane
- Paved Shoulder
- Urban Shoulder
- Signed Bike Route
- Off-road Trail

Trail Systems
- Province-Wide Cycling Network
- The Great Trail

Transportation Features
- GO Station
- Barrie Bus Terminal

Points of Interest
- Municipal Facility
- Community Centre
- Elementary School
- Private School

Sidewalk Network
- Sidewalks on both sides
- Sidewalks on one side
- Add sidewalk on one side
- Add Sidewalk on both sides

Other Features
- Park / Open Space
- **Site: 51-75 Bradford and 20 Checkley Street**

EXCERPTS FROM THE TRANSPORTATION MASTER PLAN, PROPOSED ACTIVE TRANSPORTATION IMPROVEMENTS

4.0 PARKING CONSIDERATIONS

Parking considerations for the proposed development have been reviewed considering:

- the latest consolidated zoning by-law for the City of Barrie;
- a review comparable resident parking demands;
- a review of comparable zoning by-law rates applicable to non-residential uses in downtown – transit supportive context; and,
- consideration that phased development will allow for continued evaluation of the adequacy of parking standards.

4.1 2009-141 ZONING BY-LAW REQUIREMENTS

The City of Barrie's parking requirements, as outlined in the consolidated Zoning By-law 2009-141 are outlined below. The site is zoned C2-2 (Transtion Centre Commercial) and located within the Urban Growth Centre (UGC).

- Residential Parking Requirement: The UGC requires 1.0 space per dwelling unit for residential uses that provides for both resident and resident visitor demands.

- Commercial Parking Requirement: A minimum of 1 parking space per 24 m^2 (or 4.2 spaces per 100 m^2) of gross floor area is required for multiple land uses in addition to residential parking requirements.

These rates, as applied to the current development application, are summarized in **Table 2**. The total parking requirement under Zoning By-law 2009-141 is 2,476 parking spaces, including 1,900 residential parking spaces and 576 non-residential parking spaces.

TABLE 2 ZONING BY-LAW 2009-141 PARKING REQUIREMENTS

Use	Units / Floor Area	Rate (Minimum)	Requirement (Minimum)
Residential			
Residential	1,900 unit	1 space / unit[2]	1,900 spaces
Subtotal			**1,900 spaces**
Non-Residential			
Visitor	1,900 unit	N/A[3]	0 spaces
Hotel (with restaurant)	10,459 m^2	1 space / 24 m^2 GFA[4]	436 spaces
Retail	3,371 m^2	1 space / 24 m^2 GFA[4]	140 spaces
Subtotal			**576 spaces**
TOTAL			**2,476 spaces**

Notes:
1. Based on site stats provided by Turner Fleischer on December 17, 2019.
2. Rate per Zoning By-law 2014-110.
3. The residential parking rate does not stipulate a visitor parking rate, this is assumed within rate of 1.0 per unit.
4. Rate per Section 4.6.2.3(b) of Zoning By-law 2009-141 for multi-use developments in commercial zones.

4.1 REVIEW OF APPLICABLE STANDARDS

4.1.1 Policy and Mobility Context

Adoption of reduced parking minimum standards is considered appropriate based upon the following considerations:

- Provincial and local policy / plan that direct municipalities to reduce or eliminate minimum parking requirements;
- The site's proximity to significant transit services and planned cycling and pedestrian facilities that provide non-automobile dependent travel connections across the City;
- A review of residential and visitor parking demand in Ontario municipalities with similar transportation contexts;
- The monitoring of Phase 1 parking leases and demand to determine the appropriate rate for the total development as additional phases proceed;
- A review of non-residential parking standards applicable to comparable uses and contexts in adjacent Ontario municipalities;
- The mixed-use, urban nature of the proposed development, which will encourage shared parking and interactions between the uses; and
- The transportation demand management (TDM) measures for the site that will influence parking demand on-site and in the wider area.

The following provides an overview of local policies as they relate to parking demand at mixed-use development in Barrie.

4.1.1.1 2041 Regional Transportation Plan

The purpose of the 2041 RTP prepared by Metrolinx is to provide a framework that will create an integrated, multi-modal regional transportation system to support the growth of healthy, complete and sustainable communities. The RTP contains strategies that integrate land use and transportation planning to identify areas for investment and build new connections. One of these strategies specifically address parking management.

Strategy 4.8 rethinks the future of parking, encouraging the Province to adopt a region-wide policy that:

> "*provides guidelines and encourages best practice in parking management."* The strategy states that "*zoning standards should be reviewed, with the expectation that minimum parking requirements will be reduced, particularly in transit-supportive neighbourhoods."*

4.1.1.2 Barrie Official Plan

Section 8.6.3.4 of the Official Plan outlines its Transportation Demand Management policy direction. The Section states:

> *(a) The City recognizes the potential role that Travel Demand Management can play in promoting the efficient use of transportation infrastructure, making the use of private vehicles more sustainable and encouraging increased transit use. The City shall*

encourage businesses and other organizations to develop transportation demand management strategies including staggered work hours, carpooling, priority parking for car pool vehicles and energy efficient vehicles.

(b) The City will consider reduced minimum parking standards for developments which develop a travel demand management plan, and also for high density mixed use developments.

4.1.1.3 The City of Barrie's Transportation Master Plan

The Transportation Master Plan Update contains recommendations about transportation demand management. As part of the TDM recommendations, an objective of the TMP is to reduce minimum parking standards for new developments to reduce car ownership and car use. The TMP states that this should be a parking standards initiative, where the City should review the current parking requirements to ensure appropriate parking rates are implemented based on the current vision of a multi-modal City and should adopt new requirements based on current and planned transit service.

4.1.2 Review of Proxy Residential and Visitor Parking Demand

BA Group has reviewed parking demand observed at a number of residential buildings in Newmarket, Markham, Richmond Hill, Kingston and Guelph. These developments either; (1) have comparable levels of access to transit and other non-automobile focused mobility infrastructure as that afforded to the development, or (2) are existing residential buildings considered comparable by the proposed property manager.

In order to determine the appropriateness of the proxy sites chosen, a review of the auto driver mode share for each proxy site was compared to the existing mode split for home-based travel in the area surrounding the site. The auto mode share for the Kingston sites was determined using commuting data from the 2016 Canadian Census. The mode share for the site and other proxy sites was determined using the 2011 and 2016 Transportation Tomorrow Survey (TTS). The survey years used for each site was determined based on the time the counts were conducted for each site in order to capture the mode share that best represented the sites at the time of the counts.

The site has an average auto driver mode share of approximately 73%. The selected proxy sites have an auto driver mode share that ranges from 61% to 84%. The site's auto driver mode share falls within the auto driver mode share of the proxy sites.

A review of the observed parking demand data indicates that demands for the residential parking at comparable sites range from 0.55 to 1.04 spaces per unit and visitor demands range from 0.05 to 0.14 spaces per unit.

A summary of the parking demand data is outlined in **Table 3**, and further details on the properties is provided in **Appendix C.**

TABLE 3 SUMMARY OF PROXY SITE PARKING DEMAND

Address	Municipality	Residential Parking Demand (spaces / unit)	Visitor Parking Demand (spaces / unit)	Auto Driver Mode Share
615 Fernbank Road	Newmarket	0.90	0.05	72%[1]
349 & 351 Crowder Boulevard	Newmarket	0.98	0.12	71%[2]
25 Deverill Court	Markham	0.88	0.12	61%[3]
145 Essex Avenue	Richmond Hill	1.04	0.14	61%[4]
267 & 283 The Parkway	Kingston	0.93	0.06	78%
2395 Princess Street	Kingston	0.95	--	82-84%
860 Norwest Road	Kingston	0.81	0.05	79%
16 Leroy Grant Drive	Kingston	0.55	0.08	82%
5 & 7, 8 & 16 Wilsonview Avenue	Guelph	0.91	0.14	68%[5]

Notes:
1. Based on 2011 TTS data, utilizing 2006 TTS Zones 2618, 2619, and 2628.
2. Based on 2011 TTS data, utilizing 2006 TTS Zones 2618 - 2620.
3. Based on 2011 TTS data, utilizing 2006 TTS Zones 2402, 2424, 2425, and 2398.
4. Based on 2011 TTS data, utilizing 2006 TTS Zones 2241 and 2243-2245.
5. Based on 2016 TTS data, utilizing 2006 TTS Zones 8096, 8097, 8102 and 8107.

Rates observed in Table 3 indicate support for residential parking demands below 1.0 per unit in the current transit context of the site.

4.1.3 Review of Current Municipal Zoning By-law Non-Residential Parking Requirements

BA Group reviewed parking rates in municipalities in similar context, which are likewise attempting to shift from an auto-oriented approach in order to promote more sustainable forms of development and appropriately acknowledge transit context, in order to determine appropriate parking standards to apply as part of the development proposal.

A comparison of the retail and restaurant parking requirements were compared for several municipalities and are illustrated in **Figure 10** and **Figure 11** as they compare to a) general provisions in Zoning By-Law 2009-141, b) the blended non-residential rate for C2-2 Transition Commercial Zones , and c) the selected rate for the proposed development.

FIGURE 10: COMPARISON OF RETAIL MINIMUM PARKING REQUIREMENTS: DOWNTOWN / URBAN CENTRE / TRANSIT AREA

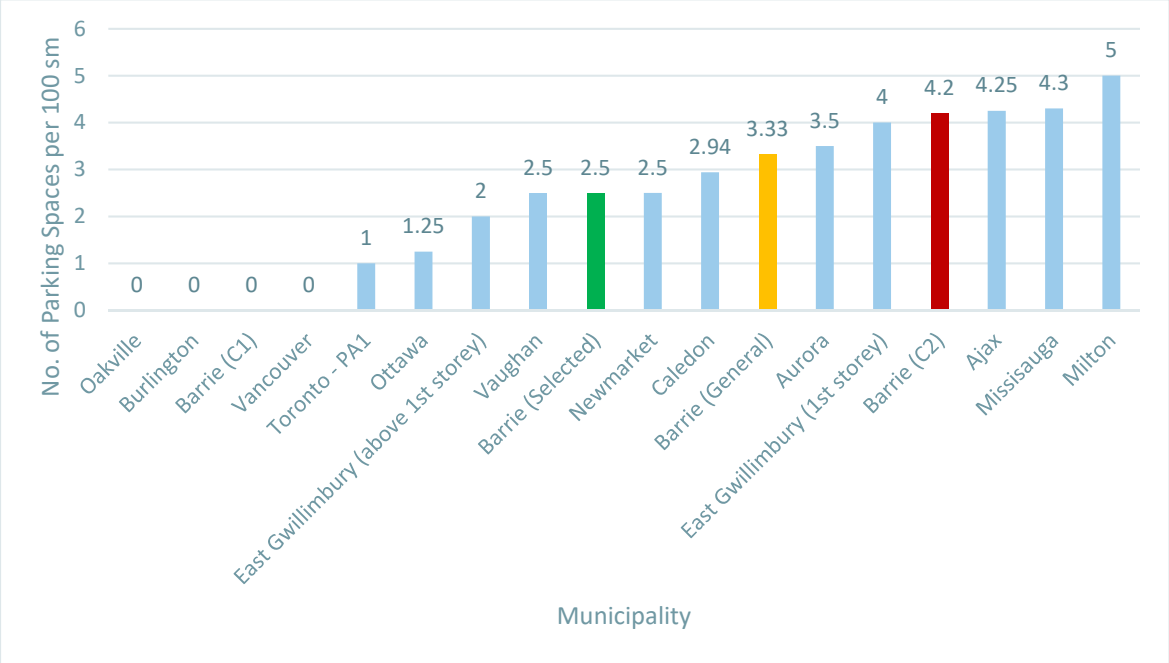
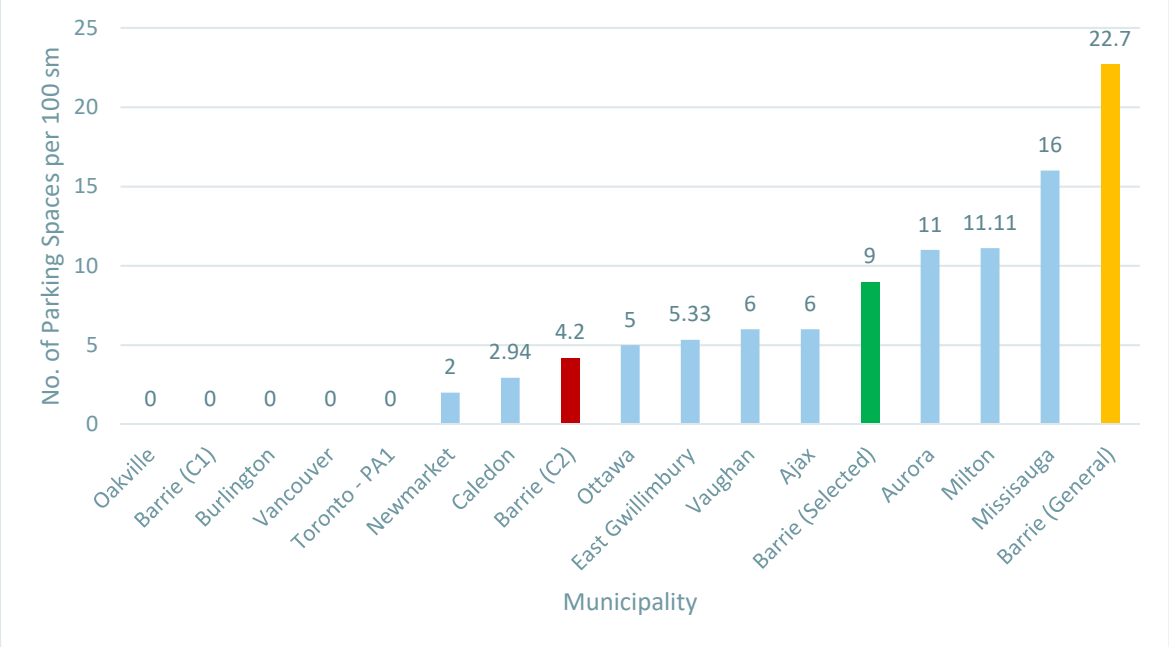


FIGURE 11: COMPARISON OF RESTAURANT MINIMUM PARKING REQUIREMENTS DOWNTOWN / URBAN CENTRE / TRANSIT AREA



Note: 22.7 spaces per 100 m^2 is calculated based on a conversion of 1 space per 4 persons required in the by-law, the proposed restaurant size of 465 m^2, and the Ontario Building Code conversion of 1.1 square metres per person for a "dining, alcoholic beverage and cafeteria space".

4.1.3.1 Comparison of Retail Parking Rates

Zoning by-law minimums for retail parking requirements of comparable municipalities range from 0 spaces to 5.0 spaces per 100 m^2 of retail GFA.

The C2-2 zoning by-law rate of 4.2 spaces per 100 m^2 is in the middle of the range observed and reflects a blended rate applicable to a variety of non-residential uses.

As noted in Figure 10, parking is notably not required for commercial uses in Barrie's C1 zone (Central Area Commercial) that is applicable to properties in the direct vicinity of the site that are located on the west side of Bradford Street, along Collier Street and along Dunlop Street in downtown Barrie.

A proposed standard of 2.5 spaces per 100 m^2 of retail GFA was selected for the site and is within the range of zoning by-law rates for retail in downtown urban centres, is comparable with rates required in Vaughan and Newmarket. The selected rate is representative of retail uses in a transition commercial centre context recognizing that the City of Barrie is planning a significant investment in local transit in the site area, the site location downtown which is extremely well situated in terms of access to amenities and active transportation, and the TDM measure proposed for the site.

4.1.3.2 Comparison of Restaurant Parking Rates

Zoning by-law minimums for restaurant parking requirements of comparable municipalities range from 0 spaces to 23 spaces per 100 m^2 of restaurant GFA.

The C2-2 zoning by-law rate of 4.2 spaces per 100 m^2 is in the mid to low range compared to typical restaurant rates observed. The C2-2 rate reflects a rate applicable to a variety of non-residential uses.

A proposed standard of 9.0 spaces per 100 m^2 of restaurant GFA was selected for the site and is within the range observed with other municipalities' zoning by-laws, and is comparable to rates in Vaughan, Ajax, Aurora, and Milton.

4.1.3.3 Sharing of Non-Residential Parking

Shared parking for mixed-use development reduces peak demands by taking into account the different temporal parking characteristics for each use. It is proposed to adopt shared parking for the site and to permit non-resident parking requirements to be met across the site. The sharing will maximize the efficiency of the parking supply, and both in turn will minimize parking supply excesses. Shared parking is an accepted practice for mixed use developments in many different Ontario municipalities and is appropriate given the site context and mix of uses contemplated within the site.

Shared parking provisions from comparable municipalities are proposed as a TDM measure, the specific sharing provisions selected for the site are outlined in Table 4.

4.2 PROPOSED PARKING STRATEGY

A parking strategy for the project has been developed that seeks to balance the need to provide parking in the near term to accommodate current demands with the desire to capitalize on the site's downtown location and transit access by minimizing auto parking in the long term. As such a phased parking strategy is proposed in the following sections.

4.2.1 Recommended Phase 1 Parking Provisions

To ensure that the parking supply for the project provides an adequate amount of vehicular parking in line with current demand trends as to avoid any off-site neighbourhood impacts, the following minimum parking requirements are proposed for Phase 1:

A minimum resident parking requirement of:

- 0.85 resident spaces per unit plus 0.15 visitors for a total of 1.0 per unit

A minimum non-resident parking requirements as follows:

- 1.0 space per hotel room
- 9.0 spaces per 100 m^2 restaurant floor area; and,

Based on the above-noted rates, Phase 1 would require a total of 526 spaces. The current concept plan included with the application illustrates a provision of 526 spaces (356 spaces in the Phase 1 podium and 170 temporary surface spaces) which satisfies the recommended Phase 1 requirements.

The proposed rates for Phase 1 are reflective of the general parking demands comparable to the site and accommodates the intent of the City of Barrie's current By-law requirement of providing a combined rate of 1.0 per unit for residential uses. In addition, the proposed non-residential uses are consistent with the requirements from other municipalities for a mixed use downtown setting and are appropriate.

4.2.2 Recommended Parking Requirements for Full Build-Out:

Consistent with the goal of supporting non-auto modes of transportation and capitalizing on the site's downtown context, the project has a goal of reducing the amount of vehicular parking provided for residential uses in the long term, the following are the recommended parking requirements in the long term:

A minimum resident parking requirement of:

- 0.75 resident spaces per unit for residents plus 0.15 spaces per unit for visitors;

A minimum non-resident parking requirements as follows:

- 1.0 space per hotel room; and,
- 3.08 spaces per 100 m^2 for retail[1] uses

[1] The retail rate reflects a blended rate of 2.5 spaces per 100 m^2 for retail uses and 9.0 spaces per 100 m^2 for restaurant uses.

Application of the recommended long term rates, including consideration for sharing provisions between non-residential land uses is presented in **Table 4**.

TABLE 4 PROPOSED PARKING REQUIREMENTS

Use	Units / Floor Area	Rate (Minimum)	Requirement with Sharing[2]
Residential	1,900 units	0.75 spaces / unit	1,425 spaces
SUBTOTAL	**1,900 units**		**1,425 spaces**
Residential Visitors	1,900 units	0.15 spaces / unit	285 spaces
Hotel	152 rooms	1.0 spaces / room	152 spaces
Retail[1]	3,836 m^2	3.08 spaces / 100 m^2 GFA	118 spaces[1,2]
SUBTOTAL			**555 spaces**
TOTAL (with sharing[2])			**1,980 spaces**

Notes:
1. The retail rate reflects a blended rate of 2.5 spaces per 100 m^2 for retail uses and 9.0 spaces per 100 m^2 for restaurant uses.
2. Sharing provisions for the site reflect:

Land Use	Morning	Noon	Afternoon	Evening
Resident Visitor	20%	20%	60%	100%
Hotel	70%	70%	70%	100%
Retail	80%	90%	90%	90%
Restaurant	20%	100%	30%	100%

Application of the proposed long term requirements would result in total of 1,980 spaces for the project. The concept plan prepared for the site currently illustrates the provision of 2,055 spaces. This meets the recommended long term transit supportive parking requirements.

The proposed long term parking requirement targets a reduced resident parking supply that recognizes that the City of Barrie is planning a significant investment in local transit in the site area, and given the site location downtown which is extremely well situated in terms of access to amenities and active transportation.

The proposed long term requirement is also appropriate given the rental nature of the overall project which will ensure the developer has control over all parking spaces and will sure that residential parking is provided only to residents who request a space (rather than spaces that come along within a unit lease). The site is also supported by a suite of TDM initiatives that will assist residents in encouraging reduced auto ownership for residents.

The draft by-law proposes a long term combined retail and restaurant parking rate of 3.0 spaces per 100 m^2 that meets the intent of the rates for individual retail and restaurant uses at full buildout. By way of example, the combined requirement calculated in Table 4 for restaurant and retail is 118 spaces (76 spaces[2] + 42 spaces), or 3.08 spaces per 100 m^2 (118 spaces / 3,836 m^2).

[2] 76 spaces = 2.5 spaces per 100 m^2 x 3,371 m^2 retail x 90% sharing provision on weekday evening as outlined in Table 4 Note 2.

The proposed parking supply satisfies the rates described above. Further details regarding the parking circulation, pavement markings, and traffic signs will be provided as part of subsequent site plan applications for each phase.

4.3 PROPOSED PARKING SUPPLY

The applicant is proposing to provide 2,055 parking spaces on the site, which exceeds the proposed parking rates outlined above.

The parking needs for the site beyond Phase 1 will be confirmed through monitoring parking on the site, and through reviewing the overall trends related to parking demand, as the site builds out.

4.4 TDM MEASURES

As will be discussed in Section 7.0**,** a number of TDM measures are being contemplated as part of the development proposal that will support a reduced residential parking supply. While a reduced parking supply is a direct incentive to reduce automobile use and ownership, there are additional TDM measures proposed to complement and work in tandem with the reduced parking supply. These include:

- The development of a mixed-use site that allows people to live and work without the use of a vehicle;
- The introduction of new core transit routes by the City along Bradford Street and Lakeshore Drive and proposed transit stop to be located along Bradford Street adjacent to the site;
- New pedestrian and cycling connections that are integrated into the proposed road plan for the site, which will support active transportation as a viable mode of traveling to and from the site;
- The provision of bicycle parking to support and encourage cycling; and,
- Additional measures to be developed in consultation with the City of Barrie.

5.0 LOADING CONSIDERATIONS

5.1 EXISTING ZONING BY-LAW REQUIREMENTS

The application of the loading requirements of Zoning By-law 2009-141 is summarized in **Table 5.**

TABLE 5 ZONING BY-LAW 2009-141 LOADING REQUIREMENTS

Land Use	GFA	Range	Number of Spaces Required
Phase 1			
Industrial or Commercial[2]	13,830 m^2 of hotel use	7,500 m^2 – 13,999 m^2	3 spaces[3]
Residential	-	-	No requirement in bylaw.
TOTAL			**3 spaces[3]**

Notes:
1. Based on site stats provided by Turner Fleischer on December 17, 2019.
2. As per Section 4.7.1, loading requirements are based on the total gross floor area of all industrial or commercial uses on a lot.
3. Minimum dimension for loading spaces is 3.0 metres width x 9.0 metres length x 4.0 metres height.

The minimum loading requirement for the site based on the prevailing zoning by-law is three (3) loading spaces.

5.2 PROPOSED LOADING SUPPLY

The current site plan illustrates five (5) loading spaces. The loading supply, design, and functionality of the loading areas will be confirmed in detail with subsequent site plan applications to the City.

6.0 BIKE PARKING

6.1 EXISTING ZONING BY-LAW REQUIREMENTS

The general provisions of the City of Barrie's Zoning By-law 2009-141 do not contain bicycle parking provisions. Bicycle parking will be provided a TDM measure for the site and to support and encourage cycling.

6.2 PROPOSED BICYCLE PARKING RATES & SUPPLY

The applicant is proposing to provide residential parking at a minimum of 0.15 spaces per unit designated for residents and 0.03 space per unit designated for visitors. The non-residential uses will provide bicycle parking at a rate of one bicycle parking spaces for every 7% of the non-residential parking spaces required based on the proposed (reduced) non-residential standards. The application of the proposed bicycle parking standards are summarized in **Table 6**.

TABLE 6 PROPOSED BICYCLE PARKING REQUIREMENTS / SUPPLY

Land Use	Units / GFA	Proposed Rate	Number of Spaces Provided
Residential	1,900 units	0.15 spaces / unit	285 spaces
Visitor	1,900 units	0.03 spaces / unit	57 spaces
Industrial or Commercial[1]	270 spaces	1 space for every 7% of required vehicular parking supply[2]	19 spaces
Subtotal			**361 bike spaces**

Notes:
1. Based on site stats provided by Turner Fleischer on December 17, 2019.
2. Based upon the proposed, reduced parking standards, as outlined in Section 4.0.

The proposed bicycle parking supply is a minimum of 361 bicycle parking spaces, including 285 residential spaces, 57 visitor spaces and 19 commercial spaces. The allocation of the commercial bicycle parking spaces between short-term and long-term spaces, as well as the location and details of the bicycle parking supply for the individual buildings will be confirmed with subsequent applications to the City.

7.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) strategies encompass a range of policies, tools, and programs designed to promote and facilitate the use of walking, cycling, public transit, telecommuting and carpooling as an alternative to single passenger vehicle travel. TDM strategies aim to reduce vehicle travel with the primary objective of:

- reducing demand on road infrastructure, thereby minimizing road and parking capital expenditures;
- increasing travel efficiency;
- reducing climate change emissions;
- improving air quality; and,
- improving overall health.

TDM Plans for new development consist of various “hard” (infrastructure based) strategies (such as the provision of infrastructure), and “soft” (program based) strategies that are operational or programmatic in nature which are implemented once a use is occupied.

The site is within close proximity of GO Transit train and GO bus, which are accessed at the Allendale Waterfront GO Station and the Downtown Barrie Station, respectively. The site is within walking / cycling distance from 6 local bus routes and cycling routes as well. The proposed TDM plan, which is outlined below, will support and encourage the use of the existing and planned sustainable transportation infrastructure in the vicinity of the site in order to reduce the overall dependence on private automobiles. The proximity to transit and other walking / cycling facilities makes the development site an excellent candidate for a TDM Plan that has the aim of increasing the non-auto mode share of the future development plan and reducing the parking needs for the site. The following section sets out the details of the proposed TDM Plan that will be implemented as part of the development approvals process.

7.1 PROPOSED TDM PLAN

A TDM plan has been crafted to tailor to the future residents, visitor and employees of all phases of the proposed development. The components of the proposed TDM plan are outlined below.

7.1.1 Reduced Parking Standards

The reduction of parking supply (compared to the applicable requirements) will encourage residents, employees and visitors of the site to consider alternative travel modes. It is a direct incentive to reduce single-occupant vehicle use and auto ownership.

Proposed Strategy:
The residential and non-residential parking supply will be provided at reduced parking supply rates, as outlined in Sections 4.2.2 and 4.3 of this report.

7.1.2 Improvement to Transit

The improvement of existing transit waiting areas and access to the bus stops is aimed at making the use of significant transit improvements more attractive and comfortable for transit users, and compliments the planned transit improvements surrounding the site. This can help support and encourage transit use.

Potential Strategy:
Through the proposed development and the planned expansion of the Bradford Street and Lakeshore Drive right-of-ways, the applicant will work with the City and transit authority to (re)locate the existing Bradford bus stop adjacent to the future signalized access proposed on Bradford Street. The timing of this relocation is subject to further site plan discussions after Phase 1 or once roadworks have commenced on Bradford Street. Providing a bus stop will improve the level of services provided by the transit agency and create a more desirable waiting area for transit that is located close to signalized pedestrian crossings and the enhanced walkwalk through the site.

7.1.3 Pedestrian & Cycling Infrastructure

The provision of cycling and pedestrian connections is a TDM Strategy aimed at making neighbourhoods more walkable and safe for pedestrians. Pedestrian infrastructure can also help improve connections to other transportation infrastructure such as bus routes, cycling facilities or other community amenities.

Proposed Strategy:
The development includes the provisions of sidewalks between the proposed buildings and between Bradford Street and Lakeshore Drive. The sidewalks will be designed at minimum in accordance with the municipal standard, connecting to existing area sidewalks. These new connections will allow people to efficiently access the proposed uses on-site, as well as efficiently travel between the main corridors surrounding the site.

Furthermore, the applicant is providing bicycle parking above the zoning by-law requirement. A minimum of 361 bicycle parking spaces will be provided to encourage cycling. These components of the development will accommodate pedestrian and cyclist circulation by supporting walking and cycling to and from the proposed uses and the existing surrounding neighbourhood.

7.1.4 Implementation Plan / TDM Checklist

This section provides a summary description proposed TDM measures proposed to be implemented. As detailed above, the main elements of the TDM Strategy are:

- the provision of vehicular parking at a reduced parking rate;
- the proximity and link to improved of the transit service along Bradford Street and Lakeshore Drive;
- the provision of sidewalks and pedestrian connection within the site to improve walkability; and,
- proposed bicycle parking to be provided on the site.

The proposed implementation plan / TDM Checklist is provided in **Table 7.**

TABLE 7 PROPOSED TDM IMPLEMENTATION PLAN / TDM CHECKLIST

	Measure	Description
Residential		
1	Reduced Vehicular Parking Supply	The reduction of parking supply (compared to the applicable requirements) is itself a TDM measure as it will force residents/visitors to consider alternative travel modes.
2	"Unbundle Parking"	This measure is also inherent to the reduced parking supply; since units are rentals and not all units will have a parking space, a sales program should be commenced which gives renters the option of leasing a parking space.
3	Car-share	Car-share vehicles offer an on-site vehicle for a resident to use if they forego car ownership. As such, the presence of car-share vehicles reduces vehicular trips. All residents could be given membership with the car-share vehicle provider (e.g. Enterprise Car Share, Zipcar, Maven, etc.)
4	Visible Transit Information	The lobby of the building should have access to local and regional transit information to assist residents in taking transit.
5	Bicycle Parking	The proposed development shall meet the bicycle parking requirements of the draft site specific zoning by-law, and should consider exceeding the bicycle parking requirement to support and encourage bicycle use to and from the site. Provide short-term bicycle parking in highly visible locations in close proximity to major entrances.
6	Travel Mode Information Package	Each new resident receives a package and/or receives regular email communications informing them of the different available travel options aside from driving a personal vehicle.
7	Community Marketing Outreach	It is recommended that an event should be held around the time of building launch focused on disseminating information about sustainable travel options (i.e. the Travel Mode Information Packages), to sign residents up to car share memberships, etc.).
8	Transit Stop	Consideration will be given to relocating the existing bus stop on Bradford Street. Bicycle parking will be provided on-site in close proximity to existing and / or future bus stops to support cycling to and from the bus stops. The purpose of these measures is to make transit use more attractive and accessible.
Non-residential		
1	(Non-Resident) Shared Parking Provisions	Apply shared parking provisions from comparable municipalities in order to permit the efficient sharing between land uses and reduce the total number of parking spaces required.
2	Carpool Parking	Priority parking spaces should be given to employees who carpool to and from work. Carpooling reduces vehicular trips.
3	Bicycle Parking	The proposed development shall meet the bicycle parking requirements of the draft site specific zoning by-law, and should consider exceeding the bicycle parking requirement to support and encourage bicycle use to and from the site. Provide short-term bicycle parking in highly visible locations in close proximity to major entrances.
4	Visible Transit Information	The lobby of the building should have access to local and regional transit information to assist staff and guests in taking transit.

8.0 TRAFFIC VOLUME PROJECTIONS

8.1 SCOPE

For the purpose of this assessment, a phasing analysis has been undertaken which considers the following horizons:

- 5-year horizon (2024) – Assumes construction of Phase 1 of the development (Building 1), with access via Checkley Street (all moves) and a new driveway to Lakeshore Drive -Toronto Street (right in/right out).
- 20-year horizon (2039) – Assumes full build-out of the site.

Based on the foregoing, analysis has been completed for the following scenarios during the AM and PM peak hour:

- Existing Traffic Conditions
- 5-year Future Background Traffic Conditions (2024)
- 20-year Future Background Traffic Conditions (2039)
- 5-year Future Total Traffic Conditions (2024) – Phase 1
- 20-year Future Total Traffic Conditions (2039) – Full Build-out

Intersections included within the analysis study area are listed below:

- Bradford Street / Simcoe Street
- Simcoe Street / Toronto Street
- Simcoe Street / Checkley Street
- Bradford Street / Tim Hortons North Driveway
- Bradford Street / Site Driveway
- Toronto Street / Site Driveway

8.2 EXISTING TRAFFIC CONDITIONS

Existing public street intersection peak hour traffic volumes have been established based on traffic counts undertaken by Spectrum Traffic Data on behalf of BA Group. The intersections which were counted are summarized in **Table 8**. The existing baseline area traffic volumes for the AM, PM and Saturday peak hours are provided in **Figure 12** and the raw turning movement counts are attached in **Appendix D.**

TABLE 8 EXISTING TRAFFIC DATA SOURCES

Intersection	Count Date	Count Times	Source
Bradford Street / Simcoe Street (Signalized)	Thursday, October 17, 2019 and Saturday, October 19, 2019	Thursday: 7:30am-9:30am 4:00pm-5:00pm Saturday: 12:00pm-3:00pm	Spectrum Traffic Data
Simcoe Street / Checkley Street (Unsignalized)			
Simcoe Street / Toronto Street (Signalized)			
Bradford Street / Tim Hortons North Driveway (Unsignalized)			

8.3 FUTURE BACKGROUND TRAFFIC CONDITIONS

8.3.1 Background Development Growth

Background traffic allowances were made for the proposed development at 34-50 Bradford Street, as outlined in **Table 9**.

TABLE 9 BACKGROUND DEVELOPMENT DETAILS

Location	Type	Development Description	Trip Generation / Assignment Source
34-50 Bradford Street	Residential	600 residential units	Report prepared by Crozier & Associates (dated June 2019)
	YMCA	6,968 m^2 (75,000 ft^2)	

8.3.2 Corridor Growth

A growth rate of 2% was adopted in both directions along both Bradford Street and Toronto Street, as discussed by the City of Barrie.

This represents the growth anticipated in the EMME model prepared for the Transportation Master Plan (TMP). The 2% growth rate could be considered conservative given it also includes significant population and employment forecasts for both the 34-50 Bradford Street development and 51-75 Bradford St and 20 Checkley St development (the site) who's site traffic has been specifically forecast in the traffic zones on the local road network as part of this study.

8.4.1.2 Retail

The base retail vehicle trip rate was adopted in accordance with the ITE fitted curve equation, as outlined in **Table 11**.

TABLE 11 RETAIL VEHICLE TRIP GENERATION RATES

		AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	2-Way	In	Out	2-Way	In	Out	2-Way
ITE 10th Edition	LUC 820 (Shopping Centre) – General Urban/Suburban									
	Rate[1] *(vehicle trips per 1,000 ft²)*	2.90	1.78	4.68	3.39	3.68	7.07	3.98	3.68	7.66
Adopted Base Rate *(vehicle trips per 1,000 ft²)*		**2.90**	**1.78**	**4.68**	**3.39**	**3.68**	**7.07**	**3.98**	**3.68**	**7.66**

Notes:
1. Calculated using fitted curve equation and proposed retail floor area of 33,733 ft²

8.4.1.3 Hotel

The base hotel vehicle trip rate was adopted in accordance with the ITE, as outlined in **Table 12**.

TABLE 12 HOTEL VEHICLE TRIP GENERATION RATES

		AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	2-Way	In	Out	2-Way	In	Out	2-Way
ITE 10th Edition	LUC 310 (Hotel) – General Urban/Suburban									
	Rate *(vehicle trips per room)*	0.28	0.19	0.47	0.31	0.29	0.60	0.40	0.32	0.72
Adopted Base Rate *(vehicle trips per room)*		**0.28**	**0.19**	**0.47**	**0.31**	**0.29**	**0.60**	**0.40**	**0.32**	**0.72**

8.3.3 Future Background Traffic Volumes

The future background traffic volumes are determined by adding existing traffic volumes, background traffic volumes and corridor growth. The future background traffic volumes for the 5-year (2024) and 20-year (2039) horizons are shown in **Figure 13** and **Figure 14**.

8.4 SITE TRAFFIC FORECASTS

8.4.1 Base Vehicle Trip Generation Rates

8.4.1.1 Residential

In order to determine an appropriate base residential vehicle trip rate, a review was undertaken of existing vehicle trip generation at nearby proxy sites along the Barrie waterfront and the applicable rates within the ITE Trip Generation Manual, as outlined in **Table 10**. Whilst the proxy sites generally indicated rates lower than the ITE, for the purpose of a conservative assessment, rates in accordance with the ITE were adopted.

TABLE 10 RESIDENTIAL VEHICLE TRIP GENERATION RATES

		AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	2-Way	In	Out	2-Way	In	Out	2-Way
Proxy Sites	**Ellen Street (307 units) – Thursday Oct 17, 2019 & Saturday, Oct 19, 2019**									
	Trips	16	39	55	57	30	87	90	71	161
	Rate *(vehicle trips per unit)*	0.05	0.13	0.18	0.18	0.10	0.28	0.29	0.23	0.52
	Grand Harbour Condominiums (263 units) – Thursday Oct 17, 2019 & Saturday, Oct 19, 2019									
	Trips	19	9	28	31	14	45	26	27	53
	Rate *(vehicle trips per unit)*	0.07	0.04	0.11	0.12	0.05	0.17	0.10	0.10	0.20
	Average Proxy Rate *(vehicle trips per unit)*	**0.06**	**0.09**	**0.15**	**0.15**	**0.08**	**0.23**	**0.20**	**0.16**	**0.36**
ITE 10th Edition	**LUC 222 (Multifamily Housing (High-Rise)) – General Urban/Suburban**									
	Rate *(vehicle trips per unit)*	0.07	0.24	0.31	0.22	0.14	0.36	0.20	0.16	0.36
Adopted Base Rate *(vehicle trips per unit)*		**0.07**	**0.24**	**0.31**	**0.22**	**0.14**	**0.36**	**0.20**	**0.16**	**0.36**

8.4.2 Internal Capture

Interaction effects reflect the tendency of trips from the different land uses proposed on-site to overlap with one another. The ITE Trip Generation Handbook 3rd Edition outlines a methodology for calculating internal interaction. The methodology requires the calculation of "unconstrained" interactions between land uses using the unconstrained interaction rates as outlined within the ITE and reproduced below **Table 13**. It is noted that the ITE does not outline unconstrained interaction rates for Saturday peak. As such, unconstrained interaction rates consistent with the PM peak have been adopted for the Saturday peak.

Subsequently, the actual internal capture between two land uses is calculated as the minimum of the "unconstrained" interactions between the two land uses, calculated individually for each of the two land uses. The calculated internal capture is subsequently deducted from the overall trip generation, as these represent trips which remain internal to the site and therefore do not extend to the external transportation network.

TABLE 13 UNCONSTRAINED INTERACTION RATES

	AM Peak Hour		PM Peak Hour		SAT Peak Hour	
	In	Out	In	Out	In	Out
Residential						
With Retail	2%	1%	46%	42%	46%	42%
With Hotel	0%	0%	0%	3%	0%	3%
Retail						
With Residential	17%	14%	10%	26%	10%	26%
With Hotel	4%	0%	2%	5%	2%	5%
Hotel						
With Residential	0%	0%	12%	2%	12%	2%
With Retail	0%	14%	17%	16%	17%	16%

Notes:
1. Unconstrained interaction rates for AM and PM peak as outlined in ITE Trip Generation Handbook 3rd Edition. ITE does not outline unconstrained interaction rates for Saturday peak. As such, unconstrained interaction rates consistent with the PM peak have been adopted for the Saturday peak.

8.4.3 Transit Reduction

As part of pre-consultation, the City of Barrie noted a 5% transit and active transit mode share is targeted for the area.

The City's Transportation Master Plan (TMP) targets 7% transit, 12% active transportation, 78% auto, and 3% other by 2041 (TMP Table 5-2). The site area currently has a peak hour driver auto share of 73% based on TTS.

A 5% transit reduction was applied to the projected base vehicle trip generation to reflect the above shift from driver to transit mode share based on the City's suggested target. We believe this to be the most conservative approach considering the existing mode split and TMP targeted mode split.

8.4.4 Vehicle Trip Generation

8.4.4.1 Phase 1

Based on the above adopted rates and reductions associated with the shift from driver to transit mode share, the projected vehicle trip generation associated with Phase 1 of the development is outlined in **Table 14**. It is noted that for phase 1, no internal capture was assumed. Overall, phase 1 of the development is projected to generate:

- 100, 115 and 115 two-way residential vehicle trips during the AM, PM and Saturday peaks respectively; and
- 65, 85 and 105 two-way hotel vehicle trips during the AM, PM and Saturday peaks respectively

TABLE 14 PHASE 1 VEHICLE TRIP GENERATION

	Number / Size	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	2-Way	In	Out	2-Way	In	Out	2-Way
Residential										
Base Vehicle Trip Rate (vehicle trips per unit)	332 units	*0.07*	*0.24*	*0.31*	*0.22*	*0.14*	*0.36*	*0.20*	*0.16*	*0.36*
Base Vehicle Trips		25	80	105	75	45	120	65	55	120
Minus 5% transit reduction		*0*	*-5*	*-5*	*-5*	*0*	*-5*	*-5*	*0*	*-5*
Vehicle Trips		**25**	**75**	**100**	**70**	**45**	**115**	**60**	**55**	**115**
Hotel										
Base Vehicle Trip Rate (vehicle trips per room)	152 rooms	*0.28*	*0.19*	*0.47*	*0.31*	*0.29*	*0.60*	*0.40*	*0.32*	*0.72*
Base Vehicle Trips		40	30	70	45	45	90	60	50	110
Minus 5% transit reduction		*-5*	*0*	*-5*	*-5*	*0*	*-5*	*0*	*-5*	*-5*
Vehicle Trips		**35**	**30**	**65**	**40**	**45**	**85**	**60**	**45**	**105**
Total Site Trips – Phase 1		**-**	**-**	**165**	**-**	**-**	**200**	**-**	**-**	**220**

8.4.4.2 Full Build-out

Based on the above adopted rates and reductions associated with internal capture and the shift from driver to transit mode share, the projected vehicle trip generation associated with the full build-out of the development is outlined in **Table 15**. Overall, the full build-out of the development is projected to generate:

- 550, 605 and 600 two-way residential vehicle trips during the AM, PM and Saturday peaks respectively;
- 145, 195 and 210 two-way retail vehicle trips during the AM, PM and Saturday peaks respectively (including 0, 70 and 50 two-way pass-by trips respectively); and
- 60, 75 and 90 two-way hotel vehicle trips during the AM, PM and Saturday peaks respectively.

TABLE 15 FULL BUILD-OUT VEHICLE TRIP GENERATION

	Number / Size	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	2-Way	In	Out	2-Way	In	Out	2-Way
Residential										
Base Vehicle Trip Rate (vehicle trips per unit)	1,900 units	*0.07*	*0.24*	*0.31*	*0.22*	*0.14*	*0.36*	*0.20*	*0.16*	*0.36*
Base Vehicle Trips		135	455	590	420	265	685	380	305	685
Minus Internal Capture w/ Retail		*-5*	*-5*	*-10*	*-35*	*-10*	*-45*	*-35*	*-15*	*-50*
Minus Internal Capture w/ Hotel		*0*	*0*	*0*	*0*	*-5*	*-5*	*0*	*-5*	*-5*
External Vehicle Trips		130	450	580	385	250	635	345	285	630
Minus 5% transit reduction		*-5*	*-25*	*-30*	*-20*	*-10*	*-30*	*-15*	*-15*	*-30*
Vehicle Trips		**125**	**425**	**550**	**365**	**240**	**605**	**330**	**270**	**600**
Retail										
Base Vehicle Trip Rate (vehicle trips per 1,000 ft²)	36,285 ft²	*2.90*	*1.78*	*4.68*	*3.39*	*3.68*	*7.07*	*3.98*	*3.68*	*7.66*
Base Vehicle Trips		105	65	170	120	135	255	145	135	280
Minus Internal Capture w/ Res		*-5*	*-5*	*-10*	*-10*	*-35*	*-45*	*-15*	*-35*	*-50*
Minus Internal Capture w/ Hotel		*-5*	*0*	*-5*	*0*	*-5*	*-5*	*-5*	*-5*	*-10*
External Vehicle Trips		95	60	155	110	95	205	125	95	220
Minus 5% transit reduction		*-5*	*-5*	*-10*	*-5*	*-5*	*-10*	*-5*	*-5*	*-10*
Vehicle Trips		**90**	**55**	**145**	**105**	**90**	**195**	**120**	**90**	**210**
Primary[1]		***90***	***55***	***145***	***70***	***55***	***125***	***95***	***65***	***160***
Pass-by[1]		***0***	***0***	***0***	***35***	***35***	***70***	***25***	***25***	***50***
Hotel										
Base Vehicle Trip Rate (vehicle trips per room)	152 rooms	*0.28*	*0.19*	*0.47*	*0.31*	*0.29*	*0.60*	*0.40*	*0.32*	*0.72*
Base Vehicle Trips		40	30	70	45	45	90	60	50	110
Minus Internal Capture w/ Res		*0*	*0*	*0*	*-5*	*0*	*-5*	*-5*	*0*	*-5*
Minus Internal Capture w/ Retail		*0*	*-5*	*-5*	*-5*	*0*	*-5*	*-5*	*-5*	*-10*
External Vehicle Trips		40	25	65	35	45	80	50	45	95
Minus 5% transit reduction		*-5*	*0*	*-5*	*-5*	*0*	*-5*	*-5*	*0*	*-5*
Vehicle Trips		**35**	**25**	**60**	**30**	**45**	**75**	**45**	**45**	**90**
Total Site Trips		**-**	**-**	**755**	**-**	**-**	**875**	**-**	**-**	**900**

Note:Pass-by percentages of 0%, 34% and 26% adopted for the AM, PM and Saturday peaks respectively, consistent with the ITE Trip Generation Handbook 3rd Edition average pass-by percentage for LUC 820 (Shopping Centre)

8.4.5 Vehicle Trip Distribution

Site traffic was assigned onto the area road network based on the results of the 2016 Transportation Tomorrow Survey (TTS), prevailing traffic patterns and area turn restrictions. General direction of approach percentages for site traffic was based on the results from the TTS and is summarized **Table 16**.

TABLE 16 SITE TRAFFIC DISTRIBUTION

Street	Direction	Residential / Hotel[1]		Retail[2]
		Inbound	Outbound	Inbound/Outbound
Bayfield Street	North	30%	30%	25%
Bradford Street / Lakeshore Drive	South	30%	25%	35%
Dunlop Street	East	15%	15%	15%
	West	25%	30%	25%
Total		**100%**	**100%**	**100%**

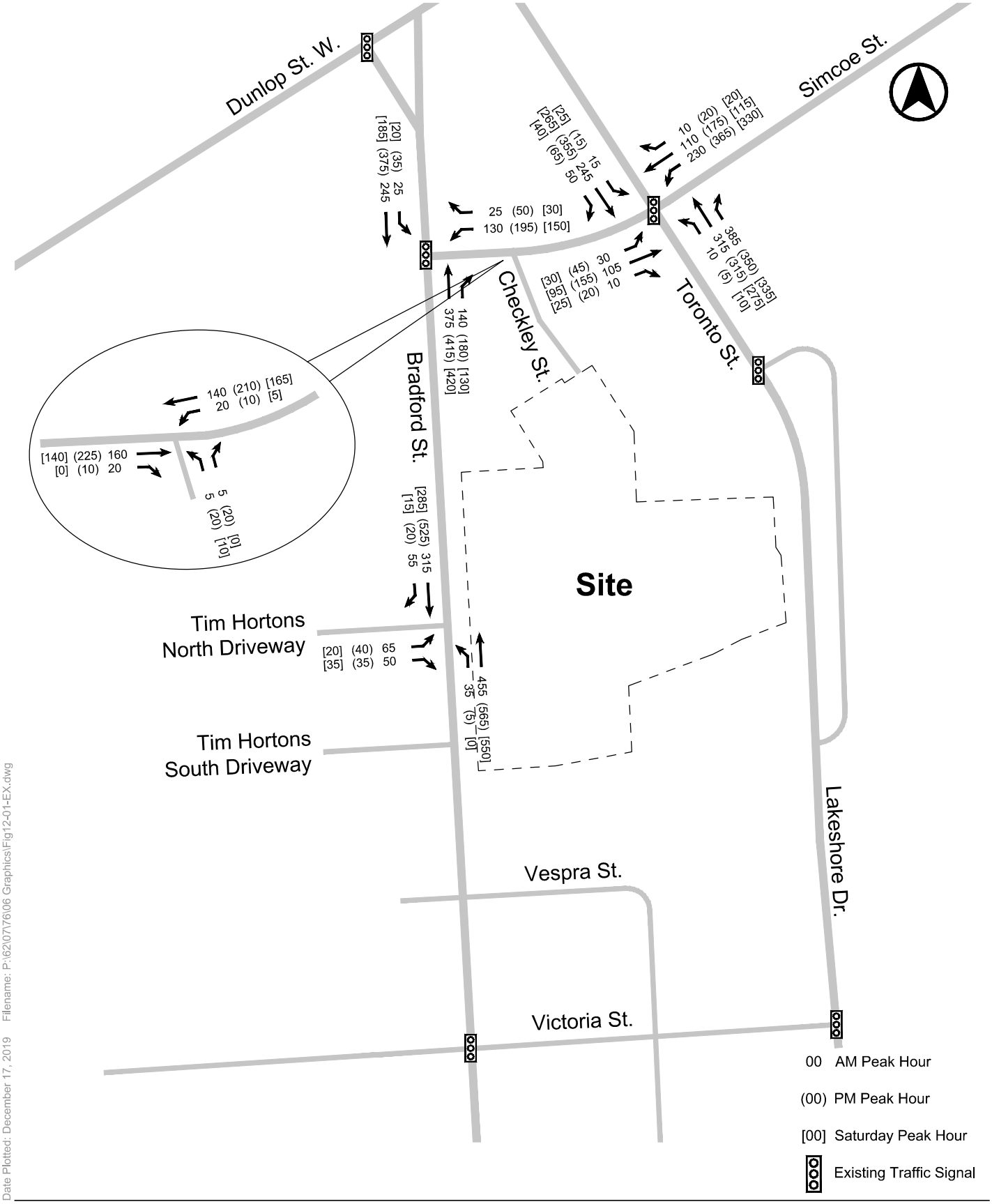
Notes:
1. Based on TTS Zones 8501-8505 for home-based trips
2. Based on TTS Zones 8501-8505 for market-based trips.

8.4.6 Site Traffic Volumes

The projected residential, hotel, and total site traffic volumes for Phase 1 are shown in **Figure 15** through to **Figure 17** respectively. The projected residential, hotel, primary retail, pass-by retail, and total site traffic volumes for full build-out are shown in **Figure 18** through to **Figure 22**, respectively.

8.4.7 Future Total Traffic Volumes

Future total traffic volumes are determined by adding the future background volumes and the site traffic volumes and are shown in **Figure 23** for Phase 1 and **Figure 24**.



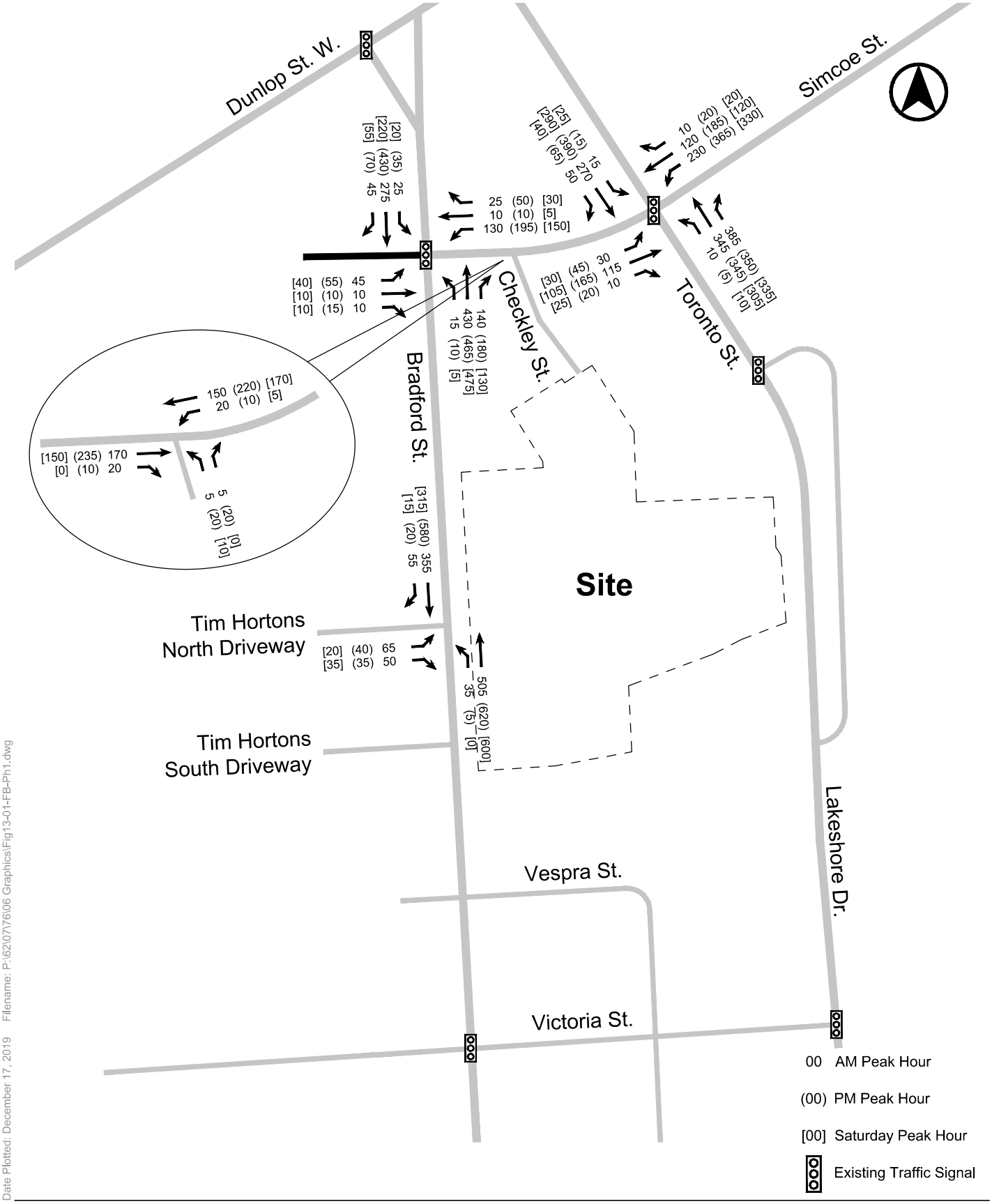
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EXISTING TRAFFIC VOLUMES

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 12



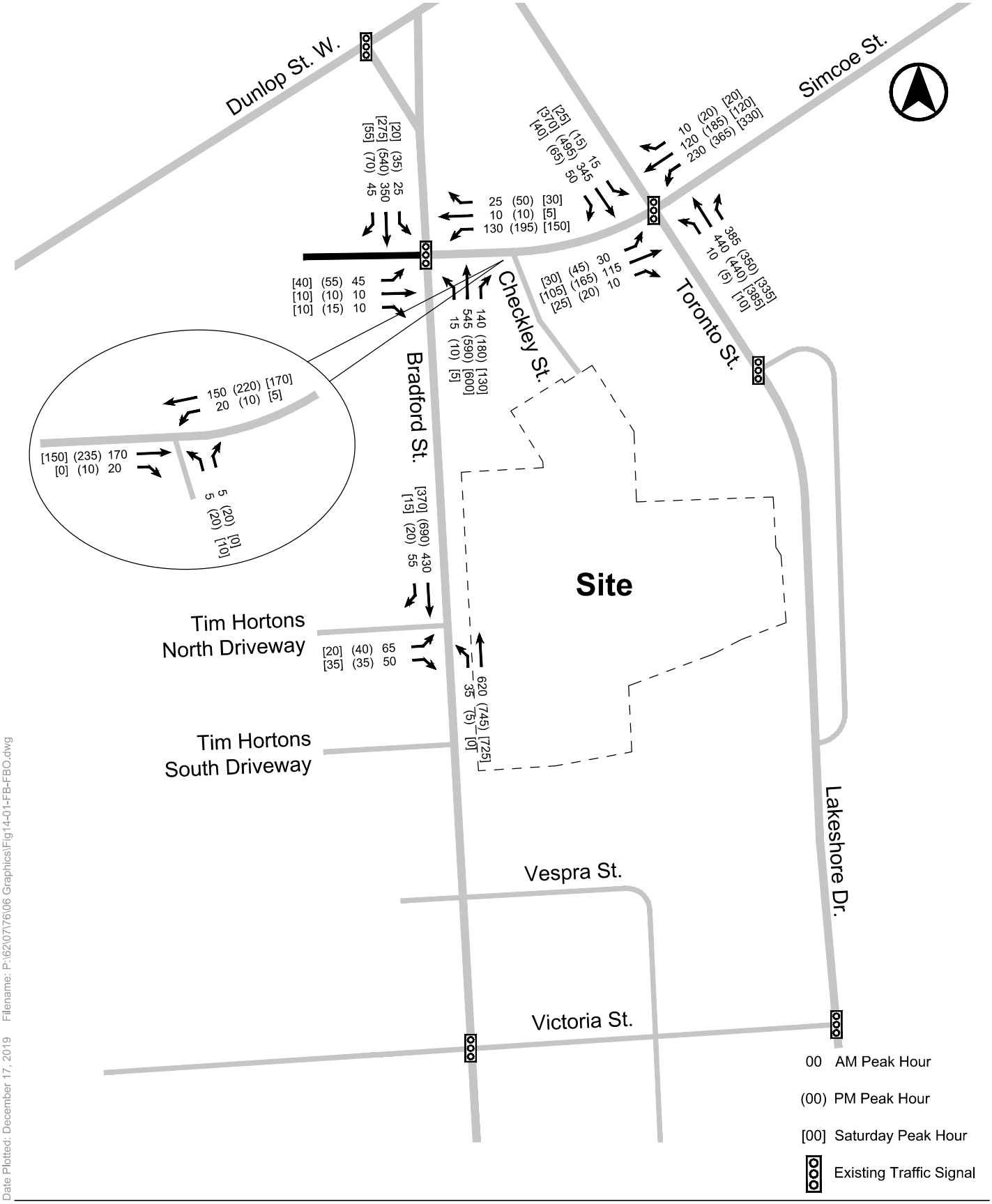
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5-YEAR FUTURE BACKGROUND TRAFFIC VOLUMES (2024)

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 13



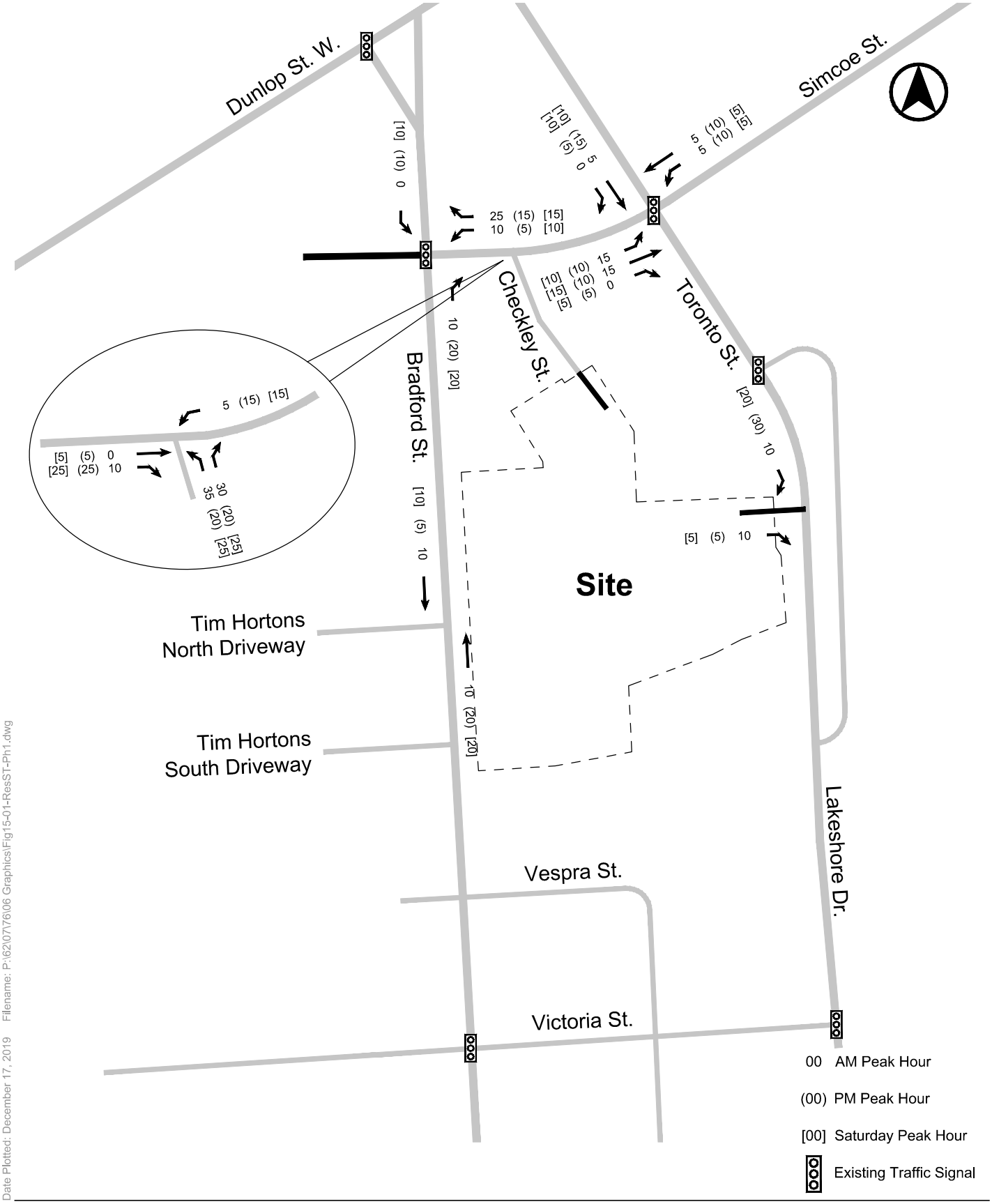
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20-YEAR FUTURE BACKGROUND TRAFFIC VOLUMES (2039)

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 14



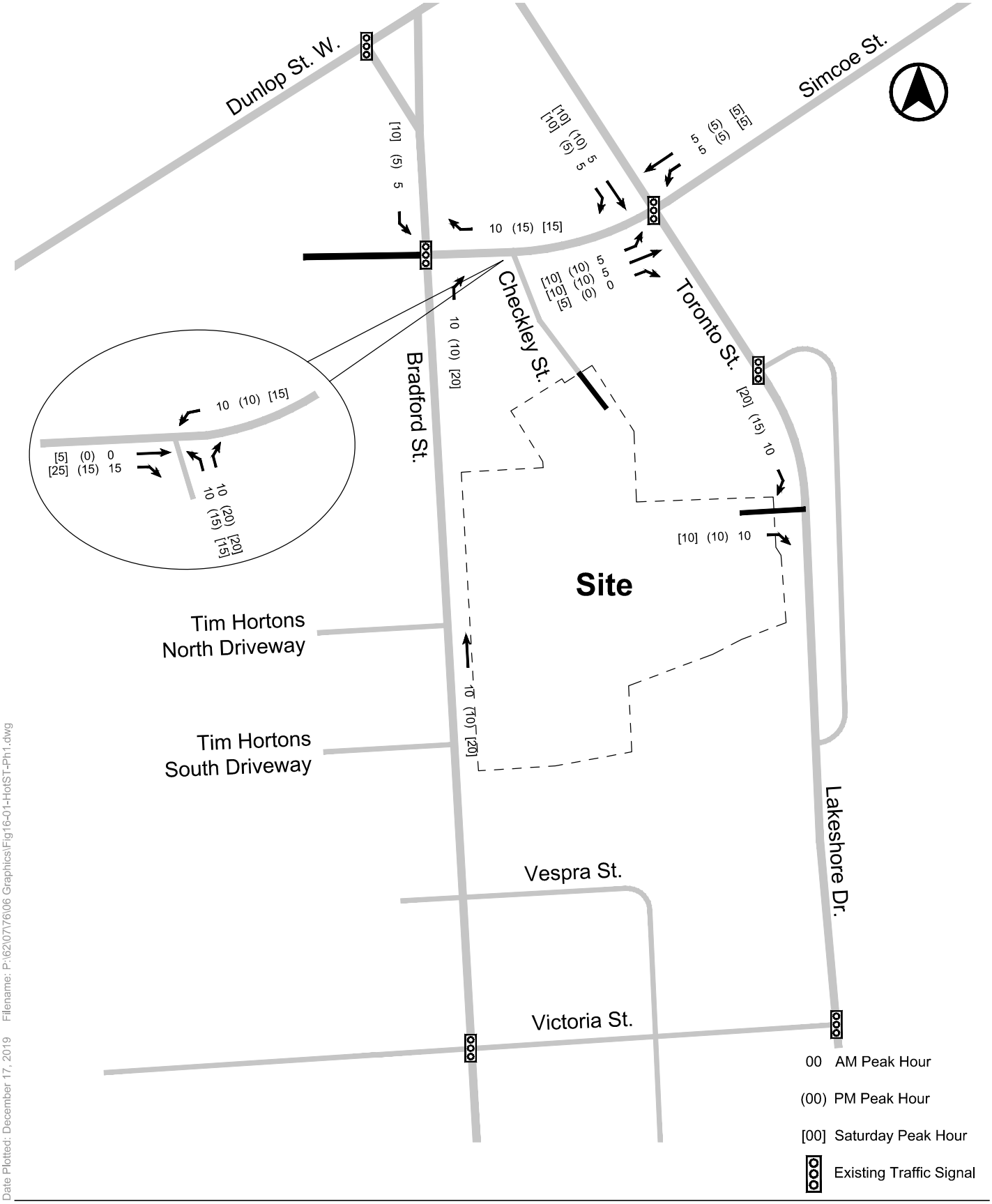
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RESIDENTIAL SITE TRAFFIC VOLUMES - PHASE 1

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 15



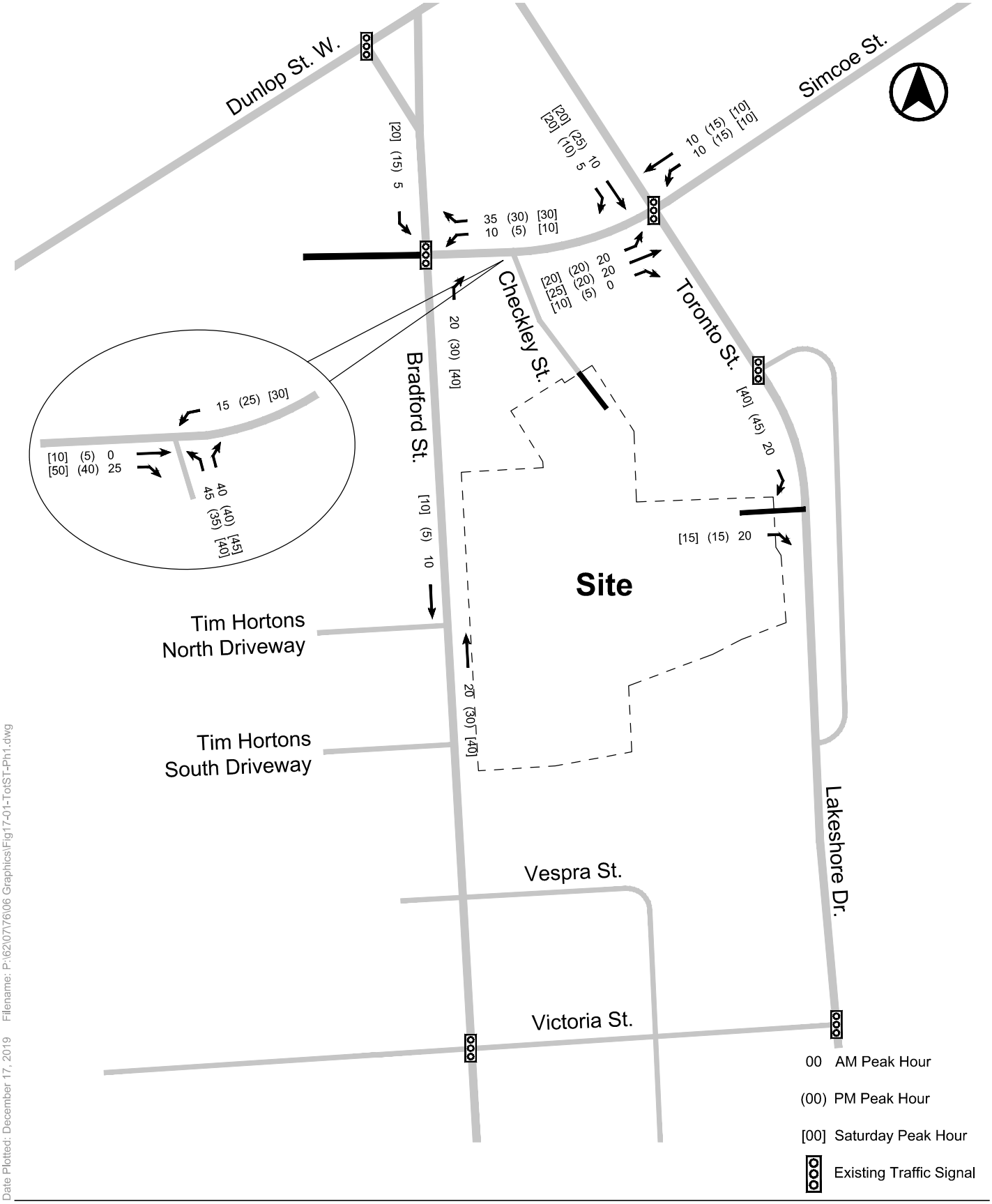
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HOTEL SITE TRAFFIC VOLUMES - PHASE 1

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 16



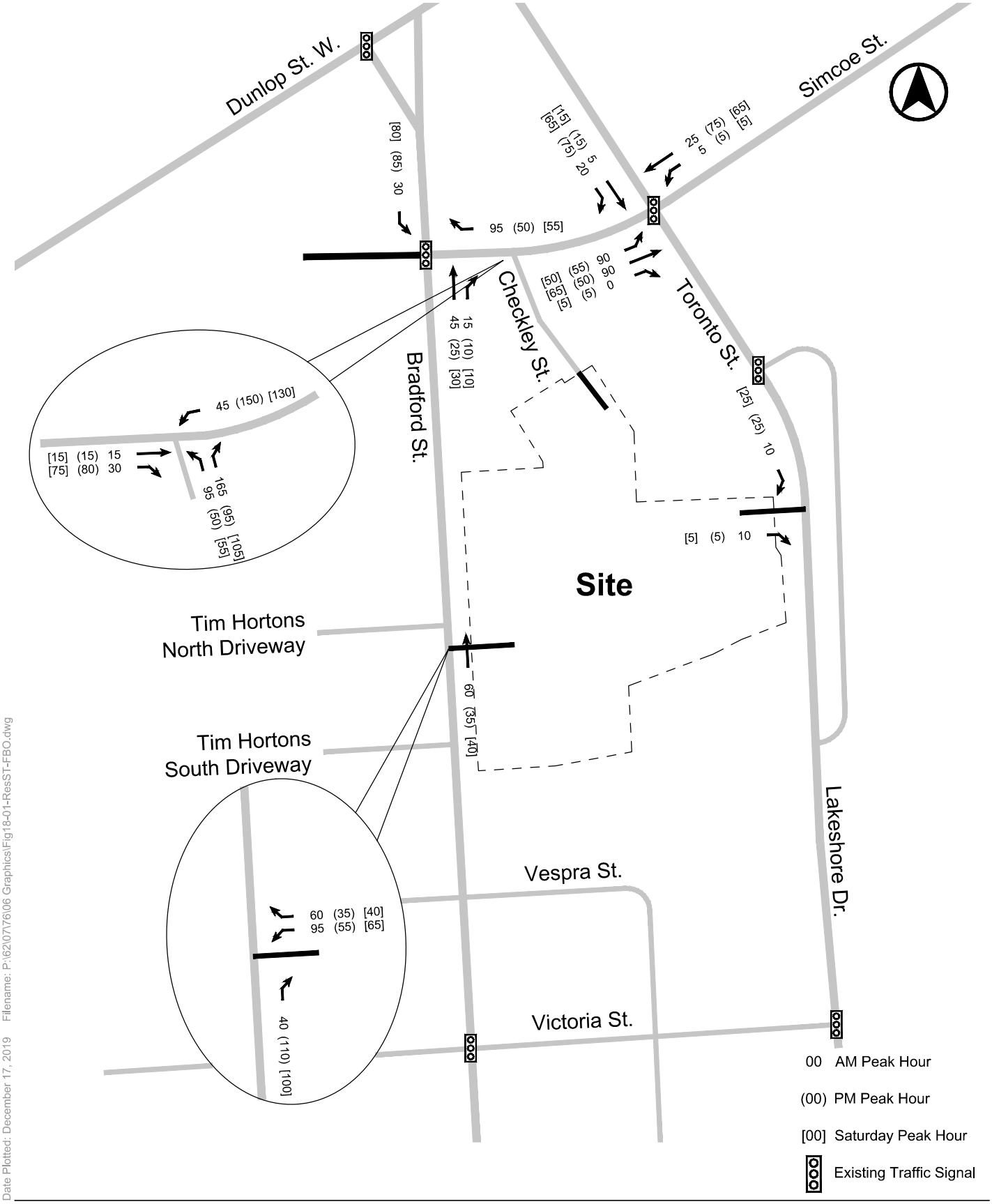
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TOTAL SITE TRAFFIC VOLUMES - PHASE 1

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 17



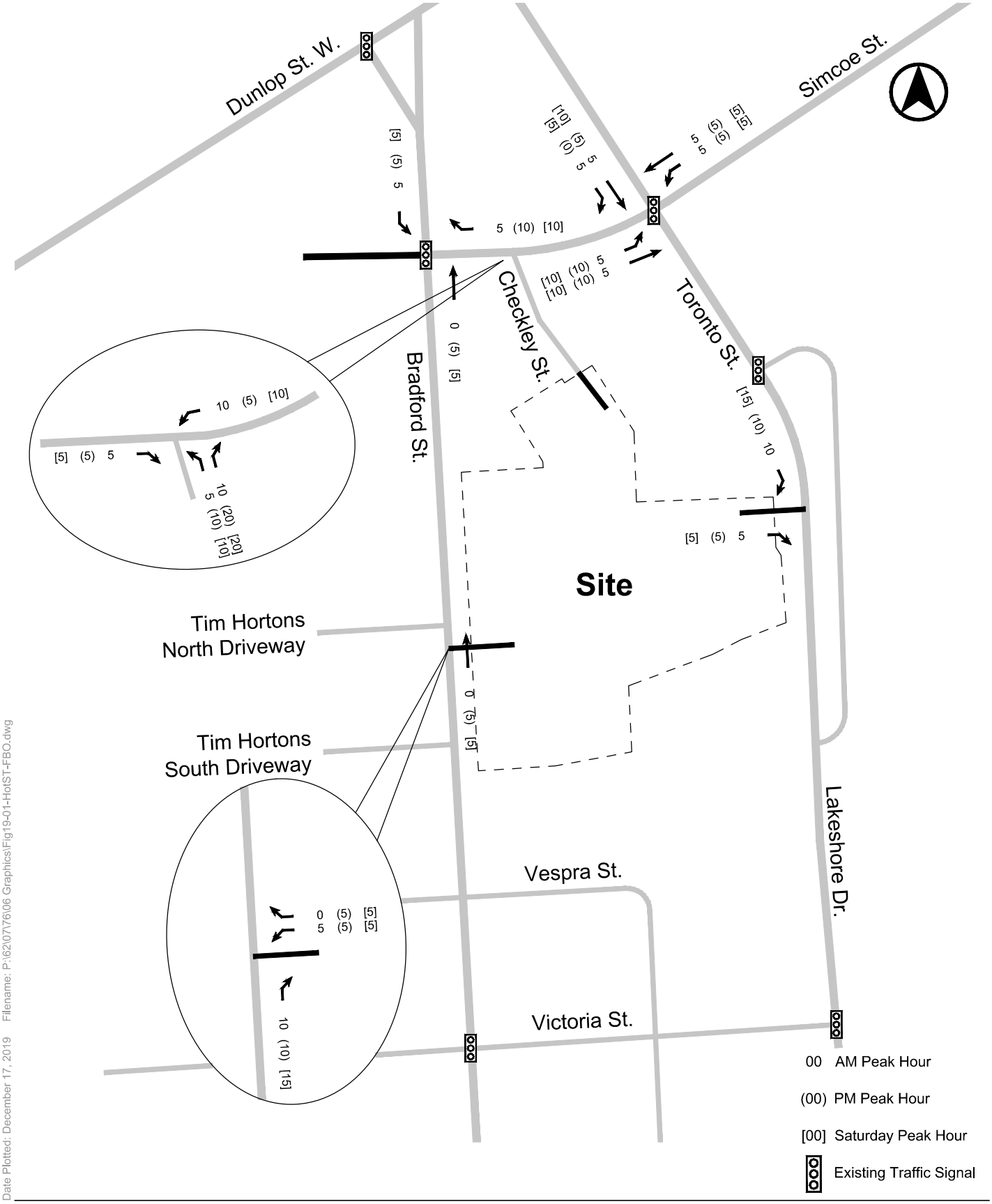
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RESIDENTIAL SITE TRAFFIC VOLUMES - FULL BUILD-OUT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 18



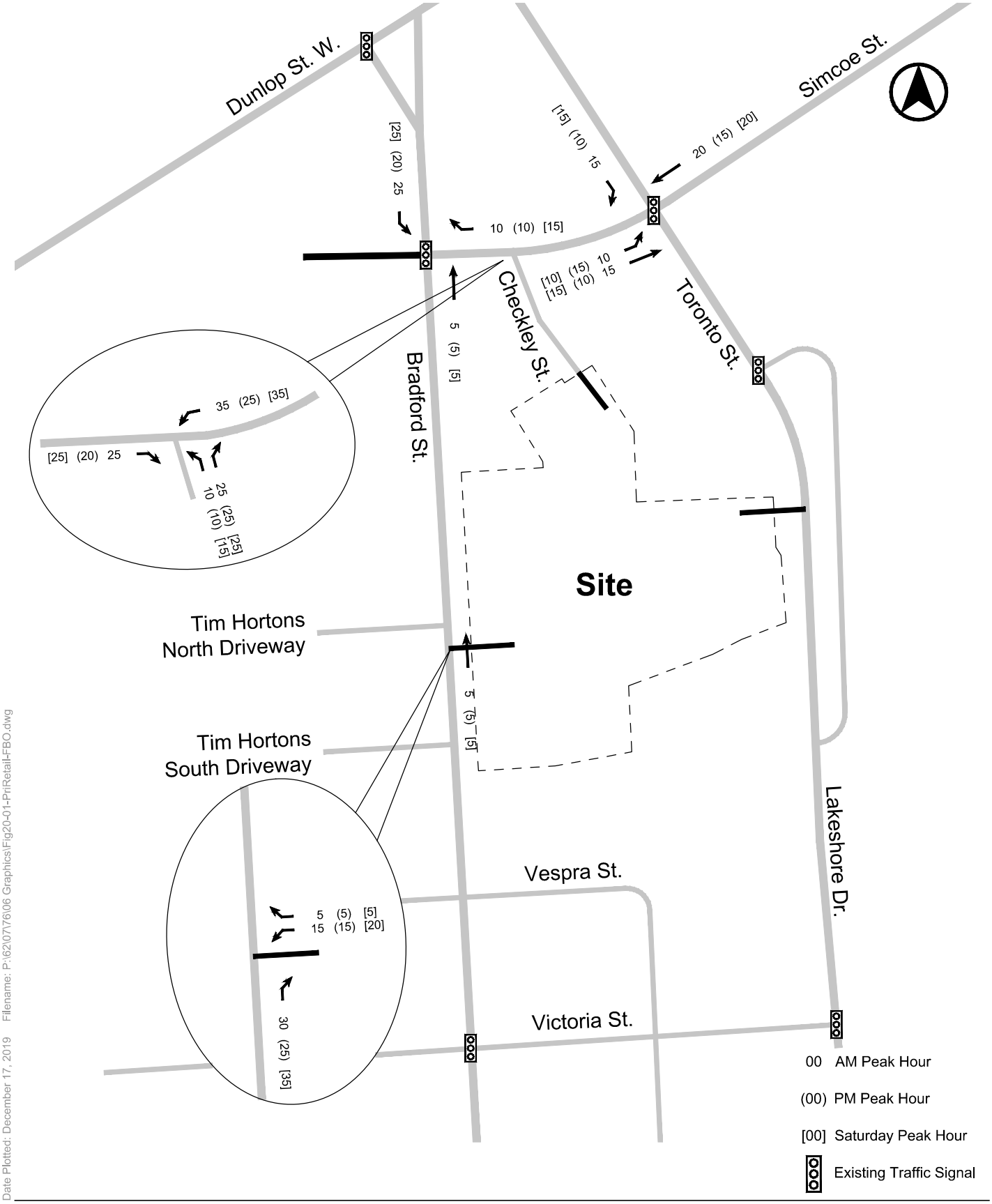
Date Plotted: December 17, 2019 Filename: P:\62\07\76\06 Graphics\Fig19-01-HotST-FBO.dwg

HOTEL SITE TRAFFIC VOLUMES - FULL BUILD-OUT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 19



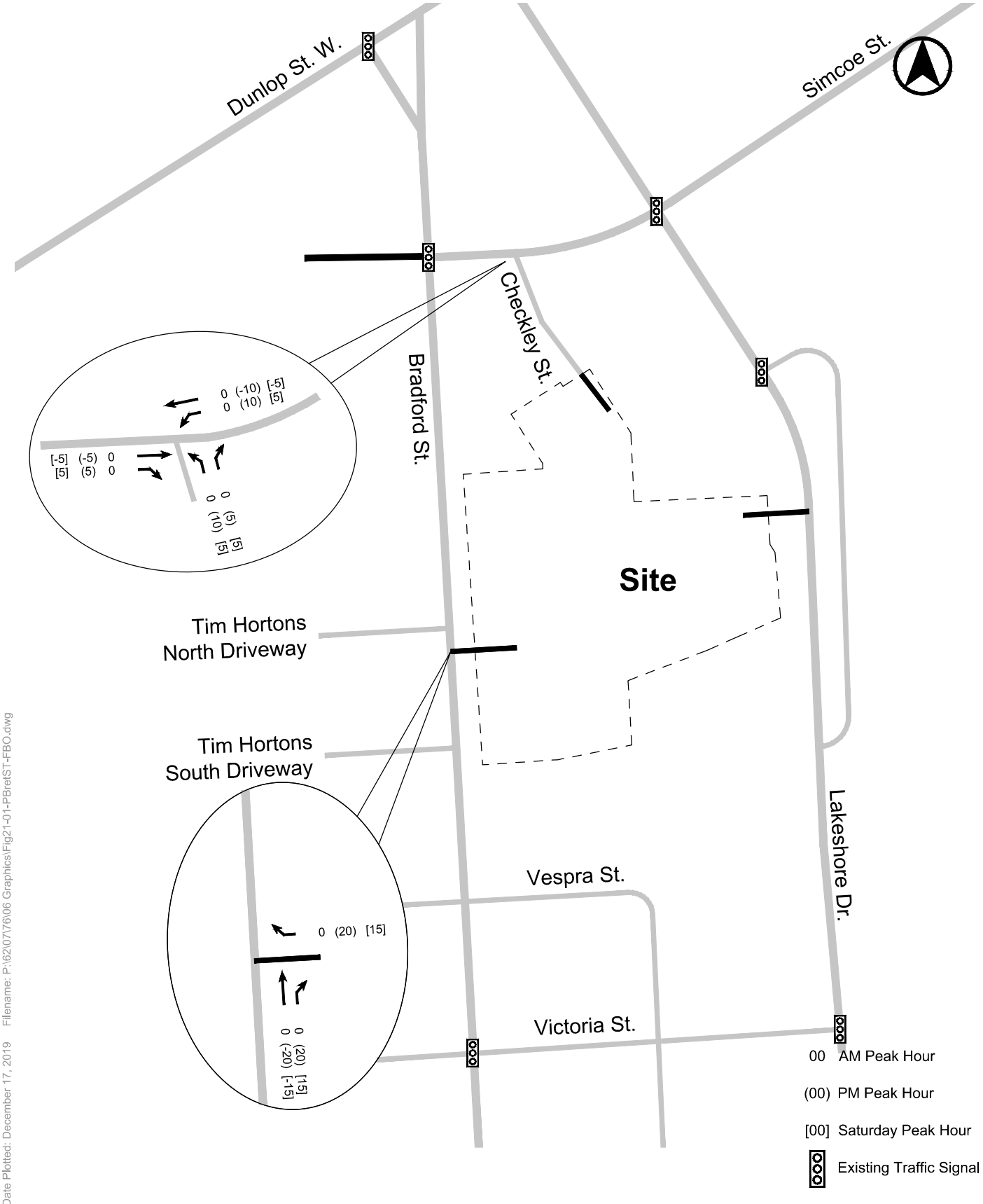
Date Plotted: December 17, 2019 Filename: P:\62\07\76\06 Graphics\Fig20-01-PriRetail-FBO.dwg

PRIMARY RETAIL SITE TRAFFIC VOLUMES - FULL BUILD-OUT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 20



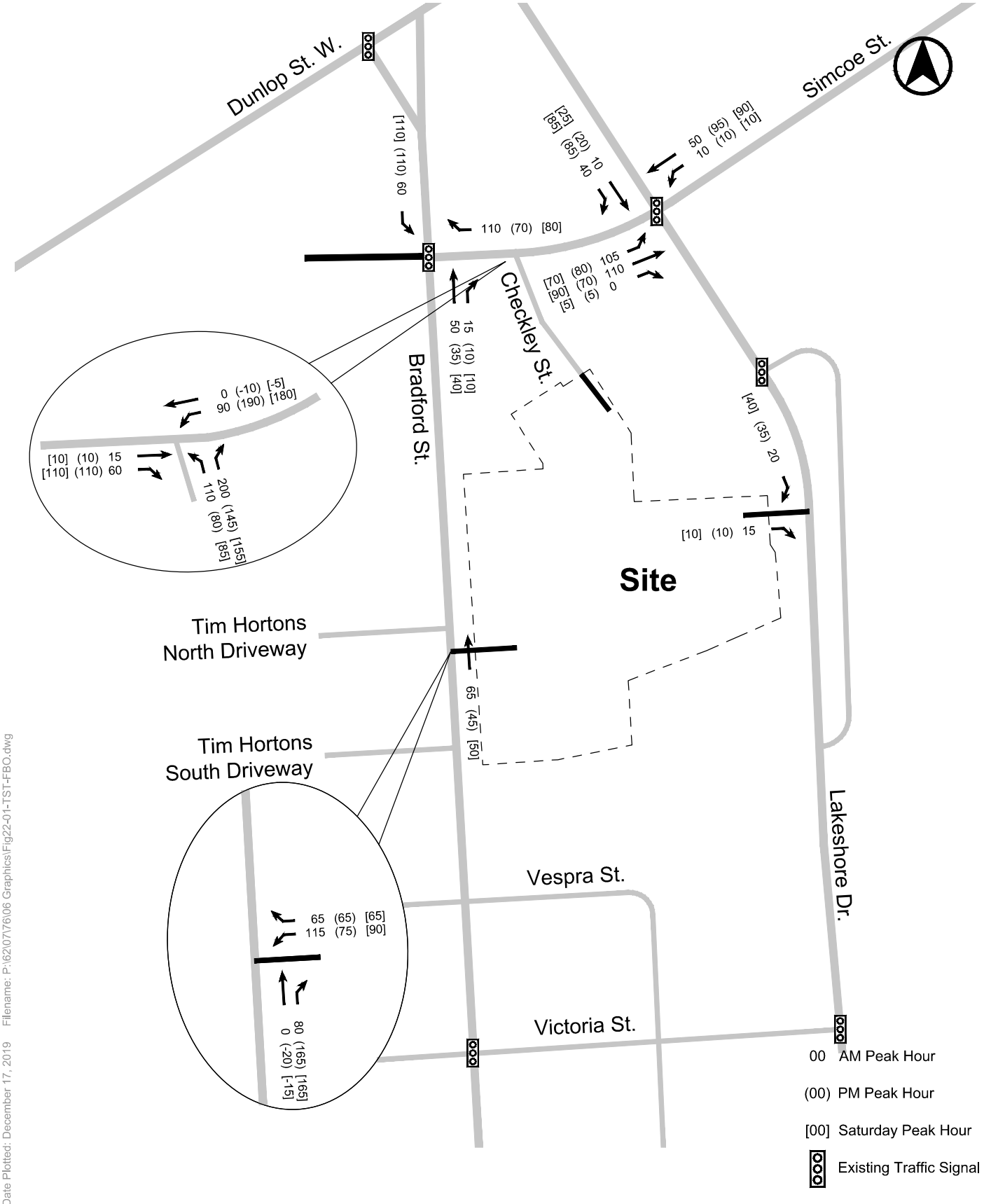
Date Plotted: December 17, 2019 Filename: P:\62\07\76\06 Graphics\Fig21-01-PBretST-FBO.dwg

PASS-BY RETAIL SITE TRAFFIC VOLUMES - FULL BUILD-OUT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 21



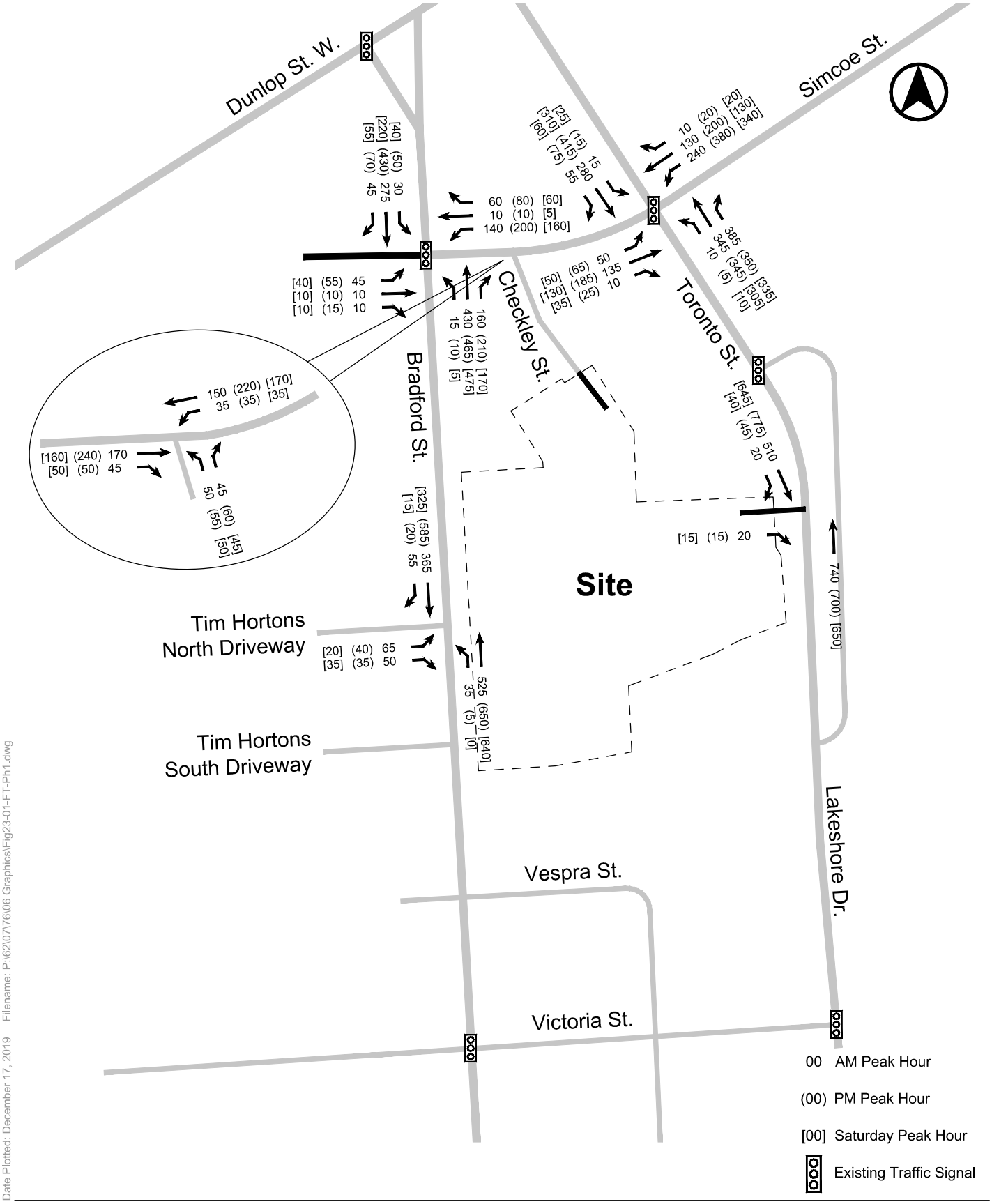
Date Plotted: December 17, 2019 Filename: P:\62\07\76\06 Graphics\Fig22-01-TST-FBO.dwg

TOTAL SITE TRAFFIC VOLUMES - FULL BUILD-OUT

BA Group

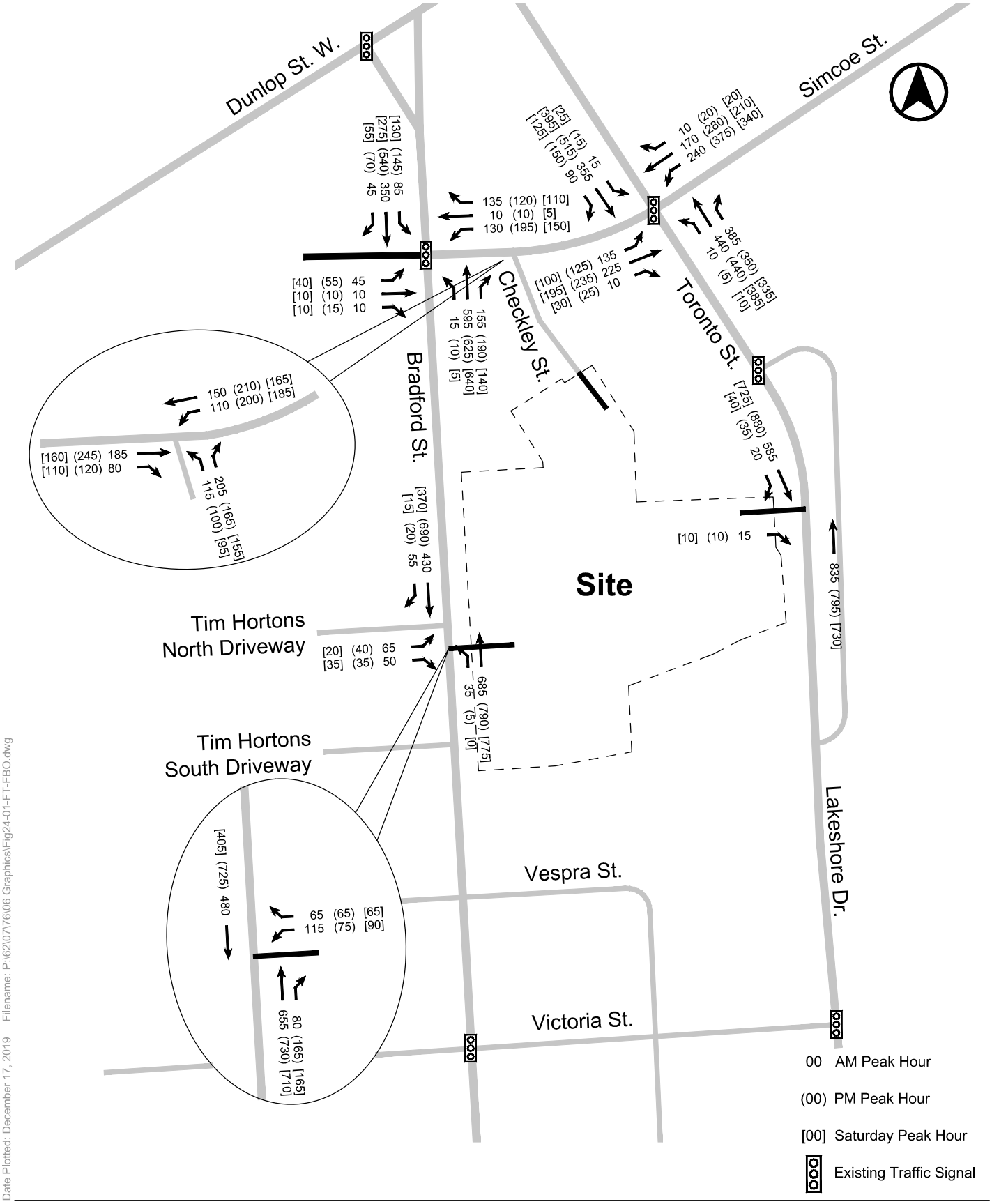
51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 22



Date Plotted: December 17, 2019 Filename: P:\62\07\76\06 Graphics\Fig23-01-FT-Ph1.dwg

5-YEAR FUTURE TOTAL TRAFFIC VOLUMES (2024) - PHASE 1



Date Plotted: December 17, 2019 Filename: P:\62\07\76\06 Graphics\Fig24-01-FT-FBO.dwg

20-YEAR FUTURE TOTAL TRAFFIC VOLUMES (2039) - FULL BUILD-OUT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 24

9.0 OPERATION ANALYSIS

9.1 ANALYSIS METHODOLOGY

Synchro Version 9.1 and the Highway Capacity Manual (HCM) methodology were used to analyze the study area intersections and site access points.

For signalized intersections, the volume-to-capacity ratio (v/c) is an indicator of the capacity utilization for the key movements in the intersection. A v/c of 1.00 indicates that a traffic movement through an intersection is operating at or near maximum capacity.

For unsignalized intersections, level of service (LOS) characterizes operational conditions for key movements in terms of average delay experienced by vehicles attempting to complete a manoeuvre through the intersection. LOS ‘A’ represents a good level of service with short delays, while LOS ‘F’ represents a poor level of service with extended delays.

Existing traffic signal timing plans for the signalized intersections within the study area were obtained from the City of Barrie and are attached in **Appendix E**. Analyses were undertaken using these signal timing plans.

Detailed analysis worksheets are attached in **Appendix F.**

9.2 ANALYSIS ASSUMPTIONS AND PARAMETRES

A base saturation flow of 1,900 vehicles per hour per lane was assumed. Peak hour factors and heavy vehicle percentages were calculated based on existing traffic volume data extracted from the traffic counts utilized in this study.

9.3 SIGNALIZED INTERSECTIONS

9.3.1 Bradford Street / Simcoe Street

A summary of the capacity, level of service, and queuing results for the Bradford Street / Simcoe Street signalized intersection under existing and future conditions is provided in **Table 17** and **Table 18**.

9.3.1.1 Existing Conditions

The existing intersection of Bradford Street / Simcoe Street is signalized with a cycle length of 72 seconds.

The intersection operates at overall v/c ratios of 0.24, 0.32, and 0.26 during the AM peak hour, PM peak hours, and Saturday peak hour respectively.

9.3.1.2 Future Background Conditions

A new eastbound approach is proposed to be constructed as contemplated in the traffic study that was prepared for 34-50 Bradford Street.

Under future background conditions, at the 5-year and 20-year horizon, the intersection is estimated to operate at an overall v/c ratio of 0.47 or better during the AM, PM and Saturday peak hours.

Individual turning movements are expected to operate at a v/c ratio of less than 0.85 during all peak hours

9.3.1.3 Future Total Conditions

Under future total conditions at the 5-year (Phase 1) and 20-year horizon (Full buildout), the intersection is expected to operate at an overall v/c ratio of 0.62 or better during the AM, PM and Saturday peak hours.

Individual turning movements are expected to operate at a v/c ratio of less than 0.85 during all peak hours

TABLE 17 PEAK HOUR ANALYSIS RESULTS: BRADFORD STREET / SIMCOE STREET (SIGNALIZED)

Lane Group	Existing		Future Background (5-year horizon)		Future Background (20-year horizon)		Future Total (5-year horizon – Phase 1)		Future Total (20-year horizon – Full build-out)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBLTR	-[2]		0.24 (0.22) [0.18]	C (C) [C]	0.24 (0.22) [0.18]	C (C) [C]	0.21 (0.22) [0.18]	C (C) [C]	0.23 (0.24) [0.19]	C (C) [C]
WBL	0.51 (0.58) [0.47]	C (C) [C]	0.62 (0.69) [0.56]	C (C) [C]	0.62 (0.69) [0.57]	C (C) [C]	0.56 (0.70) [0.58]	C (C) [C]	0.54 (0.69) [0.57]	C (C) [C]
WBTR	0.02 (0.03) [0.02]	C (C) [C]	0.05 (0.06) [0.04]	C (C) [C]	0.05 (0.06) [0.03]	C (C) [C]	0.07 (0.08) [0.06]	C (C) [C]	0.14 (0.14) [0.09]	C (C) [C]
NBLT	0.17 (0.20) [0.19]	A (A) [A]	0.22 (0.26) [0.24]	A (A) [A]	0.28 (0.33) [0.30]	A (A) [A]	0.23 (0.26) [0.24]	A (A) [A]	0.32 (0.35) [0.32]	A (A) [A]
NBR	0.11 (0.14) [0.10]	A (A) [A]	0.12 (0.15) [0.11]	A (A) [A]	0.12 (0.17) [0.12]	A (A) [A]	0.13 (0.18) [0.14]	A (A) [A]	0.14 (0.18) [0.13]	A (A) [A]
SBLTR	0.13 (0.23) [0.10]	A (A) [A]	0.17 (0.31) [0.15]	A (A) [A]	0.21 (0.38) [0.18]	A (A) [A]	0.19 (0.33) [0.17]	A (A) [A]	0.31 (0.58) [0.33]	A (B) [A]
Overall	**0.24 (0.32) [0.26]**	**A (B) [A]**	**0.31 (0.42) [0.32]**	**A (B) [B]**	**0.35 (0.47) [0.37]**	**A (B) [B]**	**0.32 (0.44) [0.33]**	**B (B) [B]**	**0.37 (0.62) [0.40]**	**A (B) [B]**

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Eastbound approach does not exist under existing conditions.

TABLE 18 95TH PERCENTILE QUEUE LENGTH: BRADFORD STREET / SIMCOE STREET (SIGNALIZED)

Lane Group	Existing	Future Background (5-year horizon)	Future Background (20-year horizon)	Future Total (5-year horizon – Phase 1)	Future Total (20-year horizon – Full build-out)
	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)
EBLTR	-[2]	13.4 (15.6) [12.4]	13.4 (15.6) [12.4]	13.4 (15.5) [12.4]	13.5 (15.7) [12.5]
WBL	25.5 (37.2) [28.3]	27.1 (40.7) [30.0]	27.1 (40.7) [30.3]	29.1 (41.2) [31.8]	27.1 (40.7) [30.3]
WBTR	4.6 (6.4) [5.0]	6.5 (8.1) [5.9]	6.5 (8.1) [5.9]	8.6 (9.6) [7.8]	12.7 (13.0) [10.1]
NBLT	23.5 (26.2) [25.7]	28.3 (30.6) [29.7]	36.1 (39.5) [38.3]	28.3 (31.2) [29.7]	39.9 (42.2) [41.1]
NBR	8.9 (11.6) [9.3]	10.6 (13.5) [10.5]	12.6 (16.1) [12.2]	11.6 (15.3) [12.4]	14.2 (17.3) [13.2]
SBLTR	17.4 (26.7) [13.4]	20.7 (34.2) [16.5]	25.7 (43.2) [20.1]	21.2 (36.4) [18.2]	31.8 (63.0) [30.8]

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Eastbound approach does not exist under existing conditions.

9.3.2 Simcoe Street / Toronto Street

A summary of the capacity, level of service, and queuing results for the Simcoe Street / Toronto Street signalized intersection under existing and future conditions is provided in **Table 19** and **Table 20**.

9.3.2.1 Existing Conditions

The existing intersection of Simcoe Street / Toronto Street is signalized with a cycle length of 100 seconds.

The intersection operates at overall v/c ratios of 0.47, 0.67, and 0.56 during the AM, PM and Saturday peak hours respectively.

9.3.2.2 Future Background Conditions

Under future background conditions, at the 5-year and 20-year horizons, the intersection is expected to operate at an overall v/c ratio of 0.77 or better during all peak hours. Individual movements are estimated to operate at a v/c ratio of 0.82 or better.

It is noted that under the 20-year horizon, signal timings were optimized during the PM peak hour, which included the removal of the existing northbound left protected phase. The existing cycle length and pedestrian minimum times were maintained.

9.3.2.3 Future Total Conditions

Phase 1

Under future total conditions at the 5-year horizon (Phase 1), the intersection is expected to operate at an overall v/c ratio of 0.89 or better during all peak hours.

Full Buildout

Under future total conditions at the 20-year horizon (Full build-out), the intersection is expected to operate at an overall v/c ratio of 0.59, 0.89, and 0.74 during the AM, PM and Saturday peak hours respectively.

Individual turning movements are expected to operate at a v/c ratio of less than 0.85 during all peak hours.

As discussed above, signal timings were optimized during the PM peak hour under the 20-year horizon.

TABLE 19 PEAK HOUR ANALYSIS RESULTS: SIMCOE STREET / TORONTO STREET (SIGNALIZED)

Lane Group	Existing		Future Background (5-year horizon)		Future Background (20-year horizon)[2]		Future Total (5-year horizon – Phase 1)		Future Total (20-year horizon – Full build-out)[2]	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.06 (0.11) [0.07]	B (C) [B]	0.06 (0.12) [0.07]	B (C) [C]	0.07 (0.13) [0.07]	C (C) [C]	0.11 (0.19) [0.12]	B (C) [C]	0.34 (0.44) [0.33]	C (D) [C]
EBTR	0.09 (0.14) [0.09]	B (C) [B]	0.10 (0.16) [0.10]	B (C) [C]	0.11 (0.18) [0.11]	C (C) [C]	0.12 (0.20) [0.13]	B (C) [C]	0.21 (0.27) [0.23]	C (C) [C]
WBL	0.34 (0.57) [0.49]	B (B) [B]	0.36 (0.60) [0.51]	B (B) [B]	0.39 (0.66) [0.55]	B (C) [B]	0.38 (0.65) [0.54]	B (B) [B]	0.44 (0.79) [0.65]	B (D) [C]
WBTR	0.07 (0.11) [0.07]	B (B) [B]	0.08 (0.12) [0.08]	B (B) [B]	0.08 (0.13) [0.08]	B (B) [B]	0.08 (0.13) [0.09]	B (B) [B]	0.11 (0.21) [0.16]	B (B) [B]
NBL	0.05 (0.03) [0.05]	C (C) [C]	0.05 (0.04) [0.05]	C (C) [C]	0.06 (0.03) [0.06]	C (C) [C]	0.05 (0.04) [0.06]	C (C) [C]	0.07 (0.04) [0.07]	C (C) [C]
NBT	0.71 (0.63) [0.64]	D (C) [D]	0.72 (0.65) [0.67]	D (C) [D]	0.81 (0.71) [0.74]	D (C) [D]	0.72 (0.61) [0.65]	D (C) [D]	0.81 (0.64) [0.64]	D (C) [C]
NBR	0.27 (0.24) [0.23]	C (C) [C]	0.27 (0.24) [0.23]	C (C) [C]	0.32 (0.26) [0.22]	C (C) [C]	0.27 (0.24) [0.23]	C (C) [C]	0.32 (0.26) [0.22]	C (C) [C]
SBL	0.08 (0.07) [0.11]	C (C) [C]	0.08 (0.07) [0.11]	C (C) [C]	0.09 (0.07) [0.12]	C (B) [C]	0.08 (0.06) [0.11]	C (C) [C]	0.09 (0.06) [0.10]	C (B) [B]
SBTR	0.63 (0.80) [0.64]	C (D) [C]	0.64 (0.82) [0.65]	C (D) [C]	0.70 (0.76) [0.72]	C (C) [C]	0.67 (0.83) [0.72]	C (D) [D]	0.79 (0.83) [0.81]	D (D) [D]
Overall	**0.47 (0.67) [0.56]**	**C (C) [C]**	**0.49 (0.70) [0.58]**	**C (C) [C]**	**0.56 (0.77) [0.64]**	**C (C) [C]**	**0.50 (0.74) [0.62]**	**C (C) [C]**	**0.59 (0.89) [0.74]**	**C (C) [C]**

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Signal timings optimized during PM peak hour, including removal of existing northbound left protected phase. Existing cycle length and pedestrian minimum times were maintained.

TABLE 20 95TH PERCENTILE QUEUE LENGTH: SIMCOE STREET / TORONTO STREET (SIGNALIZED)

Lane Group	Existing	Future Background (5-year horizon)	Future Background (20-year horizon)	Future Total (5-year horizon – Phase 1)	Future Total (20-year horizon – Full build-out)
	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)
EBL	11.4 (15.4) [11.4]	11.4 (15.5) [11.4]	11.4 (15.5) [11.4]	16.8 (20.6) [16.9]	39.8 (38.0) [30.4]
EBTR	15.0 (21.0) [14.2]	16.1 (22.2) [15.4]	16.1 (22.2) [15.4]	18.5 (24.8) [18.4]	28.7 (30.5) [26.5]
WBL	45.5 (73.8) [64.0]	45.5 (73.8) [66.1]	45.5 (81.9[2]) [66.9]	47.6 (77.5) [69.3]	47.6 (96.8[2]) [69.3]
WBTR	12.1 (17.9) [12.2]	13.0 (18.9) [13.0]	13.0 (20.1) [13.1]	13.7 (20.3) [14.0]	17.5 (29.2) [21.4]
NBL	4.2 (2.5) [4.3]	4.2 (2.5) [4.2]	4.2 (3.1) [4.2]	4.2 (2.5) [4.2]	4.2 (3.2) [4.2]
NBT	79.6 (78.7) [71.6]	88.0 (86.8) [77.8]	118.0 (110.1) [100.3]	88.0 (86.8) [77.1]	118.0 (110.1) [100.3]
NBR	19.7 (18.7) [19.4]	19.7 (18.7) [18.9]	28.4 (20.5) [18.7]	19.7 (18.7) [18.7]	28.4 (20.5) [18.7]
SBL	5.2 (5.2) [7.7]	5.2 (5.2) [7.5]	5.2 (4.9) [7.4]	5.2 (5.2) [7.4]	5.2 (4.9) [7.4]
SBTR	72.9 (108.2) [78.3]	79.9 (121.7[2]) [83.5]	102.5 (121.6) [106.8]	84.1 (143.8[2]) [93.9]	122.8[2] (158.2) [161.0[2]]

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. 95th percentile volume exceeds capacity, queue may be longer.

9.4 UNSIGNALIZED INTERSECTIONS

Capacity analysis and queuing results for the study area unsignalized intersections is summarized in **Table 21** and **Table 22**. As shown, unsignalized intersections within the study area are projected to operate with an LOS D or better under all scenarios analyzed.

TABLE 21 PEAK HOUR ANALYSIS RESULTS: UNSIGNALIZED INTERSECTIONS

Lane Group	Existing		Future Background (5-year horizon)		Future Background (20-year horizon)		Future Total (5-year horizon – Phase 1)		Future Total (20-year horizon – Full build-out)	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Simcoe St / Checkley St										
WBLT	2.4 (1.1) [0.7]	A (A) [A]	2.3 (1.0) [0.7]	A (A) [A]	2.3 (1.0) [0.7]	A (A) [A]	3.3 (2.8) [3.1]	A (A) [A]	5.8 (7.0) [6.8]	A (A) [A]
NBLR	9.9 (10.5) [10.2]	A (B) [B]	10.0 (10.6) [10.3]	A (B) [B]	10.0 (10.5) [10.3]	A (B) (B)	11.2 (12.0) [11.1]	B (B) [B]	18.0 (26.7) [20.1]	C (D) [C]
Bradford St / Tim Hortons North Driveway										
EBLR	15.1 (16.6) [11.4]	C (C) [B]	16.4 (18.4) [11.8]	C (C) [B]	13.2 (14.2) [10.9]	B (B) [B]	16.8 (18.8) [12.0]	C (C) [B]	13.4 (14.5) [10.9]	B (B) [B]
NBL[2]	-		-		8.6 (9.2) [-]	A (A) [-]	-		8.6 (9.3) [-]	A (A) [-]
NBLT[2]	1.8 (0.3) [-]	A (A) [-]	1.7 (0.2) [-]	A (A) [-]	-		1.7 (0.2) [-]	A (A) [-]	-	

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Assumes construction of two-way left turn lane along Bradford Street for 20-year horizon, as per Barrie Transportation Master Plan

TABLE 22 95TH PERCENTILE QUEUE LENGTH: UNSIGNALIZED INTERSECTIONS

Lane Group	Existing	Future Background (5-year horizon)	Future Background (20-year horizon)	Future Total (5-year horizon – Phase 1)	Future Total (20-year horizon – Full build-out)
	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)
Simcoe St / Checkley St					
WBLT	0.4 (0.2) [0.1]	0.4 (0.2) [0.1]	0.4 (0.2) [0.1]	0.6 (0.7) [0.7]	2.3 (5.2) [4.4]
NBLR	0.3 (1.5) [0.4]	0.3 (1.5) [0.4]	0.3 (1.5) [0.4]	3.9 (5.4) [4.1]	25.8 (33.7) [24.5]
Bradford St / Tim Hortons North Driveway					
EBLR	7.9 (5.9) [2.4]	8.8 (6.7) [2.6]	6.4 (4.7) [2.2]	9.1 (6.9) [2.6]	6.6 (4.8) [2.2]
NBL[2]		-	0.9 (0.1) [-]	-	0.9 (0.1) [-]
NBLT[2]	0.8 (0.1) [-]	0.8 (0.1) [-]	-	0.8 (0.1) [-]	-

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Assumes construction of two-way left turn lane along Bradford Street for 20-year horizon, as per Barrie Transportation Master Plan

9.5 SITE DRIVEWAYS

9.5.1 Bradford Street / Site Driveway

A new site driveway to Bradford Street is proposed, which will be constructed after Phase 1 of the development. The traffic capacity analysis and queuing results for the intersection under the relevant scenarios is shown in **Table 23** and **Table 24**. As shown, the intersection is projected to operate with an LOS C or better under all relevant scenarios analyzed.

TABLE 23 PEAK HOUR ANALYSIS RESULTS: BRADFORD STREET / SITE DRIVEWAY (UNSIGNALIZED)

Lane Group	Existing		Future Background (5-year horizon)		Future Background (20-year horizon)		Future Total (5-year horizon – Phase 1)		Future Total (20-year horizon – Full build-out)	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
WBLR	-[2]								18.8 (19.3) [19.5]	C (C) [C]

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Intersection does not exist under existing, future background and future total (5-year horizon) conditions

TABLE 24 95TH PERCENTILE QUEUE LENGTH: BRADFORD STREET / SITE DRIVEWAY (UNSIGNALIZED)

Lane Group	Existing	Future Background (5-year horizon)	Future Background (20-year horizon)	Future Total (5-year horizon – Phase 1)	Future Total (20-year horizon – Full build-out)
	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)
WBLR	-[2]				16.3 (13.2) [14.8]

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Intersection does not exist under existing, future background and future total (5-year horizon) conditions

9.5.2 Toronto Street / Site Driveway

A new site driveway to Toronto Street is proposed, which will be constructed as part of Phase 1 of the development. The traffic capacity analysis and queuing results for the intersection under the relevant scenarios is shown in **Table 25** and **Table 26**. As shown, the intersection is projected to operate with an LOS C or better under all relevant scenarios analyzed.

TABLE 25 PEAK HOUR ANALYSIS RESULTS: TORONTO STREET / SITE DRIVEWAY (UNSIGNALIZED)

Lane Group	Existing		Future Background (5-year horizon)		Future Background (20-year horizon)		Future Total (5-year horizon – Phase 1)		Future Total (20-year horizon – Full build-out)	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
EBR	-[2]						11.7 (17.4) [13.3]	B (C) [B]	12.3 (17.6) [14.2]	B (C) [B]

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Intersection does not exist under existing and future background conditions

TABLE 26 95TH PERCENTILE QUEUE LENGTH: TORONTO STREET / SITE DRIVEWAY (UNSIGNALIZED)

Lane Group	Existing	Future Background (5-year horizon)	Future Background (20-year horizon)	Future Total (5-year horizon – Phase 1)	Future Total (20-year horizon – Full build-out)
	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)
EBR	-[2]			0.9 (0.9) [0.8]	0.7 (0.9) [0.6]

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Intersection does not exist under existing and future background conditions

9.6 SENSITIVITY ANALYSIS

9.6.1 Bradford Street Site Driveway Signalization

The Bradford Street site driveway is proposed as an unsignalized t-intersection with restricted turns (right-in/right-out/left-out) and located to the south of the existing Tim Hortons north driveway on the west side of Bradford.

The Bradford Street site access is a candidate for full-moves signalization by future total buildout or at the time that lands on the west side of Bradford Street are redeveloped and the access on the west side can be realigned with the proposed site driveway.

For the purpose of reviewing this signalized scenario and prior to any known development density on the existing lands west of Bradford, eastbound traffic volumes currently entering/exiting the Tim Hortons North Driveway and commercial site have been assumed as the fourth (eastbound) leg of the future signalized intersection. The site related traffic movements for full buildout, including left-turns into the site, were assigned to the wesbound leg and left and right turns from Bradford Street of the future intersection.

The associated changes to the total site traffic volumes for full build-out and the resultant total site traffic volumes for full build-out under the sensitivity considering a signal on Bradford Street are shown in **Figure 25** and **Figure 26** respectively.

The future total traffic volumes for full build-out are shown in **Figure 27**.

A cycle length of 72 seconds was adopted, consistent with the Bradford Street / Simcoe Street intersection.

The results for the sensitivity analysis of the Bradford Street / Tim Hortons North Driveway / Site Driveway intersection provided in **Table 27** and **Table 28**.

Under future total conditions at the 20-year horizon (Full build-out) with the proposed signalized configuration, the intersection is expected to operate at an overall v/c ratio of 0.37, 0.40, and 0.41 during the AM, PM and Saturday peak hours respectively.

Based on the capacity analysis it is projected that a signalized configuration at this location as described above would operate within theoretical capacity.

As growth and change occurs within downtown and along the Bradford Street corridor and considering the analysis assumptions in this report contain conservative values for both mode split and corridor growth assumptions, this location should be monitored for signalization into the future.

TABLE 27 PEAK HOUR ANALYSIS RESULTS: BRADFORD STREET / TIM HORTONS NORTH DRIVEWAY / SITE DRIVEWAY (SIGNALIZED) – SENSITIVITY ANALYSIS

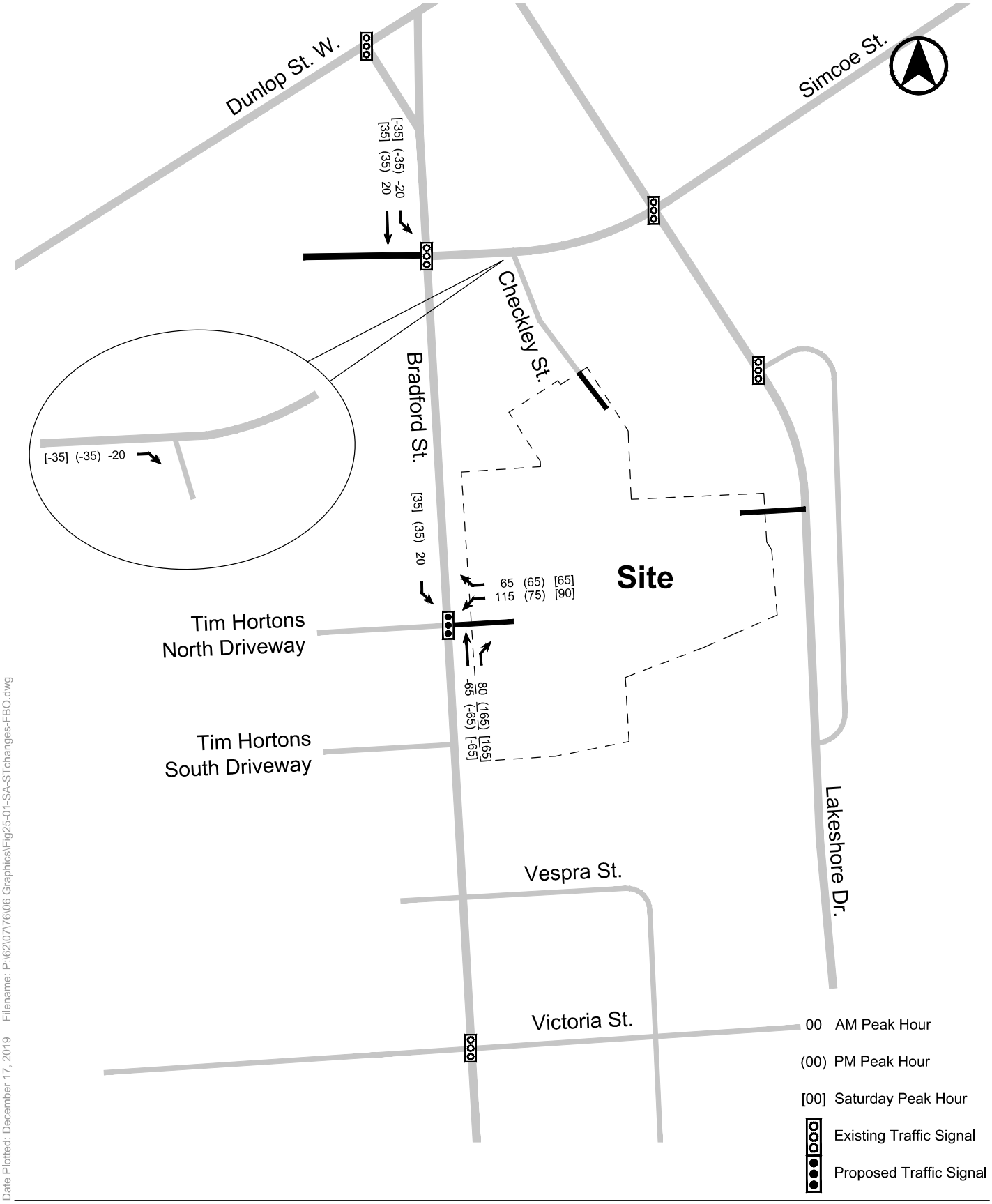
Lane Group	Existing		Future Background (5-year horizon)		Future Background (20-year horizon)		Future Total (5-year horizon – Phase 1)		Future Total (20-year horizon – Full build-out)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL									0.35 (0.20) [0.10]	C (C) [C]
EBTR									0.03 (0.02) [0.02]	C (C) [C]
WBL									0.63 (0.38) [0.45]	C (C) [C]
WBTR									0.04 (0.05) [0.04]	C (C) [C]
NBL				-[2]					0.07 (0.01) [-]	A (A) [-]
NBTR									0.32 (0.41) [0.40]	A (A) [A]
SBL									0.05 (0.11) [0.11]	A (A) [A]
SBTR									0.22 (0.32) [0.18]	A (A) [A]
Overall									**0.37 (0.40) [0.41]**	**A (A) [A]**

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Bradford Street driveway does not exist under existing, future background and future total (5-year horizon) conditions

TABLE 28 95TH PERCENTILE QUEUE LENGTH: BRADFORD STREET / TIM HORTONS NORTH DRIVEWAY / SITE DRIVEWAY (SIGNALIZED) – SENSITIVITY ANALYSIS

Lane Group	Existing	Future Background (5-year horizon)	Future Background (20-year horizon)	Future Total (5-year horizon – Phase 1)	Future Total (20-year horizon – Full build-out)
	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)
EBL					17.6 (10.1) [6.3]
EBTR					- (-) [-]
WBL					28.5 (16.5) [19.3]
WBTR			-[2]		- (2.1) [1.5]
NBL					5.6 (1.9) [-]
NBTR					34.1 (59.1) [57.8]
SBL					2.8 (5.1[3]) [6.6]
SBTR					13.0 (36.3) [20.3]

Notes:
1. xx (xx) [xx] – AM Peak (PM Peak) [Sat Peak]
2. Bradford Street driveway does not exist under existing, future background and future total (5-year horizon) conditions
3. Volume for 95th percentile queue is metered by upstream signal.



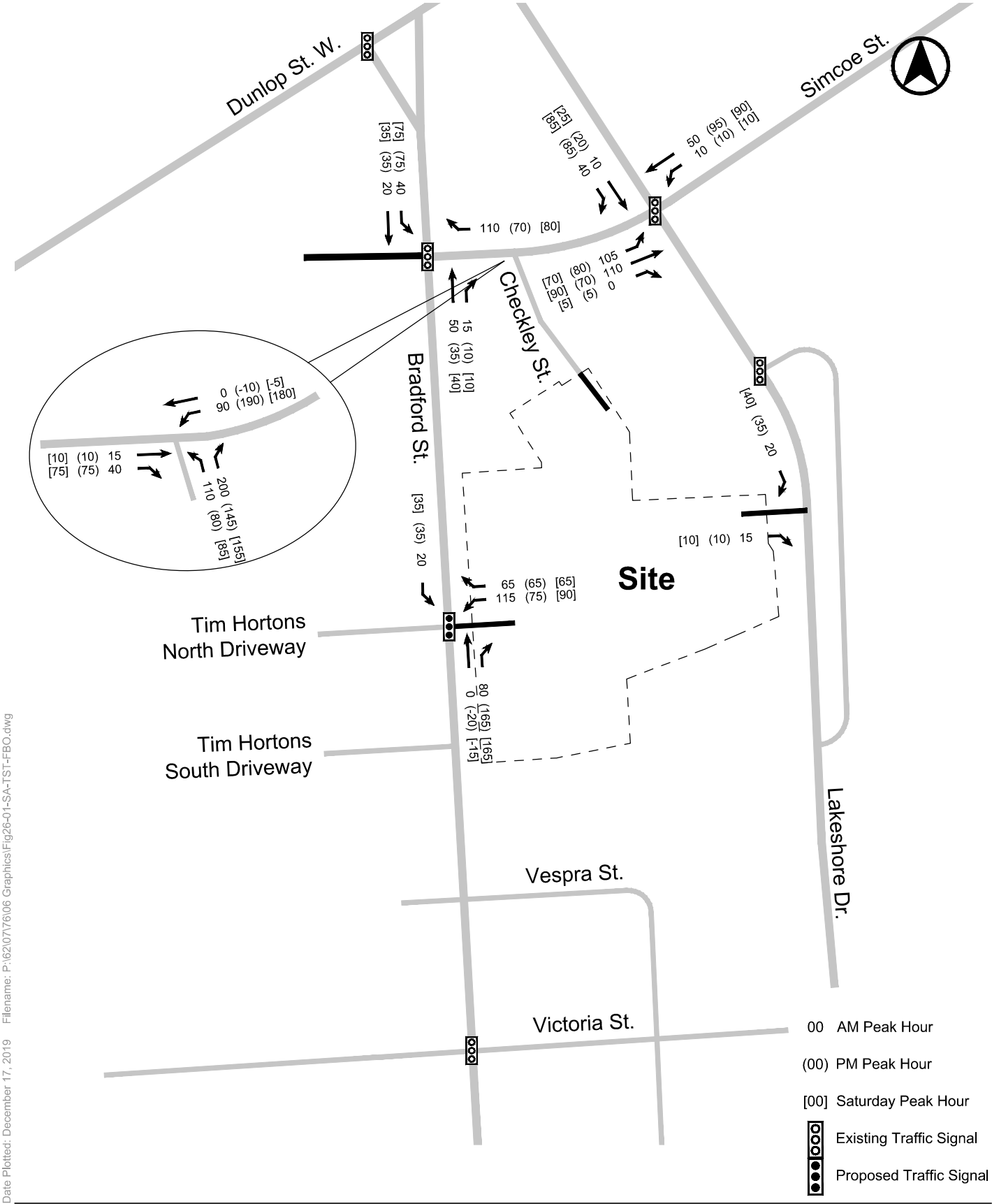
Date Plotted: December 17, 2019 Filename: P:\62\07\76\06 Graphics\Fig25-01-SA-STchanges-FBO.dwg

SENSITIVITY ANALYSIS
CHANGES TO TOTAL SITE TRAFFIC VOLUMES
- FULL BUILD OUT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 25



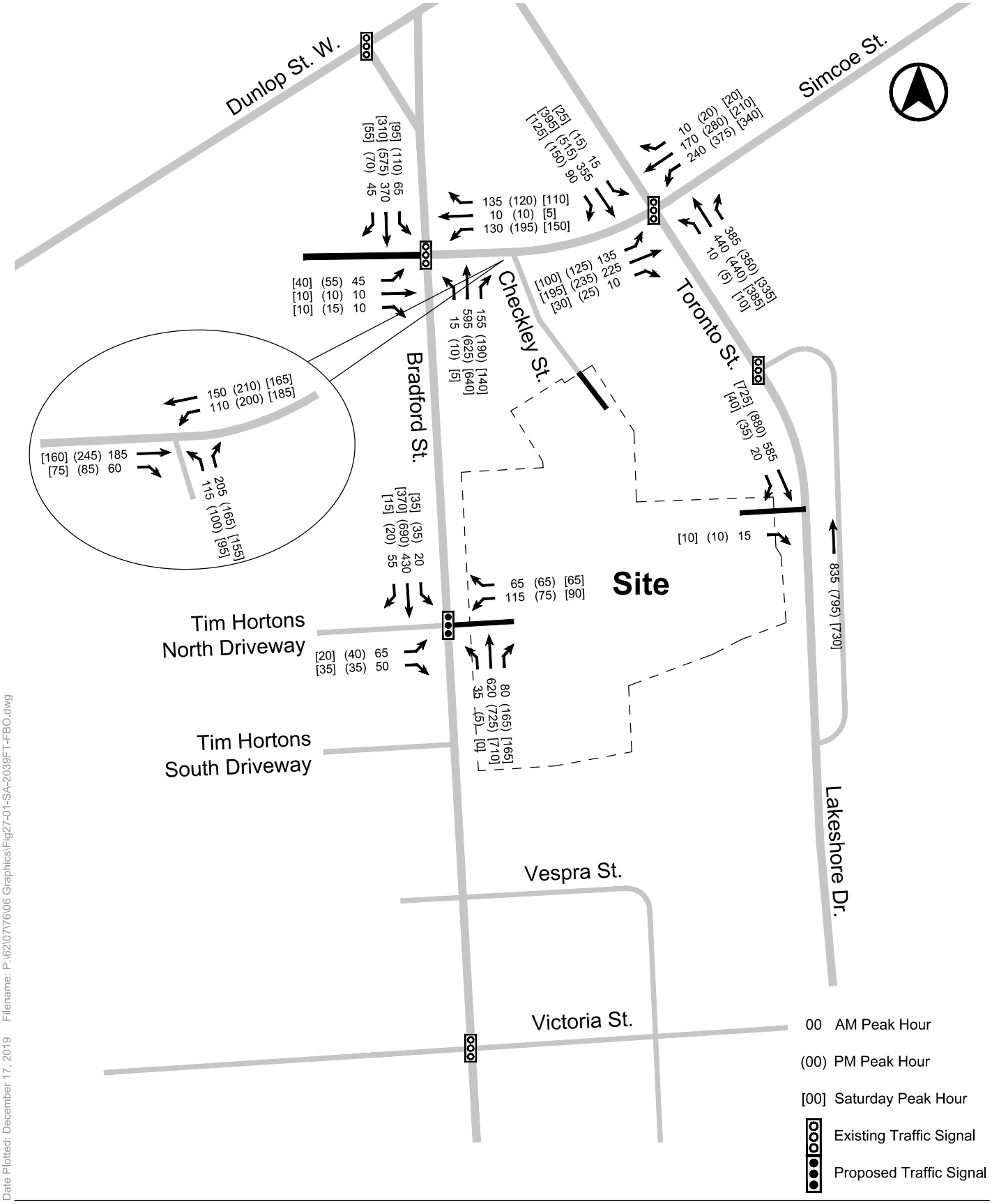
Date Plotted: December 17, 2019 Filename: P:\62\07\76\06 Graphics\Fig26-01-SA-TST-FBO.dwg

SENSITIVITY ANALYSIS
TOTAL SITE TRAFFIC VOLUMES
- FULL BUILD OUT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 26



Date Plotted: December 17, 2019 Filename: P:\62\07\76\06 Graphics\Fig27-01-SA-2039FT-FBO.dwg

SENSITIVITY ANALYSIS
20-YEAR FUTURE TOTAL TRAFFIC VOLUMES (2039)
- FULL BUILD-OUT

BA Group

51-75 BRADFORD STREET AND 20 CHECKLEY STREET
6207-76 December 2019

Figure 27

10.0 CONCLUSIONS

BA Group is retained by Barrie Lakeshore Developments to provide transportation advisory services in relation to the Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) for the proposed mixed-use development at 51, 53, 55 & 75 Bradford Street and 20 Checkley Street, Barrie, Ontario (herein referred to as the site).

Background

1. The site is located in the City Centre Revitalization area, specifically located between Bradford Street to the west, Lakeshore Drive to the east, Checkley Street to the north, and Bunker's Creek to the south.

2. The existing site is vacant and Bunker's Creek runs through the southern portion of the site.

3. The site is identified as City Centre in the Barrie Official Plan (OP) Land Use Plan.

4. The site is located within the Urban Growth Centre (UGC) and is currently zoned for C2-2 (Transition Centre Commercial) and an Environmental Protection Area (EP) on either side of Bunker's Creek. A new site-specific by-law is proposed for the site as part of this OPA and ZBA that will supersede former site specific approvals for these lands.

Development Proposal

5. The concept plans for the site contemplate a mixed-use development within four phases that will be comprised of the following site statistics:

	Time	Residential	Hotel	Retail
Phase 1: Tower 1	0 - 4 years	332 units	152 rooms[1]	-
Phase 2: Tower 2	4 to 8 years	1,104 units	-	2,370 m^2
Phase 3: Tower 3	8 to 12 years			
Phase 4: Tower 4	12 to 16 years	464 units	-	1,001 m^2
Total	**15 to 20 years**	**1,900 units 149,854 m^2 GFA**	**152 rooms[1] 10,459 m^2 GFA**	**3,371 m^2 GFA**

Notes:
1. The hotel will include a 465 m^2 restaurant.

6. The site is planned to be constructed in the phases noted above. The access conditions for each phase are described below:

    - Phase 1, 0 - 4 years: right turns access to Lakeshore Drive and access to Checkley Street where there is full-moves access to/from Simcoe Street via an unsignalized intersection.

    - Phase 2 and 3, 4 to 12 years: right turns access to Lakeshore Drive, full-moves access to Checkley Street, and an extension of the internal private road network to Bradford Street. Access at Bradford Street is proposed to be an unsignalized access that restricts left-in movements from

Bradford Street until such time that the property on the west side of Bradford Street redevelops. In the event that the property on the west side of Bradford Street redevelops within the Phase 2 and 3 time frame, full-moves signalized access would be warranted and recommended to serve properties on both sides of Bradford and is consistent with the planned growth, character and access conditions for the Bradford Street corridor.

- Phase 4, 12 to 16 years: Consistent with access conditions described for Phase 2 and 3. A full-moves signal at Bradford Street is anticipated and recommended to support full buildout.

7. The development will provide continuous pedestrian connections throughout the site, including an enhanced pedestrian connection between Bradford Street and Lakeshore Drive that will provide a pedestrian gateway to the waterfront and opportunities for a transit stop and signalized crossing of at the future signalized intersection on Bradford Street.

8. The City is investing in significant improvements along Bradford Street that include:
    - Centre left turn lane / median
    - HOV lanes to support the core transit routing planned for Bradford Street;
    - and cycle tracks.

9. Lakeshore Drive is also identified as a core transit route in the City's TMP along with increased transit frequency along the Barrie Go transit line.

10. The site is well positioned relative to the significant transit and active transit improvements planned along both frontage roads.

11. The development plan identifies a 5.5 metre widening and an additional 1.5 metre widening that will be required by the City to accommodate the 31 metre and 34 metre right-of-way widths planned for Bradford Street in the Official Plan and Transportation Master Plan, respectively.

Transportation Demand Management

12. TDM Plans for new development consist of various "hard" (infrastructure based) strategies (such as the provision of infrastructure), and "soft" (program based) strategies that are operational or programmatic in nature which are implemented once a use is occupied, including:
    - Reduced Parking Standards
    - Improvements to Transit and direct access to transit stops
    - Pedestrian and Cycling Infrastructure
    - Bicycle Parking; and an,
    - Implementation Plan / TDM Checklist

Parking Considerations

13. The minimum parking requirement for a Transition Centre Commercial (C-2) designation in Zoning By-Law 2009-141 is 2,476 spaces, made up of 1,900 residential spaces and 576 commercial spaces.This requirement is based on the following by-law rates:
    - 1.0 resident spaces per dwelling unit in the Urban Growth Centre that provides for both resident and resident visitor demands; and,
    - 1.0 commercial space per 24 m^2 of gross floor area for non-residential components of mixed-use buildings in Commercial Zones.

14. A parking strategy for the project has been developed that seeks to balance the need to provide parking in the near term to accommodate current demands with the desire to capitalize on the site's downtown location and transit access by minimizing auto parking in the long term. As such a phased parking strategy is proposed. The following resident, resident visitor and commercial parking rates are presented for the proposed site, by development phase:

<u>Recommended Phase 1 Parking Provisions</u>

15. To ensure that the parking supply for the project provides an adequate amount of vehicular parking in line with current demand trends as to avoid any off-site neighbourhood impacts, the following minimum parking requirements are proposed for Phase 1:

    - A minimum resident parking requirement of:
        i. 0.85 resident spaces per unit plus 0.15 visitors for a total of 1.0 per unit

    - Minimum non-resident parking requirements as follows:
        i. 1.0 space per hotel room
        ii. 9.0 spaces per 100 m^2 restaurant floor area; and,
        iii. apply shared parking provisions to maximize the efficiency of the parking supply.

16. Based on the above-noted rates, Phase 1 would require a total of 526 spaces. The current concept plan included with the application illustrates a provision of 526 spaces (356 spaces in Building 1 and 170 temporary surface spaces) which satisfies the recommended Phase 1 requirements.

17. The proposed rates for Phase 1 are reflective of the general parking demand in the area abd accommodates the intent of the City of Barrie's current By-law requirement of providing a combined rate of 1.0 per unit for residential uses. In addition the proposed non-residential uses are consistent with the requirements from other municipalities for a mixed use downtown setting and are appropriate.

Recommended Parking Requirements for Full Build-Out:

18. Consistent with the goal of supporting non-auto modes of transportation and capitalizing on the site's downtown context, the project has a goal of reducing the amount of vehicular parking provided for residential uses in the long term. The following are the recommended parking requirements in the long term:

    - A minimum resident parking requirement of:
        i. 0.75 resident spaces per unit for residents plus 0.15 spaces per unit for visitors;

    - The minimum non-resident parking rates of:
        i. 1.0 space per hotel room; and,
        ii. 3.08 spaces per 100 m^2 for retail uses

    - The draft by-law for the site identifies a rate of 3.0 spaces per 100 m^2 for retail/restaurant uses, which meets the intent of the individual non-residential rates as they apply to the full buildout statistics (i.e. the blended rates of 2.5 per 100 m^2 commercial-retail and 9.0 per 100 m^2 restaurant is equivalent to a blended rate of 3.08 spaces per 100 m^2 based on development plans)

19. The proposed long term parking supply targets a reduced resident parking supply that recognizes that the City of Barrie is planning a significant investment in local transit in the site area, and given the site location downtown which is extremely well situated in terms of access to amenities and active transportation. The proposed long term requirement is also appropriate given the rental nature of the overall project which will ensure the developer has control over all parking spaces and will sure that residential parking is provided only to residents who request a space (rather than spaces that come along with the purchase of condominium). The site is also supported by a suite of TDM initiatives that will assist residents in encouraging reduced auto ownership for residents.

20. The intent of the recommended non-residential requirements remain unchanged from Phase 1.These continue to be appropriate on the basis that they are accepted requirements in other Ontario municipalities in downtown mixed use settings.

21. A proposed parking requirement for residential uses less than one per unit, even including visitor needs, is a reasonable and appropriate long term goal for a project in a downtown setting based on a review of parking demand data from other comparable municipalities which suggests that parking demand at residential apartments can range from 0.55 to 1.04.

22. The proposed phased parking strategy will utilize surface parking as an interim measure in order to accommodate a portion of the Phase 1 parking requirements. The use of surface parking as an interm measure will allow the development to proceed on a phased basis allowing travel behaviour trends to change over time while also providing an opportunity to reduce the parking requirements for future phases to the long term goal through monitoring of the parking demands that occur on the site.

23. The parking needs for the site will be confirmed through monitoring parking on the site, and through reviewing the overall trends related to parking demand, as the site builds out.

24. Application of the proposed long term requirements would result in total long term parking requirement for the project of 1980 spaces. The concept plan prepared for the site currently illustrates the provision of 2055 spaces. This meets the recommended long term transit supportive parking requirements and is appropriate given the foregoing ability to monitor the need for parking as the site builds out.

25. The proposed parking strategy seeks to maximize the efficiency of the site parking supply through providing visitor parking and non-residential parking together within a combined shared parking format. Shared parking is an accepted practice for mixed use developments in many different Ontario municipalities and is appropriate given the site context and mix of uses contemplated within the site.

26. The proposed parking supply satisfies the rates described above. Further details regarding the parking circulation, pavement markings, and traffic signs will be provided as part of subsequent site plan applications for each phase.

27. Design of the parking garage will comply with Accessibility for Ontarians with Disabilities Act (AODO). The number, location and design of barrier free parking stalls will be identified in subsequent site plan applications for the site.

Bike Parking

28. A minimum of 0.15 bike spaces per unit is designated for residents and 0.03 space per unit designated for visitors. The non-residential uses will provide bicycle parking at a rate of one bicycle parking spaces for every 7% of the non-residential parking spaces required based on the proposed (reduced) standards

29. The proposed bicycle standards exceed the zoning bylaw requirements for the site.

Loading Considerations

30. Zoning By-Law No. 2009-141 requires three loading spaces to serve the industrial / commercial land uses on the site. There is no minimum requirement for residential uses.

31. The site plan illustrates five (5) loading spaces to serve all land uses on the site, which exceeds bylaw requirements.

32. Further details regarding the loading supply, design and function of the loading areas, including turning templates for garbage collection and loading zones will be provided as part of subsequent site plan applications for the site.

Traffic Forecast Estimates

33. Traffic operations have been reviewed for existing, future background, and future total conditions for existing (2019), Phase 1 (2024), and full buildout (2039).

34. Background traffic allowances were made for the proposed development on the west side of Bradford Street at 34-50 Bradford Street (Barrie Central Collegiate & Red Storey Field) which proposes 600 residential units and a YMCA.

35. A general corridor growth rate of 2% per annum (non-compounded) was adopted in both directions along both Bradford Street and Toronto Street / Lakeshore Drive as instructed by the City of Barrie. This represents the growth anticipated in the EMME model prepared for the Transportation Master Plan (TMP). The 2% growth rate could be considered conservative given it also includes significant population and employment forecasts for both the 34-50 Bradford Street development and 51-75 Bradford St and 20 Checkley St development (the site) who's site traffic has been specifically forecast on the local road network as part of this study.

36. Phase 1 (Building 1) of the development is estimated to generate 165, 200 and 220 two-way vehicle trips during the AM, PM and Saturday peaks respectively.

37. Site traffic volumes can be acceptably accommodate on the local area road network and site driveways under future background and future total conditions for Phase 1.

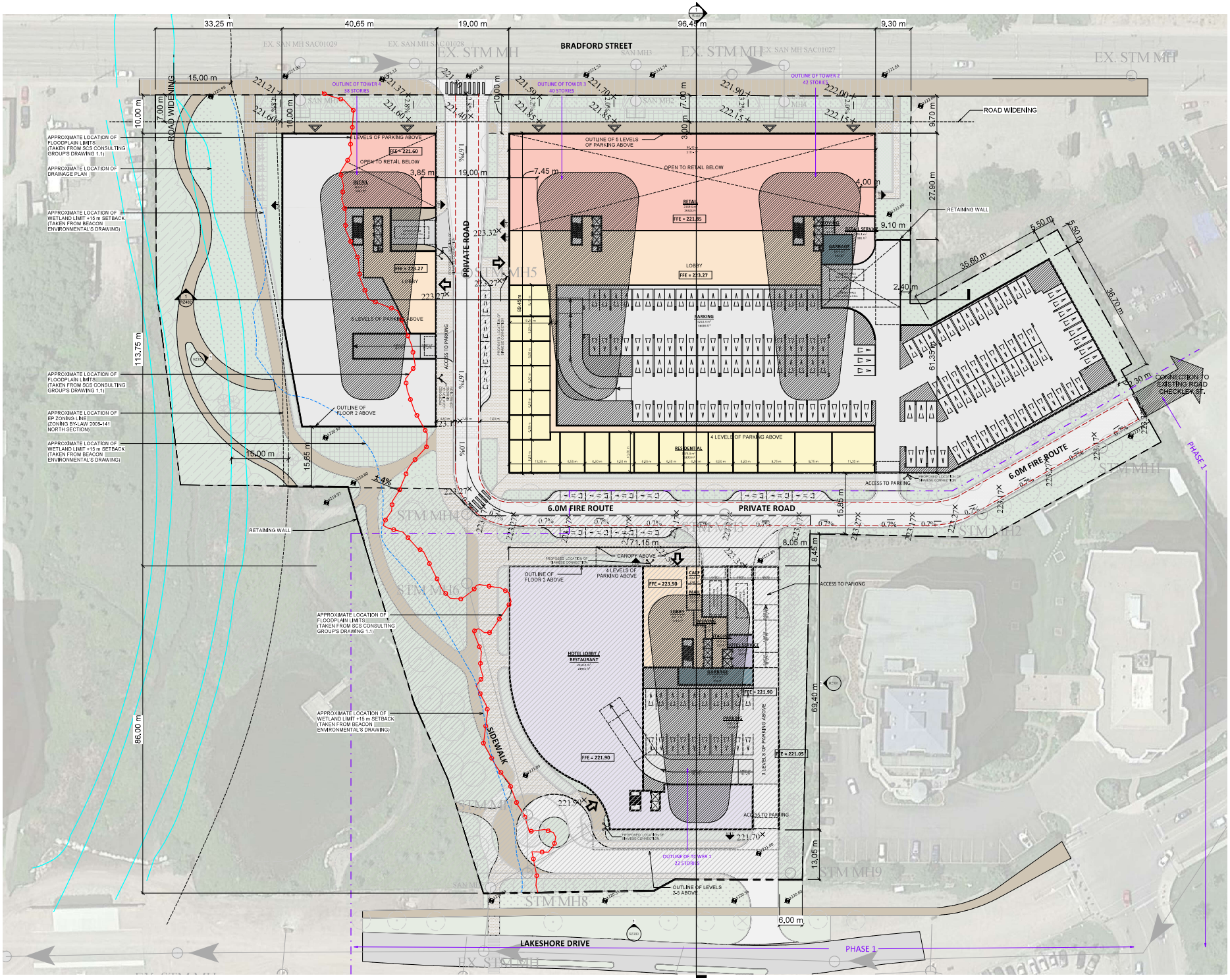
38. Full build-out (Buildings 1, 2, and 3) of the development is projected to generate 755, 875 and 900 two-way vehicle trips during the AM, PM and Saturday peaks respectively.

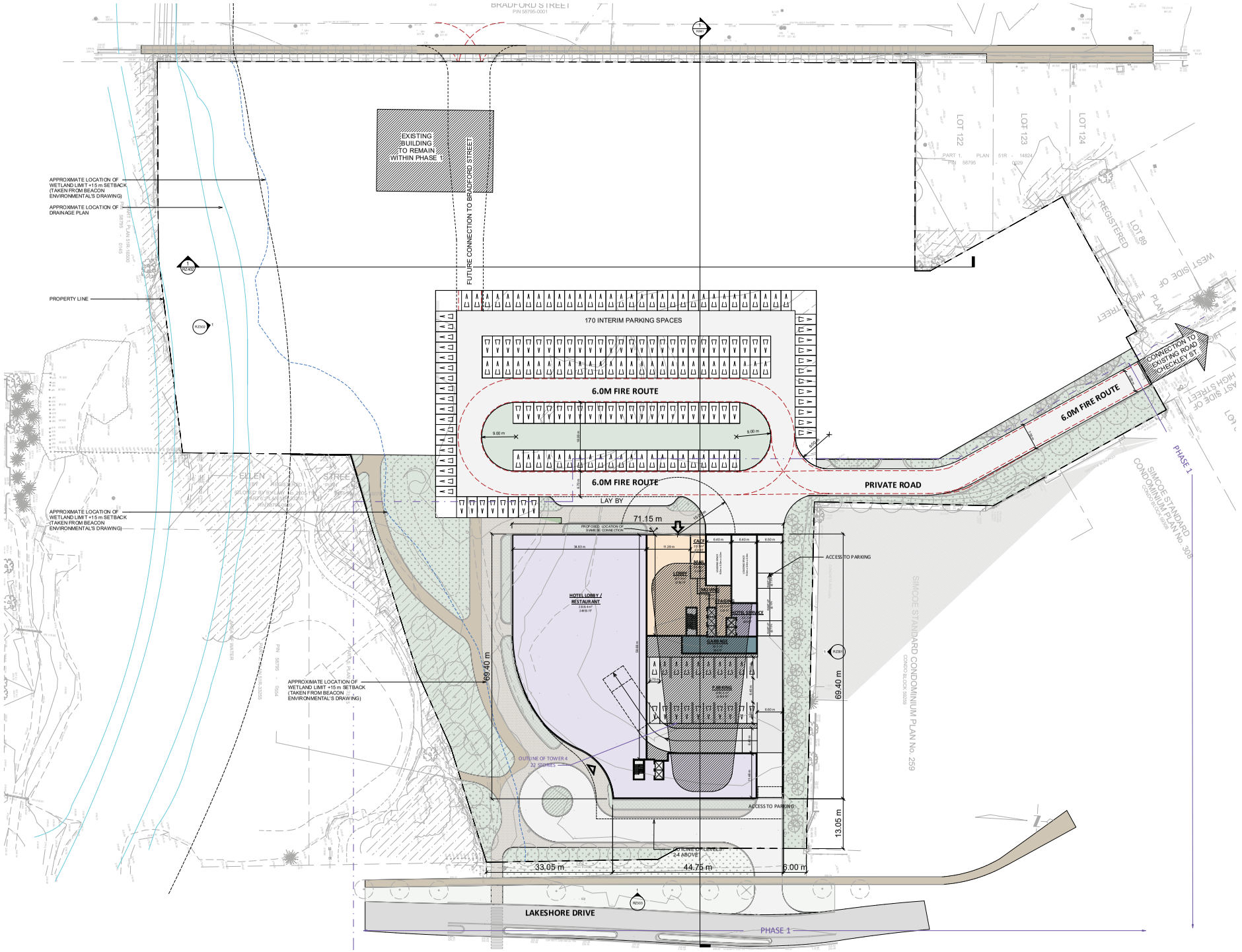
39. Site traffic volumes can be acceptably accommodate on the local area road network and site driveways under future background and future total conditions for full buildout.
    - Access at Bradford Street in Phase 2 and 3 is proposed to be an unsignalized access that restricts left-in movements from Bradford Street until such time that the property on the west side of Bradford Street redevelops. In the event that the property on the west side of Bradford Street redevelops within the Phase 2 and 3 time frame, full-moves signalized access would be warranted and recommended to serve properties on both sides of Bradford and is consistent with the planned growth, character and access conditions for the Bradford Street corridor.

    - Consistent with access conditions described for Phase 2, a full-moves signal at Bradford Street is anticipated and recommended to support full buildout. As growth and change occurs within downtown and along the Bradford Street corridor and considering the analysis assumptions in this report contain conservative values for both mode split and corridor growth assumptions, this location should be monitored for signalization into the future, to determine the most accurate timing for implementation.

APPENDIX A:
Site Plan

Turner Fleischer Architects, December 16, 2019


BRADFORD STREET
PRIVATE ROAD
PRIVATE ROAD
6.0M FIRE ROUTE
6.0M FIRE ROUTE
LAKESHORE DRIVE
SIDEWALK
ROAD WIDENING
ROAD WIDENING
RETAINING WALL
RETAINING WALL
APPROXIMATE LOCATION OF FLOODPLAIN LIMITS (TAKEN FROM SCS CONSULTING GROUP'S DRAWING 1.1)
APPROXIMATE LOCATION OF DRAINAGE PLAN
APPROXIMATE LOCATION OF WETLAND LIMIT +15 m SETBACK (TAKEN FROM BEACON ENVIRONMENTAL'S DRAWING)
APPROXIMATE LOCATION OF FLOODPLAIN LIMITS (TAKEN FROM SCS CONSULTING GROUP'S DRAWING 1.1)
APPROXIMATE LOCATION OF EP ZONING LINE (ZONING BY-LAW 2009-141 NORTH SECTION)
APPROXIMATE LOCATION OF WETLAND LIMIT +15 m SETBACK (TAKEN FROM BEACON ENVIRONMENTAL'S DRAWING)
APPROXIMATE LOCATION OF FLOODPLAIN LIMITS (TAKEN FROM SCS CONSULTING GROUP'S DRAWING 1.1)
APPROXIMATE LOCATION OF WETLAND LIMIT +15 m SETBACK (TAKEN FROM BEACON ENVIRONMENTAL'S DRAWING)
OUTLINE OF TOWER 4 39 STORIES
OUTLINE OF TOWER 3 40 STORIES
OUTLINE OF TOWER 2 42 STORIES
OUTLINE OF TOWER 1 23 STORIES
OUTLINE OF 5 LEVELS OF PARKING ABOVE
OUTLINE OF FLOOR 2 ABOVE
OUTLINE OF LEVELS 2-5 ABOVE
5 LEVELS OF PARKING ABOVE
4 LEVELS OF PARKING ABOVE
3 LEVELS OF PARKING ABOVE
OPEN TO RETAIL BELOW
CANOPY ABOVE
ACCESS TO PARKING
CONNECTION TO EXISTING ROAD CHECKLEY ST.
PHASE 1
PHASE 1
RETAIL
LOBBY
PARKING
RESIDENTIAL
HOTEL LOBBY / RESTAURANT
GARBAGE
CAGE
FFE = 221.60
FFE = 223.27
FFE = 223.27
FFE = 223.50
FFE = 221.90
FFE = 221.90
FFE = 221.05
33.25 m
40.65 m
19.00 m
96.45 m
9.30 m
15.00 m
10.00 m
7.00 m
3.00 m
9.70 m
27.90 m
19.00 m
7.45 m
4.00 m
9.10 m
3.85 m
5.50 m
5.50 m
35.60 m
36.70 m
2.40 m
61.35 m
12.30 m
113.75 m
15.00 m
15.85 m
71.15 m
8.05 m
8.45 m
69.40 m
13.05 m
86.00 m
6.00 m
4%
0.7%
10%
8.4m
6.0m
6.0m
6.0


BRADFORD STREET
PIN 58795-0001
EXISTING BUILDING TO REMAIN WITHIN PHASE 1
FUTURE CONNECTION TO BRADFORD STREET
APPROXIMATE LOCATION OF WETLAND LIMIT +15 m SETBACK (TAKEN FROM BEACON ENVIRONMENTAL'S DRAWING)
APPROXIMATE LOCATION OF DRAINAGE PLAN
PROPERTY LINE
170 INTERIM PARKING SPACES
6.0M FIRE ROUTE
6.0M FIRE ROUTE
6.0M FIRE ROUTE
LAY BY
PRIVATE ROAD
CONNECTION TO EXISTING ROAD CHECKLEY ST
71.15 m
PROPOSED LOCATION OF SIAMESE CONNECTION
ACCESS TO PARKING
HOTEL LOBBY / RESTAURANT
LOBBY
HOTEL SERVICE
69.40 m
69.40 m
OUTLINE OF TOWER 4 32 STOREYS
ACCESS TO PARKING
OUTLINE OF LEVEL 8 24 ABOVE
13.05 m
33.05 m
44.75 m
6.00 m
LAKESHORE DRIVE
PHASE 1
PHASE 1
SIMCOE STANDARD CONDOMINIUM PLAN No. 259
SIMCOE STANDARD CONDOMINIUM PLAN No. 305
REGISTERED PLAN 51R-14824
LOT 122
LOT 123
LOT 124
LOT 89
WEST SIDE OF HIGH STREET
EAST SIDE OF HIGH STREET
ELLEN STREET
CLOSED BY BYLAW No. 2003-116
PARKING PLAN
PARKING STRUCTURE
PARKING STRUCTURE
PARKING STRUCTURE

APPENDIX B:
Existing Transit Routes

TABLE B1 TRANSIT SERVICES: BUS AND TRAIN SERVICES

Type of Transit Service	Name / Number of Service Line	Headway	Closest Stop Location	Description
Barrie Transit Bus	1A – Georgian Mall 1B – Welham	Monday to Saturday – 30 min during peak periods Sunday – 45 min	Bradford Street adjacent to the site	This route generally runs in the north-south direction, but also includes some east-west travel. It operates between Georgian Mall and Park Place. This bus route provides connections to the Downtown Barrie Terminal and Allandale Waterfront GO Station.
	3A – Georgian Drive 3B –Painswick	Monday to Saturday – 30 min during peak periods Sunday – 1 hr	Vespra Street / Innisfil Street intersection (6 min or 550 m from the site)	The route generally runs in the north-south direction between Georgian College and the Barrie South GO. The 3A ends at Georgian College, while the 3B ends at the Royal Victoria Hospital. The bus route provides connections to Park Place and the Downtown Barrie Terminal.
	4A – East Bayfield 4B – South GO	Monday to Saturday – 30 to 35 min during peak periods Sunday – 65 min	Bradford Street adjacent to the site	This route generally runs in the north-south direction between Georgian Mall and Barrie South GO Station. The route serves the eastern side of Barrie. The bus route provides connections to Allendale Waterfront GO Station and the Downtown Barrie Terminal.
	7A – Bell Farm 7B – Bear Creek	Monday to Saturday – 30 min during peak periods Sunday – 1 hr	Bradford Street adjacent to the site	This route generally runs in a north-south direction between Georgian College and Park Place. The route serves the western side of Barrie. The bus route provides connections to the Downtown Barrie Terminal and Allendale Waterfront GO Station.
	8A – RVH / Yonge 8B – Crosstown / Essa	Monday to Saturday – 30 min during peak periods Sunday – 1 hr	Bradford Street adjacent to the site	Route 8A and Route 8B each operate between Park Place and Georgian College in a north-south direction, but travel in opposite directions only crossing in the middle. The 8B serves the northwest and southeast areas of Barrie, while the 8A serves the northeast and southwest areas of Barrie. The 8A bus route provides a connection to the Downtown Barrie Terminal, while the 8B provides connections to the Barrie South GO Station, Allendale Waterfront GO Station and the Downtown Barrie Terminal.
	90A – Angus Borden 90B – Peacekeepers Way	Bus service is provided weekdays only, with 5 buses travelling in each direction at various times during the day	Allandale Waterfront GO Station (15 min or 950 m from the site)	This route generally runs in an east-west direction between Allendale Waterfront GO Station and Lundy's Lane in the south west.

Type of Transit Service	Name / Number of Service Line	Headway	Closest Stop Location	Description
GO Bus	68 – Barrie / Newmarket	30 to 90 min 7 days a week	Downtown Barrie Terminal (5-6 min or 330 m from the site)	This bus route travels north-south between the Barrie Transit Terminal and Aurora GO (68) or East Gwillimbury GO (68B). Major stops occur at Allandale Waterfront GO, Barrie South GO, Bradford GO, and East Gwillimbury GO (68) and Newmarket GO (68). Connections are provided at East Gwillimbury and Aurora to the Barrie train line and the 65 bus lines that travel to Union Station.
GO Train	Barrie Line	Weekdays – 7 trains run in the morning (southbound) and 7 trains run in the evening (northbound) Weekend – 3 trains run in each direction at various times during the day	Allandale Waterfront GO Station (15-20 min or 1.0 km from the site)	The Barrie train line operates north-south between Allandale Waterfront GO and Toronto Union Station. Station stops are located at Barrie South GO, Bradford GO, East Gwillimbury GO, Newmarket GO, Aurora GO, King City GO, Maple GO, Ruterford GO, York University GO, and Downsview Park GO.

APPENDIX C:
Parking Demands

Proxy Sites

Date November 12, 2019
Client Smart Centres and Greenwin

Location	Units	Resident (Spaces/Unit)	Resident Visitor	Auto Driver Mode Share	Comments	Comments
615 Fernbank Road, Newmarket	20	0.9	0.05	72%	Demands Rates are for market units Mixed Market, RGI, Senion Greenwin, Surveyed by Cole Engineering	Approximately 250 m from 4 local bus routes
349 / 351 Crowder Boulevard, Newmarket	54	0.98	0.12	71%	Demands Rates are for market units Mixed Market, RGI, Senion Greenwin, Surveyed by Cole Engineering	Within approximately 250 m of 4 local bus route
25 Deverill Court, Markham	60	0.88	0.12	61%	Demands Rates are for market units 50% Market / 50% RGI Greenwin, Surveyed by Cole Engineering	Within approximately 150 m of 3 local bus routes and 1 km from Unionville GO Station
145 Essex Avenue, Richmond Hill	70	1.04	0.14	61%	Demands Rates are for market units Mixed Market, RGI Greenwin, Surveyed by Cole Engineering	Within approximately 250 m from 2 local bus routes and 250 m from Richmond Hill GO Station
267 & 283 The Parkway, Kingston	122	0.93	0.06	78%	Parking included in lease Rate based on observed demand	Approximately 125 m from 4 local bus routes and 725 m from Kington VIA Rail Station
2395 Princess Street, Kingston	56	0.95		82%-84%	Rate based on observed demand	Approximately 100 m from 3 local bus routes
860 Norwest Road, Kingston	118	0.81	0.05	79%	Parking facility shared with 2727 Princess Street Rate based on observed demand	Within approximately 100 m from 4 local bus routes
16 Leroy Grant Drive, Kingston	170	0.55	0.08	82%	Rate based on observed demand	Within approximately 300 m from 3 local bus routes
5 & 7, 8 & 16 Wilsonview Avenue, Guelph	141	0.91	0.14	68%	Rate based on observed demand	Within approximately 200 m from 4 local bus routes
	Minimum	0.55	0.05			
	Maximum	1.04	0.14			

APPENDIX D:
Turning Movement Counts

Turning Movement Count (8 . BRADFORD ST & TIM HORTONS DRIVEWAY)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:30:00	4	78	0	0	0	82	0	0	0	0	0	0	0	62	3	0	0	65	18	0	14	0	0	32	179	
07:45:00	5	67	0	0	0	72	0	0	0	0	2	0	0	87	8	0	2	95	17	0	19	0	0	36	203	
08:00:00	9	96	0	0	0	105	0	0	0	0	1	0	0	83	3	0	0	86	12	0	21	0	2	33	224	
08:15:00	17	81	0	0	0	98	0	0	0	0	0	0	0	105	5	0	0	110	15	0	14	0	0	29	237	843
08:30:00	16	75	0	0	0	91	1	0	0	0	1	1	0	100	9	0	0	109	9	0	21	0	1	30	231	895
08:45:00	14	84	0	0	0	98	0	0	0	0	3	0	0	118	13	0	1	131	17	0	19	0	1	36	265	957
09:00:00	9	73	0	0	0	82	0	0	0	0	1	0	0	132	8	0	0	140	10	0	10	0	0	20	242	975
09:15:00	9	75	0	0	0	84	0	0	0	0	0	0	0	92	7	0	1	99	16	0	14	0	0	30	213	951
BREAK																										
16:00:00	6	125	0	0	0	131	0	0	0	0	3	0	0	138	4	0	1	142	15	0	9	0	1	24	297	
16:15:00	7	121	0	0	1	128	0	0	0	0	2	0	0	144	1	0	0	145	10	0	10	0	0	20	293	
16:30:00	4	122	0	0	0	126	0	0	0	0	4	0	0	136	1	0	0	137	10	0	12	0	3	22	285	
16:45:00	7	131	0	0	2	138	0	0	0	0	1	0	0	137	1	0	0	138	9	0	11	0	1	20	296	1171
17:00:00	2	151	0	0	0	153	0	0	0	0	0	0	0	149	0	0	0	149	8	0	9	0	2	17	319	1193
17:15:00	2	149	0	0	1	151	0	0	0	0	4	0	0	125	0	0	0	125	6	0	5	0	0	11	287	1187
17:30:00	4	91	0	0	0	95	0	0	0	0	1	0	0	175	0	0	0	175	5	0	12	0	0	17	287	1189
17:45:00	4	86	0	0	0	90	0	0	0	0	0	0	0	112	1	0	0	113	6	0	0	0	0	6	209	1102
Grand Total	119	1605	0	0	4	1724	1	0	0	0	23	1	0	1895	64	0	5	1959	183	0	200	0	11	383	**4067**	-
Approach%	6.9%	93.1%	0%	0%		-	100%	0%	0%	0%		-	0%	96.7%	3.3%	0%		-	47.8%	0%	52.2%	0%		-	-	-
Totals %	2.9%	39.5%	0%	0%		42.4%	0%	0%	0%	0%		0%	0%	46.6%	1.6%	0%		48.2%	4.5%	0%	4.9%	0%		9.4%	-	-
Heavy	1	53	0	0		-	0	0	0	0		-	0	57	1	0		-	0	0	2	0		-	-	-
Heavy %	0.8%	3.3%	0%	0%		-	0%	0%	0%	0%		-	0%	3%	1.6%	0%		-	0%	0%	1%	0%		-	-	-
Bicycles	0	0	0	0		-	0	1	0	0		-	0	0	0	0		-	0	0	2	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	1%	0%		-	-	-

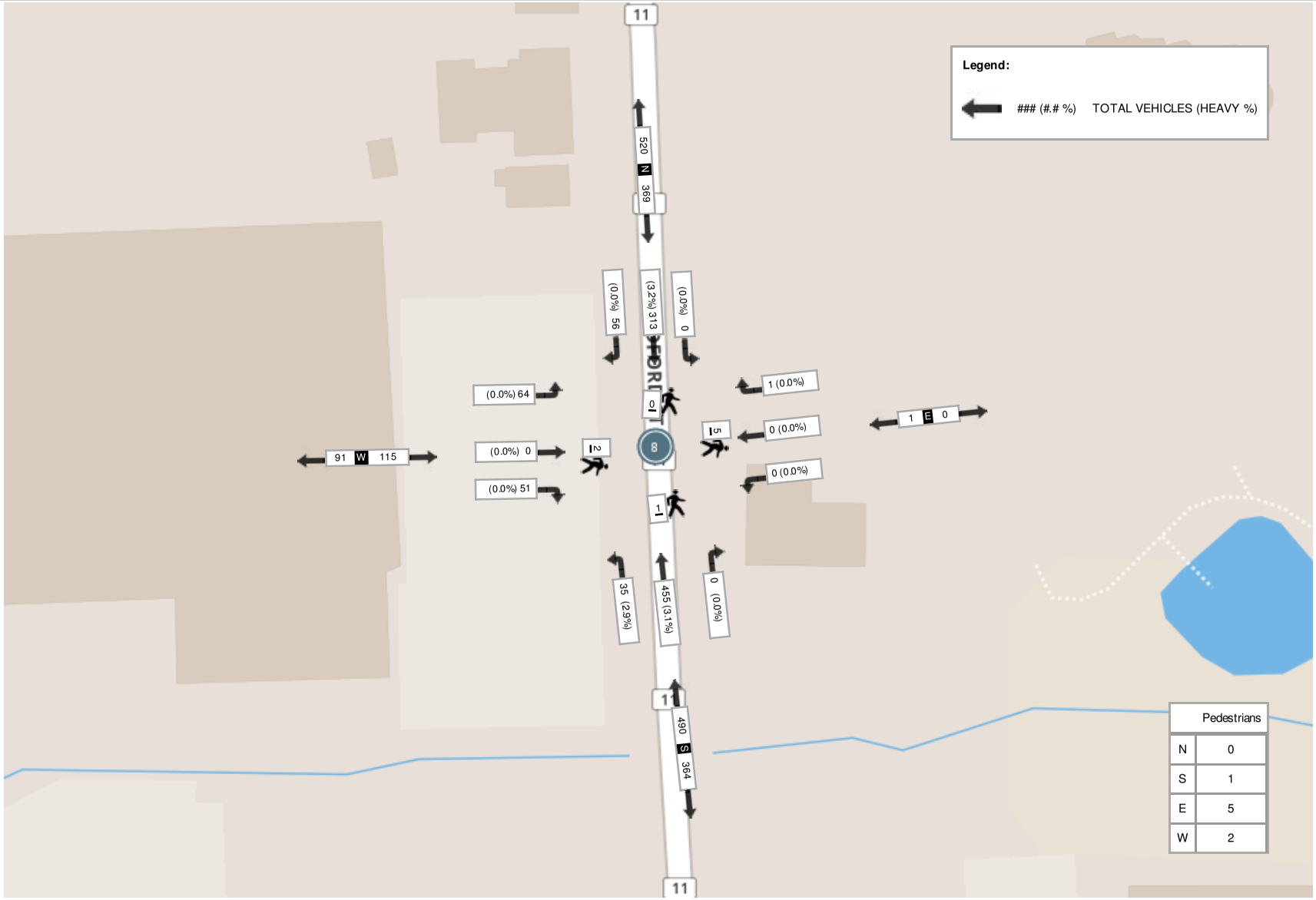
Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (5.81 °C)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:15:00	17	81	0	0	0	98	0	0	0	0	0	0	0	105	5	0	0	110	15	0	14	0	0	29	237
08:30:00	16	75	0	0	0	91	1	0	0	0	1	1	0	100	9	0	0	109	9	0	21	0	1	30	231
08:45:00	14	84	0	0	0	98	0	0	0	0	3	0	0	118	13	0	1	131	17	0	19	0	1	36	265
09:00:00	9	73	0	0	0	82	0	0	0	0	1	0	0	132	8	0	0	140	10	0	10	0	0	20	242
Grand Total	56	313	0	0	0	369	1	0	0	0	5	1	0	455	35	0	1	490	51	0	64	0	2	115	**975**
Approach%	15.2%	84.8%	0%	0%		-	100%	0%	0%	0%		-	0%	92.9%	7.1%	0%		-	44.3%	0%	55.7%	0%		-	-
Totals %	5.7%	32.1%	0%	0%		37.8%	0.1%	0%	0%	0%		0.1%	0%	46.7%	3.6%	0%		50.3%	5.2%	0%	6.6%	0%		11.8%	-
PHF	0.82	0.93	0	0		0.94	0.25	0	0	0		0.25	0	0.86	0.67	0		0.88	0.75	0	0.76	0		0.8	-
Heavy	0	10	0	0		10	0	0	0	0		0	0	14	1	0		15	0	0	0	0		0	-
Heavy %	0%	3.2%	0%	0%		2.7%	0%	0%	0%	0%		0%	0%	3.1%	2.9%	0%		3.1%	0%	0%	0%	0%		0%	-
Lights	56	303	0	0		359	1	0	0	0		1	0	441	34	0		475	51	0	64	0		115	-
Lights %	100%	96.8%	0%	0%		97.3%	100%	0%	0%	0%		100%	0%	96.9%	97.1%	0%		96.9%	100%	0%	100%	0%		100%	-
Single-Unit Trucks	0	1	0	0		1	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	-
Single-Unit Trucks %	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.8%	0%	0%	0%	0%		0%	-
Buses	0	9	0	0		9	0	0	0	0		0	0	9	1	0		10	0	0	0	0		0	-
Buses %	0%	2.9%	0%	0%		2.4%	0%	0%	0%	0%		0%	0%	2%	2.9%	0%		2%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	62.5%		-	-	-	-	12.5%		-	-	-	-	25%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

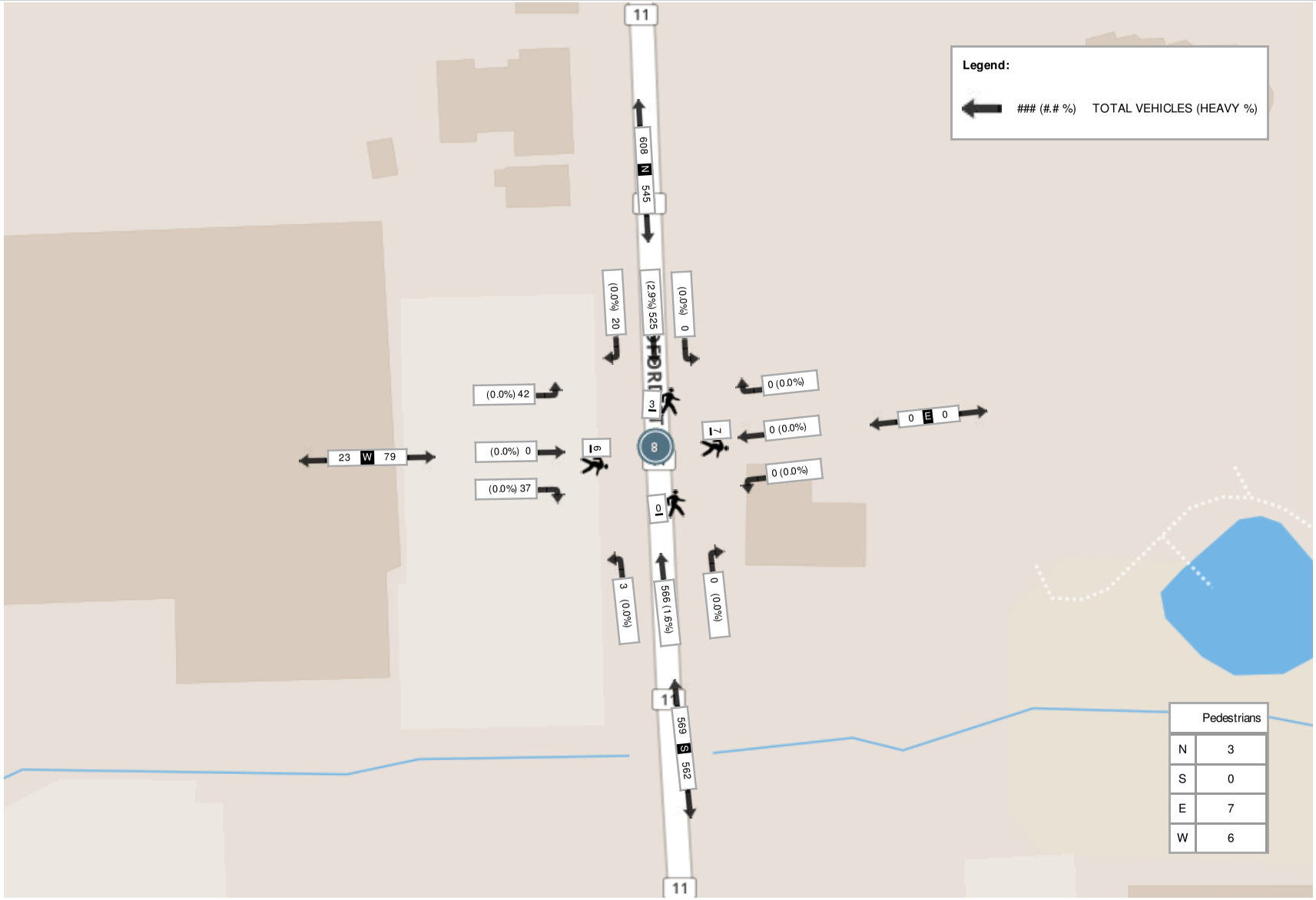
Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.65 °C)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	7	121	0	0	1	128	0	0	0	0	2	0	0	144	1	0	0	145	10	0	10	0	0	20	293
16:30:00	4	122	0	0	0	126	0	0	0	0	4	0	0	136	1	0	0	137	10	0	12	0	3	22	285
16:45:00	7	131	0	0	2	138	0	0	0	0	1	0	0	137	1	0	0	138	9	0	11	0	1	20	296
17:00:00	2	151	0	0	0	153	0	0	0	0	0	0	0	149	0	0	0	149	8	0	9	0	2	17	319
Grand Total	20	525	0	0	3	545	0	0	0	0	7	0	0	566	3	0	0	569	37	0	42	0	6	79	**1193**
Approach%	3.7%	96.3%	0%	0%		-	0%	0%	0%	0%		-	0%	99.5%	0.5%	0%		-	46.8%	0%	53.2%	0%		-	-
Totals %	1.7%	44%	0%	0%		45.7%	0%	0%	0%	0%		0%	0%	47.4%	0.3%	0%		47.7%	3.1%	0%	3.5%	0%		6.6%	-
PHF	0.71	0.87	0	0		0.89	0	0	0	0		0	0	0.95	0.75	0		0.95	0.93	0	0.88	0		0.9	-
Heavy	0	15	0	0		15	0	0	0	0		0	0	9	0	0		9	0	0	0	0		0	-
Heavy %	0%	2.9%	0%	0%		2.8%	0%	0%	0%	0%		0%	0%	1.6%	0%	0%		1.6%	0%	0%	0%	0%		0%	-
Lights	20	510	0	0		530	0	0	0	0		0	0	557	3	0		560	37	0	42	0		79	-
Lights %	100%	97.1%	0%	0%		97.2%	0%	0%	0%	0%		0%	0%	98.4%	100%	0%		98.4%	100%	0%	100%	0%		100%	-
Single-Unit Trucks	0	4	0	0		4	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Single-Unit Trucks %	0%	0.8%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Buses	0	11	0	0		11	0	0	0	0		0	0	7	0	0		7	0	0	0	0		0	-
Buses %	0%	2.1%	0%	0%		2%	0%	0%	0%	0%		0%	0%	1.2%	0%	0%		1.2%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	7	-	-	-	-	-	0	-	-	-	-	-	6	-	-
Pedestrians%	-	-	-	-	18.8%		-	-	-	-	43.8%		-	-	-	-	0%		-	-	-	-	37.5%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 08:15 AM - 09:15 AM **Weather: Overcast Clouds (5.81 °C)**



Peak Hour: 04:15 PM - 05:15 PM **Weather: Overcast Clouds (6.65 °C)**



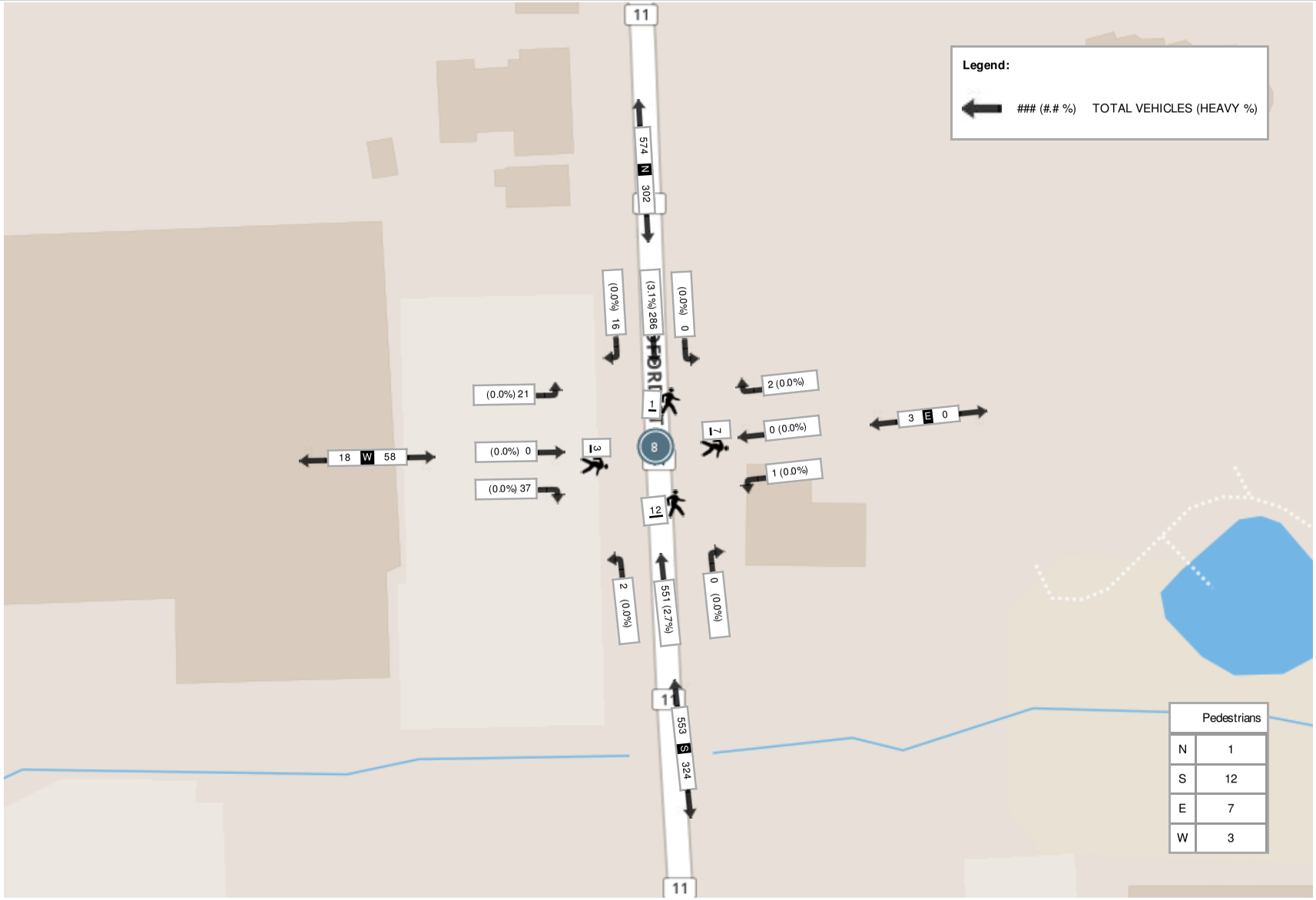
Turning Movement Count (8 . BRADFORD ST & TIM HORTONS DRIVEWAY)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
12:00:00	4	69	0	1	0	74	0	1	0	0	0	1	0	101	2	0	0	103	13	0	5	0	0	18	196	
12:15:00	4	82	0	0	0	86	0	0	0	0	0	0	0	135	3	0	1	138	10	0	6	0	0	16	240	
12:30:00	4	76	0	1	0	81	0	0	0	0	0	0	0	113	3	0	0	116	8	0	8	0	3	16	213	
12:45:00	4	69	0	0	1	73	0	0	0	0	4	0	0	123	5	0	1	128	10	0	6	0	2	16	217	866
13:00:00	4	82	0	0	0	86	0	0	0	0	5	0	0	128	2	0	1	130	6	0	7	0	2	13	229	899
13:15:00	1	60	0	0	0	61	0	0	0	0	4	0	0	115	3	0	0	118	4	0	6	0	0	10	189	848
13:30:00	3	68	0	0	0	71	0	0	1	0	2	1	0	156	1	0	1	157	8	0	5	0	2	13	242	877
13:45:00	6	74	0	0	1	80	1	0	0	0	2	1	0	149	0	0	4	149	13	0	4	0	0	17	247	907
14:00:00	2	68	0	0	0	70	1	0	0	0	2	1	0	133	1	0	4	134	11	0	6	0	1	17	222	900
14:15:00	5	76	0	0	0	81	0	0	0	0	1	0	0	113	0	0	3	113	5	0	6	0	0	11	205	916
14:30:00	2	51	0	0	0	53	1	0	0	0	1	1	0	100	1	0	3	101	5	0	5	0	0	10	165	839
14:45:00	4	61	0	0	0	65	0	0	0	0	1	0	0	99	1	0	3	100	4	0	4	0	0	8	173	765
Grand Total	43	836	0	2	2	881	3	1	1	0	22	5	0	1465	22	0	21	1487	97	0	68	0	10	165	**2538**	-
Approach%	4.9%	94.9%	0%	0.2%		-	60%	20%	20%	0%		-	0%	98.5%	1.5%	0%		-	58.8%	0%	41.2%	0%		-	**-**	-
Totals %	1.7%	32.9%	0%	0.1%		34.7%	0.1%	0%	0%	0%		0.2%	0%	57.7%	0.9%	0%		58.6%	3.8%	0%	2.7%	0%		6.5%	**-**	-
Heavy	0	29	0	0		-	0	0	0	0		-	0	39	0	0		-	0	0	0	0		-	**-**	-
Heavy %	0%	3.5%	0%	0%		-	0%	0%	0%	0%		-	0%	2.7%	0%	0%		-	0%	0%	0%	0%		-	**-**	-
Bicycles	0	1	0	0		-	0	0	0	0		-	0	1	0	0		-	0	0	0	0		-	**-**	-
Bicycle %	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	**-**	-

Peak Hour: 01:30 PM - 02:30 PM Weather: Clear Sky (9.11 °C)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
13:30:00	3	68	0	0	0	71	0	0	1	0	2	1	0	156	1	0	1	157	8	0	5	0	2	13	242
13:45:00	6	74	0	0	1	80	1	0	0	0	2	1	0	149	0	0	4	149	13	0	4	0	0	17	247
14:00:00	2	68	0	0	0	70	1	0	0	0	2	1	0	133	1	0	4	134	11	0	6	0	1	17	222
14:15:00	5	76	0	0	0	81	0	0	0	0	1	0	0	113	0	0	3	113	5	0	6	0	0	11	205
Grand Total	16	286	0	0	1	302	2	0	1	0	7	3	0	551	2	0	12	553	37	0	21	0	3	58	**916**
Approach%	5.3%	94.7%	0%	0%		-	66.7%	0%	33.3%	0%		-	0%	99.6%	0.4%	0%		-	63.8%	0%	36.2%	0%		-	-
Totals %	1.7%	31.2%	0%	0%		33%	0.2%	0%	0.1%	0%		0.3%	0%	60.2%	0.2%	0%		60.4%	4%	0%	2.3%	0%		6.3%	-
PHF	0.67	0.94	0	0		0.93	0.5	0	0.25	0		0.75	0	0.88	0.5	0		0.88	0.71	0	0.88	0		0.85	-
Heavy	0	9	0	0		9	0	0	0	0		0	0	15	0	0		15	0	0	0	0		0	-
Heavy %	0%	3.1%	0%	0%		3%	0%	0%	0%	0%		0%	0%	2.7%	0%	0%		2.7%	0%	0%	0%	0%		0%	-
Lights	16	277	0	0		293	2	0	1	0		3	0	536	2	0		538	37	0	21	0		58	-
Lights %	100%	96.9%	0%	0%		97%	100%	0%	100%	0%		100%	0%	97.3%	100%	0%		97.3%	100%	0%	100%	0%		100%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.7%	0%	0%	0%	0%		0%	-
Buses	0	9	0	0		9	0	0	0	0		0	0	11	0	0		11	0	0	0	0		0	-
Buses %	0%	3.1%	0%	0%		3%	0%	0%	0%	0%		0%	0%	2%	0%	0%		2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	7	-	-	-	-	-	12	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	4.3%		-	-	-	-	30.4%		-	-	-	-	52.2%		-	-	-	-	13%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 01:30 PM - 02:30 PM **Weather: Clear Sky (9.11 °C)**



Turning Movement Count (3 . SIMCOE ST & BRADFORD ST)

Start Time	N Approach					E Approach					S Approach					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
07:30:00	58	3	0	0	61	5	22	0	5	27	18	57	0	1	75	163	
07:45:00	42	3	0	0	45	4	29	0	1	33	30	79	0	0	109	187	
08:00:00	67	0	0	0	67	5	37	0	1	42	36	71	0	0	107	216	
08:15:00	59	4	0	1	63	5	41	0	4	46	34	81	0	0	115	224	790
08:30:00	64	6	0	0	70	3	26	0	0	29	38	88	0	0	126	225	852
08:45:00	68	10	0	2	78	7	29	0	0	36	36	103	0	0	139	253	918
09:00:00	54	7	0	0	61	9	32	0	4	41	34	103	0	1	137	239	941
09:15:00	47	0	0	2	47	7	36	0	5	43	35	75	0	0	110	200	917
BREAK																	
16:00:00	85	4	0	0	89	11	50	0	2	61	54	97	0	0	151	301	
16:15:00	79	5	0	3	84	6	53	0	6	59	58	96	0	0	154	297	
16:30:00	90	10	0	1	100	13	35	0	9	48	43	101	0	2	144	292	
16:45:00	88	8	0	1	96	11	48	0	7	59	47	100	0	0	147	302	1192
17:00:00	95	11	0	1	106	12	59	0	0	71	46	115	0	0	161	338	1229
17:15:00	101	7	0	0	108	15	53	0	2	68	43	97	0	1	140	316	1248
17:30:00	50	4	0	0	54	9	43	0	8	52	42	128	0	0	170	276	1232
17:45:00	58	9	0	0	67	5	35	0	2	40	32	100	0	0	132	239	1169
Grand Total	1105	91	0	11	1196	127	628	0	56	755	626	1491	0	5	2117	**4068**	-
Approach%	92.4%	7.6%	0%		-	16.8%	83.2%	0%		-	29.6%	70.4%	0%		-	-	-
Totals %	27.2%	2.2%	0%		29.4%	3.1%	15.4%	0%		18.6%	15.4%	36.7%	0%		52%	-	-
Heavy	12	1	0		-	0	44	0		-	46	18	0		-	-	-
Heavy %	1.1%	1.1%	0%		-	0%	7%	0%		-	7.3%	1.2%	0%		-	-	-
Bicycles	0	0	0		-	0	0	0		-	3	4	0		-	-	-
Bicycle %	0%	0%	0%		-	0%	0%	0%		-	0.5%	0.3%	0%		-	-	-

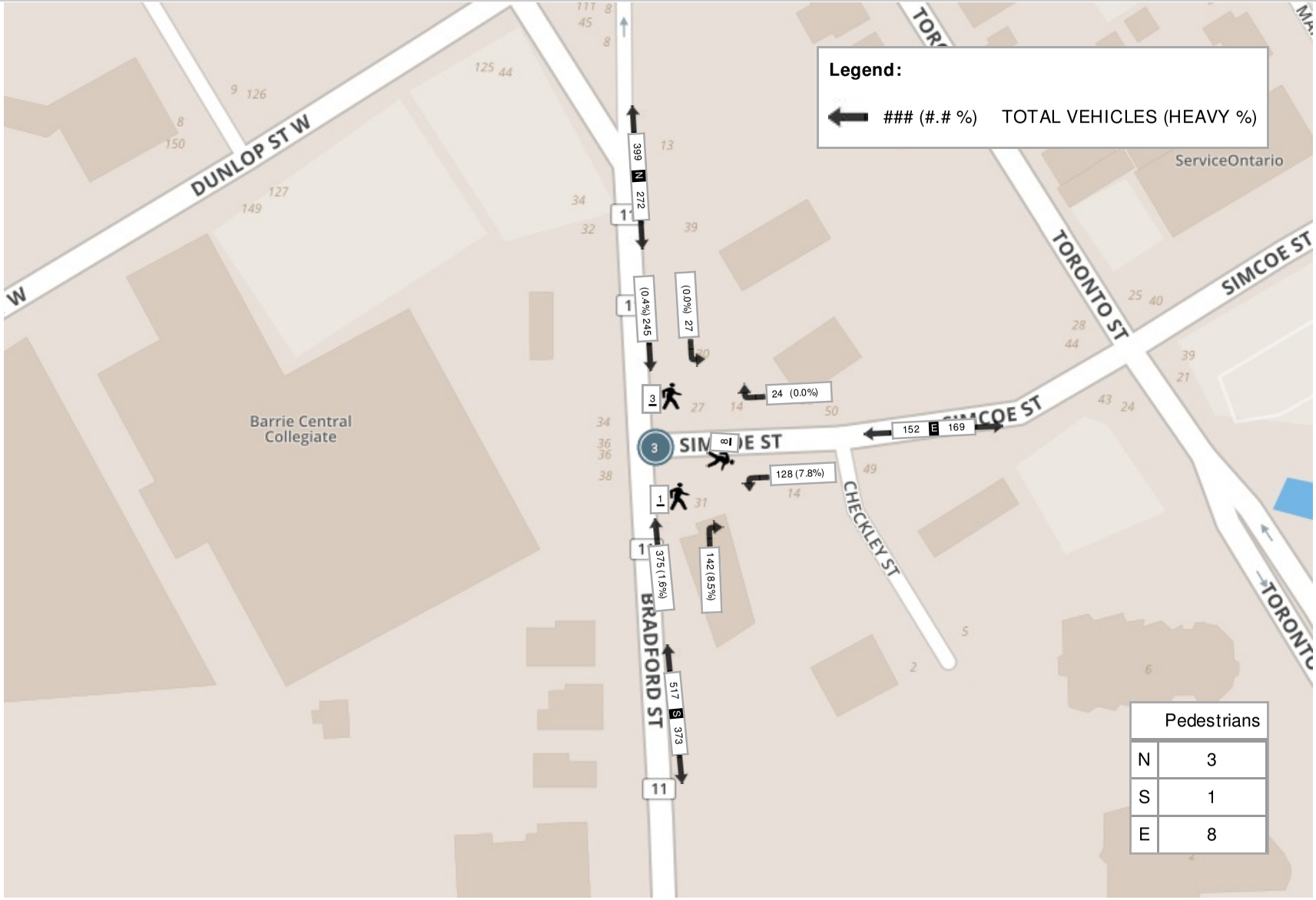
Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (5.81 °C)

Start Time	N Approach					E Approach					S Approach					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
08:15:00	59	4	0	1	63	5	41	0	4	46	34	81	0	0	115	224
08:30:00	64	6	0	0	70	3	26	0	0	29	38	88	0	0	126	225
08:45:00	68	10	0	2	78	7	29	0	0	36	36	103	0	0	139	253
09:00:00	54	7	0	0	61	9	32	0	4	41	34	103	0	1	137	239
Grand Total	245	27	0	3	272	24	128	0	8	152	142	375	0	1	517	**941**
Approach%	90.1%	9.9%	0%		-	15.8%	84.2%	0%		-	27.5%	72.5%	0%		-	-
Totals %	26%	2.9%	0%		28.9%	2.6%	13.6%	0%		16.2%	15.1%	39.9%	0%		54.9%	-
PHF	0.9	0.68	0		0.87	0.67	0.78	0		0.83	0.93	0.91	0		0.93	-
Heavy	1	0	0		1	0	10	0		10	12	6	0		18	-
Heavy %	0.4%	0%	0%		0.4%	0%	7.8%	0%		6.6%	8.5%	1.6%	0%		3.5%	-
Lights	244	27	0		271	24	118	0		142	130	369	0		499	-
Lights %	99.6%	100%	0%		99.6%	100%	92.2%	0%		93.4%	91.5%	98.4%	0%		96.5%	-
Single-Unit Trucks	0	0	0		0	0	2	0		2	3	4	0		7	-
Single-Unit Trucks %	0%	0%	0%		0%	0%	1.6%	0%		1.3%	2.1%	1.1%	0%		1.4%	-
Buses	1	0	0		1	0	8	0		8	9	2	0		11	-
Buses %	0.4%	0%	0%		0.4%	0%	6.3%	0%		5.3%	6.3%	0.5%	0%		2.1%	-
Pedestrians	-	-	-	3	-	-	-	-	8	-	-	-	-	1	-	-
Pedestrians%	-	-	-	25%		-	-	-	66.7%		-	-	-	8.3%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

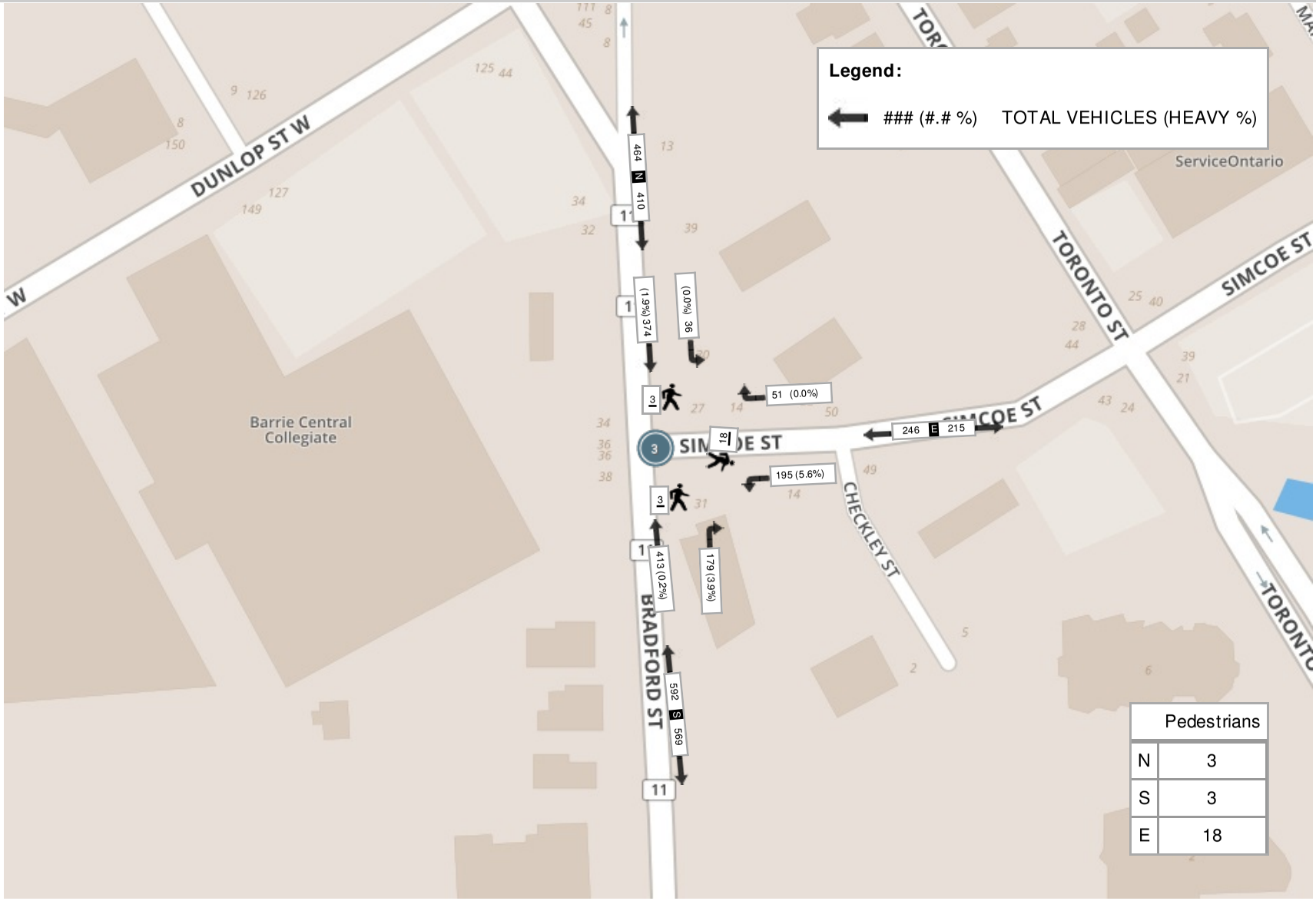
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (6.65 °C)

Start Time	N Approach					E Approach					S Approach					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:30:00	90	10	0	1	100	13	35	0	9	48	43	101	0	2	144	292
16:45:00	88	8	0	1	96	11	48	0	7	59	47	100	0	0	147	302
17:00:00	95	11	0	1	106	12	59	0	0	71	46	115	0	0	161	338
17:15:00	101	7	0	0	108	15	53	0	2	68	43	97	0	1	140	316
Grand Total	374	36	0	3	410	51	195	0	18	246	179	413	0	3	592	**1248**
Approach%	91.2%	8.8%	0%		-	20.7%	79.3%	0%		-	30.2%	69.8%	0%		-	**-**
Totals %	30%	2.9%	0%		32.9%	4.1%	15.6%	0%		19.7%	14.3%	33.1%	0%		47.4%	**-**
PHF	0.93	0.82	0		0.95	0.85	0.83	0		0.87	0.95	0.9	0		0.92	**-**
Heavy	7	0	0		7	0	11	0		11	7	1	0		8	**-**
Heavy %	1.9%	0%	0%		1.7%	0%	5.6%	0%		4.5%	3.9%	0.2%	0%		1.4%	**-**
Lights	367	36	0		403	51	184	0		235	172	412	0		584	**-**
Lights %	98.1%	100%	0%		98.3%	100%	94.4%	0%		95.5%	96.1%	99.8%	0%		98.6%	**-**
Single-Unit Trucks	6	0	0		6	0	2	0		2	0	1	0		1	**-**
Single-Unit Trucks %	1.6%	0%	0%		1.5%	0%	1%	0%		0.8%	0%	0.2%	0%		0.2%	**-**
Buses	1	0	0		1	0	9	0		9	7	0	0		7	**-**
Buses %	0.3%	0%	0%		0.2%	0%	4.6%	0%		3.7%	3.9%	0%	0%		1.2%	**-**
Pedestrians	-	-	-	3	-	-	-	-	18	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	12.5%		-	-	-	75%		-	-	-	12.5%		**-**
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	3	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (5.81 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (6.65 °C)



Turning Movement Count (3 . SIMCOE ST & BRADFORD ST)

Start Time	N Approach					E Approach					S Approach					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
12:00:00	50	8	0	0	58	2	27	0	1	29	24	81	0	0	105	192	
12:15:00	54	3	0	2	57	6	37	0	0	43	27	120	0	0	147	247	
12:30:00	47	8	0	1	55	4	35	0	3	39	33	98	0	0	131	225	
12:45:00	45	8	0	2	53	9	29	0	8	38	36	95	0	0	131	222	886
13:00:00	38	1	0	1	39	11	48	0	5	59	34	109	0	0	143	241	935
13:15:00	32	5	0	1	37	6	28	0	2	34	25	99	0	0	124	195	883
13:30:00	28	3	0	4	31	10	32	0	3	42	35	119	0	0	154	227	885
13:45:00	51	6	0	0	57	9	28	0	4	37	31	114	0	0	145	239	902
14:00:00	47	7	0	0	54	5	23	0	1	28	31	108	0	1	139	221	882
14:15:00	45	9	0	0	54	9	31	0	2	40	27	93	0	0	120	214	901
14:30:00	30	12	0	0	42	8	22	0	1	30	25	78	0	1	103	175	849
14:45:00	45	2	0	0	47	11	19	0	3	30	23	82	0	0	105	182	792
Grand Total	512	72	0	11	584	90	359	0	33	449	351	1196	0	2	1547	**2580**	-
Approach%	87.7%	12.3%	0%		-	20%	80%	0%		-	22.7%	77.3%	0%		-	-	-
Totals %	19.8%	2.8%	0%		22.6%	3.5%	13.9%	0%		17.4%	13.6%	46.4%	0%		60%	-	-
Heavy	1	0	0		-	2	22	0		-	26	10	0		-	-	-
Heavy %	0.2%	0%	0%		-	2.2%	6.1%	0%		-	7.4%	0.8%	0%		-	-	-
Bicycles	3	0	0		-	1	1	0		-	1	3	0		-	-	-
Bicycle %	0.6%	0%	0%		-	1.1%	0.3%	0%		-	0.3%	0.3%	0%		-	-	-

Peak Hour: 12:15 PM - 01:15 PM Weather: Clear Sky (9.11 °C)

Start Time	N Approach					E Approach					S Approach					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
12:15:00	54	3	0	2	57	6	37	0	0	43	27	120	0	0	147	247
12:30:00	47	8	0	1	55	4	35	0	3	39	33	98	0	0	131	225
12:45:00	45	8	0	2	53	9	29	0	8	38	36	95	0	0	131	222
13:00:00	38	1	0	1	39	11	48	0	5	59	34	109	0	0	143	241
Grand Total	184	20	0	6	204	30	149	0	16	179	130	422	0	0	552	**935**
Approach%	90.2%	9.8%	0%		-	16.8%	83.2%	0%		-	23.6%	76.4%	0%		-	-
Totals %	19.7%	2.1%	0%		21.8%	3.2%	15.9%	0%		19.1%	13.9%	45.1%	0%		59%	-
PHF	0.85	0.63	0		0.89	0.68	0.78	0		0.76	0.9	0.88	0		0.94	-
Heavy	0	0	0		0	1	10	0		11	8	6	0		14	-
Heavy %	0%	0%	0%		0%	3.3%	6.7%	0%		6.1%	6.2%	1.4%	0%		2.5%	-
Lights	184	20	0		204	29	139	0		168	122	416	0		538	-
Lights %	100%	100%	0%		100%	96.7%	93.3%	0%		93.9%	93.8%	98.6%	0%		97.5%	-
Single-Unit Trucks	0	0	0		0	0	1	0		1	1	6	0		7	-
Single-Unit Trucks %	0%	0%	0%		0%	0%	0.7%	0%		0.6%	0.8%	1.4%	0%		1.3%	-
Buses	0	0	0		0	1	9	0		10	7	0	0		7	-
Buses %	0%	0%	0%		0%	3.3%	6%	0%		5.6%	5.4%	0%	0%		1.3%	-
Pedestrians	-	-	-	6	-	-	-	-	16	-	-	-	-	0	-	-
Pedestrians%	-	-	-	27.3%		-	-	-	72.7%		-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	1	0	0	0	-	1	1	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Peak Hour: 12:15 PM - 01:15 PM Weather: Clear Sky (9.11 °C)



Turning Movement Count (4 . SIMCOE ST & CHECKLEY ST)

Start Time	E Approach					S Approach					W Approach					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	UTurn W:W	Peds W:	Approach Total		
07:30:00	28	1	0	1	29	0	0	0	1	0	1	19	0	0	20	49	
07:45:00	32	4	0	0	36	0	0	0	1	0	5	29	0	0	34	70	
08:00:00	46	2	0	1	48	0	0	0	1	0	2	29	0	0	31	79	
08:15:00	43	1	0	0	44	0	0	0	0	0	7	34	0	0	41	85	283
08:30:00	30	2	0	1	32	1	0	0	2	1	4	41	0	2	45	78	312
08:45:00	36	10	0	0	46	2	0	0	0	2	5	40	0	0	45	93	335
09:00:00	36	6	0	1	42	1	4	0	3	5	5	40	0	0	45	92	348
09:15:00	39	3	0	0	42	0	2	0	0	2	8	37	0	1	45	89	352
BREAK																	
16:00:00	55	1	0	2	56	0	4	0	1	4	0	43	0	1	43	103	
16:15:00	56	2	0	0	58	6	1	0	3	7	1	66	0	0	67	132	
16:30:00	42	1	0	4	43	3	4	0	5	7	3	50	0	0	53	103	
16:45:00	51	5	0	0	56	8	9	0	1	17	3	52	0	0	55	128	466
17:00:00	63	1	0	2	64	1	5	0	2	6	1	56	0	0	57	127	490
17:15:00	63	1	0	2	64	1	4	0	2	5	1	53	0	4	54	123	481
17:30:00	49	1	0	3	50	4	2	0	4	6	2	38	0	0	40	96	474
17:45:00	38	1	0	2	39	1	3	0	1	4	4	38	0	0	42	85	431
Grand Total	707	42	0	19	749	28	38	0	27	66	52	665	0	8	717	**1532**	-
Approach%	94.4%	5.6%	0%		-	42.4%	57.6%	0%		-	7.3%	92.7%	0%		-	-	-
Totals %	46.1%	2.7%	0%		48.9%	1.8%	2.5%	0%		4.3%	3.4%	43.4%	0%		46.8%	-	-
Heavy	43	0	0		-	0	1	0		-	1	39	0		-	-	-
Heavy %	6.1%	0%	0%		-	0%	2.6%	0%		-	1.9%	5.9%	0%		-	-	-
Bicycles	1	1	0		-	1	0	0		-	0	0	0		-	-	-
Bicycle %	0.1%	2.4%	0%		-	3.6%	0%	0%		-	0%	0%	0%		-	-	-

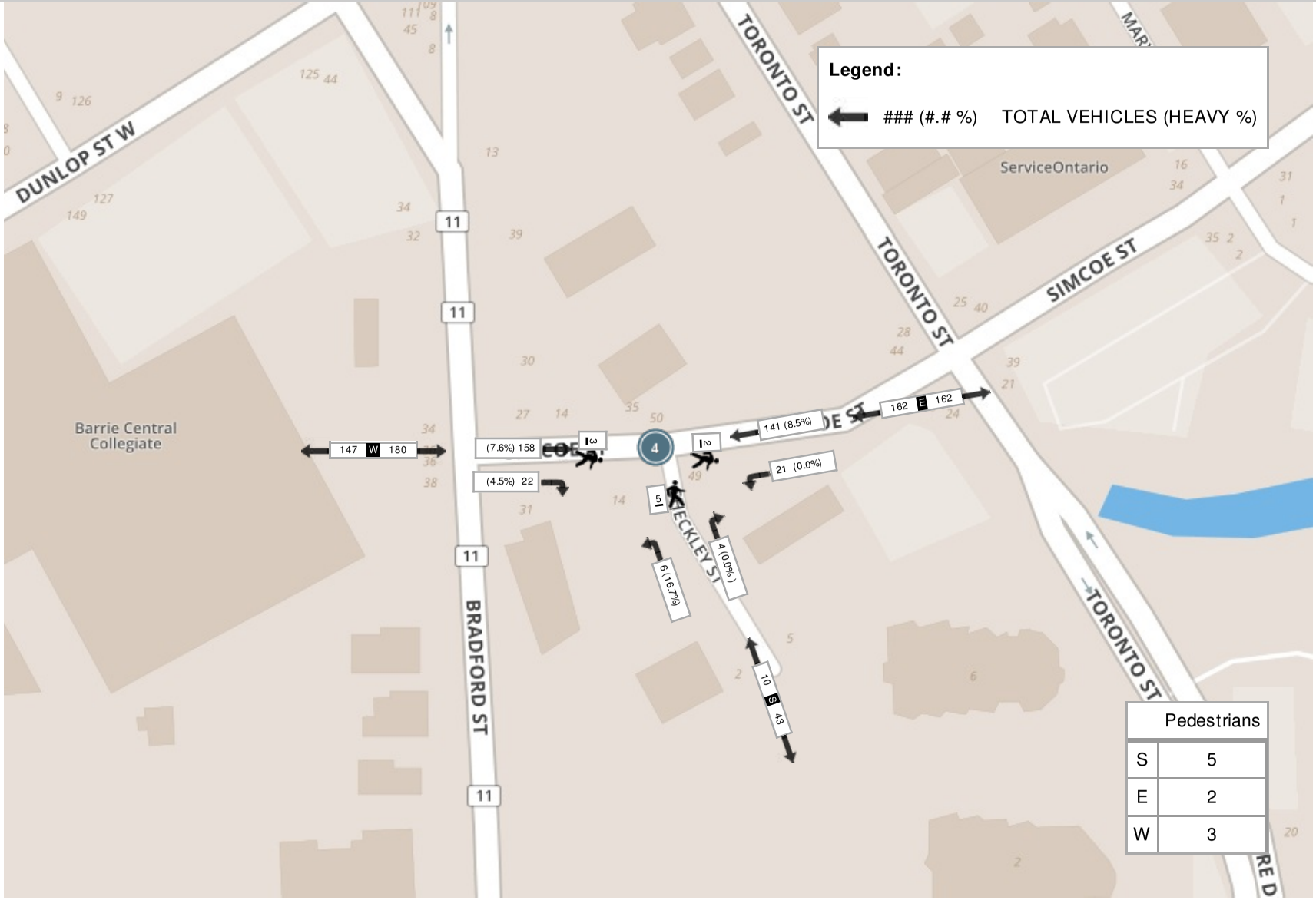
Peak Hour: 08:30 AM - 09:30 AM Weather: Overcast Clouds (5.81 °C)

Start Time	E Approach					S Approach					W Approach					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
08:30:00	30	2	0	1	32	1	0	0	2	1	4	41	0	2	45	78
08:45:00	36	10	0	0	46	2	0	0	0	2	5	40	0	0	45	93
09:00:00	36	6	0	1	42	1	4	0	3	5	5	40	0	0	45	92
09:15:00	39	3	0	0	42	0	2	0	0	2	8	37	0	1	45	89
Grand Total	141	21	0	2	162	4	6	0	5	10	22	158	0	3	180	**352**
Approach%	87%	13%	0%		-	40%	60%	0%		-	12.2%	87.8%	0%		-	-
Totals %	40.1%	6%	0%		46%	1.1%	1.7%	0%		2.8%	6.3%	44.9%	0%		51.1%	-
PHF	0.9	0.53	0		0.88	0.5	0.38	0		0.5	0.69	0.96	0		1	-
Heavy	12	0	0		12	0	1	0		1	1	12	0		13	-
Heavy %	8.5%	0%	0%		7.4%	0%	16.7%	0%		10%	4.5%	7.6%	0%		7.2%	-
Lights	129	21	0		150	4	5	0		9	21	146	0		167	-
Lights %	91.5%	100%	0%		92.6%	100%	83.3%	0%		90%	95.5%	92.4%	0%		92.8%	-
Single-Unit Trucks	2	0	0		2	0	1	0		1	1	2	0		3	-
Single-Unit Trucks %	1.4%	0%	0%		1.2%	0%	16.7%	0%		10%	4.5%	1.3%	0%		1.7%	-
Buses	10	0	0		10	0	0	0		0	0	10	0		10	-
Buses %	7.1%	0%	0%		6.2%	0%	0%	0%		0%	0%	6.3%	0%		5.6%	-
Pedestrians	-	-	-	2	-	-	-	-	5	-	-	-	-	3	-	-
Pedestrians%	-	-	-	20%		-	-	-	50%		-	-	-	30%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

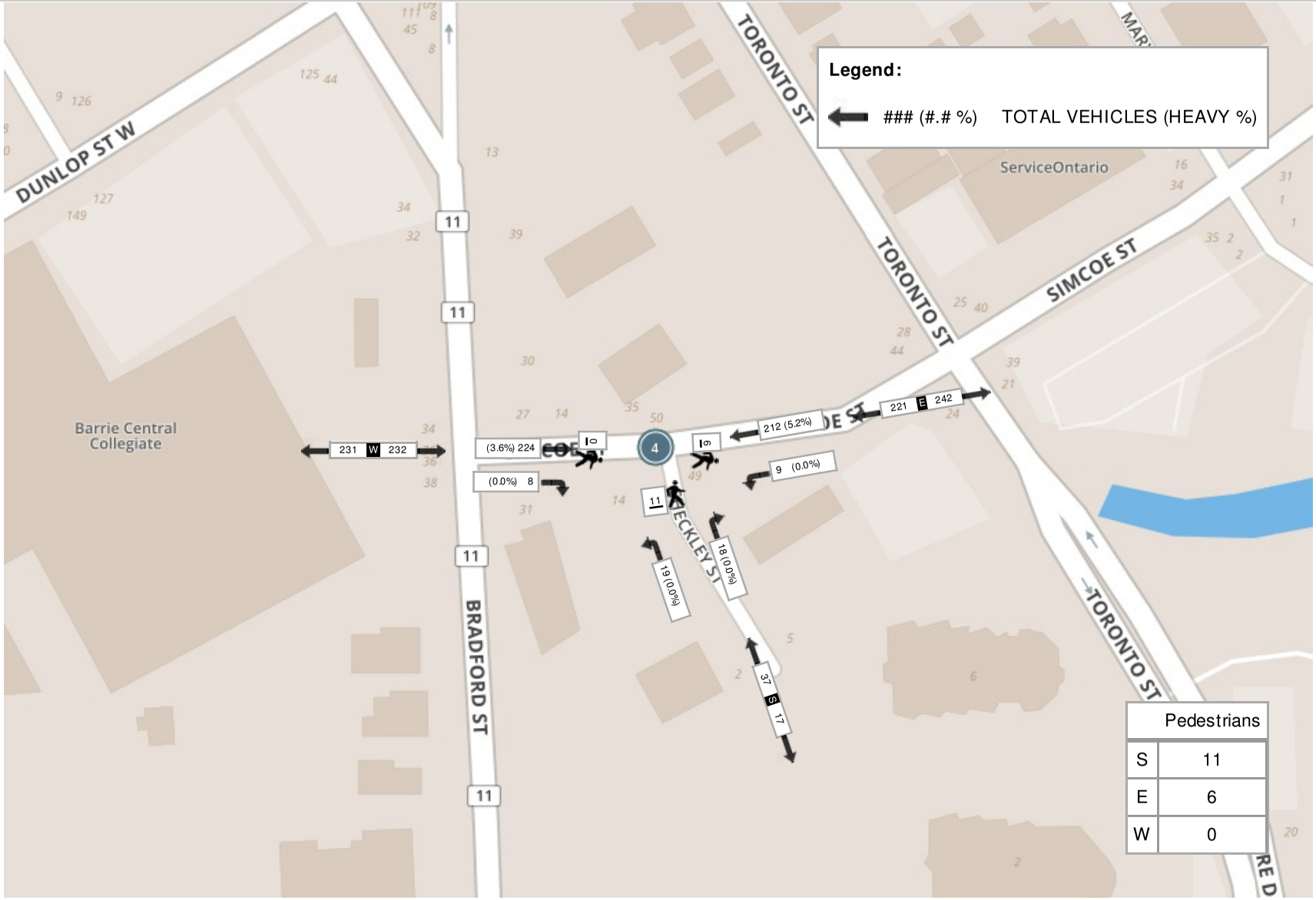
Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.65 °C)

Start Time	E Approach					S Approach					W Approach					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:15:00	56	2	0	0	58	6	1	0	3	7	1	66	0	0	67	132
16:30:00	42	1	0	4	43	3	4	0	5	7	3	50	0	0	53	103
16:45:00	51	5	0	0	56	8	9	0	1	17	3	52	0	0	55	128
17:00:00	63	1	0	2	64	1	5	0	2	6	1	56	0	0	57	127
Grand Total	212	9	0	6	221	18	19	0	11	37	8	224	0	0	232	**490**
Approach%	95.9%	4.1%	0%		-	48.6%	51.4%	0%		-	3.4%	96.6%	0%		-	-
Totals %	43.3%	1.8%	0%		45.1%	3.7%	3.9%	0%		7.6%	1.6%	45.7%	0%		47.3%	-
PHF	0.84	0.45	0		0.86	0.56	0.53	0		0.54	0.67	0.85	0		0.87	-
Heavy	11	0	0		11	0	0	0		0	0	8	0		8	-
Heavy %	5.2%	0%	0%		5%	0%	0%	0%		0%	0%	3.6%	0%		3.4%	-
Lights	201	9	0		210	18	19	0		37	8	216	0		224	-
Lights %	94.8%	100%	0%		95%	100%	100%	0%		100%	100%	96.4%	0%		96.6%	-
Single-Unit Trucks	1	0	0		1	0	0	0		0	0	0	0		0	-
Single-Unit Trucks %	0.5%	0%	0%		0.5%	0%	0%	0%		0%	0%	0%	0%		0%	-
Buses	10	0	0		10	0	0	0		0	0	8	0		8	-
Buses %	4.7%	0%	0%		4.5%	0%	0%	0%		0%	0%	3.6%	0%		3.4%	-
Pedestrians	-	-	-	6	-	-	-	-	11	-	-	-	-	0	-	-
Pedestrians%	-	-	-	35.3%		-	-	-	64.7%		-	-	-	0%		-
Bicycles on Road	1	0	0	0	-	1	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Peak Hour: 08:30 AM - 09:30 AM Weather: Overcast Clouds (5.81 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.65 °C)



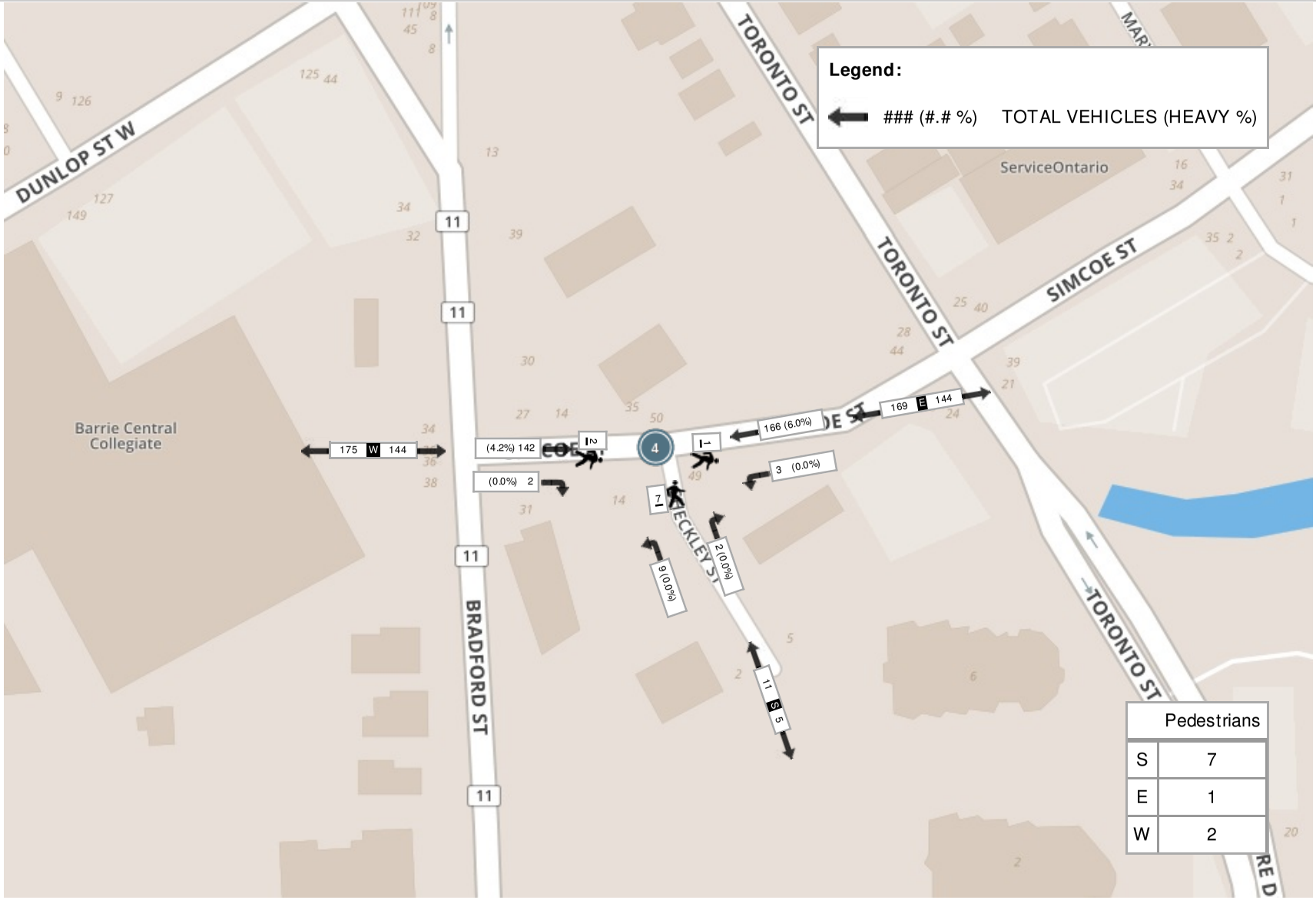
Turning Movement Count (4 . SIMCOE ST & CHECKLEY ST)

Start Time	E Approach					S Approach					W Approach					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	UTurn W:W	Peds W:	Approach Total		
12:00:00	30	0	0	1	30	0	0	0	1	0	1	28	0	0	29	59	
12:15:00	40	2	0	0	42	0	2	0	0	2	1	28	0	0	29	73	
12:30:00	39	0	0	0	39	0	0	0	2	0	1	41	0	1	42	81	
12:45:00	34	1	0	0	35	1	4	0	3	5	0	40	0	1	40	80	293
13:00:00	53	0	0	1	53	1	3	0	2	4	0	33	0	0	33	90	324
13:15:00	31	1	0	2	32	3	2	0	1	5	1	27	0	2	28	65	316
13:30:00	43	1	0	0	44	1	2	0	0	3	1	39	0	0	40	87	322
13:45:00	35	1	0	0	36	2	1	0	0	3	0	38	0	2	38	77	319
14:00:00	31	0	0	2	31	1	0	0	2	1	1	39	0	3	40	72	301
14:15:00	36	0	0	0	36	1	0	0	1	1	0	34	0	1	34	71	307
14:30:00	29	0	0	1	29	2	1	0	2	3	0	42	0	0	42	74	294
14:45:00	33	1	0	1	34	0	0	0	4	0	0	25	0	0	25	59	276
Grand Total	434	7	0	8	441	12	15	0	18	27	6	414	0	10	420	**888**	-
Approach%	98.4%	1.6%	0%		-	44.4%	55.6%	0%		-	1.4%	98.6%	0%		-	-	-
Totals %	48.9%	0.8%	0%		49.7%	1.4%	1.7%	0%		3%	0.7%	46.6%	0%		47.3%	-	-
Heavy	29	0	0		-	0	0	0		-	0	25	0		-	-	-
Heavy %	6.7%	0%	0%		-	0%	0%	0%		-	0%	6%	0%		-	-	-
Bicycles	2	0	0		-	0	0	0		-	0	2	0		-	-	-
Bicycle %	0.5%	0%	0%		-	0%	0%	0%		-	0%	0.5%	0%		-	-	-

Peak Hour: 12:15 PM - 01:15 PM Weather: Clear Sky (9.11 °C)

Start Time	E Approach					S Approach					W Approach					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
12:15:00	40	2	0	0	42	0	2	0	0	2	1	28	0	0	29	73
12:30:00	39	0	0	0	39	0	0	0	2	0	1	41	0	1	42	81
12:45:00	34	1	0	0	35	1	4	0	3	5	0	40	0	1	40	80
13:00:00	53	0	0	1	53	1	3	0	2	4	0	33	0	0	33	90
Grand Total	166	3	0	1	169	2	9	0	7	11	2	142	0	2	144	**324**
Approach%	98.2%	1.8%	0%		-	18.2%	81.8%	0%		-	1.4%	98.6%	0%		-	-
Totals %	51.2%	0.9%	0%		52.2%	0.6%	2.8%	0%		3.4%	0.6%	43.8%	0%		44.4%	-
PHF	0.78	0.38	0		0.8	0.5	0.56	0		0.55	0.5	0.87	0		0.86	-
Heavy	10	0	0		10	0	0	0		0	0	6	0		6	-
Heavy %	6%	0%	0%		5.9%	0%	0%	0%		0%	0%	4.2%	0%		4.2%	-
Lights	156	3	0		159	2	9	0		11	2	136	0		138	-
Lights %	94%	100%	0%		94.1%	100%	100%	0%		100%	100%	95.8%	0%		95.8%	-
Single-Unit Trucks	1	0	0		1	0	0	0		0	0	0	0		0	-
Single-Unit Trucks %	0.6%	0%	0%		0.6%	0%	0%	0%		0%	0%	0%	0%		0%	-
Buses	9	0	0		9	0	0	0		0	0	6	0		6	-
Buses %	5.4%	0%	0%		5.3%	0%	0%	0%		0%	0%	4.2%	0%		4.2%	-
Pedestrians	-	-	-	1	-	-	-	-	7	-	-	-	-	2	-	-
Pedestrians%	-	-	-	10%		-	-	-	70%		-	-	-	20%		-
Bicycles on Road	2	0	0	0	-	0	0	0	0	-	0	1	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Peak Hour: 12:15 PM - 01:15 PM Weather: Clear Sky (9.11 °C)



Turning Movement Count (5 . SIMCOE ST & TORONTO ST)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:30:00	8	48	0	0	5	56	3	16	59	0	0	78	74	61	4	0	0	139	0	13	5	0	1	18	291	
07:45:00	11	46	1	0	1	58	2	23	65	0	1	90	83	69	1	0	0	153	2	17	11	0	0	30	331	
08:00:00	12	51	3	0	1	66	1	37	62	0	7	100	80	74	2	0	0	156	0	22	6	0	0	28	350	
08:15:00	13	62	4	0	1	79	2	26	64	0	3	92	115	78	2	0	0	195	5	24	6	0	0	35	401	1373
08:30:00	12	65	4	0	4	81	2	21	55	0	7	78	86	77	0	0	0	163	5	28	8	0	0	41	363	1445
08:45:00	14	69	4	0	1	87	4	25	49	0	6	78	104	85	4	0	0	193	2	29	11	0	0	42	400	1514
09:00:00	8	60	3	0	5	71	10	31	48	0	2	89	80	51	2	0	0	133	2	34	7	0	0	43	336	1500
09:15:00	14	52	3	0	1	69	7	27	74	0	2	108	85	78	1	0	0	164	2	31	4	0	0	37	378	1477
BREAK																										
16:00:00	12	102	4	0	9	118	2	43	97	0	6	142	91	77	1	0	0	169	3	32	9	0	1	44	473	
16:15:00	9	100	1	0	5	110	6	48	93	0	2	147	83	61	2	0	0	146	8	52	14	0	2	74	477	
16:30:00	11	97	3	0	5	111	3	30	80	0	8	113	94	75	3	0	0	172	8	30	13	0	0	51	447	
16:45:00	16	90	4	0	0	110	5	42	92	0	8	139	85	68	0	0	0	153	5	41	9	0	0	55	457	1854
17:00:00	16	101	2	0	6	119	4	50	90	0	5	144	83	88	0	0	0	171	5	42	13	0	0	60	494	1875
17:15:00	15	99	8	0	8	122	3	50	85	0	7	138	92	74	2	0	0	168	6	33	14	0	0	53	481	1879
17:30:00	16	65	3	0	8	84	6	35	98	0	2	139	92	84	1	0	4	177	4	39	10	0	0	53	453	1885
17:45:00	9	74	3	0	4	86	0	29	79	0	1	108	74	54	1	0	0	129	3	33	3	0	2	39	362	1790
Grand Total	196	1181	50	0	64	1427	60	533	1190	0	67	1783	1401	1154	26	0	4	2581	60	500	143	0	6	703	**6494**	-
Approach%	13.7%	82.8%	3.5%	0%		-	3.4%	29.9%	66.7%	0%		-	54.3%	44.7%	1%	0%		-	8.5%	71.1%	20.3%	0%		-	-	-
Totals %	3%	18.2%	0.8%	0%		22%	0.9%	8.2%	18.3%	0%		27.5%	21.6%	17.8%	0.4%	0%		39.7%	0.9%	7.7%	2.2%	0%		10.8%	-	-
Heavy	0	12	0	0		-	1	42	4	0		-	13	11	0	0		-	1	40	0	0		-	-	-
Heavy %	0%	1%	0%	0%		-	1.7%	7.9%	0.3%	0%		-	0.9%	1%	0%	0%		-	1.7%	8%	0%	0%		-	-	-
Bicycles	0	0	0	0		-	0	0	0	0		-	0	0	0	0		-	0	1	1	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0.2%	0.7%	0%		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (5.81 °C)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	12	51	3	0	1	66	1	37	62	0	7	100	80	74	2	0	0	156	0	22	6	0	0	28	350
08:15:00	13	62	4	0	1	79	2	26	64	0	3	92	115	78	2	0	0	195	5	24	6	0	0	35	401
08:30:00	12	65	4	0	4	81	2	21	55	0	7	78	86	77	0	0	0	163	5	28	8	0	0	41	363
08:45:00	14	69	4	0	1	87	4	25	49	0	6	78	104	85	4	0	0	193	2	29	11	0	0	42	400
Grand Total	51	247	15	0	7	313	9	109	230	0	23	348	385	314	8	0	0	707	12	103	31	0	0	146	**1514**
Approach%	16.3%	78.9%	4.8%	0%		-	2.6%	31.3%	66.1%	0%		-	54.5%	44.4%	1.1%	0%		-	8.2%	70.5%	21.2%	0%		-	-
Totals %	3.4%	16.3%	1%	0%		20.7%	0.6%	7.2%	15.2%	0%		23%	25.4%	20.7%	0.5%	0%		46.7%	0.8%	6.8%	2%	0%		9.6%	-
PHF	0.91	0.89	0.94	0		0.9	0.56	0.74	0.9	0		0.87	0.84	0.92	0.5	0		0.91	0.6	0.89	0.7	0		0.87	-
Heavy	0	6	0	0		6	0	11	2	0		13	5	5	0	0		10	1	10	0	0		11	-
Heavy %	0%	2.4%	0%	0%		1.9%	0%	10.1%	0.9%	0%		3.7%	1.3%	1.6%	0%	0%		1.4%	8.3%	9.7%	0%	0%		7.5%	-
Lights	51	241	15	0		307	9	98	228	0		335	380	309	8	0		697	11	93	31	0		135	-
Lights %	100%	97.6%	100%	0%		98.1%	100%	89.9%	99.1%	0%		96.3%	98.7%	98.4%	100%	0%		98.6%	91.7%	90.3%	100%	0%		92.5%	-
Single-Unit Trucks	0	1	0	0		1	0	1	0	0		1	2	1	0	0		3	1	1	0	0		2	-
Single-Unit Trucks %	0%	0.4%	0%	0%		0.3%	0%	0.9%	0%	0%		0.3%	0.5%	0.3%	0%	0%		0.4%	8.3%	1%	0%	0%		1.4%	-
Buses	0	5	0	0		5	0	10	2	0		12	3	4	0	0		7	0	9	0	0		9	-
Buses %	0%	2%	0%	0%		1.6%	0%	9.2%	0.9%	0%		3.4%	0.8%	1.3%	0%	0%		1%	0%	8.7%	0%	0%		6.2%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	23	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	23.3%		-	-	-	-	76.7%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (6.65 °C)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	16	90	4	0	0	110	5	42	92	0	8	139	85	68	0	0	0	153	5	41	9	0	0	55	457
17:00:00	16	101	2	0	6	119	4	50	90	0	5	144	83	88	0	0	0	171	5	42	13	0	0	60	494
17:15:00	15	99	8	0	8	122	3	50	85	0	7	138	92	74	2	0	0	168	6	33	14	0	0	53	481
17:30:00	16	65	3	0	8	84	6	35	98	0	2	139	92	84	1	0	4	177	4	39	10	0	0	53	453
Grand Total	63	355	17	0	22	435	18	177	365	0	22	560	352	314	3	0	4	669	20	155	46	0	0	221	**1885**
Approach%	14.5%	81.6%	3.9%	0%		-	3.2%	31.6%	65.2%	0%		-	52.6%	46.9%	0.4%	0%		-	9%	70.1%	20.8%	0%		-	-
Totals %	3.3%	18.8%	0.9%	0%		23.1%	1%	9.4%	19.4%	0%		29.7%	18.7%	16.7%	0.2%	0%		35.5%	1.1%	8.2%	2.4%	0%		11.7%	-
PHF	0.98	0.88	0.53	0		0.89	0.75	0.89	0.93	0		0.97	0.96	0.89	0.38	0		0.94	0.83	0.92	0.82	0		0.92	-
Heavy	0	0	0	0		0	0	8	1	0		9	3	3	0	0		6	0	8	0	0		8	-
Heavy %	0%	0%	0%	0%		0%	0%	4.5%	0.3%	0%		1.6%	0.9%	1%	0%	0%		0.9%	0%	5.2%	0%	0%		3.6%	-
Lights	63	355	17	0		435	18	169	364	0		551	349	311	3	0		663	20	147	46	0		213	-
Lights %	100%	100%	100%	0%		100%	100%	95.5%	99.7%	0%		98.4%	99.1%	99%	100%	0%		99.1%	100%	94.8%	100%	0%		96.4%	-
Single-Unit Trucks	0	0	0	0		0	0	1	1	0		2	2	1	0	0		3	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.6%	0.3%	0%		0.4%	0.6%	0.3%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Buses	0	0	0	0		0	0	7	0	0		7	1	1	0	0		2	0	8	0	0		8	-
Buses %	0%	0%	0%	0%		0%	0%	4%	0%	0%		1.3%	0.3%	0.3%	0%	0%		0.3%	0%	5.2%	0%	0%		3.6%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	22	-	-	-	-	-	22	-	-	-	-	-	4	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	45.8%		-	-	-	-	45.8%		-	-	-	-	8.3%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 08:00 AM - 09:00 AM **Weather: Overcast Clouds (5.81 °C)**



Peak Hour: 04:45 PM - 05:45 PM **Weather: Overcast Clouds (6.65 °C)**



Turning Movement Count (5 . SIMCOE ST & TORONTO ST)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
12:00:00	6	57	7	0	2	70	5	25	76	0	2	106	90	50	1	0	1	141	7	18	5	0	2	30	347	
12:15:00	6	63	5	0	5	74	5	32	74	0	3	111	105	54	4	0	2	163	2	21	6	0	3	29	377	
12:30:00	13	51	6	0	4	70	7	25	61	0	1	93	93	50	0	0	1	143	4	33	5	0	2	42	348	
12:45:00	7	63	8	0	5	78	6	26	77	0	2	109	87	65	2	0	7	154	9	26	12	0	1	47	388	1460
13:00:00	10	72	4	0	2	86	4	40	68	0	0	112	77	77	5	0	0	159	6	20	7	0	1	33	390	1503
13:15:00	11	58	7	0	7	76	5	21	100	0	0	126	72	69	3	0	0	144	5	19	6	0	1	30	376	1502
13:30:00	13	74	7	0	2	94	6	30	83	0	4	119	97	66	2	0	0	165	5	28	7	0	1	40	418	1572
13:45:00	5	63	3	0	1	71	6	26	72	0	2	104	95	64	4	0	0	163	6	29	6	0	0	41	379	1563
14:00:00	4	60	5	0	5	69	7	22	79	0	0	108	79	81	4	0	1	164	5	26	6	0	1	37	378	1551
14:15:00	8	66	4	0	3	78	5	27	72	0	3	104	82	70	3	0	0	155	6	22	6	0	2	34	371	1546
14:30:00	5	63	5	0	2	73	5	25	66	0	2	96	84	60	3	0	0	147	8	29	4	0	1	41	357	1485
14:45:00	7	75	5	0	3	87	5	28	78	0	1	111	89	59	2	0	2	150	5	19	4	0	4	28	376	1482
Grand Total	95	765	66	0	41	926	66	327	906	0	20	1299	1050	765	33	0	14	1848	68	290	74	0	19	432	**4505**	-
Approach%	10.3%	82.6%	7.1%	0%		-	5.1%	25.2%	69.7%	0%		-	56.8%	41.4%	1.8%	0%		-	15.7%	67.1%	17.1%	0%		-	**-**	-
Totals %	2.1%	17%	1.5%	0%		20.6%	1.5%	7.3%	20.1%	0%		28.8%	23.3%	17%	0.7%	0%		41%	1.5%	6.4%	1.6%	0%		9.6%	**-**	-
Heavy	0	2	0	0		-	2	31	4	0		-	4	0	0	0		-	0	26	0	0		-	**-**	-
Heavy %	0%	0.3%	0%	0%		-	3%	9.5%	0.4%	0%		-	0.4%	0%	0%	0%		-	0%	9%	0%	0%		-	**-**	-
Bicycles	2	4	0	0		-	0	0	1	0		-	0	0	0	0		-	0	1	0	0		-	**-**	-
Bicycle %	2.1%	0.5%	0%	0%		-	0%	0%	0.1%	0%		-	0%	0%	0%	0%		-	0%	0.3%	0%	0%		-	**-**	-

Peak Hour: 12:45 PM - 01:45 PM Weather: Clear Sky (9.11 °C)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
12:45:00	7	63	8	0	5	78	6	26	77	0	2	109	87	65	2	0	7	154	9	26	12	0	1	47	388
13:00:00	10	72	4	0	2	86	4	40	68	0	0	112	77	77	5	0	0	159	6	20	7	0	1	33	390
13:15:00	11	58	7	0	7	76	5	21	100	0	0	126	72	69	3	0	0	144	5	19	6	0	1	30	376
13:30:00	13	74	7	0	2	94	6	30	83	0	4	119	97	66	2	0	0	165	5	28	7	0	1	40	418
Grand Total	41	267	26	0	16	334	21	117	328	0	6	466	333	277	12	0	7	622	25	93	32	0	4	150	**1572**
Approach%	12.3%	79.9%	7.8%	0%		-	4.5%	25.1%	70.4%	0%		-	53.5%	44.5%	1.9%	0%		-	16.7%	62%	21.3%	0%		-	-
Totals %	2.6%	17%	1.7%	0%		21.2%	1.3%	7.4%	20.9%	0%		29.6%	21.2%	17.6%	0.8%	0%		39.6%	1.6%	5.9%	2%	0%		9.5%	-
PHF	0.79	0.9	0.81	0		0.89	0.88	0.73	0.82	0		0.92	0.86	0.9	0.6	0		0.94	0.69	0.83	0.67	0		0.8	-
Heavy	0	0	0	0		0	1	11	2	0		14	0	0	0	0		0	0	6	0	0		6	-
Heavy %	0%	0%	0%	0%		0%	4.8%	9.4%	0.6%	0%		3%	0%	0%	0%	0%		0%	0%	6.5%	0%	0%		4%	-
Lights	41	267	26	0		334	20	106	326	0		452	333	277	12	0		622	25	87	32	0		144	-
Lights %	100%	100%	100%	0%		100%	95.2%	90.6%	99.4%	0%		97%	100%	100%	100%	0%		100%	100%	93.5%	100%	0%		96%	-
Single-Unit Trucks	0	0	0	0		0	0	1	2	0		3	0	0	0	0		0	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.9%	0.6%	0%		0.6%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Buses	0	0	0	0		0	1	10	0	0		11	0	0	0	0		0	0	6	0	0		6	-
Buses %	0%	0%	0%	0%		0%	4.8%	8.5%	0%	0%		2.4%	0%	0%	0%	0%		0%	0%	6.5%	0%	0%		4%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	16	-	-	-	-	-	6	-	-	-	-	-	7	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	48.5%		-	-	-	-	18.2%		-	-	-	-	21.2%		-	-	-	-	12.1%		-
Bicycles on Road	0	2	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 12:45 PM - 01:45 PM **Weather: Clear Sky (9.11 °C)**



APPENDIX E:
Signal Timing Plan

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

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

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

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

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

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

APPENDIX F:
Capacity Analysis Output



Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	140	27	403	151	290
v/c Ratio	0.43	0.08	0.16	0.14	0.13
Control Delay	28.3	8.2	6.1	2.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	8.2	6.1	2.4	6.1
Queue Length 50th (m)	17.6	0.0	8.7	0.4	6.1
Queue Length 95th (m)	25.5	4.6	23.5	8.9	17.4
Internal Link Dist (m)	31.3		222.5		145.0
Turn Bay Length (m)				10.0	
Base Capacity (vph)	695	679	2480	1062	2279
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.04	0.16	0.14	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	130	25	375	140	25	245
Future Volume (vph)	130	25	375	140	25	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	1.00	1.00	0.95	1.00		0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.98		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1670	1592	3539	1456		3592
Flt Permitted	0.95	1.00	1.00	1.00		0.90
Satd. Flow (perm)	1670	1592	3539	1456		3253
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	140	27	403	151	27	263
RTOR Reduction (vph)	0	23	0	47	0	0
Lane Group Flow (vph)	140	4	403	104	0	290
Confl. Peds. (#/hr)	1	3		8	8	
Heavy Vehicles (%)	8%	0%	2%	9%	0%	0%
Turn Type	Perm	Perm	NA	Perm	Perm	NA
Protected Phases			2			6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	11.9	11.9	48.1	48.1		48.1
Effective Green, g (s)	11.9	11.9	48.1	48.1		48.1
Actuated g/C Ratio	0.17	0.17	0.67	0.67		0.67
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	276	263	2364	972		2173
v/s Ratio Prot			c0.11			
v/s Ratio Perm	c0.08	0.00		0.07		0.09
v/c Ratio	0.51	0.02	0.17	0.11		0.13
Uniform Delay, d1	27.4	25.2	4.5	4.3		4.4
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.5	0.0	0.2	0.2		0.1
Delay (s)	28.8	25.2	4.6	4.5		4.5
Level of Service	C	C	A	A		A
Approach Delay (s)	28.3		4.6			4.5
Approach LOS	C		A			A

Intersection Summary				
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	160	20	20	140	5	5
Future Volume (Veh/h)	160	20	20	140	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	168	21	21	147	5	5
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked						
vC, conflicting volume			194		299	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			194		299	100
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1385		617	939

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	112	77	70	98	10
Volume Left	0	0	21	0	5
Volume Right	0	21	0	0	5
cSH	1700	1700	1385	1700	744
Volume to Capacity	0.07	0.05	0.02	0.06	0.01
Queue Length 95th (m)	0.0	0.0	0.4	0.0	0.3
Control Delay (s)	0.0	0.0	2.4	0.0	9.9
Lane LOS			A		A
Approach Delay (s)	0.0		1.0		9.9
Approach LOS					A

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

Queues
3: Toronto St & Simcoe St

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	32	123	245	128	11	335	410	16	314
v/c Ratio	0.06	0.08	0.32	0.07	0.04	0.73	0.60	0.06	0.63
Control Delay	22.5	19.0	12.7	10.9	18.0	43.6	6.6	18.7	36.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	19.0	12.7	10.9	18.0	43.6	6.6	18.7	36.1
Queue Length 50th (m)	3.2	5.9	17.3	4.1	1.6	59.7	0.0	2.3	53.5
Queue Length 95th (m)	11.4	15.0	45.5	12.1	4.2	79.6	19.7	5.2	72.9
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	562	1451	776	1926	332	569	756	296	598
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.08	0.32	0.07	0.03	0.59	0.54	0.05	0.53

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	105	10	230	110	10	10	315	385	15	245	50
Future Volume (vph)	30	105	10	230	110	10	10	315	385	15	245	50
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1787	3243		1787	3256		1805	1863	1541	1799	1822	
Flt Permitted	0.67	1.00		0.61	1.00		0.39	1.00	1.00	0.30	1.00	
Satd. Flow (perm)	1262	3243		1156	3256		739	1863	1541	566	1822	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	112	11	245	117	11	11	335	410	16	261	53
RTOR Reduction (vph)	0	6	0	0	5	0	0	0	306	0	7	0
Lane Group Flow (vph)	32	117	0	245	123	0	11	335	104	16	307	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	41.3	41.3		55.8	55.8		26.8	25.4	25.4	29.6	26.8	
Effective Green, g (s)	41.3	41.3		55.8	55.8		26.8	25.4	25.4	29.6	26.8	
Actuated g/C Ratio	0.41	0.41		0.56	0.56		0.27	0.25	0.25	0.30	0.27	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	521	1339		711	1816		212	473	391	202	488	
v/s Ratio Prot		0.04		c0.04	0.04		0.00	c0.18		c0.00	0.17	
v/s Ratio Perm	0.03			c0.16			0.01		0.07	0.02		
v/c Ratio	0.06	0.09		0.34	0.07		0.05	0.71	0.27	0.08	0.63	
Uniform Delay, d1	17.7	17.9		11.4	10.2		27.3	33.9	29.8	25.8	32.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.1		0.3	0.1		0.1	4.8	0.4	0.2	2.5	
Delay (s)	17.9	18.0		11.7	10.2		27.4	38.7	30.2	26.0	34.7	
Level of Service	B	B		B	B		C	D	C	C	C	
Approach Delay (s)		18.0			11.2			34.0			34.3	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	70.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	50	35	455	315	55
Future Volume (Veh/h)	65	50	35	455	315	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	54	38	495	342	60
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					247	
pX, platoon unblocked						
vC, conflicting volume	698	203	404			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	698	203	404			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	93	97			
cM capacity (veh/h)	366	809	1142			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	125	203	330	228	174
Volume Left	71	38	0	0	0
Volume Right	54	0	0	0	60
cSH	479	1142	1700	1700	1700
Volume to Capacity	0.26	0.03	0.19	0.13	0.10
Queue Length 95th (m)	7.9	0.8	0.0	0.0	0.0
Control Delay (s)	15.1	1.8	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	15.1	0.7		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	40.9%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	212	54	451	196	446
v/c Ratio	0.58	0.14	0.20	0.20	0.23
Control Delay	30.4	6.6	7.3	2.9	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	6.6	7.3	2.9	7.6
Queue Length 50th (m)	26.4	0.0	11.6	1.4	11.7
Queue Length 95th (m)	37.2	6.4	26.2	11.6	26.7
Internal Link Dist (m)	31.3		222.5		145.0
Turn Bay Length (m)				10.0	
Base Capacity (vph)	707	694	2224	994	1942
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.30	0.08	0.20	0.20	0.23

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	195	50	415	180	35	375
Future Volume (vph)	195	50	415	180	35	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	1.00	1.00	0.95	1.00		0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.97		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1698	1592	3610	1513		3528
Flt Permitted	0.95	1.00	1.00	1.00		0.89
Satd. Flow (perm)	1698	1592	3610	1513		3153
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	212	54	451	196	38	408
RTOR Reduction (vph)	0	42	0	63	0	0
Lane Group Flow (vph)	212	12	451	133	0	446
Confl. Peds. (#/hr)	3	3		18	18	
Confl. Bikes (#/hr)				3		
Heavy Vehicles (%)	6%	0%	0%	4%	0%	2%
Turn Type	Perm	Perm	NA	Perm	Perm	NA
Protected Phases			2			6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	15.6	15.6	44.4	44.4		44.4
Effective Green, g (s)	15.6	15.6	44.4	44.4		44.4
Actuated g/C Ratio	0.22	0.22	0.62	0.62		0.62
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	367	344	2226	933		1944
v/s Ratio Prot			0.12			
v/s Ratio Perm	c0.12	0.01		0.09		c0.14
v/c Ratio	0.58	0.03	0.20	0.14		0.23
Uniform Delay, d1	25.3	22.3	6.0	5.8		6.2
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.2	0.0	0.2	0.3		0.3
Delay (s)	27.5	22.3	6.3	6.1		6.4
Level of Service	C	C	A	A		A
Approach Delay (s)	26.4		6.2			6.4
Approach LOS	C		A			A

Intersection Summary					
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.32				
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	225	10	10	210	20	20
Future Volume (Veh/h)	225	10	10	210	20	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	242	11	11	226	22	22
Pedestrians					11	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked						
vC, conflicting volume			264		394	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			264		394	138
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	98
cM capacity (veh/h)			1299		578	883

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	161	92	86	151	44
Volume Left	0	0	11	0	22
Volume Right	0	11	0	0	22
cSH	1700	1700	1299	1700	699
Volume to Capacity	0.09	0.05	0.01	0.09	0.06
Queue Length 95th (m)	0.0	0.0	0.2	0.0	1.5
Control Delay (s)	0.0	0.0	1.1	0.0	10.5
Lane LOS			A		B
Approach Delay (s)	0.0		0.4		10.5
Approach LOS					B

Intersection Summary					
Average Delay	1.0				
Intersection Capacity Utilization	23.2%	ICU Level of Service	A		
Analysis Period (min)	15				

Queues
3: Toronto St & Simcoe St

12/17/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	47	184	384	205	5	332	368	16	442
v/c Ratio	0.10	0.14	0.53	0.11	0.02	0.65	0.54	0.06	0.80
Control Delay	24.4	20.7	16.8	11.4	17.0	38.0	5.9	18.1	43.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	20.7	16.8	11.4	17.0	38.0	5.9	18.1	43.1
Queue Length 50th (m)	5.7	10.9	33.9	7.7	0.7	55.4	0.0	2.2	77.9
Queue Length 95th (m)	15.4	21.0	73.8	17.9	2.5	78.7	18.7	5.2	108.2
Internal Link Dist (m)		78.5		280.1		170.7			0.1
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	455	1349	725	1915	279	575	727	329	607
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.14	0.53	0.11	0.02	0.58	0.51	0.05	0.73

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	155	20	365	175	20	5	315	350	15	355	65
Future Volume (vph)	45	155	20	365	175	20	5	315	350	15	355	65
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1755	3387		1800	3382		1805	1881	1543	1799	1856	
Flt Permitted	0.62	1.00		0.57	1.00		0.22	1.00	1.00	0.34	1.00	
Satd. Flow (perm)	1151	3387		1086	3382		427	1881	1543	639	1856	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	163	21	384	184	21	5	332	368	16	374	68
RTOR Reduction (vph)	0	9	0	0	7	0	0	0	265	0	6	0
Lane Group Flow (vph)	47	175	0	384	198	0	5	332	103	16	436	0
Confl. Peds. (#/hr)	22		4	4		22			22	22		
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	1%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	36.4	36.4		53.2	53.2		29.4	28.0	28.0	32.2	29.4	
Effective Green, g (s)	36.4	36.4		53.2	53.2		29.4	28.0	28.0	32.2	29.4	
Actuated g/C Ratio	0.36	0.36		0.53	0.53		0.29	0.28	0.28	0.32	0.29	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	418	1232		669	1799		144	526	432	238	545	
v/s Ratio Prot		0.05		c0.07	0.06		0.00	0.18		c0.00	c0.23	
v/s Ratio Perm	0.04			c0.23			0.01		0.07	0.02		
v/c Ratio	0.11	0.14		0.57	0.11		0.03	0.63	0.24	0.07	0.80	
Uniform Delay, d1	21.1	21.3		14.0	11.6		26.2	31.5	27.8	23.9	32.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.2		1.2	0.1		0.1	2.5	0.3	0.1	8.0	
Delay (s)	21.6	21.6		15.2	11.8		26.3	34.0	28.1	24.0	40.6	
Level of Service	C	C		B	B		C	C	C	C	D	
Approach Delay (s)		21.6			14.0			30.8			40.0	
Approach LOS		C			B			C			D	

Intersection Summary				
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	87.6%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	35	5	565	525	20
Future Volume (Veh/h)	40	35	5	565	525	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	43	38	5	608	565	22
Pedestrians	6					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					247	
pX, platoon unblocked						
vC, conflicting volume	896	300	593			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	896	300	593			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	95	99			
cM capacity (veh/h)	281	699	987			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	81	208	405	377	210
Volume Left	43	5	0	0	0
Volume Right	38	0	0	0	22
cSH	390	987	1700	1700	1700
Volume to Capacity	0.21	0.01	0.24	0.22	0.12
Queue Length 95th (m)	5.9	0.1	0.0	0.0	0.0
Control Delay (s)	16.6	0.3	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.6	0.1		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	30.2%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	158	32	442	137	216
v/c Ratio	0.47	0.10	0.19	0.14	0.10
Control Delay	28.9	7.9	6.8	2.8	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	7.9	6.8	2.8	6.5
Queue Length 50th (m)	19.8	0.0	10.2	0.8	4.6
Queue Length 95th (m)	28.3	5.0	25.7	9.3	13.4
Internal Link Dist (m)	31.3		222.5		145.0
Turn Bay Length (m)				10.0	
Base Capacity (vph)	702	660	2270	987	2066
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.23	0.05	0.19	0.14	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	150	30	420	130	20	185
Future Volume (vph)	150	30	420	130	20	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	1.00	1.00	0.95	1.00		0.95
Frpb, ped/bikes	1.00	0.98	1.00	0.98		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1687	1541	3574	1488		3590
Flt Permitted	0.95	1.00	1.00	1.00		0.90
Satd. Flow (perm)	1687	1541	3574	1488		3253
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	32	442	137	21	195
RTOR Reduction (vph)	0	26	0	43	0	0
Lane Group Flow (vph)	158	6	442	94	0	216
Confl. Peds. (#/hr)		6		16	16	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	7%	3%	1%	6%	0%	0%
Turn Type	Perm	Perm	NA	Perm	Perm	NA
Protected Phases			2			6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	14.3	14.3	45.7	45.7		45.7
Effective Green, g (s)	14.3	14.3	45.7	45.7		45.7
Actuated g/C Ratio	0.20	0.20	0.63	0.63		0.63
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	335	306	2268	944		2064
v/s Ratio Prot			c0.12			
v/s Ratio Perm	c0.09	0.00		0.06		0.07
v/c Ratio	0.47	0.02	0.19	0.10		0.10
Uniform Delay, d1	25.5	23.2	5.5	5.1		5.1
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.1	0.0	0.2	0.2		0.1
Delay (s)	26.6	23.2	5.7	5.3		5.2
Level of Service	C	C	A	A		A
Approach Delay (s)	26.0		5.6			5.2
Approach LOS	C		A			A

Intersection Summary					
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.26				
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	140	0	5	165	10	0
Future Volume (Veh/h)	140	0	5	165	10	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	156	0	6	183	11	0
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked						
vC, conflicting volume			163		266	85
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			163		266	85
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1419		698	957

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	104	52	67	122	11
Volume Left	0	0	6	0	11
Volume Right	0	0	0	0	0
cSH	1700	1700	1419	1700	698
Volume to Capacity	0.06	0.03	0.00	0.07	0.02
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.4
Control Delay (s)	0.0	0.0	0.7	0.0	10.2
Lane LOS			A		B
Approach Delay (s)	0.0		0.3		10.2
Approach LOS					B

Intersection Summary					
Average Delay	0.4				
Intersection Capacity Utilization	18.2%	ICU Level of Service	A		
Analysis Period (min)	15				

Queues
3: Toronto St & Simcoe St

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	32	128	351	143	11	293	356	27	325
v/c Ratio	0.06	0.09	0.45	0.07	0.04	0.69	0.56	0.10	0.64
Control Delay	24.2	18.0	14.2	10.0	18.4	43.5	6.8	20.0	36.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	18.0	14.2	10.0	18.4	43.5	6.8	20.0	36.6
Queue Length 50th (m)	4.1	6.8	34.5	5.5	1.4	52.4	0.0	3.4	49.0
Queue Length 95th (m)	11.4	14.2	64.0	12.2	4.3	71.6	19.4	7.7	78.3
Internal Link Dist (m)		78.5		280.1		170.7			0.1
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	511	1385	777	1912	334	571	725	311	601
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.09	0.45	0.07	0.03	0.51	0.49	0.09	0.54

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	95	25	330	115	20	10	275	335	25	265	40
Future Volume (vph)	30	95	25	330	115	20	10	275	335	25	265	40
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1766	3291		1778	3234		1803	1900	1585	1803	1858	
Flt Permitted	0.66	1.00		0.61	1.00		0.40	1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1229	3291		1137	3234		751	1900	1585	626	1858	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	101	27	351	122	21	11	293	356	27	282	43
RTOR Reduction (vph)	0	17	0	0	9	0	0	0	270	0	6	0
Lane Group Flow (vph)	32	111	0	351	134	0	11	293	86	27	319	0
Confl. Peds. (#/hr)	16		7	7		16	4		6	6		4
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	7%	0%	1%	9%	5%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	38.4	38.4		55.6	55.6		25.5	24.1	24.1	31.3	27.0	
Effective Green, g (s)	38.4	38.4		55.6	55.6		25.5	24.1	24.1	31.3	27.0	
Actuated g/C Ratio	0.38	0.38		0.56	0.56		0.26	0.24	0.24	0.31	0.27	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	471	1263		716	1798		206	457	381	246	501	
v/s Ratio Prot		0.03		c0.06	0.04		0.00	0.15		c0.00	c0.17	
v/s Ratio Perm	0.03			c0.21			0.01		0.05	0.03		
v/c Ratio	0.07	0.09		0.49	0.07		0.05	0.64	0.23	0.11	0.64	
Uniform Delay, d1	19.5	19.6		12.4	10.3		28.2	34.1	30.5	24.7	32.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.1		0.5	0.1		0.1	3.1	0.3	0.2	2.7	
Delay (s)	19.8	19.8		12.9	10.4		28.3	37.1	30.8	24.9	34.8	
Level of Service	B	B		B	B		C	D	C	C	C	
Approach Delay (s)		19.8			12.2			33.5			34.1	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	65.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	35	0	550	285	15
Future Volume (Veh/h)	20	35	0	550	285	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	22	38	0	591	306	16
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					247	
pX, platoon unblocked						
vC, conflicting volume	612	164	325			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	612	164	325			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	96	100			
cM capacity (veh/h)	428	856	1243			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	60	197	394	204	118
Volume Left	22	0	0	0	0
Volume Right	38	0	0	0	16
cSH	626	1243	1700	1700	1700
Volume to Capacity	0.10	0.00	0.23	0.12	0.07
Queue Length 95th (m)	2.4	0.0	0.0	0.0	0.0
Control Delay (s)	11.4	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.4	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	25.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	70	140	38	478	151	371
v/c Ratio	0.23	0.54	0.10	0.21	0.15	0.17
Control Delay	20.3	31.7	10.6	6.8	3.1	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	31.7	10.6	6.8	3.1	6.2
Queue Length 50th (m)	6.8	17.5	1.2	12.0	1.4	8.3
Queue Length 95th (m)	13.4	27.1	6.5	28.3	10.6	20.7
Internal Link Dist (m)	60.3		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	590	520	711	2278	1035	2200
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.27	0.05	0.21	0.15	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	10	10	130	10	25	15	430	140	25	275	45
Future Volume (vph)	45	10	10	130	10	25	15	430	140	25	275	45
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.98		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.89			1.00	0.85		0.98	
Flt Protected		0.97		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)		1756		1670	1670			3533	1456		3517	
Flt Permitted		0.77		0.71	1.00			0.94	1.00		0.90	
Satd. Flow (perm)		1401		1251	1670			3323	1456		3194	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	48	11	11	140	11	27	16	462	151	27	296	48
RTOR Reduction (vph)	0	9	0	0	22	0	0	0	41	0	10	0
Lane Group Flow (vph)	0	61	0	140	16	0	0	478	110	0	361	0
Confl. Peds. (#/hr)	3		1	1		3			8	8		
Heavy Vehicles (%)	2%	2%	2%	8%	2%	0%	2%	2%	9%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		13.0		13.0	13.0			47.0	47.0		47.0	
Effective Green, g (s)		13.0		13.0	13.0			47.0	47.0		47.0	
Actuated g/C Ratio		0.18		0.18	0.18			0.65	0.65		0.65	
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)		252		225	301			2169	950		2084	
v/s Ratio Prot					0.01							
v/s Ratio Perm		0.04		c0.11				c0.14	0.08		0.11	
v/c Ratio		0.24		0.62	0.05			0.22	0.12		0.17	
Uniform Delay, d1		25.3		27.2	24.4			5.1	4.7		4.9	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.5		5.3	0.1			0.2	0.2		0.2	
Delay (s)		25.8		32.5	24.5			5.3	4.9		5.1	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		25.8			30.8			5.2			5.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	170	20	20	150	5	5
Future Volume (Veh/h)	170	20	20	150	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	179	21	21	158	5	5
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked						
vC, conflicting volume			205		316	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			205		316	105
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1372		601	931

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	119	81	74	105	10
Volume Left	0	0	21	0	5
Volume Right	0	21	0	0	5
cSH	1700	1700	1372	1700	731
Volume to Capacity	0.07	0.05	0.02	0.06	0.01
Queue Length 95th (m)	0.0	0.0	0.4	0.0	0.3
Control Delay (s)	0.0	0.0	2.3	0.0	10.0
Lane LOS			A		A
Approach Delay (s)	0.0		0.9		10.0
Approach LOS					A

Intersection Summary					
Average Delay	0.7				
Intersection Capacity Utilization	24.7%	ICU Level of Service	A		
Analysis Period (min)	15				

Queues
3: Toronto St & Simcoe St

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	32	133	245	139	11	367	410	16	340
v/c Ratio	0.06	0.10	0.33	0.07	0.04	0.75	0.58	0.06	0.64
Control Delay	23.0	19.6	13.6	11.5	17.3	42.8	6.2	17.9	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	19.6	13.6	11.5	17.3	42.8	6.2	17.9	35.3
Queue Length 50th (m)	3.4	6.8	18.8	4.9	1.5	64.5	0.0	2.2	57.2
Queue Length 95th (m)	11.4	16.1	45.5	13.0	4.2	88.0	19.7	5.2	79.9
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	536	1400	744	1866	337	572	757	298	607
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.10	0.33	0.07	0.03	0.64	0.54	0.05	0.56

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	115	10	230	120	10	10	345	385	15	270	50
Future Volume (vph)	30	115	10	230	120	10	10	345	385	15	270	50
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1788	3246		1787	3258		1805	1863	1541	1800	1825	
Flt Permitted	0.66	1.00		0.61	1.00		0.37	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	1249	3246		1141	3258		701	1863	1541	526	1825	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	122	11	245	128	11	11	367	410	16	287	53
RTOR Reduction (vph)	0	6	0	0	5	0	0	0	298	0	6	0
Lane Group Flow (vph)	32	127	0	245	134	0	11	367	112	16	334	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.7	39.7		53.9	53.9		28.7	27.3	27.3	31.5	28.7	
Effective Green, g (s)	39.7	39.7		53.9	53.9		28.7	27.3	27.3	31.5	28.7	
Actuated g/C Ratio	0.40	0.40		0.54	0.54		0.29	0.27	0.27	0.32	0.29	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	495	1288		680	1756		216	508	420	201	523	
v/s Ratio Prot		0.04		c0.04	0.04		0.00	c0.20		c0.00	0.18	
v/s Ratio Perm	0.03			c0.16			0.01		0.07	0.02		
v/c Ratio	0.06	0.10		0.36	0.08		0.05	0.72	0.27	0.08	0.64	
Uniform Delay, d1	18.7	18.9		12.4	11.1		26.0	32.9	28.5	24.7	31.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.3	0.1		0.1	5.0	0.3	0.2	2.6	
Delay (s)	18.9	19.1		12.7	11.2		26.1	38.0	28.8	24.8	33.7	
Level of Service	B	B		B	B		C	D	C	C	C	
Approach Delay (s)		19.0			12.2			33.0			33.3	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	85.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	50	35	505	355	55
Future Volume (Veh/h)	65	50	35	505	355	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	54	38	549	386	60
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	768	225	448			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	768	225	448			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	93	97			
cM capacity (veh/h)	330	783	1100			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	125	221	366	257	189
Volume Left	71	38	0	0	0
Volume Right	54	0	0	0	60
cSH	440	1100	1700	1700	1700
Volume to Capacity	0.28	0.03	0.22	0.15	0.11
Queue Length 95th (m)	8.8	0.8	0.0	0.0	0.0
Control Delay (s)	16.4	1.7	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.4	0.6		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	43.3%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	87	212	65	516	196	581
v/c Ratio	0.25	0.69	0.15	0.26	0.21	0.32
Control Delay	18.1	35.6	7.7	8.7	3.7	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	35.6	7.7	8.7	3.7	8.7
Queue Length 50th (m)	7.7	26.0	1.1	16.0	2.8	17.7
Queue Length 95th (m)	15.6	40.7	8.1	30.6	13.5	34.2
Internal Link Dist (m)	74.6		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	585	522	713	1999	948	1841
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.41	0.09	0.26	0.21	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	10	15	195	10	50	10	465	180	35	430	70
Future Volume (vph)	55	10	15	195	10	50	10	465	180	35	430	70
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.97		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.88			1.00	0.85		0.98	
Flt Protected		0.97		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)		1748		1699	1638			3605	1513		3461	
Flt Permitted		0.76		0.70	1.00			0.94	1.00		0.90	
Satd. Flow (perm)		1381		1253	1638			3397	1513		3111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	11	16	212	11	54	11	505	196	38	467	76
RTOR Reduction (vph)	0	12	0	0	41	0	0	0	59	0	12	0
Lane Group Flow (vph)	0	75	0	212	24	0	0	516	137	0	569	0
Confl. Peds. (#/hr)	3		3	3		3			18	18		
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	2%	2%	2%	6%	2%	0%	2%	0%	4%	0%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		17.6		17.6	17.6			42.4	42.4		42.4	
Effective Green, g (s)		17.6		17.6	17.6			42.4	42.4		42.4	
Actuated g/C Ratio		0.24		0.24	0.24			0.59	0.59		0.59	
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)		337		306	400			2000	890		1832	
v/s Ratio Prot					0.01							
v/s Ratio Perm		0.05		c0.17				0.15	0.09		c0.18	
v/c Ratio		0.22		0.69	0.06			0.26	0.15		0.31	
Uniform Delay, d1		21.7		24.7	20.9			7.2	6.7		7.4	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3		6.6	0.1			0.3	0.4		0.4	
Delay (s)		22.1		31.4	20.9			7.5	7.1		7.9	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		22.1			28.9			7.4			7.9	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	74.5%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	235	10	10	220	20	20
Future Volume (Veh/h)	235	10	10	220	20	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	253	11	11	237	22	22
Pedestrians					11	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked					1.00	
vC, conflicting volume			275		410	143
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			275		399	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 %			99		96	97
cM capacity (veh/h)			1287		571	876

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	169	95	90	158	44
Volume Left	0	0	11	0	22
Volume Right	0	11	0	0	22
cSH	1700	1700	1287	1700	691
Volume to Capacity	0.10	0.06	0.01	0.09	0.06
Queue Length 95th (m)	0.0	0.0	0.2	0.0	1.5
Control Delay (s)	0.0	0.0	1.0	0.0	10.6
Lane LOS			A		B
Approach Delay (s)	0.0		0.4		10.6
Approach LOS					B

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	23.4%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
3: Toronto St & Simcoe St

12/17/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	47	195	384	216	5	363	368	16	479
v/c Ratio	0.11	0.15	0.55	0.12	0.02	0.67	0.52	0.06	0.82
Control Delay	25.1	21.8	18.0	12.2	16.4	37.4	5.6	17.4	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	21.8	18.0	12.2	16.4	37.4	5.6	17.4	42.9
Queue Length 50th (m)	6.1	12.5	36.9	8.9	0.7	59.1	0.0	2.1	83.0
Queue Length 95th (m)	15.5	22.2	73.8	18.9	2.5	86.8	18.7	5.2	#121.7
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	430	1288	698	1853	276	582	731	329	621
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.15	0.55	0.12	0.02	0.62	0.50	0.05	0.77

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	165	20	365	185	20	5	345	350	15	390	65
Future Volume (vph)	45	165	20	365	185	20	5	345	350	15	390	65
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1756	3390		1800	3385		1805	1881	1543	1800	1860	
Flt Permitted	0.62	1.00		0.56	1.00		0.20	1.00	1.00	0.32	1.00	
Satd. Flow (perm)	1140	3390		1069	3385		382	1881	1543	597	1860	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	174	21	384	195	21	5	363	368	16	411	68
RTOR Reduction (vph)	0	9	0	0	7	0	0	0	258	0	6	0
Lane Group Flow (vph)	47	186	0	384	209	0	5	363	110	16	473	0
Confl. Peds. (#/hr)	22		4	4		22			22	22		
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	1%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	34.6	34.6		51.4	51.4		31.2	29.8	29.8	34.0	31.2	
Effective Green, g (s)	34.6	34.6		51.4	51.4		31.2	29.8	29.8	34.0	31.2	
Actuated g/C Ratio	0.35	0.35		0.51	0.51		0.31	0.30	0.30	0.34	0.31	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	394	1172		643	1739		139	560	459	236	580	
v/s Ratio Prot		0.06		c0.08	0.06		0.00	0.19		c0.00	c0.25	
v/s Ratio Perm	0.04			c0.23			0.01		0.07	0.02		
v/c Ratio	0.12	0.16		0.60	0.12		0.04	0.65	0.24	0.07	0.82	
Uniform Delay, d1	22.3	22.6		15.2	12.6		25.3	30.5	26.5	22.9	31.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.3		1.5	0.1		0.1	2.6	0.3	0.1	8.6	
Delay (s)	22.9	22.9		16.7	12.7		25.4	33.1	26.8	23.0	40.4	
Level of Service	C	C		B	B		C	C	C	C	D	
Approach Delay (s)		22.9			15.3			29.9			39.8	
Approach LOS		C			B			C			D	

Intersection Summary				
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	89.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	35	5	620	580	20
Future Volume (Veh/h)	40	35	5	620	580	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	43	38	5	667	624	22
Pedestrians	6					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	984	329	652			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	984	329	652			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	94	99			
cM capacity (veh/h)	246	669	939			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	81	227	445	416	230
Volume Left	43	5	0	0	0
Volume Right	38	0	0	0	22
cSH	350	939	1700	1700	1700
Volume to Capacity	0.23	0.01	0.26	0.24	0.14
Queue Length 95th (m)	6.7	0.1	0.0	0.0	0.0
Control Delay (s)	18.4	0.2	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	18.4	0.1		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	31.7%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	64	158	37	505	137	311
v/c Ratio	0.20	0.56	0.10	0.24	0.14	0.16
Control Delay	19.3	31.8	8.9	7.5	3.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	31.8	8.9	7.5	3.4	6.1
Queue Length 50th (m)	6.1	19.7	0.6	13.2	1.5	6.3
Queue Length 95th (m)	12.4	30.0	5.9	29.7	10.5	16.5
Internal Link Dist (m)	83.1		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	608	549	657	2106	959	1989
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.29	0.06	0.24	0.14	0.16

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	10	10	150	5	30	5	475	130	20	220	55
Future Volume (vph)	40	10	10	150	5	30	5	475	130	20	220	55
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.98		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.87			1.00	0.85		0.97	
Flt Protected		0.97		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)		1756		1752	1532			3572	1488		3483	
Flt Permitted		0.80		0.72	1.00			0.95	1.00		0.91	
Satd. Flow (perm)		1443		1319	1532			3403	1488		3183	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	11	158	5	32	5	500	137	21	232	58
RTOR Reduction (vph)	0	9	0	0	25	0	0	0	39	0	18	0
Lane Group Flow (vph)	0	55	0	158	12	0	0	505	98	0	293	0
Confl. Peds. (#/hr)	6					6			16	16		
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	2%	2%	3%	2%	7%	2%	1%	6%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.4		15.4	15.4			44.6	44.6		44.6	
Effective Green, g (s)		15.4		15.4	15.4			44.6	44.6		44.6	
Actuated g/C Ratio		0.21		0.21	0.21			0.62	0.62		0.62	
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)		308		282	327			2107	921		1971	
v/s Ratio Prot					0.01							
v/s Ratio Perm		0.04		c0.12				c0.15	0.07		0.09	
v/c Ratio		0.18		0.56	0.04			0.24	0.11		0.15	
Uniform Delay, d1		23.1		25.3	22.4			6.1	5.6		5.7	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3		2.5	0.0			0.3	0.2		0.2	
Delay (s)		23.4		27.8	22.5			6.4	5.8		5.9	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		23.4			26.8			6.3			5.9	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.32			
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	73.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	150	0	5	170	10	0
Future Volume (Veh/h)	150	0	5	170	10	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	167	0	6	189	11	0
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked						
vC, conflicting volume			174		280	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			174		280	90
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1406		685	950

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	111	56	69	126	11
Volume Left	0	0	6	0	11
Volume Right	0	0	0	0	0
cSH	1700	1700	1406	1700	685
Volume to Capacity	0.07	0.03	0.00	0.07	0.02
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.4
Control Delay (s)	0.0	0.0	0.7	0.0	10.3
Lane LOS			A		B
Approach Delay (s)	0.0		0.2		10.3
Approach LOS					B

Intersection Summary					
Average Delay	0.4				
Intersection Capacity Utilization	18.3%	ICU Level of Service	A		
Analysis Period (min)	15				

Queues
3: Toronto St & Simcoe St

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	32	139	351	149	11	324	356	27	352
v/c Ratio	0.06	0.10	0.47	0.08	0.04	0.71	0.55	0.10	0.66
Control Delay	24.5	18.6	15.5	10.8	17.3	42.9	6.4	19.0	36.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	18.6	15.5	10.8	17.3	42.9	6.4	19.0	36.0
Queue Length 50th (m)	4.3	7.8	35.9	6.0	1.3	57.8	0.0	3.3	53.0
Queue Length 95th (m)	11.4	15.4	66.1	13.0	4.2	77.8	18.9	7.5	83.5
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	497	1358	748	1863	334	577	728	309	622
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.10	0.47	0.08	0.03	0.56	0.49	0.09	0.57

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	105	25	330	120	20	10	305	335	25	290	40
Future Volume (vph)	30	105	25	330	120	20	10	305	335	25	290	40
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1766	3297		1778	3238		1804	1900	1580	1803	1861	
Flt Permitted	0.66	1.00		0.60	1.00		0.37	1.00	1.00	0.30	1.00	
Satd. Flow (perm)	1222	3297		1123	3238		699	1900	1580	574	1861	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	112	27	351	128	21	11	324	356	27	309	43
RTOR Reduction (vph)	0	17	0	0	10	0	0	0	265	0	5	0
Lane Group Flow (vph)	32	122	0	351	139	0	11	324	91	27	347	0
Confl. Peds. (#/hr)	16		7	7		16	4		9	9		4
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	7%	0%	1%	9%	5%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	37.5	37.5		54.1	54.1		27.0	25.6	25.6	32.8	28.5	
Effective Green, g (s)	37.5	37.5		54.1	54.1		27.0	25.6	25.6	32.8	28.5	
Actuated g/C Ratio	0.38	0.38		0.54	0.54		0.27	0.26	0.26	0.33	0.28	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	458	1236		690	1751		204	486	404	241	530	
v/s Ratio Prot		0.04		c0.06	0.04		0.00	0.17		c0.00	c0.19	
v/s Ratio Perm	0.03			c0.21			0.01		0.06	0.03		
v/c Ratio	0.07	0.10		0.51	0.08		0.05	0.67	0.23	0.11	0.65	
Uniform Delay, d1	20.1	20.3		13.2	11.0		27.2	33.4	29.4	23.8	31.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.6	0.1		0.1	3.4	0.3	0.2	2.9	
Delay (s)	20.4	20.4		13.8	11.1		27.3	36.8	29.7	24.0	34.3	
Level of Service	C	C		B	B		C	D	C	C	C	
Approach Delay (s)		20.4			13.0			33.0			33.6	
Approach LOS		C			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	86.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	35	0	600	315	15
Future Volume (Veh/h)	20	35	0	600	315	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	22	38	0	645	339	16
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	672	180	358			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	672	180	358			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	95	100			
cM capacity (veh/h)	392	835	1209			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	60	215	430	226	129
Volume Left	22	0	0	0	0
Volume Right	38	0	0	0	16
cSH	591	1209	1700	1700	1700
Volume to Capacity	0.10	0.00	0.25	0.13	0.08
Queue Length 95th (m)	2.6	0.0	0.0	0.0	0.0
Control Delay (s)	11.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.8	0.0		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay		0.7			
Intersection Capacity Utilization	26.6%	ICU Level of Service		A	
Analysis Period (min)	15				

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	70	140	38	602	151	451
v/c Ratio	0.23	0.54	0.10	0.26	0.15	0.20
Control Delay	20.3	31.7	10.6	7.1	3.9	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	31.7	10.6	7.1	3.9	6.5
Queue Length 50th (m)	6.8	17.5	1.2	15.8	2.4	10.6
Queue Length 95th (m)	13.4	27.1	6.5	36.1	12.6	25.7
Internal Link Dist (m)	60.3		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	590	520	711	2281	1028	2200
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.27	0.05	0.26	0.15	0.20

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	10	10	130	10	25	15	545	140	25	350	45
Future Volume (vph)	45	10	10	130	10	25	15	545	140	25	350	45
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.98		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.89			1.00	0.85		0.98	
Flt Protected		0.97		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)		1756		1670	1670			3535	1456		3534	
Flt Permitted		0.77		0.71	1.00			0.94	1.00		0.90	
Satd. Flow (perm)		1401		1251	1670			3326	1456		3201	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	48	11	11	140	11	27	16	586	151	27	376	48
RTOR Reduction (vph)	0	9	0	0	22	0	0	0	33	0	8	0
Lane Group Flow (vph)	0	61	0	140	16	0	0	602	118	0	443	0
Confl. Peds. (#/hr)	3		1	1		3			8	8		
Heavy Vehicles (%)	2%	2%	2%	8%	2%	0%	2%	2%	9%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		13.0		13.0	13.0			47.0	47.0		47.0	
Effective Green, g (s)		13.0		13.0	13.0			47.0	47.0		47.0	
Actuated g/C Ratio		0.18		0.18	0.18			0.65	0.65		0.65	
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)		252		225	301			2171	950		2089	
v/s Ratio Prot					0.01							
v/s Ratio Perm		0.04		c0.11				c0.18	0.08		0.14	
v/c Ratio		0.24		0.62	0.05			0.28	0.12		0.21	
Uniform Delay, d1		25.3		27.2	24.4			5.3	4.7		5.0	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.5		5.3	0.1			0.3	0.3		0.2	
Delay (s)		25.8		32.5	24.5			5.6	5.0		5.3	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		25.8			30.8			5.5			5.3	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.35				
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	73.7%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	170	20	20	150	5	5
Future Volume (Veh/h)	170	20	20	150	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	179	21	21	158	5	5
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked						
vC, conflicting volume			205		316	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			205		316	105
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1372		601	931

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	119	81	74	105	10
Volume Left	0	0	21	0	5
Volume Right	0	21	0	0	5
cSH	1700	1700	1372	1700	731
Volume to Capacity	0.07	0.05	0.02	0.06	0.01
Queue Length 95th (m)	0.0	0.0	0.4	0.0	0.3
Control Delay (s)	0.0	0.0	2.3	0.0	10.0
Lane LOS			A		A
Approach Delay (s)	0.0		0.9		10.0
Approach LOS					A

Intersection Summary					
Average Delay	0.7				
Intersection Capacity Utilization	24.7%	ICU Level of Service	A		
Analysis Period (min)	15				

Queues
3: Toronto St & Simcoe St

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	32	133	245	139	11	468	410	16	420
v/c Ratio	0.07	0.10	0.35	0.08	0.04	0.83	0.57	0.07	0.70
Control Delay	24.0	20.9	15.2	12.7	16.3	46.0	7.4	16.9	35.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	20.9	15.2	12.7	16.3	46.0	7.4	16.9	35.5
Queue Length 50th (m)	3.8	7.8	22.1	5.7	1.4	80.8	5.2	2.0	69.1
Queue Length 95th (m)	11.4	16.1	45.5	13.0	4.2	118.0	28.4	5.2	102.5
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	490	1280	695	1744	328	591	742	277	626
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.10	0.35	0.08	0.03	0.79	0.55	0.06	0.67

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	115	10	230	120	10	10	440	385	15	345	50
Future Volume (vph)	30	115	10	230	120	10	10	440	385	15	345	50
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1788	3246		1787	3258		1805	1863	1541	1803	1832	
Flt Permitted	0.66	1.00		0.60	1.00		0.30	1.00	1.00	0.19	1.00	
Satd. Flow (perm)	1249	3246		1131	3258		565	1863	1541	369	1832	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	122	11	245	128	11	11	468	410	16	367	53
RTOR Reduction (vph)	0	6	0	0	5	0	0	0	256	0	5	0
Lane Group Flow (vph)	32	127	0	245	134	0	11	468	154	16	415	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	36.1	36.1		50.2	50.2		32.4	31.0	31.0	35.2	32.4	
Effective Green, g (s)	36.1	36.1		50.2	50.2		32.4	31.0	31.0	35.2	32.4	
Actuated g/C Ratio	0.36	0.36		0.50	0.50		0.32	0.31	0.31	0.35	0.32	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	450	1171		634	1635		200	577	477	170	593	
v/s Ratio Prot		0.04		c0.04	0.04		0.00	c0.25		c0.00	0.23	
v/s Ratio Perm	0.03			c0.15			0.02		0.10	0.03		
v/c Ratio	0.07	0.11		0.39	0.08		0.06	0.81	0.32	0.09	0.70	
Uniform Delay, d1	21.0	21.2		14.5	12.9		23.9	31.8	26.5	23.1	29.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.4	0.1		0.1	8.5	0.4	0.2	3.7	
Delay (s)	21.3	21.4		14.9	13.0		24.0	40.3	26.8	23.4	33.3	
Level of Service	C	C		B	B		C	D	C	C	C	
Approach Delay (s)		21.4			14.2			33.9			32.9	
Approach LOS		C			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	88.3%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	50	35	620	430	55
Future Volume (Veh/h)	65	50	35	620	430	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	54	38	674	467	60
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	912	266	529			
vC1, stage 1 conf vol	499					
vC2, stage 2 conf vol	413					
vCu, unblocked vol	912	266	529			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	93	96			
cM capacity (veh/h)	476	738	1026			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	125	38	337	337	311	216
Volume Left	71	38	0	0	0	0
Volume Right	54	0	0	0	0	60
cSH	562	1026	1700	1700	1700	1700
Volume to Capacity	0.22	0.04	0.20	0.20	0.18	0.13
Queue Length 95th (m)	6.4	0.9	0.0	0.0	0.0	0.0
Control Delay (s)	13.2	8.6	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	13.2	0.5			0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	33.7%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12-18-2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	87	212	65	652	196	701
v/c Ratio	0.25	0.69	0.15	0.33	0.21	0.38
Control Delay	18.1	35.6	7.7	9.1	4.8	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	35.6	7.7	9.1	4.8	9.4
Queue Length 50th (m)	7.7	26.0	1.1	21.2	4.4	22.8
Queue Length 95th (m)	15.6	40.7	8.1	39.5	16.1	43.2
Internal Link Dist (m)	74.6		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	585	522	713	1999	936	1838
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.41	0.09	0.33	0.21	0.38

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12-18-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	10	15	195	10	50	10	590	180	35	540	70
Future Volume (vph)	55	10	15	195	10	50	10	590	180	35	540	70
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.97		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.88			1.00	0.85		0.98	
Flt Protected		0.97		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)		1748		1699	1638			3606	1513		3475	
Flt Permitted		0.76		0.70	1.00			0.94	1.00		0.89	
Satd. Flow (perm)		1381		1253	1638			3399	1513		3109	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	11	16	212	11	54	11	641	196	38	587	76
RTOR Reduction (vph)	0	12	0	0	41	0	0	0	46	0	9	0
Lane Group Flow (vph)	0	75	0	212	24	0	0	652	150	0	692	0
Confl. Peds. (#/hr)	3		3	3		3			18	18		
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	2%	2%	2%	6%	2%	0%	2%	0%	4%	0%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		17.6		17.6	17.6			42.4	42.4		42.4	
Effective Green, g (s)		17.6		17.6	17.6			42.4	42.4		42.4	
Actuated g/C Ratio		0.24		0.24	0.24			0.59	0.59		0.59	
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)		337		306	400			2001	890		1830	
v/s Ratio Prot					0.01							
v/s Ratio Perm		0.05		c0.17				0.19	0.10		c0.22	
v/c Ratio		0.22		0.69	0.06			0.33	0.17		0.38	
Uniform Delay, d1		21.7		24.7	20.9			7.5	6.8		7.8	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3		6.6	0.1			0.4	0.4		0.6	
Delay (s)		22.1		31.4	20.9			8.0	7.2		8.4	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		22.1			28.9			7.8			8.4	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	74.5%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12-18-2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	235	10	10	220	20	20
Future Volume (Veh/h)	235	10	10	220	20	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	253	11	11	237	22	22
Pedestrians					11	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked					0.99	
vC, conflicting volume			275		410	143
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			275		388	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 %			99		96	97
cM capacity (veh/h)			1287		577	876

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	169	95	90	158	44
Volume Left	0	0	11	0	22
Volume Right	0	11	0	0	22
cSH	1700	1700	1287	1700	696
Volume to Capacity	0.10	0.06	0.01	0.09	0.06
Queue Length 95th (m)	0.0	0.0	0.2	0.0	1.5
Control Delay (s)	0.0	0.0	1.0	0.0	10.5
Lane LOS			A		B
Approach Delay (s)	0.0		0.4		10.5
Approach LOS					B

Intersection Summary					
Average Delay	1.0				
Intersection Capacity Utilization	23.4%	ICU Level of Service	A		
Analysis Period (min)	15				

Queues
3: Toronto St & Simcoe St

12-18-2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	47	195	384	216	5	463	368	16	589
v/c Ratio	0.12	0.17	0.62	0.13	0.03	0.71	0.48	0.06	0.81
Control Delay	26.6	23.6	24.0	14.9	21.4	35.2	5.4	14.7	35.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	23.6	24.0	14.9	21.4	35.2	5.4	14.7	35.2
Queue Length 50th (m)	6.6	13.6	43.9	10.6	0.6	71.9	1.9	1.8	99.0
Queue Length 95th (m)	15.5	22.2	#81.9	20.1	3.1	110.1	20.5	4.9	121.6
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	385	1153	624	1669	162	669	775	314	882
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.17	0.62	0.13	0.03	0.69	0.47	0.05	0.67

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12-18-2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	165	20	365	185	20	5	440	350	15	495	65
Future Volume (vph)	45	165	20	365	185	20	5	440	350	15	495	65
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		6.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1756	3390		1800	3385		1805	1881	1543	1802	1867	
Flt Permitted	0.62	1.00		0.56	1.00		0.24	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	1140	3390		1057	3385		457	1881	1543	436	1867	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	174	21	384	195	21	5	463	368	16	521	68
RTOR Reduction (vph)	0	9	0	0	7	0	0	0	231	0	5	0
Lane Group Flow (vph)	47	186	0	384	209	0	5	463	137	16	584	0
Confl. Peds. (#/hr)	22		4	4		22			22	22		
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	1%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	31.3	31.3		46.7	46.7		34.5	34.5	34.5	41.3	41.3	
Effective Green, g (s)	31.3	31.3		46.7	46.7		34.5	34.5	34.5	41.3	41.3	
Actuated g/C Ratio	0.31	0.31		0.47	0.47		0.34	0.34	0.34	0.41	0.41	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	356	1061		578	1580		157	648	532	218	771	
v/s Ratio Prot		0.05		c0.08	0.06			0.25		0.00	c0.31	
v/s Ratio Perm	0.04			c0.23			0.01		0.09	0.03		
v/c Ratio	0.13	0.18		0.66	0.13		0.03	0.71	0.26	0.07	0.76	
Uniform Delay, d1	24.6	25.0		19.0	15.1		21.7	28.5	23.6	19.6	25.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.4		2.9	0.2		0.1	3.7	0.3	0.1	4.3	
Delay (s)	25.4	25.3		21.8	15.3		21.8	32.2	23.8	19.7	29.3	
Level of Service	C	C		C	B		C	C	C	B	C	
Approach Delay (s)		25.3			19.5			28.5			29.1	
Approach LOS		C			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	95.0%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12-18-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	35	5	745	690	20
Future Volume (Veh/h)	40	35	5	745	690	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	43	38	5	801	742	22
Pedestrians	6					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					248	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	1170	388	770			
vC1, stage 1 conf vol	759					
vC2, stage 2 conf vol	410					
vCu, unblocked vol	1152	363	748			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	94	99			
cM capacity (veh/h)	385	630	856			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	81	5	400	400	495	269
Volume Left	43	5	0	0	0	0
Volume Right	38	0	0	0	0	22
cSH	471	856	1700	1700	1700	1700
Volume to Capacity	0.17	0.01	0.24	0.24	0.29	0.16
Queue Length 95th (m)	4.7	0.1	0.0	0.0	0.0	0.0
Control Delay (s)	14.2	9.2	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	14.2	0.1			0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	31.6%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	64	158	37	637	137	368
v/c Ratio	0.20	0.57	0.10	0.30	0.14	0.19
Control Delay	19.1	32.3	8.8	8.0	4.3	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	32.3	8.8	8.0	4.3	6.6
Queue Length 50th (m)	6.0	19.7	0.6	17.7	2.5	8.3
Queue Length 95th (m)	12.4	30.3	5.9	38.3	12.2	20.1
Internal Link Dist (m)	74.6		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	608	529	678	2099	947	1979
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.30	0.05	0.30	0.14	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	10	10	150	5	30	5	600	130	20	275	55
Future Volume (vph)	40	10	10	150	5	30	5	600	130	20	275	55
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.98		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.87			1.00	0.85		0.98	
Flt Protected		0.97		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)		1756		1687	1584			3573	1488		3503	
Flt Permitted		0.80		0.72	1.00			0.95	1.00		0.91	
Satd. Flow (perm)		1445		1270	1584			3404	1488		3189	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	11	158	5	32	5	632	137	21	289	58
RTOR Reduction (vph)	0	9	0	0	25	0	0	0	31	0	14	0
Lane Group Flow (vph)	0	55	0	158	12	0	0	637	106	0	354	0
Confl. Peds. (#/hr)	6					6			16	16		
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	2%	2%	7%	2%	3%	2%	1%	6%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.6		15.6	15.6			44.4	44.4		44.4	
Effective Green, g (s)		15.6		15.6	15.6			44.4	44.4		44.4	
Actuated g/C Ratio		0.22		0.22	0.22			0.62	0.62		0.62	
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)		313		275	343			2099	917		1966	
v/s Ratio Prot					0.01							
v/s Ratio Perm		0.04		c0.12				c0.19	0.07		0.11	
v/c Ratio		0.18		0.57	0.03			0.30	0.12		0.18	
Uniform Delay, d1		23.0		25.2	22.3			6.5	5.7		6.0	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3		2.9	0.0			0.4	0.3		0.2	
Delay (s)		23.2		28.1	22.3			6.9	6.0		6.2	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		23.2			27.0			6.7			6.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	150	0	5	170	10	0
Future Volume (Veh/h)	150	0	5	170	10	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	167	0	6	189	11	0
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked						
vC, conflicting volume			174		280	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			174		280	90
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1406		685	950

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	111	56	69	126	11
Volume Left	0	0	6	0	11
Volume Right	0	0	0	0	0
cSH	1700	1700	1406	1700	685
Volume to Capacity	0.07	0.03	0.00	0.07	0.02
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.4
Control Delay (s)	0.0	0.0	0.7	0.0	10.3
Lane LOS			A		B
Approach Delay (s)	0.0		0.2		10.3
Approach LOS					B

Intersection Summary					
Average Delay	0.4				
Intersection Capacity Utilization	18.3%	ICU Level of Service	A		
Analysis Period (min)	15				

Queues
3: Toronto St & Simcoe St

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	32	139	351	149	11	410	356	27	437
v/c Ratio	0.07	0.11	0.50	0.09	0.04	0.78	0.51	0.11	0.73
Control Delay	25.1	19.3	17.8	12.0	16.0	44.3	5.6	17.5	36.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	19.3	17.8	12.0	16.0	44.3	5.6	17.5	36.6
Queue Length 50th (m)	4.4	8.2	39.7	6.6	1.2	72.9	0.0	3.1	65.3
Queue Length 95th (m)	11.4	15.4	66.9	13.1	4.2	100.3	18.7	7.4	106.8
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	466	1275	698	1750	317	586	734	294	656
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.11	0.50	0.09	0.03	0.70	0.49	0.09	0.67

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	105	25	330	120	20	10	385	335	25	370	40
Future Volume (vph)	30	105	25	330	120	20	10	385	335	25	370	40
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1766	3297		1778	3238		1804	1900	1585	1804	1869	
Flt Permitted	0.66	1.00		0.60	1.00		0.28	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	1222	3297		1115	3238		538	1900	1585	439	1869	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	112	27	351	128	21	11	410	356	27	394	43
RTOR Reduction (vph)	0	18	0	0	10	0	0	0	252	0	4	0
Lane Group Flow (vph)	32	121	0	351	139	0	11	410	104	27	433	0
Confl. Peds. (#/hr)	16		7	7		16	4		6	6		4
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	7%	0%	1%	9%	5%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	35.0	35.0		50.6	50.6		30.5	29.1	29.1	36.3	32.0	
Effective Green, g (s)	35.0	35.0		50.6	50.6		30.5	29.1	29.1	36.3	32.0	
Actuated g/C Ratio	0.35	0.35		0.51	0.51		0.30	0.29	0.29	0.36	0.32	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	427	1153		641	1638		181	552	461	218	598	
v/s Ratio Prot		0.04		c0.06	0.04		0.00	0.22		c0.01	c0.23	
v/s Ratio Perm	0.03			c0.21			0.02		0.07	0.04		
v/c Ratio	0.07	0.11		0.55	0.08		0.06	0.74	0.22	0.12	0.72	
Uniform Delay, d1	21.7	21.9		15.4	12.7		25.1	32.1	26.9	22.2	30.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2		1.0	0.1		0.1	5.4	0.2	0.3	4.3	
Delay (s)	22.0	22.1		16.4	12.8		25.3	37.4	27.1	22.5	34.4	
Level of Service	C	C		B	B		C	D	C	C	C	
Approach Delay (s)		22.1			15.3			32.5			33.7	
Approach LOS		C			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	87.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	35	0	725	370	15
Future Volume (Veh/h)	20	35	0	725	370	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	22	38	0	780	398	16
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	799	210	417			
vC1, stage 1 conf vol	409					
vC2, stage 2 conf vol	390					
vCu, unblocked vol	799	210	417			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	95	100			
cM capacity (veh/h)	530	800	1150			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	60	0	390	390	265	149
Volume Left	22	0	0	0	0	0
Volume Right	38	0	0	0	0	16
cSH	674	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.00	0.23	0.23	0.16	0.09
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.9	0.0			0.0	
Approach LOS	B					

Intersection Summary					
Average Delay	0.5				
Intersection Capacity Utilization	30.0%	ICU Level of Service		A	
Analysis Period (min)	15				

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	70	151	76	478	172	376
v/c Ratio	0.23	0.56	0.19	0.23	0.18	0.19
Control Delay	20.0	32.2	8.0	7.5	3.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	32.2	8.0	7.5	3.2	6.8
Queue Length 50th (m)	6.8	18.8	1.2	12.4	1.6	8.7
Queue Length 95th (m)	13.4	29.1	8.6	28.3	11.6	21.2
Internal Link Dist (m)	60.3		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	581	520	717	2055	952	1958
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.29	0.11	0.23	0.18	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	10	10	140	10	60	15	430	160	30	275	45
Future Volume (vph)	45	10	10	140	10	60	15	430	160	30	275	45
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.98		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.87			1.00	0.85		0.98	
Flt Protected		0.97		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)		1756		1670	1631			3533	1456		3516	
Flt Permitted		0.76		0.71	1.00			0.94	1.00		0.89	
Satd. Flow (perm)		1380		1251	1631			3322	1456		3151	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	48	11	11	151	11	65	16	462	172	32	296	48
RTOR Reduction (vph)	0	9	0	0	51	0	0	0	52	0	10	0
Lane Group Flow (vph)	0	61	0	151	25	0	0	478	120	0	366	0
Confl. Peds. (#/hr)	3		1	1		3			8	8		
Heavy Vehicles (%)	2%	2%	2%	8%	2%	0%	2%	2%	9%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.5		15.5	15.5			44.5	44.5		44.5	
Effective Green, g (s)		15.5		15.5	15.5			44.5	44.5		44.5	
Actuated g/C Ratio		0.22		0.22	0.22			0.62	0.62		0.62	
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)		297		269	351			2053	899		1947	
v/s Ratio Prot					0.02							
v/s Ratio Perm		0.04		c0.12				c0.14	0.08		0.12	
v/c Ratio		0.21		0.56	0.07			0.23	0.13		0.19	
Uniform Delay, d1		23.2		25.2	22.5			6.1	5.7		5.9	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3		2.7	0.1			0.3	0.3		0.2	
Delay (s)		23.5		27.9	22.6			6.4	6.0		6.2	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		23.5			26.1			6.3			6.2	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.32			
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	73.7%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	170	45	35	150	50	45
Future Volume (Veh/h)	170	45	35	150	50	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	179	47	37	158	53	47
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked						
vC, conflicting volume			231		360	118
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			231		360	118
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			97		90	95
cM capacity (veh/h)			1343		555	914

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	119	107	90	105	100
Volume Left	0	0	37	0	53
Volume Right	0	47	0	0	47
cSH	1700	1700	1343	1700	681
Volume to Capacity	0.07	0.06	0.03	0.06	0.15
Queue Length 95th (m)	0.0	0.0	0.6	0.0	3.9
Control Delay (s)	0.0	0.0	3.3	0.0	11.2
Lane LOS			A		B
Approach Delay (s)	0.0		1.5		11.2
Approach LOS					B

Intersection Summary					
Average Delay	2.7				
Intersection Capacity Utilization	28.0%	ICU Level of Service	A		
Analysis Period (min)	15				

Queues
3: Toronto St & Simcoe St

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	155	255	149	11	367	410	16	357
v/c Ratio	0.10	0.11	0.35	0.08	0.04	0.75	0.58	0.06	0.67
Control Delay	23.2	20.0	13.8	11.6	17.4	42.8	6.2	17.9	36.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	20.0	13.8	11.6	17.4	42.8	6.2	17.9	36.5
Queue Length 50th (m)	5.7	8.3	19.6	5.3	1.5	64.5	0.0	2.2	60.7
Queue Length 95th (m)	16.8	18.5	47.6	13.7	4.2	88.0	19.7	5.2	84.1
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	530	1397	732	1867	326	572	757	298	606
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.11	0.35	0.08	0.03	0.64	0.54	0.05	0.59

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	135	10	240	130	10	10	345	385	15	280	55
Future Volume (vph)	50	135	10	240	130	10	10	345	385	15	280	55
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1788	3251		1787	3260		1805	1863	1541	1800	1822	
Flt Permitted	0.66	1.00		0.59	1.00		0.34	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	1237	3251		1117	3260		650	1863	1541	526	1822	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	144	11	255	138	11	11	367	410	16	298	59
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	298	0	7	0
Lane Group Flow (vph)	53	150	0	255	144	0	11	367	112	16	350	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.6	39.6		53.9	53.9		28.7	27.3	27.3	31.5	28.7	
Effective Green, g (s)	39.6	39.6		53.9	53.9		28.7	27.3	27.3	31.5	28.7	
Actuated g/C Ratio	0.40	0.40		0.54	0.54		0.29	0.27	0.27	0.32	0.29	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	489	1287		671	1757		202	508	420	201	522	
v/s Ratio Prot		0.05		c0.04	0.04		0.00	c0.20		c0.00	0.19	
v/s Ratio Perm	0.04			c0.17			0.01		0.07	0.02		
v/c Ratio	0.11	0.12		0.38	0.08		0.05	0.72	0.27	0.08	0.67	
Uniform Delay, d1	19.1	19.1		12.5	11.1		26.1	32.9	28.5	24.7	31.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.4	0.1		0.1	5.0	0.3	0.2	3.4	
Delay (s)	19.5	19.3		12.9	11.2		26.2	38.0	28.8	24.8	34.8	
Level of Service	B	B		B	B		C	D	C	C	C	
Approach Delay (s)		19.4			12.2			33.0			34.4	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	85.9%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
5: Toronto St & Site Dwy

12/17/2019

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	20	0	740	510	20
Future Volume (Veh/h)	0	20	0	740	510	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	0	804	554	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)					279	
pX, platoon unblocked	0.82	0.82	0.82			
vC, conflicting volume	1369	565	576			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1341	364	378			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	138	560	972			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	22	804	576
Volume Left	0	0	0
Volume Right	22	0	22
cSH	560	1700	1700
Volume to Capacity	0.04	0.47	0.34
Queue Length 95th (m)	0.9	0.0	0.0
Control Delay (s)	11.7	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.7	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	50	35	525	365	55
Future Volume (Veh/h)	65	50	35	525	365	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	54	38	571	397	60
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	790	230	459			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	790	230	459			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	93	97			
cM capacity (veh/h)	319	777	1089			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	125	228	381	265	192
Volume Left	71	38	0	0	0
Volume Right	54	0	0	0	60
cSH	428	1089	1700	1700	1700
Volume to Capacity	0.29	0.03	0.22	0.16	0.11
Queue Length 95th (m)	9.1	0.8	0.0	0.0	0.0
Control Delay (s)	16.8	1.7	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.8	0.6		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	44.2%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	87	217	98	516	228	597
v/c Ratio	0.25	0.70	0.21	0.26	0.24	0.34
Control Delay	17.9	35.6	6.6	8.8	3.9	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	35.6	6.6	8.8	3.9	9.1
Queue Length 50th (m)	7.6	26.7	1.1	16.1	3.3	18.6
Queue Length 95th (m)	15.5	41.2	9.6	31.2	15.3	36.4
Internal Link Dist (m)	74.6		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	571	522	726	1985	953	1769
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.42	0.13	0.26	0.24	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	10	15	200	10	80	10	465	210	50	430	70
Future Volume (vph)	55	10	15	200	10	80	10	465	210	50	430	70
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.97		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.87			1.00	0.85		0.98	
Flt Protected		0.97		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)		1749		1699	1622			3605	1513		3460	
Flt Permitted		0.75		0.70	1.00			0.94	1.00		0.86	
Satd. Flow (perm)		1349		1253	1622			3396	1513		3006	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	11	16	217	11	87	11	505	228	54	467	76
RTOR Reduction (vph)	0	12	0	0	65	0	0	0	69	0	11	0
Lane Group Flow (vph)	0	75	0	217	33	0	0	516	159	0	586	0
Confl. Peds. (#/hr)	3		3	3		3			18	18		
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	2%	2%	2%	6%	2%	0%	2%	0%	4%	0%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		17.9		17.9	17.9			42.1	42.1		42.1	
Effective Green, g (s)		17.9		17.9	17.9			42.1	42.1		42.1	
Actuated g/C Ratio		0.25		0.25	0.25			0.58	0.58		0.58	
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)		335		311	403			1985	884		1757	
v/s Ratio Prot					0.02							
v/s Ratio Perm		0.06		c0.17				0.15	0.11		c0.19	
v/c Ratio		0.22		0.70	0.08			0.26	0.18		0.33	
Uniform Delay, d1		21.5		24.6	20.7			7.3	6.9		7.7	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3		6.7	0.1			0.3	0.4		0.5	
Delay (s)		21.9		31.3	20.8			7.6	7.4		8.2	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		21.9			28.0			7.6			8.2	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.44			
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	78.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	240	50	35	220	55	60
Future Volume (Veh/h)	240	50	35	220	55	60
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	258	54	38	237	59	65
Pedestrians					11	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked					0.99	
vC, conflicting volume			323		490	167
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			323		463	167
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		88	92
cM capacity (veh/h)			1236		505	846

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	172	140	117	158	124
Volume Left	0	0	38	0	59
Volume Right	0	54	0	0	65
cSH	1700	1700	1236	1700	641
Volume to Capacity	0.10	0.08	0.03	0.09	0.19
Queue Length 95th (m)	0.0	0.0	0.7	0.0	5.4
Control Delay (s)	0.0	0.0	2.8	0.0	12.0
Lane LOS			A		B
Approach Delay (s)	0.0		1.2		12.0
Approach LOS					B

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	33.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
3: Toronto St & Simcoe St

12/17/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	68	221	400	232	5	363	368	16	516
v/c Ratio	0.17	0.18	0.60	0.13	0.02	0.63	0.50	0.05	0.83
Control Delay	26.8	23.1	19.9	12.9	16.2	34.9	5.4	17.0	43.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	23.1	19.9	12.9	16.2	34.9	5.4	17.0	43.3
Queue Length 50th (m)	9.6	15.3	42.1	10.6	0.6	56.2	0.0	2.0	87.6
Queue Length 95th (m)	20.6	24.8	77.5	20.3	2.5	86.8	18.7	5.2	#143.8
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	394	1198	670	1793	272	597	741	350	633
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.18	0.60	0.13	0.02	0.61	0.50	0.05	0.82

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	185	25	380	200	20	5	345	350	15	415	75
Future Volume (vph)	65	185	25	380	200	20	5	345	350	15	415	75
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1757	3386		1801	3389		1805	1881	1543	1799	1856	
Flt Permitted	0.61	1.00		0.55	1.00		0.18	1.00	1.00	0.34	1.00	
Satd. Flow (perm)	1123	3386		1034	3389		343	1881	1543	635	1856	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	195	26	400	211	21	5	363	368	16	437	79
RTOR Reduction (vph)	0	10	0	0	7	0	0	0	252	0	6	0
Lane Group Flow (vph)	68	211	0	400	225	0	5	363	116	16	510	0
Confl. Peds. (#/hr)	22		4	4		22			22	22		
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	1%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	31.9	31.9		49.6	49.6		33.0	31.6	31.6	35.8	33.0	
Effective Green, g (s)	31.9	31.9		49.6	49.6		33.0	31.6	31.6	35.8	33.0	
Actuated g/C Ratio	0.32	0.32		0.50	0.50		0.33	0.32	0.32	0.36	0.33	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	358	1080		617	1680		133	594	487	259	612	
v/s Ratio Prot		0.06		c0.09	0.07		0.00	0.19		c0.00	c0.27	
v/s Ratio Perm	0.06			c0.23			0.01		0.08	0.02		
v/c Ratio	0.19	0.20		0.65	0.13		0.04	0.61	0.24	0.06	0.83	
Uniform Delay, d1	24.7	24.7		16.6	13.6		24.4	29.0	25.3	21.6	31.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.4		2.4	0.2		0.1	1.9	0.3	0.1	9.5	
Delay (s)	25.9	25.1		19.0	13.8		24.5	30.9	25.6	21.7	40.5	
Level of Service	C	C		B	B		C	C	C	C	D	
Approach Delay (s)		25.3			17.1			28.2			39.9	
Approach LOS		C			B			C			D	

Intersection Summary

HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
5: Toronto St & Site Dwy

12/17/2019



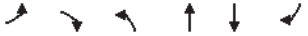
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	15	0	700	775	45
Future Volume (Veh/h)	0	15	0	700	775	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	0	761	842	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					272	
pX, platoon unblocked	0.63	0.63	0.63			
vC, conflicting volume	1628	866	891			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1704	488	527			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	63	363	651			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	761	891
Volume Left	0	0	0
Volume Right	16	0	49
cSH	363	1700	1700
Volume to Capacity	0.04	0.45	0.52
Queue Length 95th (m)	1.0	0.0	0.0
Control Delay (s)	15.4	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.4	0.0	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization	53.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	35	5	650	585	20
Future Volume (Veh/h)	40	35	5	650	585	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	43	38	5	699	629	22
Pedestrians	6					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	1006	332	657			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1006	332	657			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	94	99			
cM capacity (veh/h)	239	666	935			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	81	238	466	419	232
Volume Left	43	5	0	0	0
Volume Right	38	0	0	0	22
cSH	342	935	1700	1700	1700
Volume to Capacity	0.24	0.01	0.27	0.25	0.14
Queue Length 95th (m)	6.9	0.1	0.0	0.0	0.0
Control Delay (s)	18.8	0.2	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	18.8	0.1		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay		1.1		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	64	168	68	505	179	332
v/c Ratio	0.20	0.58	0.18	0.24	0.19	0.18
Control Delay	19.0	32.2	7.3	7.7	3.4	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	32.2	7.3	7.7	3.4	6.5
Queue Length 50th (m)	6.0	20.9	0.6	13.6	2.0	7.3
Queue Length 95th (m)	12.4	31.8	7.8	29.7	12.4	18.2
Internal Link Dist (m)	83.1		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	596	549	665	2090	965	1856
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.31	0.10	0.24	0.19	0.18

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	10	10	160	5	60	5	475	170	40	220	55
Future Volume (vph)	40	10	10	160	5	60	5	475	170	40	220	55
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.98			1.00	0.98		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.86			1.00	0.85		0.97	
Flt Protected		0.97		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)		1756		1752	1510			3572	1488		3479	
Flt Permitted		0.78		0.72	1.00			0.95	1.00		0.85	
Satd. Flow (perm)		1416		1319	1510			3403	1488		2993	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	11	168	5	63	5	500	179	42	232	58
RTOR Reduction (vph)	0	9	0	0	49	0	0	0	52	0	16	0
Lane Group Flow (vph)	0	55	0	168	19	0	0	505	127	0	316	0
Confl. Peds. (#/hr)	6					6			16	16		
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	2%	2%	3%	2%	7%	2%	1%	6%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.8		15.8	15.8			44.2	44.2		44.2	
Effective Green, g (s)		15.8		15.8	15.8			44.2	44.2		44.2	
Actuated g/C Ratio		0.22		0.22	0.22			0.61	0.61		0.61	
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)		310		289	331			2089	913		1837	
v/s Ratio Prot					0.01							
v/s Ratio Perm		0.04		c0.13				c0.15	0.09		0.11	
v/c Ratio		0.18		0.58	0.06			0.24	0.14		0.17	
Uniform Delay, d1		22.8		25.1	22.2			6.3	5.9		6.0	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3		3.0	0.1			0.3	0.3		0.2	
Delay (s)		23.1		28.1	22.3			6.6	6.2		6.2	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		23.1			26.4			6.5			6.2	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.33				
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	73.3%	ICU Level of Service	D		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	160	50	35	170	50	45
Future Volume (Veh/h)	160	50	35	170	50	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	178	56	39	189	56	50
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked						
vC, conflicting volume			241		386	124
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			241		386	124
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		90	94
cM capacity (veh/h)			1329		574	904

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	119	115	102	126	106
Volume Left	0	0	39	0	56
Volume Right	0	56	0	0	50
cSH	1700	1700	1329	1700	694
Volume to Capacity	0.07	0.07	0.03	0.07	0.15
Queue Length 95th (m)	0.0	0.0	0.7	0.0	4.1
Control Delay (s)	0.0	0.0	3.1	0.0	11.1
Lane LOS			A		B
Approach Delay (s)	0.0		1.4		11.1
Approach LOS					B

Intersection Summary					
Average Delay	2.6				
Intersection Capacity Utilization	28.9%	ICU Level of Service	A		
Analysis Period (min)	15				

Queues
3: Toronto St & Simcoe St

12/17/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	175	362	159	11	324	356	27	394
v/c Ratio	0.11	0.13	0.50	0.09	0.04	0.69	0.54	0.10	0.72
Control Delay	25.0	18.6	16.5	11.1	17.2	41.3	6.2	18.7	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	18.6	16.5	11.1	17.2	41.3	6.2	18.7	37.9
Queue Length 50th (m)	7.2	9.9	37.0	6.4	1.4	58.2	0.0	3.3	61.1
Queue Length 95th (m)	16.9	18.4	69.3	14.0	4.2	77.1	18.7	7.4	93.9
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	481	1328	721	1840	315	579	729	318	620
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.13	0.50	0.09	0.03	0.56	0.49	0.08	0.64

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	130	35	340	130	20	10	305	335	25	310	60
Future Volume (vph)	50	130	35	340	130	20	10	305	335	25	310	60
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1766	3291		1779	3242		1804	1900	1580	1803	1848	
Flt Permitted	0.65	1.00		0.58	1.00		0.31	1.00	1.00	0.31	1.00	
Satd. Flow (perm)	1211	3291		1082	3242		590	1900	1580	594	1848	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	138	37	362	138	21	11	324	356	27	330	64
RTOR Reduction (vph)	0	22	0	0	10	0	0	0	262	0	7	0
Lane Group Flow (vph)	53	153	0	362	149	0	11	324	94	27	387	0
Confl. Peds. (#/hr)	16		7	7		16	4		9	9		4
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	7%	0%	1%	9%	5%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	36.6	36.6		53.3	53.3		27.8	26.4	26.4	33.6	29.3	
Effective Green, g (s)	36.6	36.6		53.3	53.3		27.8	26.4	26.4	33.6	29.3	
Actuated g/C Ratio	0.37	0.37		0.53	0.53		0.28	0.26	0.26	0.34	0.29	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	443	1204		665	1727		181	501	417	251	541	
v/s Ratio Prot		0.05		c0.07	0.05		0.00	0.17		c0.00	c0.21	
v/s Ratio Perm	0.04			c0.22			0.02		0.06	0.03		
v/c Ratio	0.12	0.13		0.54	0.09		0.06	0.65	0.23	0.11	0.72	
Uniform Delay, d1	21.0	21.1		13.8	11.4		26.8	32.7	28.8	23.3	31.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.2		0.9	0.1		0.1	2.9	0.3	0.2	4.5	
Delay (s)	21.6	21.3		14.7	11.5		27.0	35.5	29.1	23.4	36.1	
Level of Service	C	C		B	B		C	D	C	C	D	
Approach Delay (s)		21.4			13.7			32.1			35.3	
Approach LOS		C			B			C			D	

Intersection Summary				
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	86.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
5: Toronto St & Site Dwy

12/17/2019

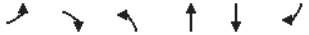
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	15	0	650	645	40
Future Volume (Veh/h)	0	15	0	650	645	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	0	707	701	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					275	
pX, platoon unblocked	0.74	0.74	0.74			
vC, conflicting volume	1430	722	744			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1404	445	474			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	113	452	802			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	707	744
Volume Left	0	0	0
Volume Right	16	0	43
cSH	452	1700	1700
Volume to Capacity	0.04	0.42	0.44
Queue Length 95th (m)	0.8	0.0	0.0
Control Delay (s)	13.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.3	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	46.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	35	0	640	325	15
Future Volume (Veh/h)	20	35	0	640	325	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	22	38	0	688	349	16
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	704	186	368			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	704	186	368			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	95	100			
cM capacity (veh/h)	375	829	1198			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	60	229	459	233	132
Volume Left	22	0	0	0	0
Volume Right	38	0	0	0	16
cSH	574	1198	1700	1700	1700
Volume to Capacity	0.10	0.00	0.27	0.14	0.08
Queue Length 95th (m)	2.6	0.0	0.0	0.0	0.0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.0	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	27.7%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	70	140	156	656	167	515
v/c Ratio	0.25	0.54	0.35	0.32	0.18	0.31
Control Delay	20.8	31.7	7.5	7.9	4.2	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	31.7	7.5	7.9	4.2	7.8
Queue Length 50th (m)	6.9	17.5	2.1	17.6	3.1	13.1
Queue Length 95th (m)	13.5	27.1	12.7	39.9	14.2	31.8
Internal Link Dist (m)	60.3		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	544	520	751	2074	945	1665
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.27	0.21	0.32	0.18	0.31

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	10	10	130	10	135	15	595	155	85	350	45
Future Volume (vph)	45	10	10	130	10	135	15	595	155	85	350	45
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.98		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.86			1.00	0.85		0.99	
Flt Protected		0.97		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)		1757		1670	1611			3535	1456		3520	
Flt Permitted		0.71		0.71	1.00			0.94	1.00		0.75	
Satd. Flow (perm)		1291		1251	1611			3324	1456		2656	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	48	11	11	140	11	145	16	640	167	91	376	48
RTOR Reduction (vph)	0	9	0	0	108	0	0	0	36	0	7	0
Lane Group Flow (vph)	0	61	0	140	48	0	0	656	131	0	508	0
Confl. Peds. (#/hr)	3		1	1		3			8	8		
Heavy Vehicles (%)	2%	2%	2%	8%	2%	0%	2%	2%	9%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.0		15.0	15.0			45.0	45.0		45.0	
Effective Green, g (s)		15.0		15.0	15.0			45.0	45.0		45.0	
Actuated g/C Ratio		0.21		0.21	0.21			0.62	0.62		0.62	
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)		268		260	335			2077	910		1660	
v/s Ratio Prot					0.03							
v/s Ratio Perm		0.05		c0.11				c0.20	0.09		0.19	
v/c Ratio		0.23		0.54	0.14			0.32	0.14		0.31	
Uniform Delay, d1		23.7		25.4	23.2			6.3	5.6		6.3	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.4		2.1	0.2			0.4	0.3		0.5	
Delay (s)		24.1		27.6	23.4			6.7	5.9		6.7	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		24.1			25.4			6.5			6.7	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	89.0%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	185	80	110	150	115	205
Future Volume (Veh/h)	185	80	110	150	115	205
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	195	84	116	158	121	216
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked					1.00	
vC, conflicting volume			284		553	144
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			284		543	144
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			91		69	75
cM capacity (veh/h)			1284		392	879

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	130	149	169	105	337
Volume Left	0	0	116	0	121
Volume Right	0	84	0	0	216
cSH	1700	1700	1284	1700	608
Volume to Capacity	0.08	0.09	0.09	0.06	0.55
Queue Length 95th (m)	0.0	0.0	2.3	0.0	25.8
Control Delay (s)	0.0	0.0	5.8	0.0	18.0
Lane LOS			A		C
Approach Delay (s)	0.0		3.6		18.0
Approach LOS					C

Intersection Summary				
Average Delay	7.9			
Intersection Capacity Utilization	45.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
3: Toronto St & Simcoe St

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	144	250	255	192	11	468	410	16	474
v/c Ratio	0.31	0.20	0.40	0.11	0.04	0.83	0.57	0.07	0.80
Control Delay	26.7	22.5	15.8	13.2	16.4	46.0	7.4	16.9	40.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	22.5	15.8	13.2	16.4	46.0	7.4	16.9	40.3
Queue Length 50th (m)	19.2	16.3	23.1	8.4	1.4	80.8	5.2	2.0	80.5
Queue Length 95th (m)	39.8	28.7	47.6	17.5	4.2	118.0	28.4	5.2	#122.8
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	464	1279	641	1745	292	591	742	277	624
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.20	0.40	0.11	0.04	0.79	0.55	0.06	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	225	10	240	170	10	10	440	385	15	355	90
Future Volume (vph)	135	225	10	240	170	10	10	440	385	15	355	90
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3263		1787	3265		1805	1863	1541	1803	1813	
Flt Permitted	0.63	1.00		0.54	1.00		0.23	1.00	1.00	0.19	1.00	
Satd. Flow (perm)	1188	3263		1010	3265		429	1863	1541	369	1813	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	144	239	11	255	181	11	11	468	410	16	378	96
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	256	0	9	0
Lane Group Flow (vph)	144	247	0	255	188	0	11	468	154	16	465	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	36.0	36.0		50.2	50.2		32.4	31.0	31.0	35.2	32.4	
Effective Green, g (s)	36.0	36.0		50.2	50.2		32.4	31.0	31.0	35.2	32.4	
Actuated g/C Ratio	0.36	0.36		0.50	0.50		0.32	0.31	0.31	0.35	0.32	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	427	1174		586	1639		158	577	477	170	587	
v/s Ratio Prot		0.08		c0.04	0.06		0.00	0.25		c0.00	c0.26	
v/s Ratio Perm	0.12			c0.17			0.02		0.10	0.03		
v/c Ratio	0.34	0.21		0.44	0.11		0.07	0.81	0.32	0.09	0.79	
Uniform Delay, d1	23.3	22.2		14.6	13.2		24.4	31.8	26.5	23.1	30.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	0.4		0.5	0.1		0.2	8.5	0.4	0.2	7.2	
Delay (s)	25.4	22.6		15.1	13.3		24.6	40.3	26.8	23.4	38.0	
Level of Service	C	C		B	B		C	D	C	C	D	
Approach Delay (s)		23.6			14.3			33.9			37.5	
Approach LOS		C			B			C			D	

Intersection Summary

HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
5: Toronto St & Site Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	15	0	835	585	20
Future Volume (Veh/h)	0	15	0	835	585	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	0	908	636	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)					279	
pX, platoon unblocked	0.75	0.75	0.75			
vC, conflicting volume	1555	647	658			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1573	367	381			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	91	511	886			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	908	658
Volume Left	0	0	0
Volume Right	16	0	22
cSH	511	1700	1700
Volume to Capacity	0.03	0.53	0.39
Queue Length 95th (m)	0.7	0.0	0.0
Control Delay (s)	12.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.3	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	50	35	685	430	55
Future Volume (Veh/h)	65	50	35	685	430	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	54	38	745	467	60
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	948	266	529			
vC1, stage 1 conf vol	499					
vC2, stage 2 conf vol	448					
vCu, unblocked vol	948	266	529			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	93	96			
cM capacity (veh/h)	464	738	1026			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	125	38	372	372	311	216
Volume Left	71	38	0	0	0	0
Volume Right	54	0	0	0	0	60
cSH	552	1026	1700	1700	1700	1700
Volume to Capacity	0.23	0.04	0.22	0.22	0.18	0.13
Queue Length 95th (m)	6.6	0.9	0.0	0.0	0.0	0.0
Control Delay (s)	13.4	8.6	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	13.4	0.4			0.0	
Approach LOS	B					

Intersection Summary				
Average Delay		1.4		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
8: Bradford St & Site Dwy

12/17/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	115	65	655	80	0	480
Future Volume (Veh/h)	115	65	655	80	0	480
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	71	712	87	0	522
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						276
pX, platoon unblocked						
vC, conflicting volume	1016	400			799	
vC1, stage 1 conf vol	756					
vC2, stage 2 conf vol	261					
vCu, unblocked vol	1016	400			799	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	88			100	
cM capacity (veh/h)	398	600			819	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	196	475	324	261	261
Volume Left	125	0	0	0	0
Volume Right	71	0	87	0	0
cSH	453	1700	1700	1700	1700
Volume to Capacity	0.43	0.28	0.19	0.15	0.15
Queue Length 95th (m)	16.3	0.0	0.0	0.0	0.0
Control Delay (s)	18.8	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	18.8	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	37.7%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12-18-2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	87	212	141	690	207	821
v/c Ratio	0.26	0.69	0.29	0.35	0.22	0.59
Control Delay	18.4	35.6	7.6	9.3	5.0	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	35.6	7.6	9.3	5.0	12.6
Queue Length 50th (m)	7.7	26.0	2.9	22.7	5.0	32.3
Queue Length 95th (m)	15.7	40.7	13.0	42.2	17.3	63.0
Internal Link Dist (m)	74.6		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	551	522	738	1995	936	1399
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.41	0.19	0.35	0.22	0.59

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12-18-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	10	15	195	10	120	10	625	190	145	540	70
Future Volume (vph)	55	10	15	195	10	120	10	625	190	145	540	70
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00	0.97		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.86			1.00	0.85		0.99	
Flt Protected		0.97		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)		1749		1699	1613			3606	1513		3467	
Flt Permitted		0.72		0.70	1.00			0.94	1.00		0.68	
Satd. Flow (perm)		1303		1253	1613			3393	1513		2366	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	11	16	212	11	130	11	679	207	158	587	76
RTOR Reduction (vph)	0	12	0	0	85	0	0	0	46	0	7	0
Lane Group Flow (vph)	0	75	0	212	56	0	0	690	161	0	814	0
Confl. Peds. (#/hr)	3		3	3		3			18	18		
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	2%	2%	2%	6%	2%	0%	2%	0%	4%	0%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		17.6		17.6	17.6			42.4	42.4		42.4	
Effective Green, g (s)		17.6		17.6	17.6			42.4	42.4		42.4	
Actuated g/C Ratio		0.24		0.24	0.24			0.59	0.59		0.59	
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)		318		306	394			1998	890		1393	
v/s Ratio Prot					0.03							
v/s Ratio Perm		0.06		c0.17				0.20	0.11		c0.34	
v/c Ratio		0.24		0.69	0.14			0.35	0.18		0.58	
Uniform Delay, d1		21.8		24.7	21.3			7.6	6.8		9.3	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.4		6.6	0.2			0.5	0.4		1.8	
Delay (s)		22.2		31.4	21.5			8.1	7.3		11.1	
Level of Service		C		C	C			A	A		B	
Approach Delay (s)		22.2			27.4			7.9			11.1	
Approach LOS		C			C			A			B	

Intersection Summary				
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	91.3%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12-18-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	245	120	200	210	100	165
Future Volume (Veh/h)	245	120	200	210	100	165
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	263	129	215	226	108	177
Pedestrians					11	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked					0.96	
vC, conflicting volume			403		882	207
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			403		790	207
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			81		58	78
cM capacity (veh/h)			1155		256	797

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	175	217	290	151	285
Volume Left	0	0	215	0	108
Volume Right	0	129	0	0	177
cSH	1700	1700	1155	1700	443
Volume to Capacity	0.10	0.13	0.19	0.09	0.64
Queue Length 95th (m)	0.0	0.0	5.2	0.0	33.7
Control Delay (s)	0.0	0.0	7.0	0.0	26.7
Lane LOS			A		D
Approach Delay (s)	0.0		4.6		26.7
Approach LOS					D

Intersection Summary				
Average Delay	8.6			
Intersection Capacity Utilization	49.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
3: Toronto St & Simcoe St

12-18-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	132	273	395	316	5	463	368	16	700
v/c Ratio	0.41	0.25	0.73	0.20	0.04	0.64	0.46	0.05	0.88
Control Delay	32.5	25.8	30.9	17.4	21.6	30.5	5.0	13.9	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	25.8	30.9	17.4	21.6	30.5	5.0	13.9	39.1
Queue Length 50th (m)	20.4	20.2	52.0	19.0	0.5	64.0	1.7	1.6	114.2
Queue Length 95th (m)	38.0	30.5	#96.8	29.2	3.2	110.1	20.5	4.9	158.2
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	325	1071	541	1548	121	718	807	355	873
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.25	0.73	0.20	0.04	0.64	0.46	0.05	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12-18-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	235	25	375	280	20	5	440	350	15	515	150
Future Volume (vph)	125	235	25	375	280	20	5	440	350	15	515	150
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		6.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1762	3396		1801	3402		1805	1881	1543	1802	1836	
Flt Permitted	0.56	1.00		0.51	1.00		0.17	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	1039	3396		967	3402		317	1881	1543	509	1836	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	132	247	26	395	295	21	5	463	368	16	542	158
RTOR Reduction (vph)	0	8	0	0	5	0	0	0	218	0	11	0
Lane Group Flow (vph)	132	265	0	395	311	0	5	463	150	16	689	0
Confl. Peds. (#/hr)	22		4	4		22			22	22		
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	1%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	29.0	29.0		43.0	43.0		38.2	38.2	38.2	45.0	45.0	
Effective Green, g (s)	29.0	29.0		43.0	43.0		38.2	38.2	38.2	45.0	45.0	
Actuated g/C Ratio	0.29	0.29		0.43	0.43		0.38	0.38	0.38	0.45	0.45	
Clearance Time (s)	6.0	6.0		4.0	6.0		6.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	301	984		499	1462		121	718	589	265	826	
v/s Ratio Prot		0.08		c0.08	0.09			0.25		0.00	c0.38	
v/s Ratio Perm	0.13			c0.26			0.02		0.10	0.03		
v/c Ratio	0.44	0.27		0.79	0.21		0.04	0.64	0.26	0.06	0.83	
Uniform Delay, d1	28.9	27.3		23.0	17.9		19.4	25.3	21.2	17.2	24.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.6	0.7		8.4	0.3		0.1	2.0	0.2	0.1	7.3	
Delay (s)	33.5	28.0		31.3	18.2		19.5	27.3	21.4	17.3	31.5	
Level of Service	C	C		C	B		B	C	C	B	C	
Approach Delay (s)		29.8			25.5			24.7			31.2	
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	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
5: Toronto St & Site Dwy

12-18-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	10	0	795	880	35
Future Volume (Veh/h)	0	10	0	795	880	35
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	0	864	957	38
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					272	
pX, platoon unblocked	0.54	0.54	0.54			
vC, conflicting volume	1840	976	995			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2128	533	568			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	30	296	544			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	864	995
Volume Left	0	0	0
Volume Right	11	0	38
cSH	296	1700	1700
Volume to Capacity	0.04	0.51	0.59
Queue Length 95th (m)	0.9	0.0	0.0
Control Delay (s)	17.6	0.0	0.0
Lane LOS	C		
Approach Delay (s)	17.6	0.0	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12-18-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	35	5	790	690	20
Future Volume (Veh/h)	40	35	5	790	690	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	43	38	5	849	742	22
Pedestrians	6					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	1194	388	770			
vC1, stage 1 conf vol	759					
vC2, stage 2 conf vol	434					
vCu, unblocked vol	1194	388	770			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	94	99			
cM capacity (veh/h)	376	613	849			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	81	5	424	424	495	269
Volume Left	43	5	0	0	0	0
Volume Right	38	0	0	0	0	22
cSH	459	849	1700	1700	1700	1700
Volume to Capacity	0.18	0.01	0.25	0.25	0.29	0.16
Queue Length 95th (m)	4.8	0.1	0.0	0.0	0.0	0.0
Control Delay (s)	14.5	9.3	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	14.5	0.1			0.0	
Approach LOS	B					

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization	32.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
8: Bradford St & Site Dwy

12-18-2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	75	65	730	165	0	725
Future Volume (Veh/h)	75	65	730	165	0	725
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	71	793	179	0	788
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						280
pX, platoon unblocked						
vC, conflicting volume	1276	486			972	
vC1, stage 1 conf vol	882					
vC2, stage 2 conf vol	394					
vCu, unblocked vol	1276	486			972	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	75	87			100	
cM capacity (veh/h)	334	527			705	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	153	529	443	394	394
Volume Left	82	0	0	0	0
Volume Right	71	0	179	0	0
cSH	402	1700	1700	1700	1700
Volume to Capacity	0.38	0.31	0.26	0.23	0.23
Queue Length 95th (m)	13.2	0.0	0.0	0.0	0.0
Control Delay (s)	19.3	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	19.3	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	40.2%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
1: Bradford St & Simcoe St

12/17/2019

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	64	158	121	679	147	484
v/c Ratio	0.21	0.57	0.28	0.32	0.16	0.34
Control Delay	19.3	32.3	6.4	8.2	4.4	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	32.3	6.4	8.2	4.4	8.3
Queue Length 50th (m)	6.0	19.7	0.6	19.2	2.9	13.0
Queue Length 95th (m)	12.5	30.3	10.1	41.1	13.2	30.8
Internal Link Dist (m)	74.6		31.3	224.1		145.0
Turn Bay Length (m)					10.0	
Base Capacity (vph)	574	529	715	2096	947	1431
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.30	0.17	0.32	0.16	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Bradford St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	10	10	150	5	110	5	640	140	130	275	55
Future Volume (vph)	40	10	10	150	5	110	5	640	140	130	275	55
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	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00		1.00	0.98			1.00	0.98		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.86			1.00	0.85		0.98	
Flt Protected		0.97		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)		1757		1687	1554			3573	1488		3483	
Flt Permitted		0.75		0.72	1.00			0.95	1.00		0.65	
Satd. Flow (perm)		1362		1270	1554			3403	1488		2307	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	11	158	5	116	5	674	147	137	289	58
RTOR Reduction (vph)	0	9	0	0	91	0	0	0	31	0	10	0
Lane Group Flow (vph)	0	55	0	158	30	0	0	679	116	0	474	0
Confl. Peds. (#/hr)	6					6			16	16		
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	2%	2%	7%	2%	3%	2%	1%	6%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.6		15.6	15.6			44.4	44.4		44.4	
Effective Green, g (s)		15.6		15.6	15.6			44.4	44.4		44.4	
Actuated g/C Ratio		0.22		0.22	0.22			0.62	0.62		0.62	
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)		295		275	336			2098	917		1422	
v/s Ratio Prot					0.02							
v/s Ratio Perm		0.04		c0.12				0.20	0.08		c0.21	
v/c Ratio		0.19		0.57	0.09			0.32	0.13		0.33	
Uniform Delay, d1		23.0		25.2	22.5			6.6	5.7		6.7	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3		2.9	0.1			0.4	0.3		0.6	
Delay (s)		23.3		28.1	22.6			7.0	6.0		7.3	
Level of Service		C		C	C			A	A		A	
Approach Delay (s)		23.3			25.7			6.8			7.3	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	78.1%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
2: Checkley St & Simcoe St

12/17/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	160	110	185	165	95	155
Future Volume (Veh/h)	160	110	185	165	95	155
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	178	122	206	183	106	172
Pedestrians					7	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	55			102		
pX, platoon unblocked					0.98	
vC, conflicting volume			307		750	157
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			307		698	157
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			84		66	80
cM capacity (veh/h)			1257		308	861

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	119	181	267	122	278
Volume Left	0	0	206	0	106
Volume Right	0	122	0	0	172
cSH	1700	1700	1257	1700	511
Volume to Capacity	0.07	0.11	0.16	0.07	0.54
Queue Length 95th (m)	0.0	0.0	4.4	0.0	24.5
Control Delay (s)	0.0	0.0	6.8	0.0	20.1
Lane LOS			A		C
Approach Delay (s)	0.0		4.7		20.1
Approach LOS					C

Intersection Summary				
Average Delay	7.7			
Intersection Capacity Utilization	44.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
3: Toronto St & Simcoe St

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	106	239	362	244	11	410	356	27	553
v/c Ratio	0.29	0.22	0.60	0.15	0.05	0.67	0.47	0.09	0.81
Control Delay	29.4	24.2	21.4	14.4	16.1	36.1	5.1	16.8	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	24.2	21.4	14.4	16.1	36.1	5.1	16.8	39.1
Queue Length 50th (m)	15.8	16.8	40.1	12.1	1.3	74.2	0.0	3.1	91.1
Queue Length 95th (m)	30.4	26.5	69.3	21.4	4.2	100.3	18.7	7.4	#161.0
Internal Link Dist (m)		78.5		280.1		170.7			172.0
Turn Bay Length (m)	35.0		45.0		45.0		55.0	45.0	
Base Capacity (vph)	361	1085	607	1610	293	624	759	348	679
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.22	0.60	0.15	0.04	0.66	0.47	0.08	0.81

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Toronto St & Simcoe St

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	195	30	340	210	20	10	385	335	25	395	125
Future Volume (vph)	100	195	30	340	210	20	10	385	335	25	395	125
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		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1771	3321		1780	3267		1805	1900	1585	1804	1824	
Flt Permitted	0.60	1.00		0.53	1.00		0.20	1.00	1.00	0.29	1.00	
Satd. Flow (perm)	1119	3321		994	3267		376	1900	1585	547	1824	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	106	207	32	362	223	21	11	410	356	27	420	133
RTOR Reduction (vph)	0	13	0	0	7	0	0	0	236	0	10	0
Lane Group Flow (vph)	106	226	0	362	237	0	11	410	120	27	543	0
Confl. Peds. (#/hr)	16		7	7		16	4		6	6		4
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	7%	0%	1%	9%	5%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	29.1	29.1		45.9	45.9		35.2	33.8	33.8	41.0	36.7	
Effective Green, g (s)	29.1	29.1		45.9	45.9		35.2	33.8	33.8	41.0	36.7	
Actuated g/C Ratio	0.29	0.29		0.46	0.46		0.35	0.34	0.34	0.41	0.37	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	325	966		556	1499		152	642	535	278	669	
v/s Ratio Prot		0.07		c0.08	0.07		0.00	0.22		c0.00	c0.30	
v/s Ratio Perm	0.09			c0.22			0.02		0.08	0.04		
v/c Ratio	0.33	0.23		0.65	0.16		0.07	0.64	0.22	0.10	0.81	
Uniform Delay, d1	27.8	27.0		18.7	15.8		23.0	27.9	23.7	19.1	28.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	0.6		2.7	0.2		0.2	2.1	0.2	0.2	7.4	
Delay (s)	30.4	27.5		21.5	16.0		23.2	30.0	23.9	19.2	35.9	
Level of Service	C	C		C	B		C	C	C	B	D	
Approach Delay (s)		28.4			19.3			27.1			35.2	
Approach LOS		C			B			C			D	

Intersection Summary

HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
5: Toronto St & Site Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	10	0	730	725	40
Future Volume (Veh/h)	0	10	0	730	725	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	0	793	788	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					272	
pX, platoon unblocked	0.65	0.65	0.65			
vC, conflicting volume	1602	810	831			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1658	434	467			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	70	403	709			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	793	831
Volume Left	0	0	0
Volume Right	11	0	43
cSH	403	1700	1700
Volume to Capacity	0.03	0.47	0.49
Queue Length 95th (m)	0.6	0.0	0.0
Control Delay (s)	14.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	14.2	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization	50.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy

12/17/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	35	0	775	370	15
Future Volume (Veh/h)	20	35	0	775	370	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	22	38	0	833	398	16
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					248	
pX, platoon unblocked						
vC, conflicting volume	826	210	417			
vC1, stage 1 conf vol	409					
vC2, stage 2 conf vol	416					
vCu, unblocked vol	826	210	417			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	95	100			
cM capacity (veh/h)	519	800	1150			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	60	0	416	416	265	149
Volume Left	22	0	0	0	0	0
Volume Right	38	0	0	0	0	16
cSH	668	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.00	0.24	0.24	0.16	0.09
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.9	0.0			0.0	
Approach LOS	B					

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
8: Bradford St & Site Dwy

12/17/2019



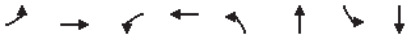
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	90	65	710	165	0	405
Future Volume (Veh/h)	90	65	710	165	0	405
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	71	772	179	0	440
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						283
pX, platoon unblocked						
vC, conflicting volume	1082	476			951	
vC1, stage 1 conf vol	862					
vC2, stage 2 conf vol	220					
vCu, unblocked vol	1082	476			951	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	72	87			100	
cM capacity (veh/h)	356	536			718	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	169	515	436	220	220
Volume Left	98	0	0	0	0
Volume Right	71	0	179	0	0
cSH	415	1700	1700	1700	1700
Volume to Capacity	0.41	0.30	0.26	0.13	0.13
Queue Length 95th (m)	14.8	0.0	0.0	0.0	0.0
Control Delay (s)	19.5	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	19.5	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	40.5%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
6: Bradford St & Tim Hortons Nth Dwy/Site Dwy

12/17/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	54	125	71	38	761	22	527
v/c Ratio	0.30	0.10	0.53	0.17	0.06	0.31	0.05	0.21
Control Delay	28.0	0.4	34.6	0.9	5.8	5.6	4.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	0.4	34.6	0.9	5.8	5.6	4.5	3.5
Queue Length 50th (m)	8.6	0.0	15.7	0.0	1.5	18.6	0.6	7.8
Queue Length 95th (m)	17.6	0.0	28.5	0.0	5.6	34.1	2.8	13.0
Internal Link Dist (m)		48.8		90.5		50.4		224.1
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	469	755	466	661	603	2475	478	2482
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.07	0.27	0.11	0.06	0.31	0.05	0.21

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy/Site Dwy

12/17/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	0	50	115	0	65	35	620	80	20	430	55
Future Volume (vph)	65	0	50	115	0	65	35	620	80	20	430	55
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1594		1768	1583		1750	3438		1765	3447	
Flt Permitted	0.71	1.00		0.72	1.00		0.46	1.00		0.36	1.00	
Satd. Flow (perm)	1350	1594		1343	1583		841	3438		668	3447	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	0	54	125	0	71	38	674	87	22	467	60
RTOR Reduction (vph)	0	46	0	0	60	0	0	9	0	0	9	0
Lane Group Flow (vph)	71	8	0	125	11	0	38	752	0	22	518	0
Confl. Peds. (#/hr)			1	1			2		5	5		2
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	3%	3%	2%	2%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.7	10.7		10.7	10.7		49.3	49.3		49.3	49.3	
Effective Green, g (s)	10.7	10.7		10.7	10.7		49.3	49.3		49.3	49.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.68	0.68		0.68	0.68	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	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)	200	236		199	235		575	2354		457	2360	
v/s Ratio Prot		0.01			0.01			c0.22			0.15	
v/s Ratio Perm	0.05			c0.09			0.05			0.03		
v/c Ratio	0.35	0.03		0.63	0.04		0.07	0.32		0.05	0.22	
Uniform Delay, d1	27.5	26.2		28.8	26.3		3.7	4.6		3.7	4.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.76	0.70	
Incremental Delay, d2	1.1	0.1		6.1	0.1		0.2	0.4		0.2	0.2	
Delay (s)	28.6	26.3		34.9	26.3		4.0	4.9		3.0	3.2	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		27.6			31.8			4.9			3.1	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.37				
Actuated Cycle Length (s)	72.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	52.1%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

Queues
6: Bradford St & Tim Hortons Nth Dwy/Site Dwy

12/17/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	38	81	70	5	957	38	764
v/c Ratio	0.17	0.09	0.32	0.18	0.01	0.39	0.10	0.31
Control Delay	24.0	0.4	27.1	1.9	7.4	6.8	7.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	0.4	27.1	1.9	7.4	6.8	7.0	5.3
Queue Length 50th (m)	5.3	0.0	10.2	0.0	0.2	21.8	1.0	11.8
Queue Length 95th (m)	10.1	0.0	16.5	2.1	1.9	59.1	m5.1	36.3
Internal Link Dist (m)		48.8		90.5		50.4		224.1
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	468	653	473	623	480	2445	369	2481
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.06	0.17	0.11	0.01	0.39	0.10	0.31

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

HCM Signalized Intersection Capacity Analysis
6: Bradford St & Tim Hortons Nth Dwy/Site Dwy

12/17/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	0	35	75	0	65	5	725	165	35	690	20
Future Volume (vph)	40	0	35	75	0	65	5	725	165	35	690	20
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1801	1615		1770	1560		1800	3422		1765	3490	
Flt Permitted	0.71	1.00		0.73	1.00		0.36	1.00		0.28	1.00	
Satd. Flow (perm)	1349	1615		1364	1560		676	3422		521	3490	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	43	0	38	81	0	70	5	780	177	38	742	22
RTOR Reduction (vph)	0	32	0	0	59	0	0	17	0	0	2	0
Lane Group Flow (vph)	43	6	0	81	11	0	5	940	0	38	762	0
Confl. Peds. (#/hr)	3					3	6		7	7		6
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	0%	2%	2%	2%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.3	11.3		11.3	11.3		48.7	48.7		48.7	48.7	
Effective Green, g (s)	11.3	11.3		11.3	11.3		48.7	48.7		48.7	48.7	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.68	0.68		0.68	0.68	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	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)	211	253		214	244		457	2314		352	2360	
v/s Ratio Prot		0.00			0.01			c0.27			0.22	
v/s Ratio Perm	0.03			c0.06			0.01			0.07		
v/c Ratio	0.20	0.02		0.38	0.05		0.01	0.41		0.11	0.32	
Uniform Delay, d1	26.4	25.7		27.2	25.8		3.8	5.2		4.1	4.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.88	0.81	
Incremental Delay, d2	0.5	0.0		1.1	0.1		0.0	0.5		0.5	0.3	
Delay (s)	26.9	25.7		28.3	25.8		3.8	5.7		4.1	4.2	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		26.4			27.2			5.7			4.2	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.40				
Actuated Cycle Length (s)	72.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	50.9%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

Queues
6: Bradford St & Tim Hortons Nth Dwy/Site Dwy

12/17/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	22	38	97	70	940	38	414
v/c Ratio	0.09	0.06	0.38	0.17	0.39	0.10	0.17
Control Delay	21.7	0.2	28.2	1.5	7.0	5.8	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	0.2	28.2	1.5	7.0	5.8	4.0
Queue Length 50th (m)	2.6	0.0	12.3	0.0	21.7	0.9	5.3
Queue Length 95th (m)	6.3	0.0	19.3	1.5	57.8	6.6	20.3
Internal Link Dist (m)		48.8		90.5	50.4		224.1
Turn Bay Length (m)	20.0		20.0			20.0	
Base Capacity (vph)	468	791	468	629	2411	375	2461
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.05	0.21	0.11	0.39	0.10	0.17

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	0	35	90	0	65	0	710	165	35	370	15
Future Volume (vph)	20	0	35	90	0	65	0	710	165	35	370	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85			0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1804	1579		1752	1563			3393		1765	3485	
Flt Permitted	0.71	1.00		0.73	1.00			1.00		0.29	1.00	
Satd. Flow (perm)	1351	1579		1351	1563			3393		531	3485	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	0	38	97	0	70	0	763	177	38	398	16
RTOR Reduction (vph)	0	32	0	0	59	0	0	18	0	0	3	0
Lane Group Flow (vph)	22	6	0	97	11	0	0	922	0	38	411	0
Confl. Peds. (#/hr)	1		12	12		1	3		7	7		3
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	0%	3%	2%	2%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6			48.4		48.4	48.4	
Effective Green, g (s)	11.6	11.6		11.6	11.6			48.4		48.4	48.4	
Actuated g/C Ratio	0.16	0.16		0.16	0.16			0.67		0.67	0.67	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	217	254		217	251			2280		356	2342	
v/s Ratio Prot		0.00			0.01			c0.27			0.12	
v/s Ratio Perm	0.02			c0.07						0.07		
v/c Ratio	0.10	0.02		0.45	0.04			0.40		0.11	0.18	
Uniform Delay, d1	25.8	25.4		27.3	25.5			5.3		4.2	4.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		0.70	0.68	
Incremental Delay, d2	0.2	0.0		1.5	0.1			0.5		0.6	0.2	
Delay (s)	26.0	25.5		28.8	25.6			5.8		3.5	3.1	
Level of Service	C	C		C	C			A		A	A	
Approach Delay (s)		25.7			27.4			5.8			3.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			