

126-140 BRADFORD STREET URBAN TRANSPORTATION CONSIDERATIONS

Official Plan Amendment and Zoning By-law Amendment
City of Barrie



Prepared For: Crown (Bradford) Developments Inc.

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BA Group

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1.0 INTRODUCTION

BA Group is retained by Crown (Bradford) Developments Inc. (referred to herein as the “applicant”) to provide transportation consulting services in relation to an Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) application submission being made to the City of Barrie for the proposed mixed-use residential development municipally located at 126-140 Bradford Street (herein referred to as the “site” or “proposed development”).

1.1 Site Location and Context Overview

The site is bounded by Bradford Street to the east, single detached residential homes to the west, and private commercial properties to the north (120 Bradford Street development) and south (144 Bradford Street development).

Surrounding uses of the site include predominantly residential uses (single detached to the west and mid to high-rise condominiums to the east) and commercial uses along the Bradford Street corridor, which is planned to undergo revitalization as per City of Barrie’s New Official Plan (further discussed in **Section 3.2.1**).

In addition, based on the New Official Plan, the site is notably located within the Urban Growth Centre boundary. Future site users are immediately serviced by Barrie Transit buses primarily operating between the Barrie Bus Terminal and Allandale Waterfront GO Station, both located approximately one kilometre to the north and south, respectively. Further, based on the ongoing Transportation Master Plan, various improvements are being planned in relation to roadway revitalization, active transportation infrastructure, and transit service and facilities near the site. Further details are provided in **Section 3.0** and **Section 4.0**.

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

1.2 Existing Site

The site currently comprises a mix of commercial-oriented developments, including an auto repair shop, massage therapist establishment, and clinic. The existing vehicle parking supply is approximately 30 to 40 spaces on-site.

Vehicle access to the property is provided via two all-moves driveways on Bradford Street, approximately 55 metres and 105 metres south of the Bradford Street / Victoria Street intersection. A shared all-moves driveway on Bradford Street, approximately 40 metres south of the Bradford Street / Victoria Street intersection, provides additional access to the site. The shared driveway provides access to the site and neighbouring commercial property to the north, connecting the two properties. All existing driveways operate as two-way STOP controlled intersections.

Pedestrian access to the existing site is provided from the sidewalks along Bradford Street. While these sidewalks front the property, there are currently no direct pedestrian connections into the site via sidewalk facilities.

There are no formal cycling connections, or facilities to / from the existing site.

It is noted that all existing uses on the site will be demolished as part of the proposed development.



1.3 Proposed Development

The proposed development includes two 45-storey residential towers connected by a six-storey podium and at-grade commercial space. Specifically, the proposal includes 912 residential units (608 one-bedroom units and 304 two-bedroom units) and 334 square metres of retail gross floor area (GFA). It is noted that a portion of the residential component (i.e., 15% of the total unit count), including approximately 136 residential units, will be affordable housing units. The remaining 776 residential units will be market (condominium) housing units. Primary site access is provided on Bradford Street, approximately 85 metres south of the Bradford Street / Victoria Street intersection. Further details are provided in **Section 2.0**.

1.4 This Study

BA Group has undertaken a comprehensive review of the key transportation-related aspects of the initial ZBA application being submitted to the City of Barrie to permit the proposed development. As such, BA Group has prepared a report based on the following study scope:

Development Proposal

- A summary of the development proposal.
- An overview of the site and the area-wide transportation system that provides for automobiles but encourages a shift towards non-automobile travel from prospective residents and visitors while still being able to meet the practical and operational needs of the development proposal.
- A review of the transportation elements of the proposed development plan that includes vehicle access and circulation, loading, and parking facilities.

Policy Context

- A review of the evolving planning context including key provincial and municipal policies, plans, and programs subject to the proposed development.

Transportation Context

- A review of existing and future transportation context including key municipal road, transit, pedestrian and cycling changes and other non-automobile dependent travel options in the area.

Site Plan Review

- A review of the vehicle parking supply requirements and provisions for the proposed development plans.
- A review of the bicycle parking supply requirements and provisions for the proposed development plans.
- A review of the loading space requirements and provisions for the proposed development plans.
- A review of the functionality and appropriateness of the proposed facilities incorporated into the site plan, as applicable, including loading / garbage collection and pick-up / drop-off facility arrangements.

Transportation Demand Management (TDM)

- A review of TDM measures to encourage, facilitate, and support non-automobile travel to/from the site.



Travel Demand Forecasting

- An outline of travel characteristics and travel demand projections for pedestrians, cyclists, transit users and automobile users of the proposed development.
- An assessment of the site-related traffic forecasts for the transit, pedestrians, and cyclists of the proposed development.
- An assessment of the existing vehicle traffic activity patterns and volumes in the study area during the key weekday morning and afternoon peak periods.
- A comprehensive review of the vehicle traffic changes that may occur in the area in the future with the development of several other area development projects.
- A review of existing vehicle site-related traffic activity levels that will be eliminated as a result of the proposed development.
- A comparison of the proposed vehicle site-related traffic forecasts to the existing vehicle site-related traffic activity levels generated by the existing site uses today.
- An assessment of the vehicle traffic and other trip generation characteristics of the proposed development.

Traffic Operations Review

- A detailed review of the traffic operations at intersections in the area under existing and future traffic conditions including an assessment of the operational impacts of the proposed development.



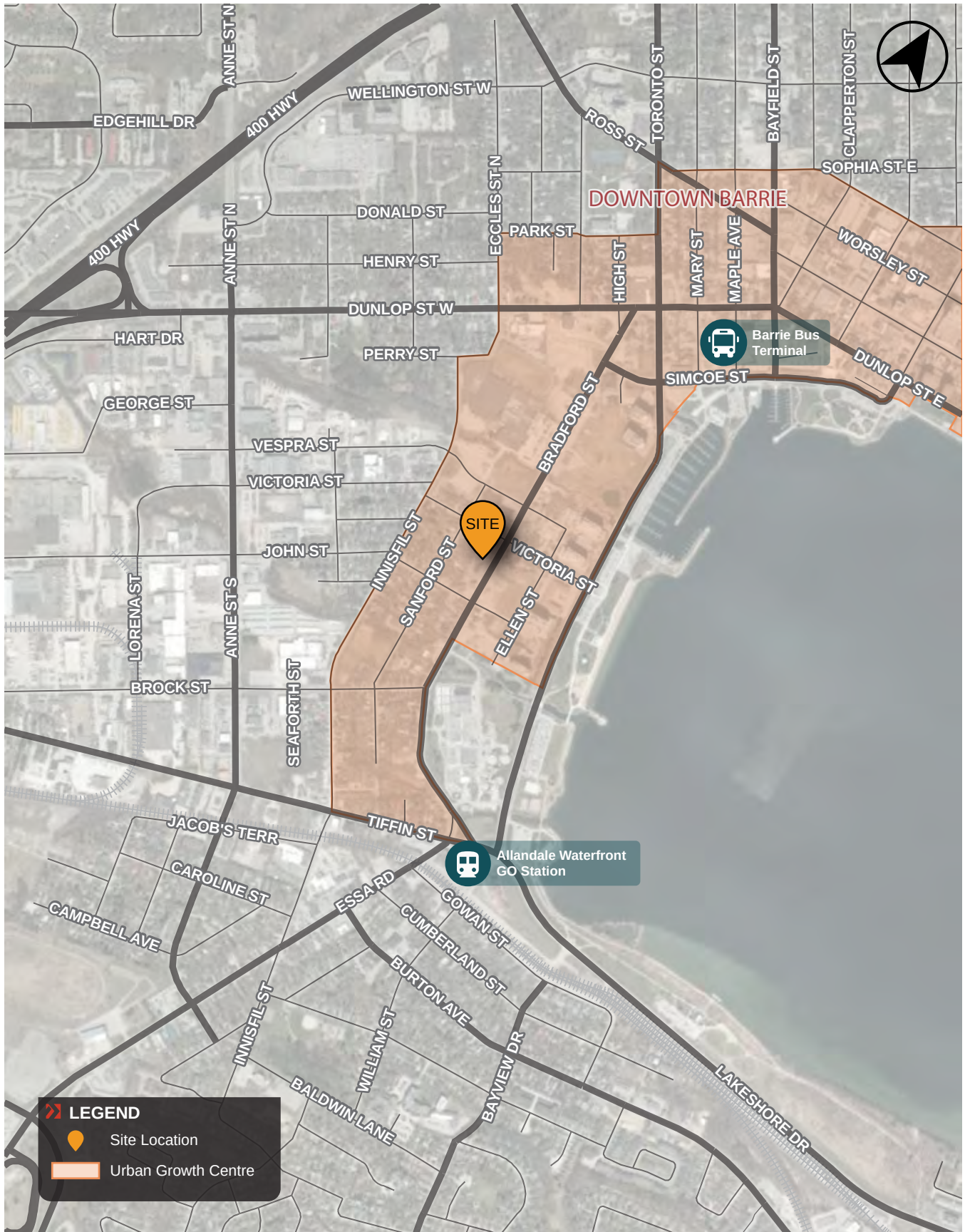


FIGURE 1 SITE LOCATION

2.0 DEVELOPMENT PROPOSAL

As mentioned, the proposed development includes two towers comprising the following uses:

- **Building A:** 456 residential units (304 one-bedroom and 152 two-bedroom) and 153 square metres of retail GFA
- **Building B:** 456 residential units (304 one-bedroom and 152 two-bedroom) and 181 square metres of retail GFA
- **Total:** 912 residential units (608 one-bedroom and 304 two-bedroom) and 334 square metres of retail GFA

The development proposal summary is outlined in **Table 1** and the site plan illustrated in **Figure 2**. Architectural plans are provided in **Appendix A**.

Table 1 Development Proposal Summary

Type		Current OPA/ZBA and SPA Submission ¹
Land Use Elements		
Residential Units ²		912 units (608 one-bedroom and 304 two-bedroom)
Retail GFA		334 m ²
Transportation Elements		
Site Driveway		All-moves access on Bradford Street, approximately 85 metres south of the Bradford Street / Victoria Street intersection.
Vehicle Parking	Supply	364 vehicle parking spaces (including 21 accessible spaces)
	Access	Two above-grade parking ramps via driveway off Bradford Street
Bicycle Parking	Supply	912 bicycle spaces (820 long-term and 92 short-term)
	Access	At-grade, elevators, and bicycle ramps
Pedestrian	Access	Building entrances via sidewalks off Bradford Street
Loading	Supply	Two loading spaces (shared retail and residential move-in / move-out and garbage collection)
	Access	Two at-grade loading areas via driveway off Bradford Street
Pick-up / Drop-off	Supply	Four short-term spaces
	Access	At-grade via driveway off Bradford Street

Notes:

1. Site statistics received from Kirkor Architects and Planners dated November 28, 2023.
2. A portion of the residential component (i.e., 15% of the total unit count), including approximately 136 residential units, will be affordable housing units. The remaining 776 residential units will be market (condominium) housing units.



3.0 POLICY AND PLANNING CONTEXT

3.1 Provincial Policies

There are several current and proposed provincial policy documents subject to the site, including the following:

- Provincial Policy Statement (2020);
- A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2017) and Transportation Plan (2022);
- Proposed Provincial Planning Statement (2023);
- Ministry of Transportation Transit-Supportive Guidelines (2012);
- Metrolinx 2041 Regional Transportation Plan (2019);
- Metrolinx Mobility Hub Guidelines (2011); and
- GO Rail Station Access Plan (2023).

3.1.1 Provincial Policy Statement (2020)

The 2020 Provincial Policy Statement (PPS) promotes efficient development patterns optimizing the use of land, resources, and public investment in infrastructure and public service facilities for up to the next 25 years. According to the PPS, efficient development patterns promote a mix of housing, including affordable housing, employment, recreation, parks and open spaces, and transportation choices that increase the use of active transportation and transit before other modes of travel.

Policies within the PPS address the importance of transit-supportive development to promote greater density in proximity to existing and planned transit to encourage the use of transit. The policies also promote healthy, active communities through active transportation facilities and street design that provide safe pedestrian facilities. To maximize the use of existing and planned transportation infrastructure, the PPS policies recommend the use of TDM strategies for new developments, such as the site.

3.1.2 A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020) and Greater Golden Horseshoe Transportation Plan (2022)

A Place to Grow: Growth Plan for the Greater Golden Horseshoe (Growth Plan for the GGH) outlines the importance of reducing reliance upon the automobile and promoting transit and active transportation. Planning along priority transit corridors and within Major Transit Station Areas (MTSAs) shall be prioritized and planned for minimum density targets and a mix of uses to maximize the number of potential transit users within walking distance of the station. Within all MTSAs, development will be supported by providing alternative development standards, such as reduced parking.

Per the Growth Plan for the GGH, an MTSA is defined as “the area within an approximate 500 to 800-metre radius of a transit station, representing about a 10-minute walk”. Although the site is not located within the specified distance of an MTSA, it is located approximately one kilometre to the north of the Allandale Waterfront GO Station. Albeit the development programme aims to remain consistent with the Growth Plan’s support for reduced parking standards in MTSAs, encouraging future area residents, visitors, and patrons to use alternate modes of transportation.

In early 2022, the Ministry of Transportation and its partners developed the Transportation Plan for the GGH as a 30-year plan for improved mobility across the Greater Golden Horseshoe area. As the GGH continues to expand, the region will require improvements to its transportation systems to accommodate increased demand. The Plan aims to address the impact of predicted growth through a well-connected transportation system that provides safe, efficient, and convenient options for users. The 2051 vision of the Plan focuses on fighting gridlock and improving road performance, getting people moving on a connected transit system, supporting a more sustainable and resilient region, and efficiently moving goods.



Improving transit is a key focus of the Plan and is viewed as an important component towards achieving a more sustainable and resilient region. Currently, it is noted that the City of Barrie is in the process of improving the local and regional transit network (i.e., Barrie Transit bus service and Allandale Waterfront GO Station operations) within its jurisdiction. Expanding service across the Region will allow for greater inter-regional travel and connections to destinations that might have previously been difficult to reach by transit alone. As such, Barrie is aligned with the Plan as it aims to adopt more routes, increase service frequency, and provide more connections to enhance the network.

3.1.3 Proposed Provincial Planning Statement (Updated June 2023)

The Provincial Planning Statement was introduced in 2022 to provide a set of adapted and integrated policies from the existing PPS (discussed in **Section 3.1.1**) and the Growth Plan for the GGH (discussed in **Section 3.1.2**), ultimately replacing both documents, to form a new provincial planning policy tool. Given the significance of the PPS and Growth Plan for the GGH in navigating land use planning decisions across the province (i.e., guiding growth, transportation infrastructure, public health, and more to achieve livable communities), the Provincial Planning Statement aims to further leverage several policies to provide a streamlined land use planning policy framework.

As a result of all government feedback received, the Provincial Policy Statement proposed sets of policies under five pillars:

1. Appropriate Housing Supply;
2. Available Land for Development;
3. Infrastructure to Support Development;
4. Balance Housing with Resources; and
5. Implementation.

Proposed land development and transportation-related policies under these pillars indicate meeting minimum density targets for MTSAs and urban growth centres (including the site area), encourage transit-supportive greenfield density targets, require municipalities to implement intensification policies, require municipalities to plan for and protect corridors for transit infrastructure to accommodate growth, require the integration of land use planning and transportation through transit-supportive development, and require municipalities to reduce greenhouse gas emissions and improve air quality.

In addition, Chapter 2 (Building Homes, Sustaining Strong and Competitive Communities) of the Provincial Planning Statement proposes policies in relation to accommodating access to multi-modal transportation options and facilitating low impact development and residential intensification near main transit corridors and stations. Further, Chapter 3 (Infrastructure and Facilities) propose several policies in relation to providing transit-supportive development where applicable and promoting healthy and active communities through facilitating active transportation, planning public streets to meet diverse needs, and providing opportunities for convenient public access to the recreational (i.e., waterfront) area.

It is noted that the Provincial Planning Statement was posted in April 2023 with a 120-day comment period that was extended to August 2023. Since this period, the proposal notice was last updated in June 2023 to permit review and input for the additional policies added to the document.



3.1.4 Ministry of Transportation Transit Supportive Guidelines (2012)

The Transit-Supportive Guidelines are intended to assist municipalities in implementing policies and objectives of the PPS and Growth Plan for the GGH. The Guidelines aim to create an environment that is supportive of transit and to develop services and programs to increase transit ridership. Under the guidelines, a “node” is an area of more intense density, use, and activity. It is recommended to focus urban growth within nodes, such as the site, especially those with higher order transit service to better link land use and transit, reduce walking times to / from uses, and support the efficient delivery of transit services.

The Guidelines also support the use of TDM strategies, including the reduction of parking requirements upon the adoption of TDM measures, shared parking between uses, and the use of on-street parking during off-peak hours. The site is notable located within a nearby distance between the Barrie Bus Terminal and Allandale Waterfront GO Station, as well as within the City’s Urban Growth Centre boundary, which suggests that a TDM strategy and reduced parking may be considered key apt components of the development programme.

3.1.5 Metrolinx Regional Transportation Plan (2018)

The Metrolinx 2041 Regional Transportation Plan (2018 RTP) – an update to The Big Move (2008) – envisions sustainable and healthy communities that are developed through intensification and have low carbon footprints. A key strategy of the plan is the integration of transit and land use by focusing development at or near mobility hubs and MTSAs, such as Allandale Waterfront GO Station. Embedding TDM strategies in land use planning and development to prioritize cycling, walking and transit use is highlighted in the Plan. Furthermore, the 2018 RTP encourages best practices in parking management, such as reducing minimum parking standards especially for new developments near transit stations.

3.1.6 Metrolinx Mobility Hub Guidelines (2011)

Initially introduced in The Big Move and as part of the set of accomplishments set out in the 2018 RTP, Metrolinx’s Mobility Hub Guidelines, although dated, remains a key aspect of the planning process. The document designates various MTSAs at key intersections within the evolving higher order / rapid transit network to integrate multiple transportation modes and accommodate concentrated places to collectively live, work, shop, and play. Although the site is not designated within a mobility hub, it is within a one-kilometre walking distance to the Allandale Waterfront GO Station MTSA. Further, it is noted that the future development of the Barrie Allandale Transit Terminal (i.e., transforming the Allandale Waterfront area into an inter-regional transit hub), further discussed in **Section 4.2.2**, is intended to support the several objectives resembling a mobility hub. This includes the seamless integration of modes at the rapid transit station, strategic parking management, safe / efficient movement of people, mixed-use environment, and an attractive public realm.

3.1.7 GO Rail Station Access Plan (2023)

As part of the accomplishments set out in the 2018 RTP, Metrolinx introduced the GO Rail Station Access Plan, which intends to set requirements to support future GO ridership, enhance the rider experience, grow multi-modal access, support equitable access, and generally align with regional plans and policies to the year 2041. In order of priority, the Plan considers modal access for pedestrians, transit, cycling, pick-up / drop-off, carpool passengers, and parkers. Based upon population and employment forecasts, it is anticipated that ridership will vastly increase, especially in a post-pandemic condition and as a result of various GO expansions. As such, each transit station in the network, including the Allandale Waterfront GO Station near the site, will be improved to provide greater transit access, opportunities, and safety for existing and future riders within the site area to use regional transit as a viable and reliable travel option.



3.2 Municipal Policies

There are several current and proposed municipal policy documents subject to the site, including the following:

- Barrie New Official Plan (2023);
- Draft Barrie Comprehensive Zoning By-law (2023); and
- Barrie Transportation Master Plan (2019).

3.2.1 Barrie New Official Plan (2023)

The City of Barrie Official Plan (OP) aims to implement provincial directions, as identified above, and outlines City Council's goals and visions. The OP intends to ensure that the municipality evolves, improves, and realizes its full potential in areas such as transit, land use development, and the environment. Future growth is being steered by the OP to areas that are well served by transit and the evolving road network.

Approved by City Council in February 2022 and the Province (Ministry of Municipal Affairs and Housing) in April 2023, Barrie updated its Official Plan (OP), including 73 modifications to several policies and maps, to further address provincial policy direction in relation to land use compatibility and government priorities (i.e., housing and a streamlined development process). After over four years of extensive public consultation, the new OP replaced the in-effect OP adopted in 2010.

The latest policies in relation to TDM (Section 4.6), Sustainable and Resilient Design (Section 3.2.3), General Urban Design (Section 3.2), and Parking Design and Solutions (Sections 3.4 and 4.7) specify the following:

- Support for TDM programs that reduce single-occupant vehicle travel and encourage the use of and access to alternative non-auto modes;
- Prevent the domination of surface parking in the Urban Growth Centre, unless located to the rear of development;
- Reduced parking is suitable in strategic growth areas where transit, walking, and cycling alternatives exist;
- Context-sensitive parking requirements in response to diverse settings (e.g., Strategic Growth Areas with multi-modal transportation services);
- Prioritization of public streets, mid-block connections, or other human-scale connections and transportation modes, including active transportation and transit;
- increasing overall connectivity and walkability through intersection density across the city (e.g., block lengths ranging between 150 metres and 250 metres in length with shorter lengths in intensification areas such as the site); and
- Support and preparation for carpool, car share, and zero emission vehicles (e.g., electric vehicle) through designated parking.

Based on the new OP, Map 1 (Community Infrastructure) and Map 2 (Land Use Designations) as approved indicate that the site is located within the Urban Growth Centre and High Density zone, and that Bradford Street is recognized as an Intensification Corridor. In addition, the Allandale Waterfront GO Station is considered an MTSA, in which its area is located within one kilometre to the south of the site (equivalent to an approximate 15-minute walk). These findings suggest that the site location is a strong candidate for high intensification and transit-supportive development.

Further, Map 4A and 4B (Ultimate Mobility Network) indicate that the site is accessible to an evolving multi-modal transportation network, including the planned Allandale Waterfront Network Hub (further discussed in **Section 4.2.2**), planned cycling routes along Bradford Street, Victoria Street, and Innisfil Street (further discussed in **Section 4.3.2**), and the existing Barrie Waterfront Trail (further discussed in **Section 4.3.1**). Further, the Bradford Street corridor, within the vicinity of the site, is planned to provide a potential rightmost high-occupancy vehicle (HOV) lane.



Moreover, Map 5 (Right-of-Way Widths) indicates that Bradford Street, within the vicinity of the site, is planned to be widened to 34 metres. Further details on the preferred design of Bradford Street as part of the Environmental Assessment (EA) process are discussed in **Section 4.1.2**.

Lastly, the latest housing policies in relation to the Urban Growth Centre (Section 2.3.2), General Land Use (Section 2.5), and Affordable Housing (Section 6.4.2) indicate that at least 15% of all new residential developments in High Density zones and at least 20% of the entirety of the Urban Growth Centre, as subject to the site, be affordable as per provincial guidance and the affordable targets set by the City's Affordable Housing Strategy dated December 2023. Based upon the findings of the Affordable Housing Strategy, consideration may be given to alternative parking standards (i.e., significantly reducing or eliminating minimum parking requirements) to support the provision of affordable housing. It is noted that the site provides a portion of its units as affordable housing and considers these latest policies as part of the proposed plan.

3.2.2 Draft Barrie Comprehensive Zoning By-law (2023)

Following the adoption of the new OP, City staff are currently developing the Draft Comprehensive Zoning By-law to align with its updated policies. As a result of ongoing consultation beginning Fall 2023, a complete first draft and subsequent interim second draft of the Zoning By-law have been released to address the latest land use planning best practices.

From a transportation zoning perspective, the latest Draft Comprehensive Zoning By-law proposes a significant update to the existing vehicle parking and bicycle parking standards. Appendix D (Parking District Map) of the Draft Zoning By-law introduced a new structure including four types of parking districts citywide:

- Parking District 1 (Urban Growth Centre / MTSAs);
- Parking District 2 (Strategic Growth Area / Intensification Corridor);
- Parking District 3 (Employment Areas); and
- Parking District 4 (All Other City Lands).

As such, the site is subject to Parking District 1, which provides the lowest minimum vehicle parking requirements and greatest bicycle parking requirements for the proposed residential and retail uses, recognizing its location within the Urban Growth Centre (as per the new OP) and proximity to an MTSAs. Further details on the application of these proposed standards to the proposed development are outlined in **Section 5.1** and **Section 6.2**.

Lastly, it is noted that the site is currently subject to the in-effect Barrie Zoning By-law 2009-141, and the release of the complete second draft of the new Zoning By-law is anticipated in late 2023. However, this release is subject to the proposed policy changes and implementation of the Provincial Planning Statement, as previously discussed in **Section 3.1.3**.

3.2.3 Barrie Transportation Master Plan (2019)

The City of Barrie's current Transportation Master Plan (TMP) was adopted by Council in 2019 to serve as a roadmap for establishing a well-balanced transportation system for the future needs and development citywide to 2041. Based on the forecasted growth and density changes anticipated by 2041, the transportation network and infrastructure were reviewed and updated to better accommodate this level of growth and changing patterns in mobility. Specifically, the TMP examined active transportation (AT), public transportation, and motorized transportation infrastructure (e.g., cycling infrastructure, sidewalks, bus terminals, train stations, and current road network) within the City to identify gaps in the network.



An updated AT strategy was developed with a set of guiding principles to help achieve the intent of the TMP, including (but not limited to) providing direct connections throughout the City and to key destinations, developing multi-modal routes and connections to transit, and enhance opportunities for people to walk and cycle for short trips. Note that approximately 485 kilometres of new AT facilities are proposed in addition to the approximately 973 kilometres of existing AT facilities to strengthen the network. Based on Figure ES-2 (Cycling and Multi-use Trail Network) of the TMP, new cycle tracks along Bradford Street, bike lanes along Victoria Street and Innisfil Street are being planned within the vicinity of the site to provide stronger north-south and east-west connections. In addition, ES-3 (Sidewalk and Multi-use Trail Network) of the TMP indicates that Vespra Street and Innisfil Street will provide additional sidewalk infrastructure along its streets near the site.

An updated road network plan has been identified to focus on road improvements and transit priority corridors across the City. The ultimate 2041 network plan illustrated in Figure ES-4 (2041 Proposed Preferred Network) and ES-6 (Proposed HOV Lanes and Transit Priority Features) of the TMP indicates that the Bradford Street corridor near the site is proposed to have five lanes (including auxiliary left-turn lanes or a median) as well as a potential rightmost HOV lane to provide more efficient connections to the emerging transit hubs.

An updated transit plan has been provided to align with Barrie Transit Vision (further discussed in **Section 4.2.2.2**) and other emerging projects surrounding the Allandale Waterfront GO Station and Downtown Barrie Bus Terminal.

Lastly, as a result of the transportation strategies established and considering the ongoing transit and active transportation investments being made on a local basis, the following future mode share targets to 2041 are estimated as follows:

- Transit: 7%
- Active Transportation: 12%
- Auto Driver: 78%
- Other: 3%

The proposed development considers the existing and future transportation conditions within the immediate area and generally aims to achieve the mode share targets indicated above through a combination of TDM measures and on-site infrastructural provisions.



4.0 TRANSPORTATION CONTEXT

4.1 Road Network

4.1.1 Existing Road Context

The site is served by a diverse road network including arterial (intensification corridor), major and minor collector, and local roads. The existing road network in the immediate vicinity of the site is summarized in **Table 2** and illustrated in **Figure 4**. The existing road configuration and traffic control are illustrated in **Figure 3**.

Table 2 Existing Road Network

Street Name	Road Cross Section	Parking and Traffic Regulations	Posted Speed Limit	Route Description
Arterial				
Bradford Street	4-lane cross-section (2 lanes in each direction)	Parking is not permitted in the vicinity of the site. This street has a community safety zone extending from Dunlop Street West in the north to Vespra Street in the south.	50 km/h	Bradford Street is a north-south arterial road extending from Dunlop Street West in the north to Tiffin Street in the south. At Tiffin Street, the roadway continues southward as Essa Road. It is signalized at its intersection with Victoria Street in the vicinity of the site.
Major Collector				
Victoria Street (Bradford Street to Lakeshore Drive)	2-lane cross-section (1 lane in each direction) with dedicated left-turn lanes at key intersections	Parking is not permitted in the vicinity of the site.	50 km/h	Victoria Street is an east-west major collector road extending from Bradford Street in the east to Lakeshore Drive in the west. It is signalized at its intersections with Bradford Street and Lakeshore Drive in the vicinity of the site.
Innisfil Street	2-lane cross-section (1 lane in each section)	Parking is not permitted in the vicinity of the site. The roadway has a community safety zone, extending from Holgate Street in the north to Marshall Street in the south.	50 km/h	Innisfil Street is a north-south major collector road extending from Perry Street in the north and continues as Glenridge Road in the south (approx. 215 metres west of its intersection with Bayview Drive). It is unsignalized at its intersection with Victoria Street in the vicinity of the site.



Street Name	Road Cross Section	Parking and Traffic Regulations	Posted Speed Limit	Route Description
Minor Collector				
Victoria Street (Innisfil Street to Bradford Street)	2-lane cross-section (1 lane in each direction)	Parking is not permitted except by permit from 9:00 a.m. - 9:00 p.m. (June 15 – September 15) along the west side of the roadway near the vicinity of the site.	40 km/h	Victoria Street is an east-west minor collector road extending from Innisfil Street in the east to Bradford Street in the west. It is unsignalized at its intersections with Innisfil Street and Sanford Street in the vicinity of the site.
Local				
John Street	2-lane cross-section (1 lane in each section)	Parking is not permitted except by permit from 9:00 a.m. - 9:00 p.m. (June 15 - September 15) along both sides of the roadway near the vicinity of the site. It is noted that John Street (from Bradford Street in the east to Innisfil Street in the west) will be closed between August 8, 2023 and December 1, 2023 for reconstruction as part of the Historic Neighbourhoods Strategy Program.	40 km/h	John Street is an east-west local road extending from Ellen Street in the east to Dymont Road in the west. It is unsignalized at its intersection with Bradford Street and Sanford Street in the vicinity of the site.
Sanford Street	2-lane cross-section (1 lane in each section)	Parking is not permitted except by permit from 9:00 a.m. - 9:00 p.m. (June 15 - September 15) along both sides of the roadway near the vicinity of the site.	40 km/h	Sanford Street is a north-south local road extending from Vespra Street in the north and it terminates at a Cul-de-sac in the south. It is unsignalized at its intersection with Vespra Street in the vicinity of the site.



4.1.2 Planned Road Context

Some road improvements are being planned directly at the site, primarily along Bradford Street. The planned road network within the vicinity of the site is described below and illustrated in **Figure 5**.

4.1.2.1 TRANSPORTATION MASTER PLAN ROAD IMPROVEMENTS (IN PROGRESS - 2041)

As mentioned in **Section 3.2.3** (and consistent with the latest Official Plan discussed in **Section 3.2.1**), the ultimate 2041 network plan illustrated in Barrie's TMP indicates that Bradford Street will provide five lanes (including two travel lanes, per direction, with auxiliary left-turn lanes or a median), extending between Dunlop Street to the north and Tiffin Street to the south (and continuing southward to Essa Road), within a 34-metre right-of-way. Additional roadway widenings near the site include Victoria Street (maximum right-of-way of 25 metres), Innisfil Street (maximum right-of-way of 26 metres), and Lakeshore Drive (maximum right-of-way of 27 metres and 34 metres along specific segments of the roadway).

In addition, it is planned to provide a potential rightmost HOV lane along Bradford Street, extending between Simcoe Street to the north and Tiffin Street to the south (and continuing southward to Essa Road). This transportation feature aims to provide more efficient connections for carpooling / multi-passenger vehicles, particularly towards emerging transit hubs.

4.1.2.2 BRADFORD STREET CORRIDOR ENVIRONMENTAL ASSESSMENT

As mentioned in **Section 3.2.1**, the New Official Plan indicated that Bradford Street will be widened to a maximum right-of-way of 34 metres. The current right-of-way width for Bradford Street is approximately 20 metres.

Based on the foregoing, a four-phase Schedule 'C' Municipal Class Environmental Assessment (EA) was conducted for the Bradford Street corridor to develop a recommended design concept for the future road. The EA study area, encompassing the site, is generally bounded by Dunlop Street to the north, Milburn Street to the south, Ellen Street to the east, and Sanford Street to the west.

The overall objectives and vision for the future roadway was primarily guided by the need for Bradford Street to accommodate the future multi-modal transportation needs of the community as the surrounding area continues to redevelop and vastly increase in population. Currently, the corridor (particularly near the site) provides limited multi-modal infrastructure.

Based upon a City of Barrie staff report dated June 2023 (file DEV025-23), after the completion of the EA study in conformance with subject plans and policies (e.g., latest TMP and OP), the recommended 34.0-metre design concept of Bradford Street includes the following (in order from centre to outer edge):

- One 4.2-metre centre median or 3.0-metre two-way left-turn lanes;
- Four 3.3 to 3.5-metre outer travel lanes (two per direction);
- Two 3.0-metre boulevards (one per side);
- Two 2.0-metre cycle tracks (one per direction); and
- Two sidewalk paths (one per direction).

It is noted that City staff indicated that the current design of the Bradford Street corridor may be accommodated to the year 2041.

It is also noted that the final cross section details are to be determined upon receiving a Notice of Study Completion, and subsequently, obtaining full Council approval.

The architectural plans for the proposed development, as illustrated in **Figure 2** and **Appendix A**, incorporate a 7.0-metre widening along the west side of Bradford Street within its property limits to respect the future road widening and revitalization.



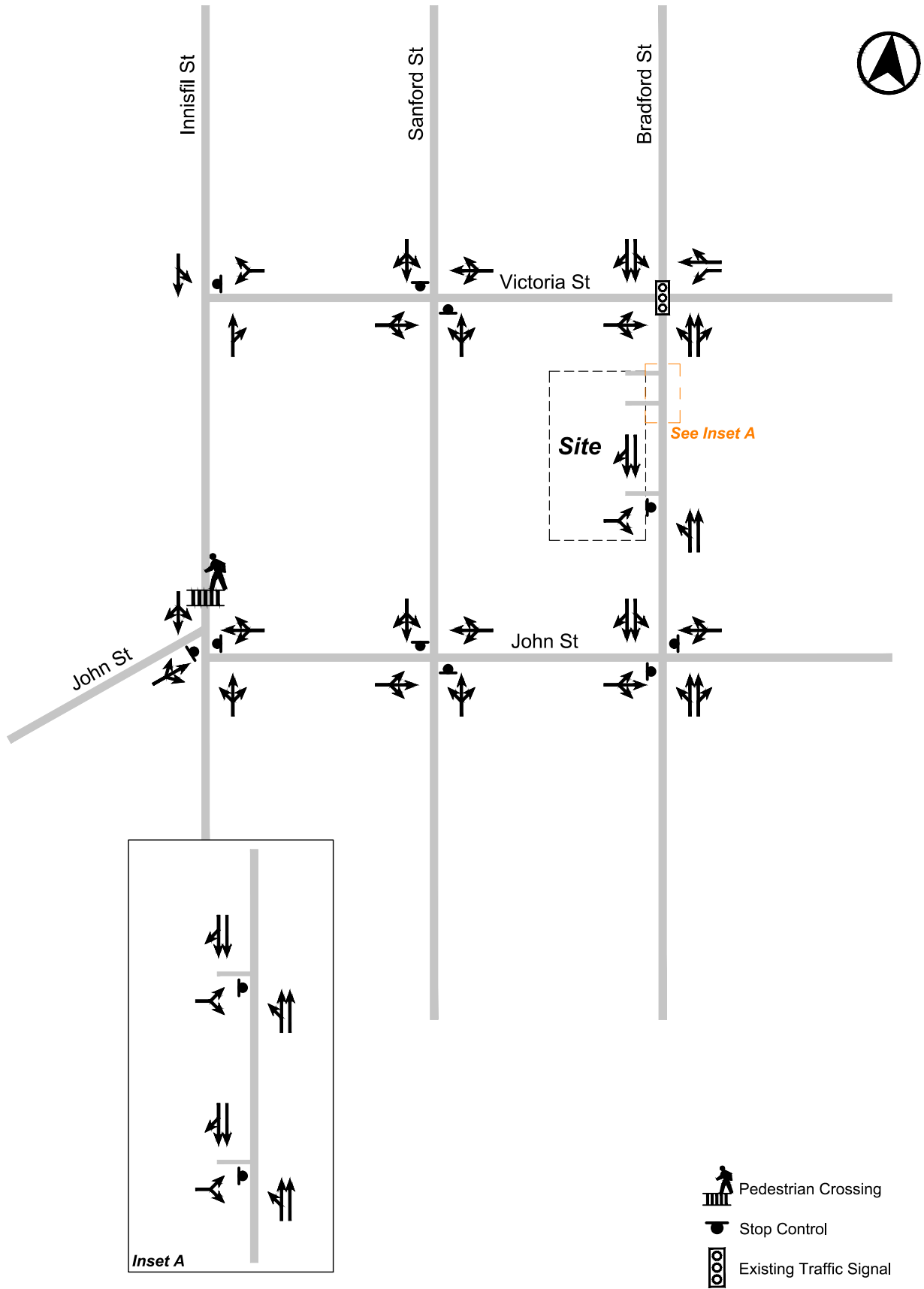


FIGURE 3 EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL

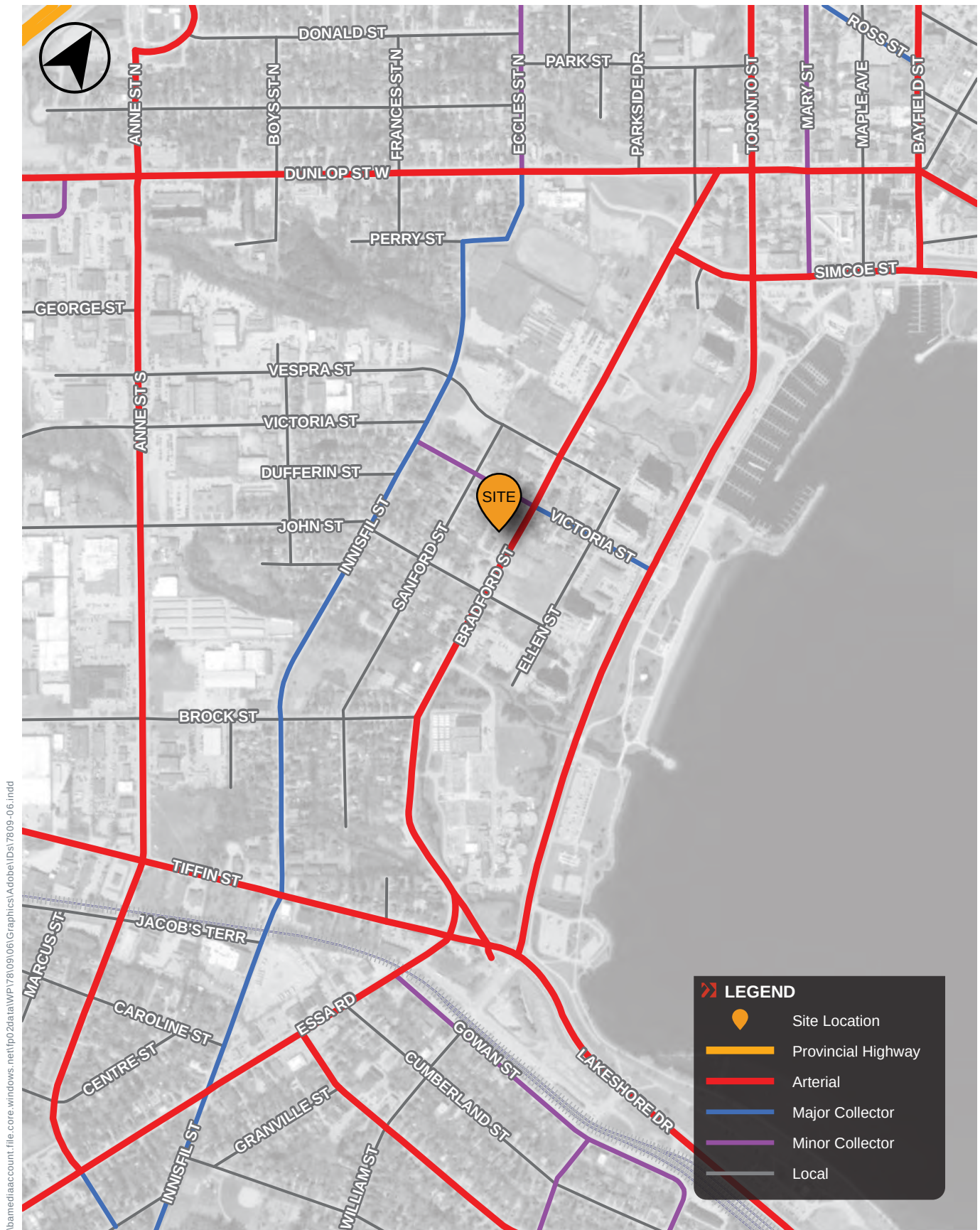


FIGURE 4 EXISTING STREET NETWORK

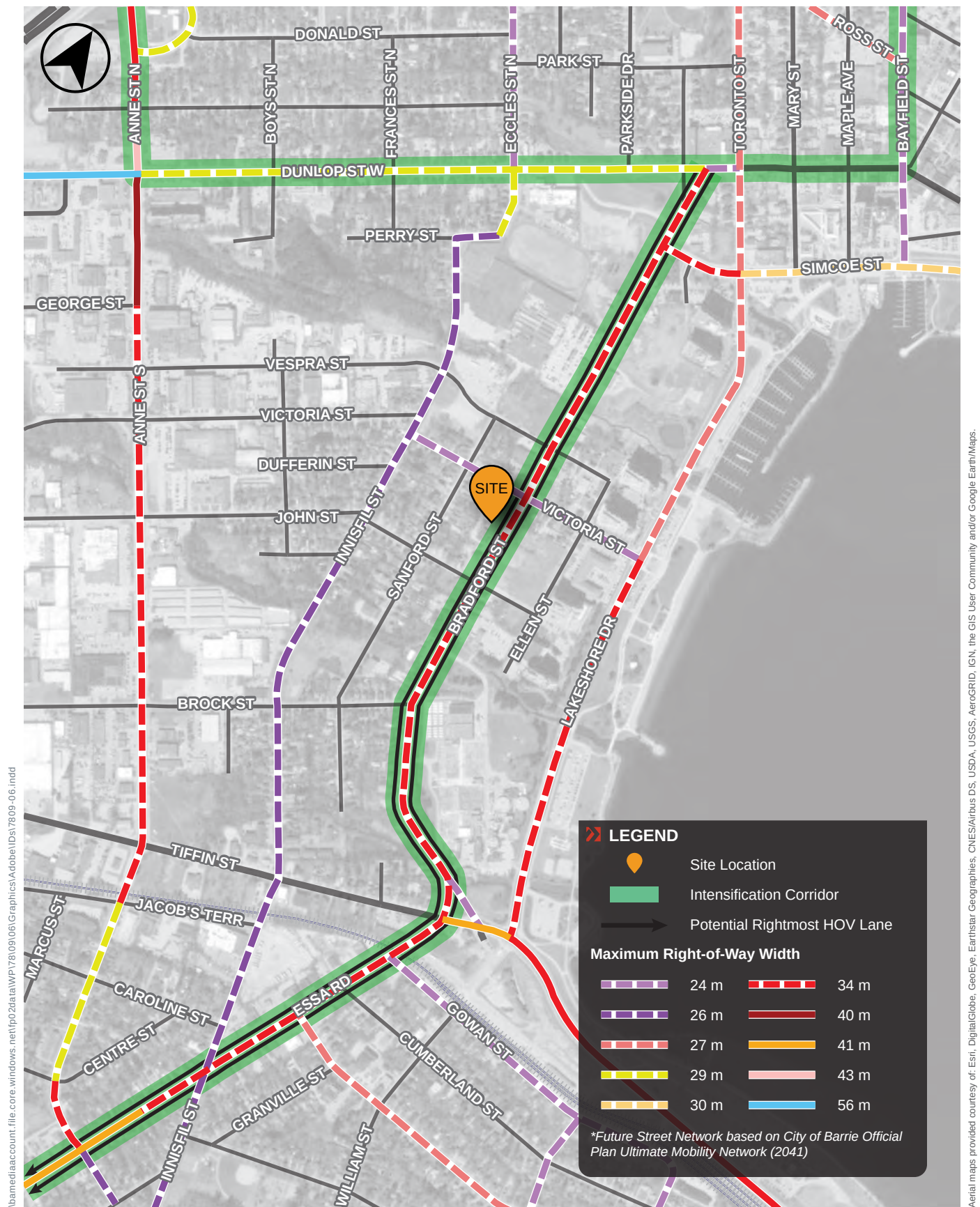


FIGURE 5 PLANNED STREET NETWORK

4.2 Transit Network

4.2.1 Existing Transit Context

The site area is well-served by public transit services primarily operated by Barrie Transit, Metrolinx (GO) Transit, and Simcoe County LINX Transit. Several transit stops, located within 200 metres of the site, provide direct connections to key local and regional transit destinations, including the Barrie Bus Terminal (approximately one kilometre to the north) and Allandale Waterfront GO Station (approximately one kilometre to the south) as part of the Barrie Line. In addition, the Allandale Waterfront GO Station provides regional public transit connections via Barrie GO Line (north-south between Barrie and Downtown Toronto) and the LINX Bus Route 2 (east-west between Barrie and Wasaga Beach). The existing transit network in the immediate vicinity of the site is summarized in **Table 3** and illustrated in **Figure 6**.

Table 3 Existing Transit Network

Route	Walking Distance to Nearest Transit Stop	Headway	Route Description
Barrie Transit – Bus Service			
Route 1 (Georgian Mall)	- Northbound: Bradford Street / Victoria Street (approx. 35 metres) - Southbound: Bradford Street / John Street (approx. 70 metres)	Approx. 30 minutes all-day	The 1 Georgian Mall bus route operates in a north-south direction between Georgian Mall and Welham Road.
Route 3 (Bayview)	- Northbound: Innisfil Street / Victoria Street (approx. 200 metres) - Southbound: Innisfil Street / Vespra Street (approx. 280 metres)	Approx. 30 minutes all-day	The 3 Bayview bus route operates in a north-south direction between the Downtown Barrie Terminal and Barrie South GO Station.
Route 4 (East Bayfield)	- Northbound: Bradford Street / Victoria Street (approx. 35 metres) - Southbound: Bradford Street / John Street (approx. 70 metres)	Approx. 35 minutes all-day	The 4 East Bayfield bus route operates in a north-south direction between Hanmer Street East and Barrie South GO Station.
Route 7 (Grove)	- Northbound: Bradford Street / Victoria Street (approx. 35 metres) - Southbound: Bradford Street / John Street (approx. 70 metres)	Approx. 30 minutes all-day	The 7 Grove bus route operates in a north-south direction between Georgian College and Park Place.
Route 8 (Royal Victoria Hospital)	- Northbound: Bradford Street / Victoria Street (approx. 35 metres) - Southbound: Bradford Street / John Street (approx. 70 metres)	Approx. 30 minutes all-day	The 8 RVH bus route operates in a north-south direction between Georgian Mall and Barrie South GO Station.
GO Transit – Bus Service			
Route 68 (Aurora GO)	Allandale Waterfront GO Station at Essa Road / Gowan Street (approx. 1 kilometre)	Approx. 1 hour all-day	The 68 Aurora GO bus route operates in a north-south direction between Barrie Transit Terminal and Aurora GO Station in the Town of Aurora. It is noted that this route stops at Allandale Waterfront GO Station in the northbound and southbound directions.



Route	Walking Distance to Nearest Transit Stop	Headway	Route Description
GO Transit – Train Service			
Barrie Line	Allandale Waterfront GO Station at Essa Road / Gowan Street (approx. 1 kilometre)	Approx. 30 minutes - 1 hour during peak periods Approx. 1 - 2 hours during off-peak periods	The Barrie GO train route operates in an east-west direction between the Allandale Waterfront GO Train Station and Union Station in the City of Toronto.
Simcoe County LINX – Bus Service			
Route 2 (Wasaga Beach to Barrie)	Allandale Waterfront GO Station at Essa Road / Gowan Street (approx. 1 kilometre)	Approx. 1 hour all-day	Bus Route 2 operates in an east-west direction between Allandale Waterfront GO Station and the Town of Wasaga Beach.

4.2.2 Planned Transit Context

The City of Barrie is currently in the process of improving its local and regional transit facilities. The future (evolving) transit network in the immediate vicinity of the site is outlined below and illustrated in **Figure 7**.

4.2.2.1 PUBLIC TRANSIT FACILITY IMPROVEMENTS (IN PROGRESS)

As a result of the new OP and ongoing TMP, the City's two main transit terminals, the Allandale Waterfront GO Station and Barrie Bus Terminal, are both being transformed into established transit hubs.

The Allandale area, near the location of the existing Allandale Waterfront GO Station, is planned to become the centralized "Barrie Allandale Transit Terminal" as an interregional multi-modal hub. The development of this hub is expected to provide seamless transit services (rail and bus) with direct connections across the County of Simcoe and the Greater Toronto Area.

Meanwhile, the "Downtown Mini Hub", near the location of the existing Downtown Barrie Bus Terminal, will provide bus stops and weather-protected waiting areas along Maple Avenue. The bus stops will continue to provide downtown transit service levels as well as provide direct connections to and from Downtown Barrie. The current transit terminal will be reduced within the downtown; however, route coverage will be generally maintained to support downtown revitalization and the general popularity of this district of the City.

In March 2023, a presentation in relation to these proposed facilities was presented to the Infrastructure and Community Investment Committee with preliminary design concepts and project findings. Key project benefits indicated include (but is not limited to) its support for Barrie Transit growth and goals, increased transit access to the existing GO station, seamless connections throughout the Region with integrated transit access, provision of a centralized hub, increased ridership in conformance with Barrie's TMP and OP, increase active transportation and bicycle ridership, support for tourism, and addresses rapid growth throughout the City.

Lastly, the project will be funded by the Government of Canada, Government of Ontario, and City of Barrie to implement the development of the proposed facilities. The project and its approved funding are particularly beneficial to the proposed site due to its convenient access on foot, by cycling, or by a direct transit ride to both planned facilities.



4.2.2.2 BARRIE TRANSIT VISION (IN PROGRESS - 2025)

Building upon the 2019 TMP, the City of Barrie Transit Vision Project launched in late 2020 to evaluate the existing transit network and implement changes to improve mobility for future residents and visitors to the year 2025. Upon initiating the study, it was recognized that a re-evaluation was needed as a response to the new and / or emerging Barrie Allandale Transit Terminal and Downtown Barrie Hub, new OP, new Transit ON Demand service, and change in transit ridership trends (i.e., forecasted population growth, new development and technology, and natural change in commute patterns). As such, the scope of the study includes a new 2025 transit network, transit planning post-2025, and a bus stop infrastructure plan.

In May-June 2023, a new transit network for Barrie was presented to the Infrastructure and Community Investment Committee. June 21, 2023, City Council ultimately approved a two-phase implementation of new transit network – Phase 1 is planned to begin in 2024 and Phase 2 has an expected completion in 2025.

The new transit network generally provides express service, higher frequency / headways, greater access to employment, and broader network to enhance mobility across the City of Barrie. A summary of the new 2025 transit network changes within the vicinity of the site are outlined in **Table 4** and illustrated in **Figure 7**.

Table 4 Barrie Transit – Ultimate 2025 Network Changes

Existing Route Name	Proposed Change	Future Route Name
Route 1 (Georgian Mall)	- Route adjustment between Georgian Mall and Barrie South GO Station - Replace Route 3 - Route name change from 1 to 12	Route 12
Route 3 (Bayview)	Replaced with Route 12 with 30-minute headways	--
Route 4 (East Bayfield)	Replace with Transit ON Demand zone with <20-minute headways	Route 4
Route 7 (Grove)	- Replacement with local route and Transit ON Demand zone with <20-minute headways - Replacement with local route with 30-minute headways	Routes 14, 102
Route 8 (Royal Victoria Hospital)	- Replacement with local route and Transit ON Demand zone with <20-minute headways - Replacement with local route with 30-minute headways	Routes 14, 100/101, 102

Notes:

- Further details on the existing Barrie Transit bus routes are outlined in **Table 3**.

4.2.2.3 ALLANDALE WATERFRONT GO IMPROVEMENTS VIA GO RAIL STATION ACCESS PLAN (2041)

As indicated in the GO Rail Station Access Plan (described in **Section 3.1.7**), several required on-site and off-site improvements were identified by municipal engagement for the existing Allandale Waterfront GO Station, planned to the year 2041, as part of this process.



Required on-site improvements include (but are not limited to) the following:

- Enhance transit rider experience through reviewing opportunities to improve transit vehicle access to / from the Station;
- Provide additional bicycle parking spaces near the rail corridor;
- Modify the existing PUDO area to include dedicated vehicle waiting areas;
- Provide approximately half of the parking supply as carpool / reserved spaces, as well as shared or leased parking.

In addition, required off-site improvements identified through municipal engagement include (but are not limited to) the following:

- Provide pedestrian improvements (e.g., wayfinding and signage), particularly at the Tiffin Street / Essa Road / Bradford Street intersection;
- Provide localized TDM campaigns in relation to promoting local transit connectivity with the GO station, provide personalized travel planning consultation, and information outreach campaigns;
- Enhance transit rider experience through reviewing opportunities to improve transit vehicle access to / from the Station;
- Collaborate with the City and Barrie Transit agency to deliver the relocated Barrie Transit Hub adjacent to the Allandale Waterfront GO Station, and improve bus connectivity and service at the Station;
- Prioritize the implementation of active transportation infrastructure improvements along Bradford Street;
- Provide alternative parking solutions (e.g., shared or leased parking) in proximity to the Station.

As a result of these improvements, the access travel mode split targets project a significant shift from auto (drivers that park) trips to transit and active trips, as outlined below in **Table 5**.

Table 5 GO Rail Station Access Plan – Allandale Waterfront GO Target Access Mode Share (2041)

Travel Mode	Current Access Mode Share (2019)	Target Access Mode Share (2041)
Drive and Park	34%	27%
Pick-up / Drop-off	49%	23%
Carpool	3%	1%
Local Transit	8%	35%
Bike	1%	2%
Walk	5%	12%





FIGURE 6 EXISTING TRANSIT NETWORK



FIGURE 7 PLANNED TRANSIT NETWORK

4.3 Active Transportation Network

4.3.1 Existing Active Transportation Context

The site is served by continuous sidewalks on either one or both sides of all roadways throughout the neighbourhood. Within the immediate vicinity of the site, continuous two-sided sidewalks are provided along Bradford Street, Victoria Street, John Street, and Sanford Street, while one-sided sidewalks are provided along Innisfil Street and Vespra Street. For recreational or leisure purposes, site users can access the Barrie Waterfront Trail on-foot via Vespra Street. The Barrie Waterfront Trail is an approximate seven-kilometre paved pathway for pedestrians and cyclists, extending between Johnson Beach in the north and Minet's Point Beach in the south. Various facilities are distributed along the trail (e.g., parking lots, docks, washrooms, and washrooms) at several waterfront parks and beaches. Other than the major waterfront trail, the site is generally limited in cycling infrastructure within the area.

In addition, the site is easily accessible to services, amenities, and other key destinations, including (but not limited to) the following:

- Centennial Beach and Park – approximately 350 metres to the east (five-minute walk or three-minute bike ride);
- Lakeshore Family Medicine – approximately 250 metres to the east (four-minute walk or two-minute bike ride);
- Barrie By the Bay Shopping Mall – approximately 450 metres to the north (six-minute walk or two-minute bike ride);
- Downtown Barrie and Barrie Bus Terminal – approximately one kilometre to the north (15-minute walk or four-minute bike ride);
- Barrie City Hall and Library – approximately 1.5 kilometres to the north (20-minute walk or six-minute bike ride);
- Various retail / commercial uses – approximately 900 metres to the north and west (12-minute walk or five-minute bike ride); and
- Allandale Waterfront GO Station – approximately one kilometre to the south (15-minute walk or four-minute bike ride).

The existing active transportation context in the immediate vicinity of the site is illustrated in **Figure 8** and **Figure 9**.

4.3.2 Planned Active Transportation Context

4.3.2.1 TRANSPORTATION MASTER PLAN (2019) AND NEW OFFICIAL PLAN (2023)

As mentioned in **Section 3.2.3**, Figure ES-2 (Cycling and Multi-use Trail Network) of the TMP, the following routes are being planned within the vicinity of the site:

- North-south cycle tracks along Bradford Street (between Dunlop Street and Tiffin Street);
- East-west bike lanes along Victoria Street (between Lakeshore Road and Innisfil Street); and
- North-south bike lanes along Innisfil Street (between Perry Street and Holgate Street).

In addition, ES-3 (Sidewalk and Multi-use Trail Network) of the TMP indicates that Vespra Street and Innisfil Street will provide additional sidewalk infrastructure along its streets near the site.

Further, as part of the New Official Plan, Bradford Street's recent designation as an "Intensification Corridor" will encourage the development of new, diverse uses that will enhance the pedestrian realm through active frontages and an overall improved street design near the site.



4.3.2.2 ON-SITE ACTIVE TRANSPORTATION IMPROVEMENTS

In addition to the active transportation facilities being planned within the area, various public realm improvements to the existing site conditions are being made as a result of the proposed development. As illustrated in the architectural plans (**Appendix A**), the following key improvements include:

- Landscaped buffers provided on the northern, southern, and western boundaries of the site;
- Bicycle parking with convenient access at-grade (as well as other above-grade levels);
- Pedestrian walkways between the site and external network;
- Various building entrances along Bradford Street (with respect to planned public road widening); and
- Majority of parking and loading operations to the rear or above-grade on-site.



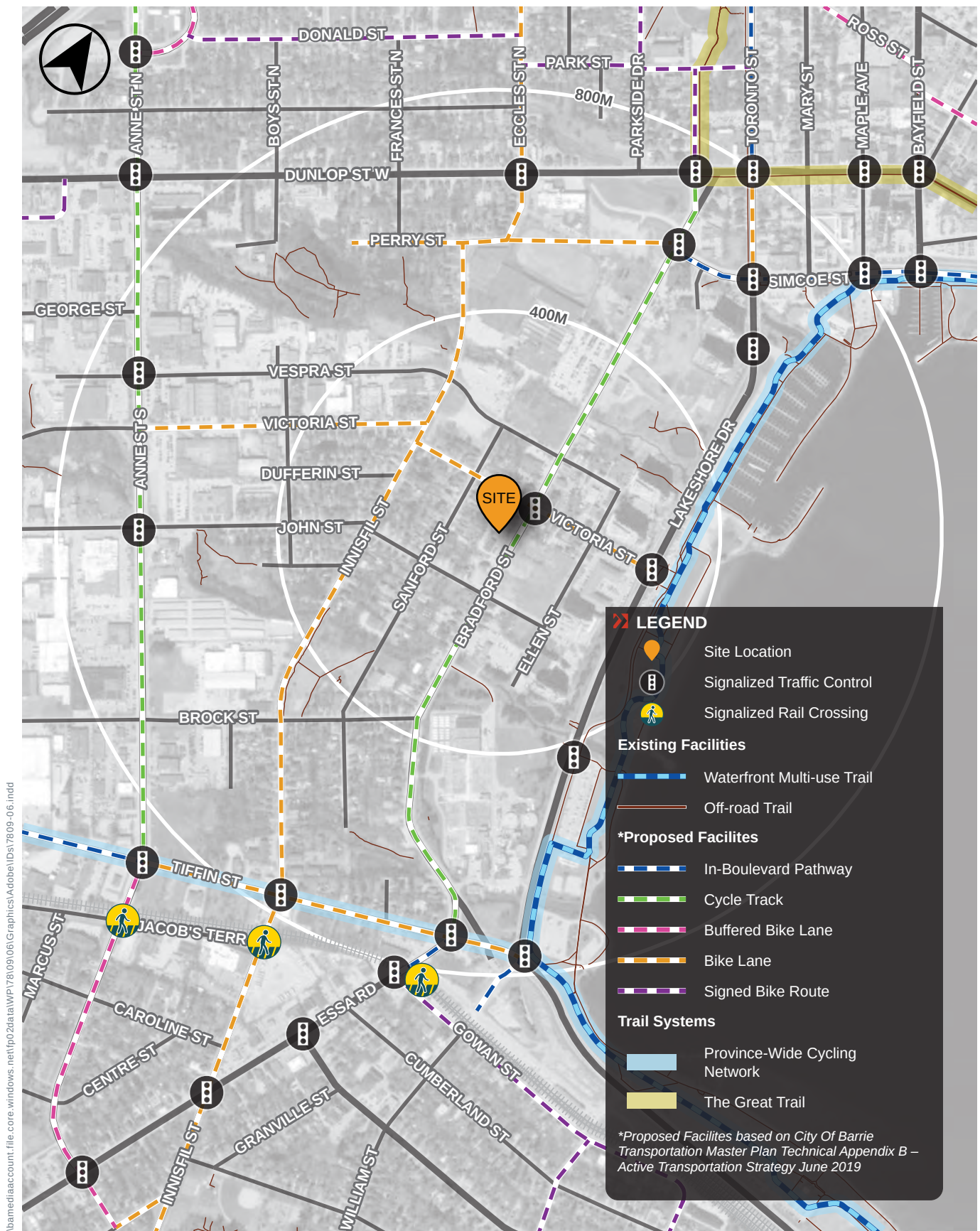


FIGURE 8 EXISTING AND PLANNED CYCLING CONTEXT



FIGURE 9 EXISTING AND PLANNED PEDESTRIAN CONTEXT



Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 10 AREA PEDESTRIAN DESTINATIONS

5.0 VEHICLE PARKING CONSIDERATIONS

5.1 Subject Zoning By-law Vehicle Parking Requirements

5.1.1 City of Barrie Zoning By-law 2009-141 (General)

The site is primarily subject to the City of Barrie Zoning By-law 2009-141 vehicle parking standards. A summary of the minimum general vehicle parking requirements for the proposed development is provided in **Table 6**. It is assumed that the minimum resident parking requirement of 1.5 spaces per unit is inclusive of residential visitor uses, as there is no separate requirement specified under the Zoning By-law.

Table 6 Barrie Zoning By-law 2009-141 “General” Minimum Parking Requirements

Use	Units / GFA / Category ¹	Minimum Rate	Minimum Requirement ²
Resident			
Resident	912 dwelling units	1.50 spaces / unit	1,368 spaces
<i>Resident Subtotal</i>			<i>1,368 spaces</i>
Non-Resident			
Residential Visitor	912 dwelling units	Inclusive of minimum resident rate	-
Retail	334 m ²	1.00 space / 24 m ² GFA	14 spaces
<i>Non-Resident Subtotal</i>			<i>14 spaces</i>
TOTAL			1,382 spaces
Accessible Parking Requirement³			
Total Required Parking	Over 100 spaces	1 + 3% of required parking spaces	43 spaces (21 Type A and 22 Type B)

Notes:

1. Based upon site statistics provided by Kirkor Architects and Planners, dated November 28, 2023.
2. City of Barrie Zoning By-law 2009-141 does not state rounding rules for the calculation of minimum parking. As such, the minimum parking requirement will be rounded to the nearest whole number.
3. As per City of Barrie Zoning By-law 2009-141 Section 4.6.4, where an odd number of barrier free parking spaces are required, the odd numbered space may be a Type B parking space.

Application of the Zoning By-law 2009-141 (General) vehicle parking standards results in a minimum requirement of 1,382 parking spaces, consisting of 1,368 resident spaces (inclusive of residential visitor parking) and 14 retail spaces. In addition, 43 spaces of the total parking requirement must be accessible, consisting of 21 Type A and 22 Type B accessible spaces.

5.2 Review of Applicable Vehicle Parking Standards

5.2.1 City of Barrie Zoning By-law 2009-141 (Urban Growth Centre)

As discussed in **Section 3.2.1**, the City of Barrie's new OP was approved in April 2023 and is currently in-force and effect. The OP updated the City's Urban Growth Centre (UGC) boundary to include the site. As such, it is appropriate to apply the UGC minimum vehicle parking requirements to the site.



A summary of the minimum UGC vehicle parking requirements for the proposed development is provided in **Table 7**. It is assumed that the minimum resident parking requirement of one space per unit is inclusive of residential visitor uses, as there is no separate requirement specified under the Zoning By-law.

Table 7 Barrie Zoning By-law 2009-141 “Urban Growth Centre” Minimum Parking Requirements

Use	Units / GFA / Category ¹	Minimum Rate	Minimum Requirement ²
Resident			
Resident	912 dwelling units	1.00 space / unit	912 spaces
<i>Resident Subtotal</i>			<i>912 spaces</i>
Non-Resident			
Residential Visitor	912 dwelling units	Inclusive of minimum resident rate	-
Retail	334 m ²	1.00 space / 24 m ² GFA	14 spaces
<i>Non-Resident Subtotal</i>			<i>14 spaces</i>
TOTAL			926 spaces
Accessible Parking Requirement³			
Total Required Parking	Over 100 spaces	1 + 3% of required parking spaces	29 spaces (14 Type A and 15 Type B)

Notes:

1. Based upon site statistics provided by Kirkor Architects and Planners, dated November 28, 2023.
2. City of Barrie Zoning By-law 2009-141 does not state rounding rules for the calculation of minimum parking. As such, the minimum parking requirement will be rounded to the nearest whole number.
3. As per City of Barrie Zoning By-law 2009-141 Section 4.6.4, where an odd number of barrier free parking spaces are required, the odd numbered space may be a Type B parking space.

Application of the Zoning By-law 2009-141 “Urban Growth Centre” vehicle parking standards results in a minimum requirement of 926 parking spaces, consisting of 912 resident parking spaces (inclusive of residential visitor parking) and 14 retail parking spaces. In addition, 29 spaces of the total parking requirement must be accessible, consisting of 14 Type A and 15 Type B accessible spaces.

5.2.2 City of Barrie Draft Comprehensive Zoning By-law (Parking District 1)

As discussed in **Section 3.2**, the City of Barrie is in the process of creating a new Comprehensive Zoning By-law to align with the vision and policies of the recently approved OP. The interim second draft of this Zoning By-law (Draft Zoning By-law), dated June 2023, reduces minimum parking requirements for residential uses and eliminates minimum parking requirements for some non-residential uses compared to the currently in-force Zoning By-law 2009-141. As per the Draft Zoning By-law, the site is located within Parking District 1 (Urban Growth Centre/Major Transit Station Areas) and is subject to the corresponding minimum vehicle parking standards.

A summary of the minimum Parking District 1 vehicle parking requirements for the proposed development is provided in **Table 8**. Although the provisions of the new comprehensive Zoning By-law are in draft form and are not currently in force and effect, it is important to consider the City’s evolving and forward-thinking policy direction as it relates to parking supply within the City and especially in the UGC.



Table 8 Barrie Draft Zoning By-law “Parking District 1” Minimum Parking Requirements

Use	Units / GFA / Category ¹	Minimum Rate	Minimum Requirement ²
Resident			
Resident	912 dwelling units	0.60 spaces / unit	548 spaces
<i>Resident Subtotal</i>			<i>548 spaces</i>
Non-Resident			
Residential Visitor	912 dwelling units	0.10 spaces / unit	92 spaces
Retail	334 m ²	No minimum requirement	0 spaces
<i>Non-Resident Subtotal</i>			<i>92 spaces</i>
TOTAL			640 spaces
Accessible Parking Requirement			
Total Required Parking	Over 100 spaces	1 + 3% of required parking spaces	21 spaces (10 Type A and 11 Type B)

Notes:

1. Based upon site statistics provided by Kirkor Architects and Planners, dated November 28, 2023.
2. As per the City of Barrie Draft Zoning By-law Section 16.1, if the calculation for the required number of standard parking spaces results in a non-integer greater than one (1), then the required number of standard parking spaces must be rounded up to the nearest integer.
3. As per the City of Barrie Zoning By-law Draft #2 Section 16.2.4, where an odd number of barrier free parking spaces are required, the odd numbered space may be a Type B parking space.

Application of the Draft Zoning By-law “Parking District 1” vehicle parking standards results in a minimum requirement of 640 parking spaces, consisting of 548 resident parking spaces and 92 residential visitor parking spaces. In addition, 21 spaces of the total parking requirement must be accessible, consisting of 10 Type A and 11 Type B accessible spaces.

5.3 Proposed Parking Standards and Supply

It is proposed to provide reduced vehicle parking standards to the in-force Zoning By-law 2009-141 with consideration of other applicable (and evolving) policies and standards, as described in **Section 3.0**. The proposed vehicle parking standards for the site are summarized in **Table 9**.

Table 9 Proposed Parking Standards

Use	Units / GFA ¹	Proposed Parking Supply	Effective Parking Supply Rate
Resident (Market)	776 dwelling units	364 spaces	0.469 spaces / unit
Resident (Affordable)	136 dwelling units	0 spaces	No minimum requirement
Residential Visitor	912 dwelling units	0 spaces	No minimum requirement
Retail	334 m ²	0 spaces	No minimum requirement
TOTAL		364 spaces	0.469 spaces / unit

Notes:

1. Based upon site statistics provided by Kirkor Architects and Planners, dated November 28, 2023.



The architectural plans illustrate the provision of 364 resident parking spaces for market housing units, located at-grade and within five levels of above-grade parking. In addition, four short-term / PUDO parking spaces will be provided within the at-grade parking level, discussed further in **Section 8.0**. Further details on the parking supply are provided in **Appendix A**.

The appropriateness of the proposed parking supply to the current in-force Zoning By-law 2009-141 is further discussed in **Section 5.4**.

5.3.1 Accessible Parking

As part of the proposed vehicle parking requirement and supply, a total of 13 accessible spaces, consisting of 6 Type A and 7 Type B spaces, are required. The minimum accessible parking requirement for the site is summarized in **Table 10**.

Table 10 Minimum Accessible Parking Requirement

Use	Units / GFA	Minimum Rate ²	Minimum Requirement
TOTAL			364 spaces
Accessible Parking Requirement³			
Required Parking	Over 100 spaces	1 + 3% of required parking spaces	13 spaces (6 Type A and 7 Type B)

Notes:

1. Based upon site statistics provided by Kirkor Architects and Planners, dated November 28, 2023.
2. As per the City of Barrie Zoning By-law Draft #2 Section 16.1, if the calculation for the required number of standard parking spaces results in a non-integer greater than one (1), then the required number of standard parking spaces must be rounded up to the nearest integer.
3. As per the City of Barrie Zoning By-law Draft #2 Section 16.2.4, where an odd number of barrier free parking spaces are required, the odd numbered space may be a Type B parking space.

The current proposal incorporates a total of 21 accessible parking spaces, which are located near the parking elevator lobbies. As such, the proposed accessible parking supply meets the requirements outlined in the City of Barrie Zoning By-law 2009-141 as well as the Draft Zoning By-law.

5.4 Appropriateness of the Proposed Parking Standards

The in-force parking requirements, as per Zoning By-law 2009-141, overstate the parking needs of contemporary developments in transit-accessible areas of Barrie, such as the site. The following parking standards are proposed:

- Resident (Market): 0.469 spaces per unit
- Resident (Affordable): No minimum requirement
- Residential Visitor: No minimum requirement
- Retail: No minimum requirement

As such, the following sections discuss the appropriateness of the proposed (reduced) parking requirements, per use.



5.4.1 Resident Parking Assessment

The proposed resident parking standard is considered appropriate based on the following key considerations:

- Emergence of non-auto supportive regional and local plans and policy directives;
- Existing and planned transit and active transportation facilities afforded to the area;
- Review of other residential parking By-law standards across Ontario;
- Observed precedence for residential parking approvals; and
- Support from the site's TDM strategy for residents.

5.4.1.1 REVIEW OF EVOLVING PLANS AND POLICIES

As growth in cities increases, transit connections and access to alternative modes of transportation (e.g., walking, cycling, carpooling) become more critical in moving residents between home, work, and entertainment destinations. In addition, developments within major cities in North America are continuously recognizing that the location of a proposed development in relation to transit services, pedestrian infrastructure, and cycling infrastructure plays an important role in decreasing auto ownership, and potentially alleviating traffic congestion.

In this way, increasing efforts and investments are being made to change travel behaviour, as shown through existing and evolving provincial, regional, and local policies as it pertains to parking management, parking requirements, and prioritizing more sustainable travel choices over automobiles.

Provincial Policy Statement

The Provincial Policy Statement (PPS) contains policies which promote the use of TDM strategies to be implemented for new developments to increase the efficiency of existing and planned transportation infrastructure (Section 1.6.7.2). Such TDM strategies may include the reduction of applicable parking standards. In addition, Section 1.6.7.4 of the PPS states that appropriate land use patterns, density, and a mix of uses should be promoted to minimize the length and number of vehicle trips taken and to support current and future use of transit and active transportation.

In summary, the PPS is supportive of the use of TDM, such as reduced parking rates, to support and increase the efficiency of more sustainable transportation options, including the various planned transportation improvements within the site vicinity, discussed further in **Section 5.4.1.2**. The proposed reduction in resident parking rates associated with the development is consistent with the PPS and is an appropriate development standard to facilitate intensification and transit-supportive development as planned for the area.

A Place to Grow: Growth Plan for the Greater Golden Horseshoe

Similar to the Provincial Policy Statement (PPS), the Growth Plan for the Greater Golden Horseshoe also outlines the importance of reducing reliance on the automobile and promoting transit and active transportation. In particular, Section 3.2.2.4 of the Plan encourages municipalities to implement TDM policies that would prioritize and improve sustainable transportation modes, further supporting a reduced parking standard for the proposed site:



Municipalities will develop and implement transportation demand management policies in official plans or other planning documents or programs to:

- a) reduce trip distance and time;*
- b) increase the modal share of alternatives to the automobile, which may include setting modal share targets;*
- c) prioritize active transportation, transit, and goods movement over single-occupant automobiles;*
- d) expand infrastructure to support active transportation; and*
- e) consider the needs of major trip generators.*

Furthermore, the Growth Plan explicitly shows support for reduced parking standards within major transit station areas (MTSAs). Although the site is not located within the specified distance of an MTSA, it is located approximately one kilometre to the north of the Allandale Waterfront GO Station. As such, it is relevant to consider the MTSA-specific policies within the Growth Plan.

The Growth Plan explicitly states that development in MTSAs should provide alternative development standards such as reduced parking standards in Section 2.2.4.9:

Within all major transit station areas, development will be supported, where appropriate, by:

- a) planning for a diverse mix of uses, including additional residential units and affordable housing, to support existing and planned transit service levels;*
- b) fostering collaboration between public and private sectors, such as joint development projects;*
- c) providing alternative development standards, such as reduced parking standards; and*
- d) prohibiting land uses and built form that would adversely affect the achievement of transit-supportive densities.*

In summary, the Growth Plan shows support for TDM measures which may reduce private automobile trips and, instead, increase the modal share of transit and active transportation. As such, the proposed resident parking reduction on-site aligns with policies within the Growth Plan and is considered appropriate.

Ontario Ministry of Transportation Transit-Supportive Guidelines

The Ontario Ministry of Transportation Transit-Supportive Guidelines aim to create an environment that is supportive of transit, and to develop services and programs intended to increase transit ridership. The guidelines also support the use of TDM strategies, particularly near transit routes. This may include the sharing of parking between site uses, the use of on-street parking during off-peak hours, and the reduction of minimum and maximum parking requirements as TDM measures are adopted. In this way, the proposed parking reduction proposed by the site is consistent with these provincial guidelines.

2041 Metrolinx Regional Transportation Plan

The Metrolinx 2041 Regional Transportation Plan (RTP) provides a framework to create an integrated, multi-modal, and regional transportation system to support the growth of healthy, complete, and sustainable communities. Strategy 4.8 specifically addresses parking management and states that “zoning standards should be reviewed, with the expectation that minimum parking requirements will be reduced, particularly in transit-supportive neighbourhoods”, such as the neighbourhood of the site. The RTP also speaks to embedding TDM strategies in land use planning and development to prioritize cycling, walking, and transit use. Overall, the Metrolinx RTP explicitly supports the potential reduction of minimum parking requirements for sites in areas with high transit accessibility, of which the site would be an example in its future context.



Metrolinx Mobility Hub Guidelines

The Metrolinx Mobility Hub Guidelines provide a framework to guide development across mobility hubs to support more intense development and accommodate strong pedestrian, cycling, and transit facilities. The Guidelines recommend minimizing auto use through the implementation of parking maximums to limit excess parking supply and suggests reviewing and possibly removing minimum parking standards in areas that have high accessibility to rapid transit stations. Although the site is not designated within a mobility hub, it is within a one-kilometre walking distance to the Allandale Waterfront GO Station MTSA. As such, the proposed parking reduction for the development is consistent with Metrolinx's policies for sites located near higher-order transit.

GO Rail Station Access Plan (2023)

The Metrolinx GO Rail Station Access Plan provides a high-level vision and policy guidance for the future planning, design, and access of GO Rail facilities, including the Allandale Waterfront GO Station near the site. The station will be improved to provide greater transit access, opportunities, and safety for existing and future riders within the site area, overall supporting regional transit as a viable and reliable travel option. Overall, the site's reduced resident parking supply aligns with the GO Rail Station Access Plan as it encourages transit use, particularly the Waterfront GO station for inter-regional travel, and positions transit as a viable travel option for residents.

City of Barrie New Official Plan

As discussed in **Section 3.2.1**, the City of Barrie's new Official Plan (OP) was approved in April 2023 and is currently in force and effect. As part of this update, the City's UGC boundary was expanded to include the site. Within the OP, the City of Barrie describes their UGC as a key intensification area and a premiere hub for businesses, residences, and visitors with a broad range of uses. As part of the City's vision for their UGC, the City's current Zoning By-law 2009-141 provides reduced minimum parking requirements for many land uses within the UGC. As such, it is appropriate to consider a reduction of minimum parking requirements for the site as it is currently located within a UGC.

The City of Barrie's new OP also provides support for appropriate TDM and parking management strategies to reduce single-occupant vehicle travel and encourage the use of more sustainable transportation modes in the City.

Section 3.4 of the OP outlines the City's policy direction towards reducing or eliminating surface parking for developments and ensuring a more attractive public realm more focused on active transportation, including the pedestrian experience. In this way, it is evident that the City is overall de-prioritizing auto-travel in favour of more sustainable modes of transportation. The proposed resident parking reduction would be supportive of these City goals:

- a) Parking areas supporting new development in the Urban Growth Centre, Strategic Growth Areas, Major Transit Station Areas, or Intensification Corridors should be encouraged to be located underground and/or in structured parking to reduce or eliminate the need for surface parking.*
- d) Walkways should be provided directly from parking lots and municipal sidewalks to the main entrance(s) of the building(s). Walkways should be well articulated, safe, accessible, and integrated with the overall network of pedestrian linkages in the area to create a comfortable walking environment. Landscaping should enhance the walkway.*
- g) Bicycle parking should be provided and conveniently located near building entrances. Sheltered bicycle parking should be integrated into built form.*

Section 4.7 of the OP directly supports the reduction of parking requirements to reflect Barrie's status as a growing, transit-supportive and pedestrian-friendly city. This section states that the City may consider reduced parking requirements by:



- ii) *Establishing context-sensitive parking requirements that respond to diverse settings, including but not limited to, Strategic Growth Areas and historic places;*
- iii) *Reducing parking requirements in Strategic Growth Areas where transit, walking, and cycling alternatives exist;*
- v) *Assessing the peak parking periods in a day for each use within an appropriate radius (because there may be opportunity for uses to share parking spaces, therefore lowering the total number of required number of spaces); and,*
- vi) *Regularly reviewing and evaluating city-wide parking standards to meet parking needs while minimizing the provision of excess parking.*

Additionally, housing policies in relation to the Urban Growth Centre (Section 2.3.2), General Land Use (Section 2.5), and Affordable Housing (Section 6.4.2) indicate that at least 15% of all new residential developments in High Density zones (i.e. the site) should be affordable, as guided by the City's latest Affordable Housing Strategy. Findings as part of the Strategy indicate that consideration may be given to alternative parking standards (i.e., significantly reducing or eliminating minimum parking requirements) to support the provision of affordable housing on the site.

From the above policies, the City of Barrie understands that parking requirements are context-specific and can be reduced appropriately, based upon the type of dwelling unit, within areas where non-auto modes of transportation are readily available. It is important to the City to avoid the provision of excess parking. In this way, the proposed development strives to support the City's goals as it relates to parking design and supply through the recommendation of a reduced resident parking supply.

City of Barrie Draft Comprehensive Zoning By-law

As discussed in **Section 3.2.2**, the City of Barrie is in the process of updating their comprehensive Zoning By-law to align with the vision and policies of the recently approved Official Plan. The second draft Zoning By-law, dated June 2023, reduces minimum parking requirements for residential uses and eliminates minimum parking requirements for some non-residential uses compared to the currently in-force Zoning By-law 2009-141. The draft by-law established four (4) parking districts across the city, of which the site is located within Parking District 1 (Urban Growth Centre/Major Transit Station Areas), the district with the lowest minimum parking requirements. Overall, the draft by-law significantly reduces the minimum parking standards compared to Zoning By-law 2009-141 and establishes parking maximums. As per the draft by-law, the minimum resident parking requirement is 0.60 spaces per unit.

Although the provisions of the new Zoning By-law are in draft form and are not currently in force and effect, it is important to consider the City's evolving and forward-thinking policy direction as it relates to parking provisions within the City and for a site located within the UGC and near an MTSA. In this way, the proposed resident parking reduction is considered appropriate as it takes into consideration the City's explicit and current policy efforts to reduce parking in their UGC / MTSAs.

City of Barrie Transportation Master Plan

The City of Barrie's current Transportation Master Plan (TMP) serves as a roadmap for establishing a well-balanced, multi-modal transportation system for the future needs and development of the City. Improvements to the area cycling and pedestrian network, discussed in detail in **Section 4.0**, enhance opportunities for active transportation travel by residents for shorter trips. Moreover, the planned expansion of the Bradford Street corridor to include an HOV lane near the site will further improve transit accessibility, convenience, and comfort within the site area. Overall, the reduction in resident parking on-site supports the City's plans and investments to encourage travel by active transportation and transit.



5.4.1.2 REVIEW OF EVOLVING TRANSPORTATION CONTEXT

The evolving transportation context of the site area further supports the reduction of private vehicle ownership and trips and, therefore, a reduction of parking ownership and usage on-site. Most notably, the site will be located between two emerging major transportation hubs in the City of Barrie, the Allandale Transit Terminal, located adjacent to the existing Allandale GO Rail Station, and the Downtown Mini Hub.

As discussed in **Section 4.0**, the Allandale Transit Terminal is planned to be a relocation and expansion of the existing Downtown Transit Terminal, which currently provides service along local Barrie Transit bus routes and GO bus routes. The proposed terminal will help support the City's ongoing growth as an inter-regional transit facility, providing connections between Simcoe County and the GTA. The terminal will be located adjacent to the existing Allandale Waterfront GO Station, approximately one-kilometre south of the site, a 15-minute walk or four-minute bike ride from the site. Overall, for future site residents and visitors this new transit terminal will allow for increased transit access to the Allandale Waterfront GO Rail station and will provide safer and more convenient linkages between bus, vehicular, and pedestrian traffic.

With the development of the Allandale Transit Terminal, the City is also advancing the development of a Downtown Mini Hub which will consist of bus stops and sheltered waiting areas on Maple Avenue. The Downtown Mini Hub will reduce the footprint of the current transit terminal at 24 Maple Avenue while maintaining transit service levels in the downtown. The hub will be located approximately one-kilometre north of the site and will be within a 15-minute walk or four-minute bike ride from the site. In addition to these transit facility improvements, the City of Barrie has also approved the implementation of a new transit network for Barrie, starting in 2024. The new network will provide improved frequency, reduced trip times, better access to employment areas, and wider coverage across the city.

Furthermore, improvements to the area road, cycling, and pedestrian network as per the City of Barrie's current Transportation Master Plan (TMP) include a potential HOV lane along Bradford Street which will provide more efficient connections towards emerging transit hubs, cycle tracks along Bradford Street, and additional sidewalks within the site vicinity. These improvements, among others, will further allow site residents to reduce their trips by private automobile and travel more reliably by transit and active transportation.

These City-directed transportation improvements are anticipated to increase the transit and active transportation mode share of the site area and provide an alternative mode of transportation across the City of Barrie as well as greater connectivity to neighbouring municipalities. As the transportation context of the site immediate area is rapidly evolving, it is important to ensure the parking provisions of the site align with this increase in transit and active transportation accessibility being afforded to the site and the City.

Overall, the two evolving transportation hubs and planned improvements to the local road, transit, cycling, and pedestrian network showcase the City's direction towards prioritizing non-auto modes of travel, of which a reduced parking supply would align with and would help the City achieve. The site will be within one-kilometre of both future transportation hubs which can also be reached by bike or transit in five minutes or within a 15-minute walk. Based on the foregoing, a reduction in resident parking on the site is considered appropriate and can be supported by the site's existing and evolving high level of transit accessibility.

5.4.1.3 REVIEW OF RESIDENT ZONING BY-LAW STANDARDS

Several municipalities across Ontario have approved relatively low parking standards for residential parking within their respective Zoning By-laws. These reduced minimum parking requirements reflect evolving transit contexts, mixed-use environments, and the emergence of alternative modes of travel.

A comprehensive Zoning By-law review was undertaken to compare parking standards adopted across numerous municipalities in Ontario with comparable transit access to the proposed site, summarized in **Table 11**.

The selection of municipalities was primarily based on certain urban characteristics, including density and intensification patterns, conventionally auto-centric network, and a diversity of transit services available in the area.



Municipalities, including Brampton, Kitchener, Kingston, and Vaughan, have adopted substantial reductions in their resident parking rates within their downtown areas to align with goals of reducing non-auto modes of travel and to promote existing and planned investments to transit, cycling, and pedestrian infrastructure. It is noted that half of the municipalities reviewed have parking standards lower than what is currently proposed in the City of Barrie (0.60 spaces per unit). In particular, the City of Kingston's downtown area has a minimum parking standard of 0.40 spaces per unit despite having a similar level of transit service and accessibility as the site and Barrie's general downtown area.

Overall, the range of minimum resident (market) parking standards was observed to be between 0 to 0.80 spaces per unit. As such, the reduced parking standards proposed for the site (0.469 spaces per unit for resident market units) is within the range of contemporary zoning standards across the GTHA and southern Ontario.

Collectively, the above indicates a general trend within municipalities across the GTA towards a progressive outlook towards the provision of resident parking supply, particularly where transit and transportation context is, or is planned to be, conducive to non-automobile travel. Furthermore, within many of these observed municipalities, the existing and planned transit context is comparable or less than those available in proximity to the site. Therefore, the reduced resident parking standards for the site are in line with comparable municipalities across southern Ontario.

Table 11 Comparison of Zoning By-law Resident Parking Standards

Municipality	Zoning By-law	Centre Area	Land Use Category	Nearby Transit Service	Minimum Parking Requirements (spaces per unit)
					Resident
Proposed Development	--	District 1	--	• Barrie Transit Bus • GO Bus / Train	0.469 (proposed for market units)
Barrie	Draft Zoning By-law (Draft 2 – June 2023)	District 1	Any Dwelling Unit		0.60
Mississauga	By-law 0225-2007	Precinct 1	Condo / Rental Apartment	• MiWay Bus • MiWay Express Bus • Mississauga Transitway • GO Bus / Train • Future Hurontario LRT • Future Lakeshore BRT	0.80
Pickering	By-law 7553-17	City Centre	Apartment Dwelling	• Durham Region Transit Bus • GO Train • Future Durham-Scarborough BRT	0.80
Waterloo	By-law 2018-050	Residential Mixed-Use Zones (Parking Area A)	Residential	• Grand River Bus • Grand River ION LRT • GO Bus / Train	0.60 - 0.65 ¹
Vaughan	By-law 001-2021	VMC	Apartment Dwelling	• YRT Bus • YRT Viva BRT • GO Bus / Train • TTC Bus / Subway	0.40



Municipality	Zoning By-law	Centre Area	Land Use Category	Nearby Transit Service	Minimum Parking Requirements (spaces per unit)
					Resident
	Yonge-Steeles Secondary Plan (OLT)	Yonge-Steeles	Apartment Dwelling	• YRT Bus • YRT Viva BRT • GO Bus • TTC Bus / Subway • Future Yonge North Subway Extension	No Minimum
Kingston	By-law 2022-62	Parking Area 1 (Downtown) & Parking Area 2 (Main Street Corridor)	Mixed-Use Building	• Kingston Transit Bus • Kingston Transit Express Bus	0.40
Hamilton ²	By-law 05-200	Downtown Zone	Multiple Dwelling	• HSR Bus • Future B-Line LRT • Future A-Line BRT • GO Bus / Train	• Unit < 50 m²: 0.30 • Unit > 50 m²: 0.50 to 0.70 • 3+ BR: 0.30
Kitchener	By-law 2019-051	Urban Growth Centre / Downtown	Multiple Residential Buildings	• Grand River Bus • Grand River ION LRT • GO Bus / Train	No minimum
Brampton	By-law 270-2004	Central Area / Downtown	Apartment Dwelling	• Brampton Bus • Brampton ZUM BRT • GO Bus / Train • Future Hurontario LRT	No minimum

Notes:

1. The City of Waterloo Zoning By-law 2018-050 provides parking standards for each Residential Mixed-Use (RMU) Zone. As such, the range of parking standards across the various RMUs is reported in this table.
2. The City of Hamilton Zoning By-law 05-200 provides a minimum resident parking rate based on unit size:
 - (a) Dwelling units less than 50m² in GFA: 0.30 spaces / unit
 - (b) Dwelling units greater than 50m² in GFA: 0.50 spaces / unit (Units 13-50) and 0.70 spaces / unit (Units 51+)
 - (c) Dwelling units with 3 or more bedrooms: 0.30 spaces / unit

It is noted that the first 12 units for each unit type do not require a minimum number of resident parking spaces.

5.4.1.4 OBSERVED RESIDENT PARKING REDUCTION APPROVALS

Consistent with the trend of reduced parking standards, there is a demonstrated trend towards parking supply reductions across the broader Greater Toronto and Hamilton Area (GTHA) beyond their respective Zoning By-law standards. BA Group has reviewed approvals for developments near GO Stations (with comparable transportation contexts as the site) for which reduced resident and residential visitor standards have been provided by City Council as part of the Zoning By-law Amendment process, by the Committee of Adjustment as part of Minor Variance applications, or at the Ontario Land Tribunal (OLT), formerly known as the Ontario Municipal Board (OMB) and the Local Planning Appeal Tribunal (LPAT).

A summary of these GTHA-wide resident parking reduction approvals for proxy sites with similar or less transit-supportive contexts as the proposed development are provided in **Table 12**.



Table 12 Approved GTHA-Wide Resident Parking Supply Reductions

Address	Nearest Major Transit Station	Approved Minimum Resident Parking Rate	Permission Through	Year of Approval
Proposed Development				
126-140 Bradford Street	Allandale Waterfront GO Station (~1km from site)	0.469 spaces / unit (proposed for market units)	--	--
City of Mississauga				
151 City Centre Drive	City Centre Transit Terminal (~750m from site)	1-Bed – 0.62 spaces / unit 2-Bed – 0.72 spaces / unit	CoA File A355.21 (September 23, 2021)	2021
151 City Centre Drive	City Centre Transit Terminal (~750m from site)	0.62 spaces / unit	CoA File A308.23 (September 7, 2023)	2023
City of Hamilton				
90 Charlton Avenue West, 85 Robinson Street, and 220 Park Street South	Hamilton GO Centre Station (~700 m from site)	0.58 spaces / unit (effective)	Site-Specific By-law 14-118	2014
98 James Street South	Hamilton GO Centre Station (~150 m from site) West Harbour GO Station (~1.5km from site)	0.47 spaces / unit	Site-Specific By-law 15-024	2015
108 James Street North and 111 and 15 Hughson Street North	West Harbour GO Station (~850m from site)	0.50 spaces / unit	Site-Specific By-law 15-188	2015
71 Rebecca Street	Hamilton GO Centre Station (~750 m from site) West Harbour GO Station (~1.4km from site)	0.65 spaces / unit	Site-Specific By-law 18-293	2018
175 Catharine Street South and 117 Forest Avenue	Hamilton GO Centre Station (~350m from site)	0.65 spaces / unit	Site-Specific By-law 20-216	2020
600 James Street North	West Harbour GO Station (~900m from site)	0.58 spaces / unit	LPAT Case No. PL190517 Site-Specific By-law 21-053-LPAT	2021
City of Pickering				
Universal City 2 & 3 (Bayly Street & Liverpool Road)	Pickering GO Station (~550 m from site)	0.74 spaces / unit	CoA File P/CA 60/19	2019



Address	Nearest Major Transit Station	Approved Minimum Resident Parking Rate	Permission Through	Year of Approval
Universal City 6 (Bayly Street & Liverpool Road)	Pickering GO Station (~550 m from site)	0.71 spaces / unit	Site-Specific By-law 7810/21	2021
Universal City 4 & 5 (Bayly Street & Liverpool Road)	Pickering GO Station (~550 m from site)	0.65 spaces / unit	Site-Specific By-law 7936/22	2022
Universal City 7 (Bayly Street & Liverpool Road)	Pickering GO Station (~550 m from site)	0.65 spaces / unit	Site-Specific By-law 7924/22	2022
PTC Phase 1	Pickering GO Station (~750 m from site)	0.65 spaces / unit	Site-Specific By-law 7981/23	2023
1786-1790 Liverpool Road	Pickering GO Station (~700 m from site)	0.55 spaces / unit	Site-Specific By-law 8023/23	2023
City of Vaughan				
Transit City 3 ¹ (Millway Avenue & Portage Parkway)	Vaughan Metropolitan Centre Subway Station (~450 m from site)	0.33 spaces / unit	Site-Specific By-law 096-2018	2018
Transit City 4-6 ¹ (Jane Street & Portage Parkway)	Vaughan Metropolitan Centre Subway Station (~400 m from site)	0.41 spaces / unit	Site-Specific By-law 071-2019	2019
101 Edgeley Boulevard ¹ (Block A5)	Vaughan Metropolitan Centre Subway Station (~550 m from site)	0.18 spaces / unit	Site-Specific By-law 124-2021	2021
VMC Block 3 South (Interchange Way and Commerce Street)	Vaughan Metropolitan Centre Subway Station (~700 m from site)	0.30 spaces / unit	Site-Specific By-law 147-2022	2022
North-East Corner of Highway 7 and Commerce Street (Block E2)	Vaughan Metropolitan Centre Subway Station (~550 m from site)	0.18 spaces / unit	Site-Specific By-law 151-2022	2022
7800 Jane Street	Vaughan Metropolitan Centre Subway Station (~250 m from site)	0.37 spaces / unit	Site-Specific By-law 153-2022	2022
216 & 220 Doughton Rd	Vaughan Metropolitan Centre Subway Station (~700 m from site)	0.35 spaces / unit	Site-Specific By-law 155-2022	2022



Cities such as Hamilton, Pickering, and Vaughan have shown flexibility and pragmatism in adapting to the evolving transportation landscape as options become available to residents that were not available at the time when the Zoning By-law was enacted. For example, within the City of Pickering near the Pickering GO Station / Pickering Town Centre, decreasing parking supplies have been observed relative to the by-law requirement as the population continues to grow and as transit services levels continue to improve within its urban area. A review of these approvals, shown in **Table 12**

illustrates a significant decline in resident parking rates over the last four years as there has been a reduction of 0.19 spaces per unit from 2019 to 2023.

Furthermore, this review of reduced parking approvals illustrates how numerous municipalities across the GTHA continue to approve resident parking standard reductions from their Zoning By-law standards, even for standards updated recently. For example, in 2023, the City of Mississauga approved a parking reduction of 0.62 spaces per unit (from 0.80 spaces per unit) for 151 City Centre Drive, a site located approximately 750 metres from the City Centre Bus Terminal. This approval represents a reduction of approximately 23% from the by-law standard. Furthermore, the applicable by-law standard of 0.80 spaces per unit was already the updated and reduced standard which the City of Mississauga passed in 2021. Therefore, it is not uncommon for municipalities to approve reduced resident parking rates from their Zoning By-law, even for standards updated recently.

In addition, the City of Pickering approved a resident parking reduction of 0.55 spaces per unit (from 0.80 spaces per unit) at 1786-1790 Liverpool Road, representing a reduction of approximately 38% from the by-law standard. The proposed resident parking rate for market units of the site, 0.469 spaces per unit (from 0.6 spaces per unit), represents a reduction of approximately 22%. Therefore, the proposed reduction from the by-law standard is comparable to those observed in Mississauga and Pickering and is considered appropriate.

Further in the City of Vaughan, VMC Block 3 South and 216 and 220 Doughton Road are approximately 700 metres from the Vaughan Metropolitan Centre (VMC) subway station and were approved with a minimum resident parking requirement of 0.30 and 0.35 spaces per unit, respectively. By way of comparison, the proposed development is within one kilometre of the existing Allandale GO Station and will be within one kilometre of two transit hubs in the future. As such, the proposed development may be considered comparable to some degree to these VMC sites, further considering its future evolving site and mobility context, recognizing new cycling and pedestrian infrastructure and intensification policies on local and regional levels. Moreover, it is appropriate to compare the VMC sites and the proposed development as they share comparable distances to higher-order transit facilities. As such, the proposed resident parking rate is viewed as proportionate to the parking approvals observed at other progressive centre areas, such as the VMC.

Overall, approved resident parking rates for comparable transit-oriented approvals within the GTHA range from 0.18 spaces per unit to 0.74 spaces per unit. The proposed resident market rate (0.469 spaces per unit) is within the mid-point of this range and is, therefore, considered appropriate for the site's existing and, most notably, future transportation context.

5.4.1.5 PROPOSED RESIDENT-BASED TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

As discussed in detail in **Section 9.0**, a TDM Plan for the site is proposed to guide the provision of viable, alternative personal transportation options beyond the single-occupant, private automobile. The objective is to encourage the use of active and sustainable transportation modes, respond to the mobility needs of site residents and reduce dependence on automobiles.

The future site context provides frequent, public transit services and improved pedestrian and cycling connectivity. The TDM Plan supplements and further leverages the physical infrastructure and attributes of the site area with a goal of reducing or minimizing auto-mode share. The proposed residential-based TDM strategies include, but are not limited to the following:



- Provision of a reduced resident parking supply;
- Unbundled parking from unit cost;
- Provision of a pre-loaded Presto transit pass;
- Provision of abundant long-term bicycle parking supply, meeting the Draft Zoning By-law standards;
- Provision of bicycle repair station; and
- Provision of direct pedestrian and cycling connections to building entrances, bicycle parking facilities, nearby transit stops, and the external / public network; and
- Provision of direct pedestrian and cycling connections to building entrances, bicycle parking facilities, nearby transit stops, and the external / public network.

Overall, the proposed TDM strategies complement the site's resident parking reduction. It is noted that the reduced parking supply is, in and of itself, considered an effective TDM strategy. In addition, the overall TDM strategies are supportive of and conform to the current and evolving policies discussed in **Section 5.4.1.1**. As such, the proposed resident parking reduction can be appropriately accommodated through the proposed resident-based TDM strategies.

5.4.1.6 RESIDENT PARKING SUMMARY

In summary, it is proposed to adopt a reduced residential parking supply standard in comparison to the minimum requirements of City of Barrie Zoning By-law 2009-141. The appropriateness of the proposed (reduced) residential parking requirements has been summarized by theme and is provided below in **Table 13**.

Table 13 Summary of Resident Parking Rationale

Theme/Initiative	Brief Description
Proposed Market Resident Parking Rate: 0.469 spaces per unit Proposed Affordable Resident Parking Rate: No Minimum Requirement	
Progressive Inter-Governmental Policy Context	Numerous existing and evolving provincial, regional, and local policies prioritize more sustainable travel choices over automobiles, including providing support for parking management strategies (TDM) and reduced minimum parking requirements for both market and affordable housing units.
Availability of Non-Automobile Travel Options	The site is near existing and planned transit services, bicycle route facilities, and various transportation improvements that provide non-automobile dependent travel connections across the City and Region. These services include the existing Allandale Waterfront GO Station, the planned Allandale Transit Terminal, planned Downtown Mini Hub, and future bike lanes near the site.
Comparison of Zoning By-laws across Ontario	The reduced resident parking standards proposed for the site is within the range of contemporary zoning standards across the Province of Ontario. Half of the municipalities reviewed have parking standards lower than the City of Barrie's Draft Zoning By-law (0.60 spaces per unit). Resident Zoning By-law Range Observed: 0.00 - 0.80 spaces per unit
Parking Requirement Reduction Approvals across the GTHA	Several resident parking reduction approvals have been granted for developments in comparable or slightly less transit supportive contexts. The proposed resident rate is within the midpoint of this range. Resident Reduction Approval Range Observed: 0.18 - 0.74 spaces per unit
Resident-Based TDM Strategies	The proposed residential-based TDM strategies are supportive of the reduced supply, encourage the use of active and sustainable transportation modes, and aim to reduce reliance on private automobile ownership and usage. The proposed parking reduction can be well accommodated in combination with these measures.



5.4.2 Non-resident Parking Assessment

The proposed non-resident parking standards have been assessed based on the following considerations:

- Emergence of non-auto supportive regional and local plans and policy directives;
- Existing and planned transit and active transportation facilities afforded to the area;
- Review of area public parking opportunities;
- Review of other residential visitor parking By-law standards;
- Ancillary nature and impact of the proposed retail use;
- Observed 'no minimum' retail parking approvals; and
- Support from the site's TDM strategy for visitors.

5.4.2.1 REVIEW OF EVOLVING PLANS AND POLICIES

Similar to the resident parking assessment, the applicable provincial, regional, and local policies demonstrate increasing efforts to reduce auto-related trips for non-resident travel. Overall, increasing efforts and investments are being made to change the travel behaviour of future site visitors.

Provincial and Regional Policies

As discussed in **Section 3.1** and **Section 5.4.1.1**, Provincial policy documents such as the Provincial Policy Statement (PPS), the Growth Plan for the Greater Golden Horseshoe, Provincial Planning Statement, and the Ontario Ministry of Transportation Transit-Supportive Guidelines, support the use of appropriate development standards and TDM measures, such as reduced parking standards, to facilitate intensification and support transit-supportive development within site areas. In addition, Metrolinx policy documents, including the 2041 Regional Transportation Plan, Mobility Hub Guidelines, and the GO Rail Station Access Plan, prioritize the intensification of development near transit and the creation of a multi-modal regional transportation system. As such these documents directly state the potential to reduce and potentially remove minimum parking requirements in transit-supportive areas while also providing direction to improve the accessibility of regional transit, including the Allandale Waterfront GO Station near the site. As such, these documents support the proposed 'no minimum' non-resident parking standard.

Overall, a common theme across provincial and regional policy documents is to encourage the reduction of auto-related trips and increase the modal share of more active forms of transportation. The provision of 'no minimum' non-resident parking encourages visitors to utilize more active forms of transportation to travel to and from the site, thereby facilitating intensification and supporting active transportation within the site area.

City of Barrie New Official Plan

The City of Barrie's new Official Plan (OP) expanded the City's Urban Growth Centre (UGC) boundary to include the site. As such, it is appropriate to consider a reduction of minimum parking requirements for the site as it is currently located within a UGC, as described in **Section 5.4.1.1**. As well, Section 4.7 of the OP showcases the City's desire to utilize and provide parking, whether municipal or private, effectively. In other words, parking efficiencies, such as the sharing of parking infrastructure, can be supported:

- g) The City will encourage and support the development of central, shared parking facilities in the Strategic Growth Areas, including the Urban Growth Centre, which may result in greater parking and land use efficiencies. Such facilities are encouraged to be provided below grade or in stacked parking garages.*
- n) The creation of new surface parking lots as primary land use is generally discouraged.*
- o) Opportunities for the sharing of parking infrastructure, based on time of use and other considerations will be encouraged between compatible uses, where feasible, subject to a parking study and an evaluation by the City.*



- p) *The City will encourage shared parking between schools and parks where the facilities are within 500.0 to 800.0 metres distance.*

Furthermore, as described in **Section 5.4.1.1**, Section 3.4 of the OP illustrates the City's policy direction towards reducing or eliminating surface parking to ensure a more attractive public realm more focused on active transportation, including the provision of a rich pedestrian environment. In this way, it is evident that the City is overall de-prioritizing auto-travel in favour of more sustainable modes of transportation.

In summary, policies within the OP explicitly support achieving greater parking efficiencies through strategies such as shared parking infrastructure and encouraging travel by more active modes of transportation such as cycling. Specifically, the City has shown support for the sharing of parking infrastructure for facilities within walking distance of each other. In this way, future site visitors who arrive by car may consider parking at the public parking facilities available within the immediate site area, as discussed further in **Section 5.4.2.3**.

City of Barrie Draft Comprehensive Zoning By-law

The City of Barrie is in the process of updating their comprehensive Zoning By-law to align with the vision and policies of the recently approved Official Plan. The second draft Zoning By-law reduces minimum parking requirements for residential uses and eliminates minimum parking requirements for some non-residential uses compared to the currently in-force Zoning By-law 2009-141. The site is located within Parking District 1, the Urban Growth Centre / Major Transit Station Areas.

As shown in **Table 14**, the "Parking District 1" minimum parking standards require residential visitor parking to be provided at a minimum of 0.1 spaces per unit and requires no minimum parking for retail uses. Although the proposed residential visitor parking standard is deficient of the Draft Zoning By-law standard, the proposed retail parking standard of no minimum is met.

Table 14 Existing and Proposed Non-resident Parking Standards

Use	By-law 2009-141 "UGC" Minimum Parking Standards	Draft By-law "Parking District 1" Minimum Parking Standards	Proposed Parking Standard
Residential Visitor	Assumed as inclusive of resident parking requirement	0.10 spaces / unit	No minimum
Retail	1.00 space / 24 m ² GFA	No minimum	No minimum

While the proposed residential visitor parking standard is below the minimum requirement contemplated in Draft Zoning By-law, it is also recognized that the current in-force Zoning By-law 2009-141 does not specify an explicit minimum parking requirement for residential visitors. In this way, the proposed residential visitor rate remains consistent with Zoning By-law 2009-141 in that no minimum designated residential visitor parking supply is required on-site.



5.4.2.2 REVIEW OF EVOLVING TRANSPORTATION CONTEXT

As described in **Section 5.4.1.2**, the site will be within one kilometre of two future transportation hubs and will benefit from various planned improvements to the local area road, transit, cycling, and pedestrian network. These two evolving transportation hubs and planned improvements showcase the City's direction towards prioritizing non-auto modes of travel and increasing the mode share of transit and active transportation, of which a reduced non-resident parking spaces would align with.

5.4.2.3 REVIEW OF AREA PUBLIC PARKING OPPORTUNITIES

Currently, there are various on-street and off-street public parking opportunities within a 500-metre radius (approximate five to six-minute walk) of the site. In terms of off-street parking opportunities, the North and South Victoria parking lot are located approximately 500 metres to the east of the site along the waterfront, supplying approximately 95 parking spaces. In terms of on-street parking opportunities, layby parking is permitted along the following roadways, all-year round:

- South side of John Street (between Bradford Street and Ellen Street), supplying approximately eight parking spaces;
- West side of Ellen Street (between Victoria Street and John Street), supplying approximately 17 parking spaces;
- West side of Lakeshore Drive (between Victoria Street and the Dyments Pond Park), supplying approximately 31 parking spaces; and
- East side of Lakeshore Drive (between a point 125 metres south of Victoria Street / Lakeshore Drive to the Dyments Pond Park), supplying approximately 28 parking spaces.

In this way, future visitors, should they arrive by way of driving, may be accommodated utilizing the area public parking supply within a reasonable walking distance to / from the site.

Given that future site users are generally encouraged to arrive using alternative modes of transportation, certain visitors and employees who need to arrive by car would contribute to maximizing the efficiency of nearby public parking facilities usage throughout the day and week. It is also expected that visitors arriving by way of driving would generate minimal impacts on the overall parking availability based on the evolving transit and active transportation context of the site area.

5.4.2.4 REVIEW OF RESIDENTIAL VISITOR ZONING BY-LAW STANDARDS

In addition to the resident parking standards reviewed in **Section 5.4.1**, a comprehensive Zoning By-law review was also undertaken to compare residential visitor parking standards adopted across numerous municipalities in Ontario with comparable transit access to the proposed site, summarized in **Table 15**. The selection of municipalities was primarily based on certain urban characteristics, including density and intensification patterns, conventionally auto-centric network, and a diversity of transit services available in the area.

Several municipalities across Ontario have approved relatively low parking standards for residential visitor parking within their respective Zoning By-laws. These reduced minimum parking requirements reflect evolving transit contexts, mixed-use environments, and the emergence of alternative modes of travel.

Overall, the range of minimum resident parking standards was observed to be between 0 to 0.20 spaces per unit. As such, the eliminated residential visitor parking standards proposed for the site is within the range observed, but in the low-end of contemporary zoning standards across the GTHA and southern Ontario.

The above indicates a general trend within municipalities across the GTA towards a progressive outlook towards the provision of residential visitor parking supply, particularly where transit and transportation context is existing or planned, conducive to non-automobile travel. Within many of these observed municipalities, the existing and planned transit context is comparable or less than those available near the site.



Table 15 Comparison of Evolving Zoning By-law Residential Visitor Parking Standards

Municipality	Zoning By-law	Centre Area	Land Use Category	Nearby Transit Service	Minimum Parking Requirements (spaces per unit)
					Residential Visitor
Proposed Development	-	District 1	-	• GO Train • Barrie Transit Bus	No minimum requirement (proposed)
Barrie	Draft Zoning By-law (June 2023)	District 1	Any Dwelling Unit		0.10
Mississauga	By-law 0225-2007	Precinct 1	Condo / Rental Apartment	• MiWay Bus • MiWay Express Bus • Mississauga Transitway • GO Bus / Train • Future Hurontario LRT • Future Lakeshore BRT	0.20
Pickering	By-law 7553-17	City Centre	Apartment Dwelling	• Durham Region Transit Bus • GO Train • Future Durham-Scarborough BRT	0.15
Waterloo	By-law 2018-050	Residential Mixed-Use Zones (Parking Area A)	Residential	• Grand River Bus • Grand River ION LRT • GO Bus / Train	0.10 ¹
Vaughan	By-law 001-2021	VMC	Apartment Dwelling	• YRT Bus • YRT Viva BRT • GO Bus / Train • TTC Bus / Subway	0.15
Vaughan	Yonge-Steeles Secondary Plan (OLT)	Yonge-Steeles	Apartment Dwelling	• YRT Bus • YRT Viva BRT • GO Bus • TTC Bus / Subway • Future Yonge North Subway Extension	0.15
Kingston	By-law 2022-62	Parking Area 1 (Downtown) & Parking Area 2 (Main Street Corridor)	Mixed-Use Building	• Kingston Transit Bus • Kingston Transit Express Bus	0.10
Hamilton	By-law 05-200	Downtown Zone	Multiple Dwelling	• HSR Bus • Future B-Line LRT • Future A-Line BRT	Inclusive of minimum resident rate



Municipality	Zoning By-law	Centre Area	Land Use Category	Nearby Transit Service	Minimum Parking Requirements (spaces per unit)
					Residential Visitor
				GO Bus / Train	
Kitchener	By-law 2019-051	Urban Growth Centre / Downtown	Multiple Residential Buildings	- Grand River Bus - Grand River ION LRT - GO Bus / Train	No minimum
Brampton	By-law 270-2004	Central Area / Downtown	Apartment Dwelling	- Brampton Bus - Brampton ZUM BRT - GO Bus / Train - Future Hurontario LRT	0.20

Notes:

1. The City of Waterloo Zoning By-law 2018-050 provides parking standards for each Residential Mixed-Use (RMU) Zone. As such, the range of parking standards across the various RMUs is reported in this table.

5.4.2.5 ANCILLARY NATURE AND IMPACT OF RETAIL USE

As illustrated in the architectural plans (**Appendix A**), the proposed retail use on-site is expected to provide ancillary-level service, as opposed to destination retail, where prospective customers are expected to be local or on-site residents. In this way, it is assumed that all or most retail-related trips would be internal or on-foot, generating a negligible peak period demand. Therefore, the provision of no retail parking spaces is considered appropriate considering the relatively small / ancillary size of retail use proposed for the site.

5.4.2.6 OBSERVED 'NO MINIMUM' RETAIL PARKING APPROVALS

To further support the proposed "no minimum" parking for the ancillary retail use on-site, BA Group has reviewed approvals for developments near the site vicinity for which "no minimum" retail parking standards were approved by the City of Barrie, summarized in **Table 16**.

The two (2) proxy sites were approved for zero (0) retail / commercial parking and are located north-east of the site, approximately 1 kilometre from the Downtown Barrie Transit Terminal, similar to the subject site. Furthermore, it is noteworthy that the proxy site at 55 - 57 McDonald Street, 53 - 59 & 61 - 67 Owen Street, 70 – 78 Worsley Street has a total retail / commercial GFA that is approximately twice the retail GFA of the subject site and was approved for "no minimum" retail parking. As such, there is precedence for "no minimum" retail parking standards near the site vicinity and is, therefore, an appropriate standard to apply to the subject site.



Table 16 Approved City of Barrie Retail Parking Supply Reductions

Address	Nearest Major Transit Station	Retail / Commercial GFA	Approved Minimum Retail / Commercial Parking Rate	Permission Through
126-140 Bradford Street	Allandale Waterfront GO Station & Downtown Barrie Terminal (~1km from site)	334 m ²	No Minimum	--
55 - 57 McDonald Street, 53 - 59 & 61 - 67 Owen Street, 70 – 78 Worsley Street	Downtown Barrie Terminal (~1 km from site)	954 m ^{2,2}	No Minimum	City of Barrie Zoning Bylaw 2009-141 Special Provision: 13.2.96, C2-1 (SP-563)
129 Collier Street	Downtown Barrie Terminal (~1 km from site)	No proposed retail/commercial use at the time of application	0 parking spaces / 24m ² (i.e., No Minimum)	Site-Specific By-law 2022-124

5.4.2.7 PROPOSED VISITOR-BASED TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

As discussed in detail in **Section 9.0**, a TDM Plan for the site is proposed to guide the provision of viable, alternative personal transportation options beyond the single-occupant, private automobile. The objective is to encourage the use of active and sustainable transportation modes, respond to the mobility needs of site residents and reduce dependence on automobiles. The future site context provides frequent, public transit services and improved pedestrian and cycling connectivity. The TDM Plan further leverages the physical infrastructure and attributes of the site area with a goal of reducing or minimizing auto-mode share. The proposed visitor-based TDM strategies include, but are not limited to, the following:

- Provision of abundant short-term bicycle parking supply, meeting the Draft Zoning By-law standards; and
- Provision of four short-term / PUDO parking spaces at-grade.

5.4.2.8 NON-RESIDENT PARKING SUMMARY

In summary, it is proposed to adopt reduced non-resident parking supply standards in comparison to the minimum requirements of the City of Barrie Zoning By-law 2009-141. The assessment of the proposed (reduced) non-resident parking requirements has been summarized by theme and is provided below in **Table 17**.



Table 17 Summary of Reduced Non-Resident Parking Rationale

Theme/Initiative	Brief Description
Proposed Residential Visitor and Retail Parking Rate: No Minimum Requirement	
Progressive Inter-Governmental Policy Context	Numerous existing and evolving provincial, regional, and local policies prioritize more sustainable travel choices over automobiles, including support for parking management strategies and reduced minimum parking requirements.
Availability of Non-Automobile Travel Options	The site is near existing and planned transit services, bicycle route facilities, and various transportation improvements that provide non-automobile dependent travel connections across the City. These services include the existing Allandale Waterfront GO Station, planned Allandale Transit Terminal, planned Downtown Mini Hub, and future bike lanes near the site.
Availability of Area Public Parking Opportunities	There are area public parking opportunities within a 500-metre radius (~5-6-minute walk) of the site, with a total supply of approximately 95 off-street parking spaces and 84 on-street parking spaces, all-year round.
Ancillary Retail Parking Demand and Requirements	The proposed retail use is considered small ancillary service retail, which is expected to generate internal site trips by residents on-site. As well, there is no minimum parking requirement for retail land uses within the City's Draft Zoning By-law.
"No Minimum" Retail Parking Approvals in Barrie	"No minimum" retail parking standards have been granted by the City of Barrie for developments near the site vicinity, with a similar level of transit accessibility. Therefore, there is precedence for the proposed "no minimum" retail rate.
Comparison of Zoning By-laws across Ontario	The reduced non-resident parking standards proposed for the site is within the low-end of the range of Zoning By-law standards observed across the GTHA and southern Ontario. Residential Visitor Zoning By-law Range Observed: 0.00 - 0.20 spaces per unit
Residential Visitor-Based TDM Strategies	The proposed visitor-based TDM strategies, including the provision of abundant short-term bicycle parking supply, meeting the Draft Zoning By-law standards, and the provision of four (4) short-term / PUDO parking spaces encourage the use of active and sustainable transportation modes, reducing reliance on private automobile ownership and usage.

5.4.3 Parking Summary

It is proposed to provide a reduced vehicular parking supply to the requirements stipulated in subject City of Barrie Zoning By-law 2009-141. The appropriateness of the proposed parking standards, for all uses, are summarized in **Table 18**.



Table 18 Summary of Rationale

Theme/Initiative	Brief Description	
	Resident	Non-Resident
	Proposed Market Resident Rate: 0.469 spaces per unit Proposed Affordable Resident Rate: No minimum	Proposed Residential Visitor Rate: No minimum Proposed Retail Rate: No minimum
Progressive Inter-Governmental Policy Context	Existing and evolving provincial, regional, and local policies prioritize sustainable travel choices over automobiles, supporting the use of parking management strategies and reduced minimum parking requirements for both market and affordable housing units.	
Availability of Non-Automobile Travel Options	The site is in close proximity to existing and planned transit services, bicycle route facilities, and various transportation improvements that encourage non-automobile dependent travel across the City.	
Comparison of Zoning By-laws across Ontario	Resident Zoning By-law Range: 0.00 - 0.80 spaces / unit	Residential Visitor Zoning By-law Range: 0.00 - 0.20 spaces / unit
Comparison of Draft Zoning By-law Standards	Proposed Resident Rate: 0.60 spaces / unit	Proposed Residential Visitor Rate: 0.10 spaces / unit Proposed Retail Rate: No minimum
Parking Requirement Reduction Approvals across the GTHA	Resident Approval Range: 0.18 to 0.74 spaces / unit	-
Availability of Area Public Parking Opportunities	-	There are various on-street and off-street public parking opportunities within a 500-metre radius (~5-6-minute walk) of the site, totaling to a supply of at least 95 off-street parking spaces and 84 on-street parking space.
Ancillary Retail Parking Demand	-	The proposed retail use is considered small ancillary service retail, which is expected to generate internal site trips by residents on-site.
"No Minimum" Retail Parking Approvals in Barrie	-	"No minimum" retail parking standards have been granted by the City of Barrie for developments near the site vicinity, with a similar level of transit accessibility.
TDM Strategies	The proposed TDM strategies encourage the use of sustainable transportation modes, reducing reliance on private automobile ownership and usage for both residents and visitors.	



6.0 BICYCLE PARKING CONSIDERATIONS

6.1 Subject Zoning By-law Bicycle Parking Requirements

6.1.1 City of Barrie Zoning By-law 2009-141

The site is primarily subject to the City of Barrie Zoning By-law 2009-141 bicycle parking standards. A summary of the minimum general vehicle parking requirements for the proposed development is provided in **Table 19**.

Table 19 Barrie Zoning By-law 2009-141 Minimum Bicycle Parking Requirements

Use	Units / GFA ¹	Minimum Rate	Minimum Requirement ²
Resident			
Resident (Indoor)	912 dwelling units	0.20 spaces / unit	182 spaces
Resident (Outdoor)	912 dwelling units	No requirement	--
<i>Resident Subtotal</i>			<i>182 spaces</i>
Non-resident³			
Retail (Indoor)	334 m ²	No requirement	--
Retail (Outdoor)	334 m ²	No requirement	--
<i>Non-resident Subtotal</i>			
Total Indoor			182 spaces
Total Outdoor			--
TOTAL			182 spaces

Notes:

1. Based upon site statistics provided by Kirkor Architects and Planners, dated November 28, 2023.
2. City of Barrie Zoning By-law 2009-141 does not state rounding rules for the calculation of minimum parking. As such, the minimum parking requirement will be rounded to the nearest whole number.
3. As per City of Barrie Zoning By-law 2009-141 Section 14.4.2 b), additional spaces shall be required for all non-residential uses in the Neighbourhood Mixed-Use (NMU) zone only.

Application of the Zoning By-law 2009-141 bicycle parking standards results in a minimum requirement of 182 resident (indoor) bicycle parking spaces.

6.2 Applicable Bicycle Parking Standards

6.2.1 City of Barrie Draft Comprehensive Zoning By-law (Parking District 1)

As part of Barrie's Zoning By-law update process noted in **Section 3.2.2**, it is appropriate to review and consider the proposed minimum bicycle parking requirements to the site under Parking District 1, which provide a substantial increase to the current Zoning By-law 2009-141 standards. A summary of the minimum Parking District 1 bicycle parking requirements for the proposed development is provided in **Table 19**.



Table 20 Barrie Draft Zoning By-law Parking District 1 Minimum Bicycle Parking Requirements

Use	Units / GFA ¹	Minimum Rate	Minimum Requirement ²
Resident			
Resident (Indoor)	912 dwelling units	1.50 spaces / unit	1,368 spaces
Resident (Outdoor)	912 dwelling units	0.20 spaces / unit	183 spaces
<i>Resident Subtotal</i>			<i>1,551 spaces</i>
Non-resident³			
Retail (Indoor)	334 m ²	0.30 spaces / 100 m ²	2 spaces
Retail (Outdoor)	334 m ²	3 spaces plus 0.30 spaces / 100 m ²	5 spaces
<i>Non-resident Subtotal</i>			<i>7 spaces</i>
Total Indoor			1,370 spaces
Total Outdoor			188 spaces
TOTAL			1,558 spaces

Notes:

1. Based upon site statistics provided by Kirkor Architects and Planners, dated November 28, 2023.
2. As per City of Barrie's Draft #2 Comprehensive Zoning By-law Section 16.1 d), if a calculation for the required minimum/maximum number of standard parking spaces or bicycle parking spaces results in a non-integer greater than one (1) then the required minimum/maximum number of standard parking spaces must be rounded up to the nearest integer.

Application of the Draft Zoning By-law bicycle parking standards results in a minimum requirement of 1,558 bicycle parking spaces, consisting of 1,370 indoor bicycle parking spaces and 188 outdoor bicycle parking spaces.

6.2.2 Province-wide Municipal Zoning By-law Standards

While it is commendable that the City of Barrie has proposed significantly increased bicycle parking standards for the residential and retail uses (but are not yet in effect), it is suitable to provide a widespread comparison of applicable bicycle parking standards for various progressive municipalities across the Province. Urban municipalities, notably the City of Toronto, City of Mississauga, and City of Vaughan are rapidly evolving with high intensified growth in its designated centre areas, providing the most progressive standards. As a conservative approach, the bicycle parking supply considered for the site should resemble a relatively comparable, yet equitable, standard with consideration to Barrie's evolving transportation network (provided in **Section 4.0**), planning and policy directives (provided in **Section 3.0**), proposed vehicle parking supply (provided in **Section 5.3**), and proposed TDM Plan (see **Section 9.3**).

Based on the foregoing, **Table 21** provides a summary of the various residential and ancillary retail-based (i.e., GFA less than 500 square metres) bicycle parking standards currently in effect across the Province of Ontario, with applicable occupant (long-term or indoor) and visitor (short-term or outdoor) bicycle parking designations, for comparison.



Table 21 Comparison of Province-wide Zoning By-law Bicycle Parking Standards

Municipality	Zoning By-law	Centre Area	Min. Resident Bicycle Parking Requirement (spaces per unit)		Min. Ancillary Retail Bicycle Parking Requirement (spaces per 100 m ²)
			Long-term (Indoor)	Short-term (Outdoor)	
City of Toronto	By-law 569-2013	Parking Zone A	0.90	0.20	No minimum below 2,000 m ²
		Parking Zone B	0.68	0.05	
Mississauga	By-law 0225-2007	Precinct 1 (City Centre)	0.80	Greater of 6 spaces or 0.10	No minimum below 1,000 m ²
Pickering	By-law 7553-17	City Centre	0.50		Greater of 2 spaces or 1.0
Vaughan	By-law 001-2021	Vaughan Metropolitan Centre / Mixed-use	0.80	0.20	No minimum below 2,000 m ²
Kingston	By-law 2022-62	Parking Area 1 (Downtown) / Parking Area 2 (Main Street Corridor)	0.90	0.10	0.20 (long-term) 3 spaces plus 0.20 (short-term)
Hamilton	By-law 05-200	Downtown Zone	0.50	5 spaces	No minimum below 450 m ²
Kitchener	By-law 2019-051	Urban Growth Centre / Downtown	1.00	6 spaces (greater than 20 units)	1.0 space per 500 m ² (long-term) 1.0 space per 167 m ² (short-term)
Observed Bicycle Parking Range			0.50 - 1.00	5 spaces - 0.20	No minimum - 3 spaces plus 0.20

6.3 Proposed Bicycle Parking Strategy and Supply

Based on the overview of standards presented above, the architectural plans illustrate the provision of 912 bicycle parking spaces, consisting of 820 outdoor spaces and 92 indoor spaces, located at-grade and within the basement level of the site. The bicycle parking supply results in approximately 0.90 outdoor spaces per unit and 0.10 indoor spaces per unit (total bicycle parking supply of 1.0 spaces per unit) to accommodate the proposed development.

All indoor bicycle parking is provided on upper parking levels, which may be accessed from the main building entrances, elevators (to levels 2 to 4), and bicycle ramps (to upper mezzanine level). All outdoor bicycle parking is provided at-grade with direct access from publicly accessible entrances and the external network. Further details on the distribution of the bicycle parking supply are provided in **Appendix A**.

The proposed bicycle parking supply and its dimensions meet the current minimum zoning requirements and are appropriate for the site based on a comprehensive review of other applicable (province-wide) standards.



7.0 LOADING CONSIDERATIONS

7.1 Subject Zoning By-law Loading Requirements

7.1.1 City of Barrie Zoning By-law 2009-141

The site is primarily subject to the City of Barrie Zoning By-law 2009-141 loading standards. A summary of the minimum loading requirements for the proposed development, which result in no minimum requirement, is provided in **Table 22**.

Table 22 Barrie Zoning By-law 2009-141 Loading Requirements

Use	GFA / Units ¹	Category	Minimum Requirement
Commercial Use	334 m ²	0 - 999 m ²	No requirement
TOTAL			-

Notes:

1. Based upon site statistics provided by Kirkor Architects and Planners, dated November 28, 2023.
2. As per City of Barrie Zoning By-law 2009-141 Section 4.7.1.2, each loading space shall have a minimum width of 3.0 metres, minimum length of 9.0 metres, and minimum vertical clearance of 4.0 metres.

7.2 Applicable Loading Standards

7.2.1 City of Barrie Draft Comprehensive Zoning By-law (Parking District 1)

As part of Barrie's Zoning By-law update process noted in **Section 3.2.2**, it is appropriate to review and consider the proposed minimum loading requirements to the site. However, it is noted that the Draft Zoning By-law provides no change to the current Zoning By-law 2009-141 loading standards. As such, there is no minimum loading requirement for the site.

7.2.2 City of Toronto Comprehensive Zoning By-law 569-2013

By way of comparison, it is appropriate to consider the practical needs of the site based upon a review of another municipality with considerably progressive loading standards. As summarized below in **Table 23**, the City of Toronto's Zoning By-law 569-2013 loading requirements have been applied to the proposed development for the purposes of understanding the minimum supply required in another urban municipal context.

Table 23 Toronto Zoning By-law 569-2013 Loading Requirements

Use	GFA / Units ¹	Category	Minimum Requirement ²
Resident	912 dwelling units	400 dwelling units or more	1 Type G and 1 Type C
Retail	334 m ²	0 - 499 m ²	No requirement
TOTAL			2 loading spaces

Notes:

1. Based upon site statistics provided by Kirkor Architects and Planners, dated November 28, 2023.
2. As per City of Toronto Zoning By-law 569-2013 Section 220.5.1.10 (8), Type G spaces typically facilitate garbage/refuse collection and require a minimum length of 13.0 metres, minimum width of 4.0 metres, and minimum vertical clearance of 6.1 metres. Type C spaces facilitate retail and residential move-in/out activity require a minimum length of 6.0 metres, minimum width of 3.5 metres, and minimum vertical clearance of 3.0 metres.



7.3 Proposed Loading Strategy and Supply

The architectural plans illustrate a loading supply including two loading spaces, consisting of one loading space per building, located at-grade near the building cores.

Waste storage and garbage rooms are to be provided within each building adjacent to each loading area, with the intention that property management would move the bins to the collection area on the day of waste pick-up. Additionally, spaces will service deliveries, moving vans, and retail-related loading activities.

It is noted that the garbage truck manoeuvre requires one correction when entering each loading space. Further details on the vehicle manoeuvring diagrams for the proposed development are provided in **Appendix B**.

Further, to appropriately manage the different types of loading activities anticipated on the site, it is recommended that scheduling be provided to assist with key residential activity, including garbage collection.

The proposed loading supply and its dimensions meet the minimum zoning requirements.



8.0 PICK-UP / DROP-OFF CONSIDERATIONS

The emergence and convenience of auto-based shared mobility services, including car-share, taxi, and ride-hailing services (e.g., Uber and Lyft), and general carpooling, have grown in recent years and are being used as an increasingly suitable alternative for private vehicle ownership or single-occupancy vehicle. Based on the foregoing, it is anticipated that new high intensification developments, such as the site, will require an appropriate amount of space to permit safe and organized pick-up / drop-off activity occurring on a short-term basis. In consideration of these aspects, a portion of the proposed parking facility will provide designated pick-up / drop-off (short-term) spaces on-site.

Based on the foregoing, a pick-up / drop-off area has been incorporated within the ground floor level to accommodate the site's short-term passenger pick-up / drop-off, delivery, or service and maintenance activities. The pick-up / drop-off area provides four (4) designated parking spaces to facilitate these activities.

The provision of a pick-up / drop-off area, while not formally required, is expected to meet the practical needs of the development on-site while limiting vehicular impacts on the area street network.

The supply and location of the pick-up / drop-off (short-term) spaces at-grade is further illustrated in **Appendix A**.



9.0 TRANSPORTATION DEMAND MANAGEMENT

Based upon the City of Barrie's Transportation Impact Study Guidelines (2021), a Transportation Demand Management (TDM) Plan is required to support the proposed development based on the following threshold characteristics:

- Residential unit count of 50 or greater;
- Site area of 2,000 square metres or greater;
- Parking supply reduction to the City's Zoning By-law; and
- Auto-trip generation reduction via multi-modal trip distribution.

Transportation Demand Management ("TDM") refers to a variety of strategies to reduce congestion, minimize the number of single-occupant vehicle trips, encourage non-auto modes of travel, and reduce vehicle dependency to create a sustainable transportation system based on current and emerging plans and policy directives.

9.1 TDM Objectives

A TDM Plan has been developed for the proposed development to support the following key objectives:

- 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.

As mentioned, the site is accessible to GO Transit (bus and train) located at the Allendale Waterfront GO Station, approximately one kilometre to the south of the site via Bradford Street and Essa Road. The site is also within immediate walking and cycling distance from various Barrie Transit bus routes, the existing Waterfront Trail, and various planned cycling routes.

9.2 Site Travel Mode Share

9.2.1 Existing Mode Share

The resident area travel mode share for the area in the vicinity of the site has been derived from the 2016 Transportation Tomorrow Survey (TTS) for the traffic zones 8501-8504 and 8525. This is a similar travel distribution of the existing travel mode shares for all commuter travel to / from the City of Barrie, which is presented in the City of Barrie 2019 TMP. The existing residential travel mode share and the TMP mode share is summarized in **Table 24**. The detailed TTS queries for the existing area travel mode share is provided in **Appendix C**.



Table 24 Existing Mode Share

Travel Mode	Existing TTS		Existing TMP
	AM	PM	AM
Auto (Driver & Passenger)	87%	89%	82%
Transit	6%	4%	2%
Active (Walk & Cycle)	5%	1%	9%
Others	2%	6%	7%
Total	100%	100%	100%

Notes:

- Existing site mode share is based on two-way residential home-based trips to / from 2006 TTS Traffic Zones 8501-8504.
- Existing TMP mode share is based on two-way AM trips (including all land uses) to from the planning district of Barrie.

The existing residential mode share for the site reflects a high auto travel mode approximately 87%-89% during the weekday peak periods and approximately 5% to 11% residents utilizing non-auto modes of travel (i.e. transit and active transportation such as walking and cycling). When compared to the travel mode share (presented in the City of Barrie 2019 TMP, which represents all commuter travel to and from the entire City of Barrie), the distribution of travel modes is generally similar (approximately 82% of travel utilizing auto modes) and reflects a strong dominance in auto-centric travel choices in the City of Barrie. The City of Barrie 2019 TMP presents a travel mode share of approximately 11% utilizing non-auto modes of travel and 7% utilizing other modes.

9.2.2 City of Barrie Transportation Master Plan Mode Share

The City of Barrie Transportation Master Plan (TMP) dated June 2019, reviews the commuter travel mode shares during the weekday morning peak period and 24-hour period for trips in to and out from Barrie. Existing travel mode shares are based on 2016 TTS data for all trips to / from Barrie. Furthermore, the TMP establishes a future target travel mode share, which estimates a decrease in vehicle modes of travel and an increase in non-vehicle modes. A summary of the existing and future target mode shares from the 2019 TMP is presented in **Table 25**.

Table 25 City of Barrie 2019 TMP Travel Mode Shares

Travel Mode	Existing	Future Target (2041)	Difference	% Change
	AM	AM		
Auto (Driver & Passenger)	82%	78%	-4%	-5%
Transit	2%	7%	+5%	--
Active (Walk & Cycle)	9%	12%	+3%	--
Others	7%	3%	-4%	--
Total	100%	100%	--	--

Notes:

- Existing TMP mode share is based on two-way AM trips (including all land uses) to from the planning district of Barrie



The target future mode share indicates a reduction in the auto modes of travel (approximately a reduction rate of 5%) and an increase in the utilization of non-auto transportation modes. This reflects planned improvements in transit services and active transportation infrastructure.

9.2.3 Future Target Mode Share

BA Group also reviewed the City of Barrie's 2019 TMP to determine the future mode share targets. The adopted future mode share for the site was derived from a review of the City of Barrie's TMP travel mode share and discussions with the City of Barrie staff. The 5% reduction in the auto mode share was adopted and applied to the existing site mode share for both the weekday morning and afternoon peak hours, which resulted in approximately a decrease of 4 percentage points for auto travel modes. This was then redistributed to the transit and active travel modes proportionally. The category for 'other' travel modes was kept the same. A summary of the future mode share adopted for the site is presented in table **Table 26**.

Table 26 Future Target Mode Shares

Travel Mode	Adopted Future Mode Share	
	AM	PM
Auto (Driver & Passenger)	83%	85%
Transit	8%	7%
Active (Walk & Cycle)	7%	2%
Others	2%	6%
Total	100%	100%

Notes:

1. Adopted mode share are rounded to the nearest 1%, such that the total sum of all travel modes is 100%.

9.3 Proposed TDM Plan Strategies and Checklist

The proposed TDM Plan is catered to a mixed-use residential development and will support and encourage the use of the existing and planned sustainable transportation infrastructure within the vicinity of the site to reduce dependence on private automobiles. The proximity to transit and other walking and cycling facilities makes the proposed development a strong candidate for a mixed-use intensified and transit-oriented development with alternative non-auto travel options.

In addition, the TDM Plan indicates implementation measures including the type (i.e., infrastructure or program-based), responsibility or involvement (i.e., Applicant and / or City), cost estimate, and approximate timing of each proposed strategy.

Table 27 summarizes the proposed TDM strategies considered on-site as part of this initial ZBA application. It is noted that these TDM strategies are to be continuously refined throughout the application process and upon further discussion with City staff.



Table 27 Proposed TDM Strategies

Proposed TDM Strategy	Description	Responsibility	Cost Estimate	Approximate Timing
Infrastructure-based Strategies				
Reduced Vehicle Parking Supply	Provision of a reduced on-site vehicle parking supply to the current and Draft Zoning By-law (Parking District 1) standards. Please refer to Section 5.0 for further details.	Applicant	N/A ¹	Development construction
Unbundled Vehicle Parking	Vehicle parking spaces to be separated or “unbundled” from each residential unit, benefiting those who do not need or want a parking space.	Applicant / Sales and Marketing	N/A ¹	Initial Unit Purchase
Pick-up / Drop-off Area	Provision of four short-term parking spaces located at the rear of the site near the building entrances.	Applicant	N/A ¹	Development construction
Electric Vehicle (EV) Ready Parking	Provision of 30% of the total parking supply to be EV ready spaces to support Level 2 charging (i.e., 208 to 240-volt power source with dedicated circuit up to 60 amps).	Applicant	N/A ¹	Development construction
Abundant Bicycle Parking Supply	Provision of an on-site bicycle parking supply meeting the Draft Zoning By-law (Parking District 1) standards. Please refer to Section 6.0 for further details.	Applicant	N/A ¹	Development construction
Bicycle Repair Stations	Provision of bicycle repair stations within or near the residential bicycle parking areas.	Applicant	N/A ¹	Development construction
Internal and External Cycling and Pedestrian Connections	Provision of direct pedestrian and cycling connections to building entrances, bicycle parking facilities, nearby transit stops, and the external / public network.	Applicant	N/A ¹	Development construction
PRESTO Transit Passes	Provision of a pre-loaded PRESTO pass for each initial residential unit owner.	Applicant	N/A ¹	Initial Building Occupancy
Program-based Strategies				
Information Packages	Provision of travel-related information packages on nearby current services / maps / schedules to each initial residential unit owner.	City (informational website)	N/A ¹	Initial Building Occupancy
Transit Screens / Visible Transit Information	Provision of a real-time transit screen or informational sheets at each residential lobby.	Applicant	N/A ¹	Development construction

Notes:

1. Estimated cost to be determined at a later date as part of the development’s resulting site construction budget.



10.0 MULTI-MODAL TRAVEL DEMAND FORECASTING

The evolving area transportation context is a result of the transformative combination of new developments and major non-automobile infrastructure improvements and investments. Given these changes to the local and regional area transportation context, it is expected that travel mode shares in the area will correspondingly shift to reflect these changes. This study evaluates the existing and future traffic conditions in the 2028, 2033, and 2038 horizon years with the target mode share, as presented in the City of Barrie June 2019 TMP and based on discussions with the City of Barrie staff.

10.1 Site Multi-Modal Trip Generation

Multi-modal forecasts have been derived from vehicle trip generation rates based on the Institute of Transportation Engineers (ITE) 11th Edition Trip Generation Manual. Using a backwards calculation methodology, the total person trips are forecast based on the vehicle trips generated. The resultant total person trips were then distributed to each travel mode based on the adopted mode share information outlined in **Table 26** to derive the multi-modal trip generation.

10.1.1 Vehicle Trip Generation

Vehicle trip generation rates were derived from the ITE 11th Edition Trip Generation Manual for land use code (LUC) 222 – Multifamily housing (High-Rise), not close to rail transit) for the weekday morning and afternoon peak hours. As per City of Barrie TIS Guidelines 6.3.1 (January 12, 2021), since the AM and PM R² values for the fitted curve equations are less than 0.85, a comparison of the fitted curve equations and average rate was reviewed. A summary of this comparison is presented in **Table 28**.

Table 28 Residential Vehicle Trip Generation ITE 11th Edition Methodology Comparison

Travel Mode	Units	AM Peak			PM Peak		
		In	Out	2-Way	In	Out	2-Way
Directional Distribution	--	26%	74%	--	62%	38%	--
ITE Average Rate	--	--	--	0.27	--	--	0.32
Vehicle Trips Generated (Average Rate)	912	65	180	245	180	110	290
ITE Fitted Curve Equation (2-Way)	--	0.22(X) + 18.85			0.26(X) + 23.12		
Vehicle Trips Generated (Equation)	912	55	165	220	135	85	220

Notes:

1. Vehicle trips are rounded to the nearest 5 trips.

As a result, the ITE average trip rates for the weekday morning and afternoon peak hours were adopted for this study. As part of pre-consultation, the City of Barrie noted a 5% auto mode share reduction to reflect the increase in transit and active mode shares targeted for the area. Therefore, the adopted vehicle trip rates were further adjusted to account for the projected increase in transit services and active transportation infrastructure improvements. This allowance resulted in an auto trip rate reduction of 5% based on the City's suggested target and review of the City's 2019 TMP. A summary of the forecast trip generation for the site is provided in **Table 29**.



Table 29 Residential Vehicle Trip Generation Summary

Travel Mode	Units	AM Peak			PM Peak		
		In	Out	2-Way	In	Out	2-Way
Directional Distribution	--	26%	74%	--	62%	38%	--
ITE Average Rate	--	--	--	0.27	--	--	0.32
Future Auto Reduction – 5%	--	--	--	0.01	--	--	0.02
Adopted Vehicle Trip Rate	--	0.07	0.19	0.26	0.19	0.11	0.30
Vehicle Trips Generated (Average Rate)	912	60	175	235	170	105	275

Notes:

1. Vehicle trips are rounded to the nearest 5 trips.

Application of the adopted vehicle trip rates to the development plan results in 235 and 275 two-way vehicle trips during the weekday morning and afternoon peak hours, respectively.

10.1.1.1 MULTI-MODAL TRIPS

Using a backwards calculation methodology, the total person trips were derived based on the forecast vehicle trips from **Table 29**. The resultant net person trips for each travel mode were then calculated based on the adopted mode share information outlined in **Table 26** to derive the multi-modal trip generation. A summary of the person trip generation is provided in **Table 30**.

Table 30 Residential Person Trip Generation Summary

Travel Mode	Mode Share		AM Peak			PM Peak		
	AM	PM	In	Out	2-Way	In	Out	2-Way
Auto (Driver & Passenger)	83%	85%	60	175	235	170	105	275
Transit	8%	7%	10	15	25	15	10	25
Active Transportation	7%	2%	5	15	20	5	0	5
Other	2%	6%	0	5	5	10	10	20
Total Person Trips	100%	100%	75	210	285	200	125	325

Notes:

1. Vehicle trips are rounded to the nearest 5 trips.

The site is forecast to generate a total of 285 and 325 two-way person trips during the weekday morning and afternoon peak hours, respectively. Of the total person trips, 235 and 275 two-way trips are forecast for the site during the weekday morning and afternoon peak hours, respectively.

The non-automobile travel modes reflect a much smaller portion of trips forecast for the site. 25 two-way person trips are anticipated to be made by transit modes during the weekday morning and afternoon peak hours, respectively. An additional 20 and 5 two-way non-automobile trips are forecast to be made by walking and cycling during the weekday morning and afternoon peak hours, respectively.



It should be noted that the 'other' travel mode category includes motorcycle, school bus, taxi passenger, paid rideshare, and others, which was not considered as auto trips by the City of Barrie. These trips may represent a small number of vehicle trips. However, this amount would have a negligible impact on the vehicle traffic analysis. To be consistent with the TMP, these trips were not considered as part of the vehicle road network and analysis.



11.0 VEHICULAR TRAFFIC CONSIDERATIONS

11.1 Traffic Analysis Scenarios and Study Periods

Based on discussions with the City of Barrie staff and consistent with the City of Barrie TIS Guidelines (January 12, 2021), Traffic operations analyses have been undertaken during the weekday morning and afternoon peak hours under the following conditions:

Existing Conditions (2023)

- The existing road network and transportation context.

Future Background (Build-Out Year, 2028)

- Traffic activity level in the future, which includes allowances for area background growth and general corridor growth over 5 years relative to existing traffic levels.

Future Background (5-Year Post Build-Out, 2033)

- Traffic activity level in the future, which includes allowances for area background growth and general corridor growth over 10 years relative to existing traffic levels.

Future Background (10-Year Post Build-Out, 2038)

- Traffic activity level in the future, which includes allowances for area background growth and general corridor growth over 15 years relative to existing traffic levels.

Future Total (Build-Out Year, 2028)

- Traffic activity level in the future, associated with the full build-out of the development site in addition to traffic allowances for area background growth and general corridor growth.

Future Total (5-Year Post Build-Out, 2033)

- Traffic activity level in the future, associated with the full build-out of the development site in addition to traffic allowances for area background growth and general corridor growth.

Future Total (10-Year Post Build-Out, 2038)

- Traffic activity level in the future, associated with the full build-out of the development site in addition to traffic allowances for area background growth and general corridor growth.



11.2 Existing Traffic Volumes

Existing baseline traffic volumes were established at intersections and driveways within the study area for the weekday morning and afternoon peak hour periods using traffic count information obtained from surveys undertaken by Spectrum Traffic Data Inc. on Wednesday, September 13, 2023. A list of count data and sources are provided in **Table 31**. The raw traffic counts are provided in **Appendix D**.

Table 31 Existing Traffic Data Sources

Intersection	Count Date	Time Period	Source
Victoria Street / Bradford Street	Wednesday, September 13, 2023 7:30 to 9:30 a.m.	4:00 to 6:00 p.m.	Spectrum Traffic Data Inc.
Victoria Street / Sanford Street			
Victoria Street / Innisfil Street			
John Street / Innisfil Street			
John Street / Sanford Street			
John Street / Bradford Street			
Bradford Street / Existing Site Access (North)			
Bradford Street / Existing Site Access (Middle)			
Bradford Street / Existing Site Access (South)			

Existing turning movement counts were reviewed in detail to ensure a general consistency in the traffic volumes on roadways between intersections. Where necessary, minor adjustments were made to balance traffic volumes between intersections to create a representative traffic volume base for the purposes of the traffic operations analyses undertaken as part of this study.

Existing balanced baseline area traffic volumes for the weekday morning and afternoon street peak hours are summarized in **Figure 11**.



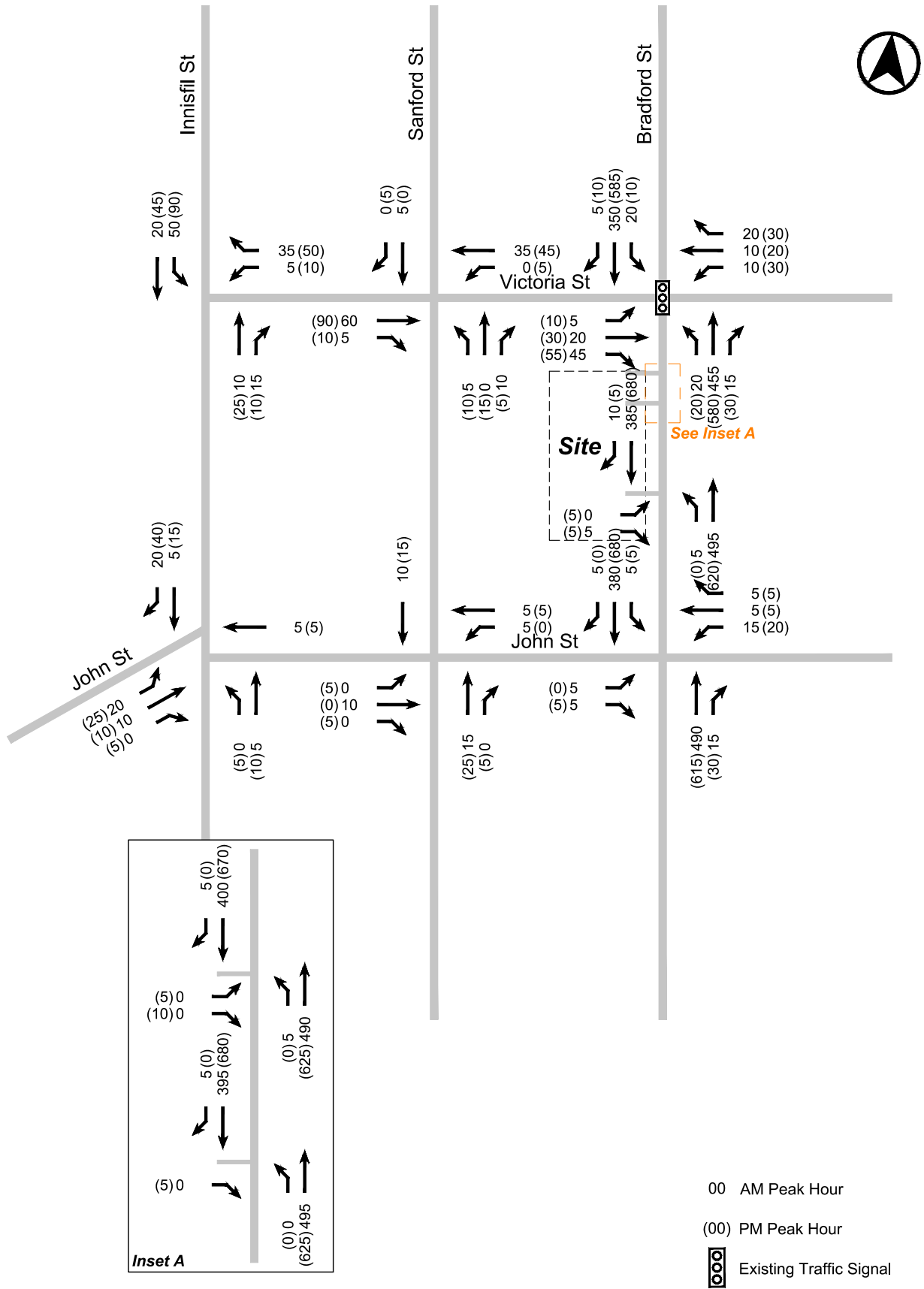


FIGURE 11 EXISTING TRAFFIC VOLUMES

11.3 Future Background Traffic Volumes

Traffic growth in the vicinity of the site has been considered based upon an evaluation of traffic volume changes related to:

- Specific area development traffic (i.e. background development traffic); and
- General corridor growth on the major arterial roads in the area (i.e. Bradford Road).

11.3.1 Area Background Development Growth

Traffic allowances were made for other specific proposed developments in the area, based on a review of the City of Barrie's list of current development projects as of October 2023. These sites represent a total development of approximately 4,650 residential units, 145 hotel units, 5,100 m² of non-residential GFA. A list of area background developments considered as part of this study is summarized in **Table 32**. **Figure 12** illustrates the locations of the area background developments in the vicinity of the subject site.

Table 32 Area Background Developments and Key Development Statistics

Site Location		Residential Units	Non-Residential GFA (m ²)	Hotel Units	Trip Generation Sources
A.	34, 36, 38, 40, 44 & 50 Bradford Street	630	--	--	Crozier, June 2019
B.	51-75 Bradford Street & 20 Checkley Street	1,723	3,530	145	BA Group, August 2020
C.	220 Bradford Street	121	97	--	Skelton Brumwell & associates Inc., February 2020
D.	259-273 Innisfil Street & 41 & 43 Essa Road	1,276	896	--	GHD, September 2021
E.	272 Innisfil Street	333	--	--	Tatham Engineering Limited, April 2022
F.	17 & 27 Jacobs Terrace	565	609	--	GHD, August 2021
Total		4,648	5,132	145	--

11.3.2 General Corridor Growth

An allowance for the general corridor growth of traffic along Bradford Road in the City of Barrie has been considered as part of this study. As part of the pre-consultation with the City, a 4% per annum growth rate was considered for the build-out, 5-year and 10-year post build-out horizon years. However, it should be noted that a 4% per annum growth rate over 15 years represents a significant growth in vehicle traffic, which does not align with the vision of reducing auto travel modes and increasing non-auto travel modes (i.e. transit, walking and cycling) presented in the new Barrie Official Plan (2023) and Transportation Master Plan (2019).

Furthermore, application of this growth rate in addition to the traffic allowances for background area development growth is considered excessive and does not represent a reasonable traffic growth. Nevertheless, a review comparing the general corridor growth rates and the effective growth rates that represent the local area traffic of the total background development traffic was conducted. **Table 33** summarizes the resultant comparison of traffic growth.



Table 33 Traffic Growth Comparison along Bradford Street

	Existing (TMC – 2023)		Build-out (2028)		5-Yr Post Build-Out (2033)		10-Yr Post Build-Out (2038)	
	AM	PM	AM	PM	AM	PM	AM	PM
Net Growth (4% per annum)								
NB - Bradford / Victoria	455	580	100	125	220	280	365	465
SB - Bradford / Victoria	350	585	75	125	170	280	280	470
Background Development Volumes								
NB - Bradford / Victoria	--	--	90	95	90	95	150	210
SB - Bradford / Victoria	--	--	70	80	70	80	175	150
Background Development Effective Growth Rates								
NB - Bradford / Victoria	--	--	3.68%	3.08%	1.82%	1.53%	1.92%	2.08%
SB - Bradford / Victoria	--	--	3.71%	2.60%	1.84%	1.29%	2.74%	1.53%
Resultant Corridor Growth Volumes								
NB - Bradford / Victoria	--	--	10	30	130	185	215	255
SB - Bradford / Victoria	--	--	5	45	100	200	105	320
Resultant Corridor Growth Rate								
NB - Bradford / Victoria	--	--	0.32%	0.92%	2.18%	2.47%	2.08%	1.92%
SB - Bradford / Victoria	--	--	0.29%	1.40%	2.16%	2.71%	1.26%	2.47%
Adopted Corridor Growth Volumes								
NB - Bradford / Victoria	--	--	10	30	130	185	215	255
SB - Bradford / Victoria	--	--	5	45	100	200	105	320

Notes:

1. Volumes are rounded to the nearest 5 trips.



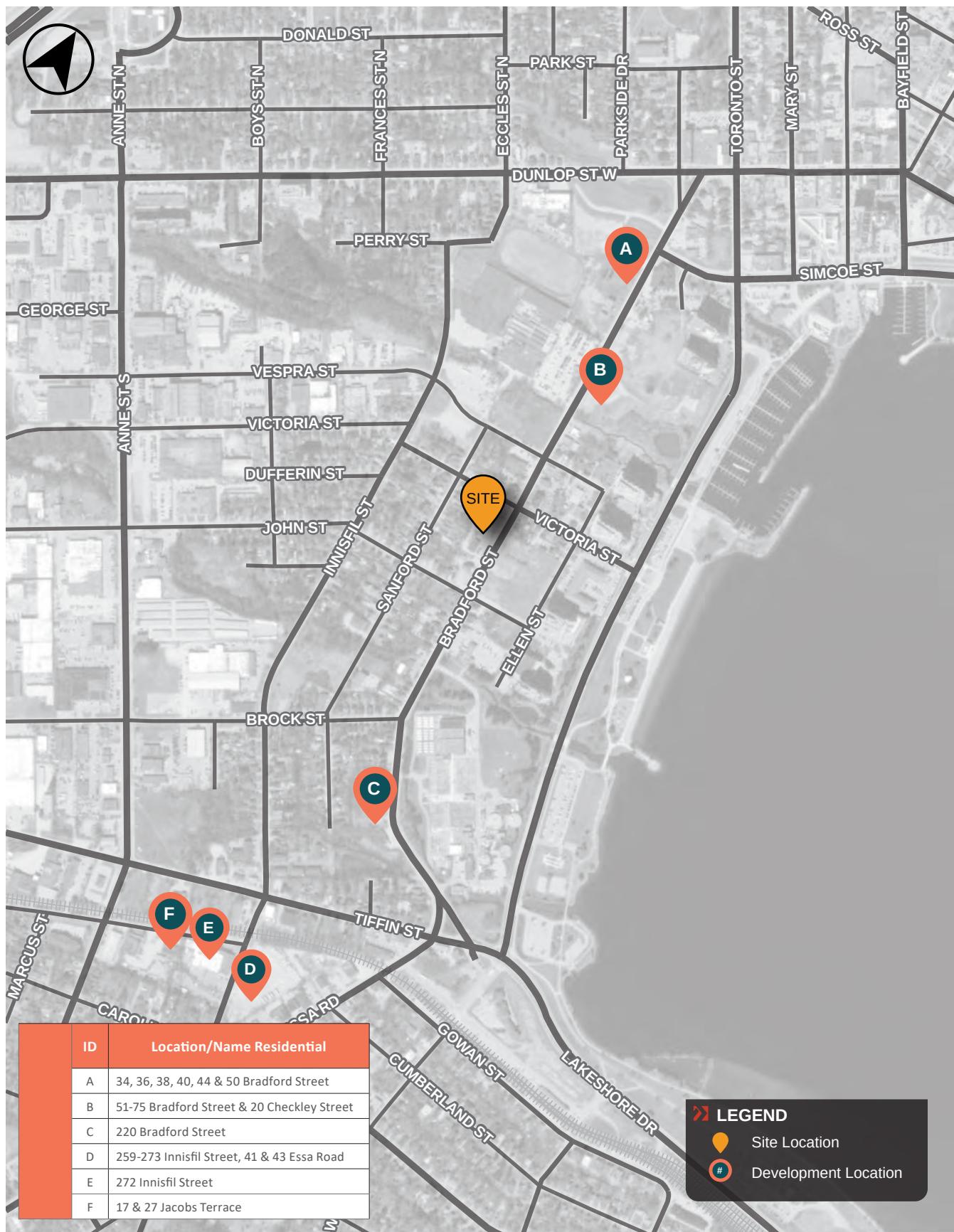
The traffic allowances for background development traffic in the vicinity of the site represent an effective growth rate between approximately 2.60% to 3.71% under the build-out horizon year scenario; 1.29% to 1.84% during the 5-year post build-out horizon year scenario; and 1.53% to 2.74% during the 10-year post build-out horizon year scenario. It should be noted that the allowance of traffic volumes from background developments represents a substantial amount of corridor growth along Bradford Road.

Based on this review, BA Group conservatively adopted a resultant general corridor growth in addition to the area background development traffic allowances, which would result in a net growth of 4% per annum along Bradford Street northbound and southbound. To reflect a saturated nature of traffic on Bradford Street over time and significant contributing effect of area development, it is considered appropriate that BA Group adopts a resultant growth rate of 4% per annum, which is the sum of the allowance of background development traffic and net corridor growth rate.

Future background traffic volumes are illustrated on **Figure 13**, **Figure 14**, and **Figure 15**.



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Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 12 BACKGROUND AREA DEVELOPMENTS

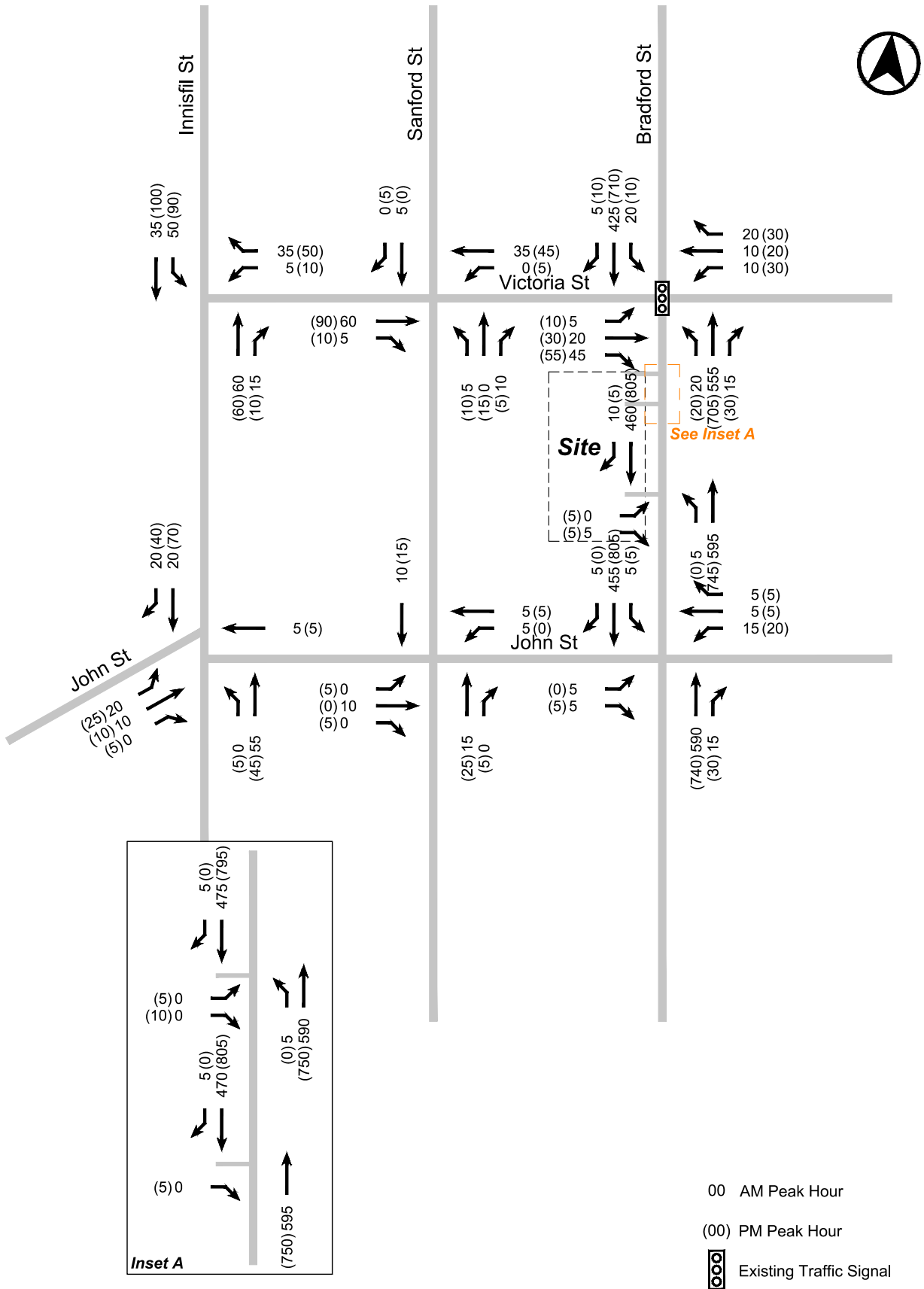


FIGURE 13 FUTURE BACKGROUND TRAFFIC VOLUMES 2028

11.4 Site Traffic Volumes

11.4.1 Existing Site Traffic Volumes

Existing site-related traffic volumes were collected during the weekday morning and afternoon peak hours on Wednesday, September 13, 2023, by Spectrum Traffic Data Inc. on behalf of BA Group at the existing site driveways along Bradford Street. As part of the proposed development programme, the subject site will be repurposed with residential mixed-use buildings. As part of this analysis, the existing site-related vehicle trips were removed from the road network during the weekday morning and afternoon peak hours.

The existing site-related traffic volumes, as surveyed, are summarized in **Table 34**.

Table 34 Existing Site Traffic Volumes

Intersection	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Bradford Street / Existing Site Access (North)	10	0	10	0	15	15
Bradford Street / Existing Site Access (Middle)	5	0	5	0	5	5
Bradford Street / Existing Site Access (South)	15	5	20	5	10	15
Total Site Trips	30	5	35	5	30	35

Notes:

1. Volumes are rounded to the nearest 5 vehicle trips.

The existing site, as surveyed, generates approximately 35 two-way vehicle trips during the weekday morning and afternoon peak hours.

The removal of existing site traffic volumes during the weekday morning and afternoon peak hours are illustrated in **Figure 16**.



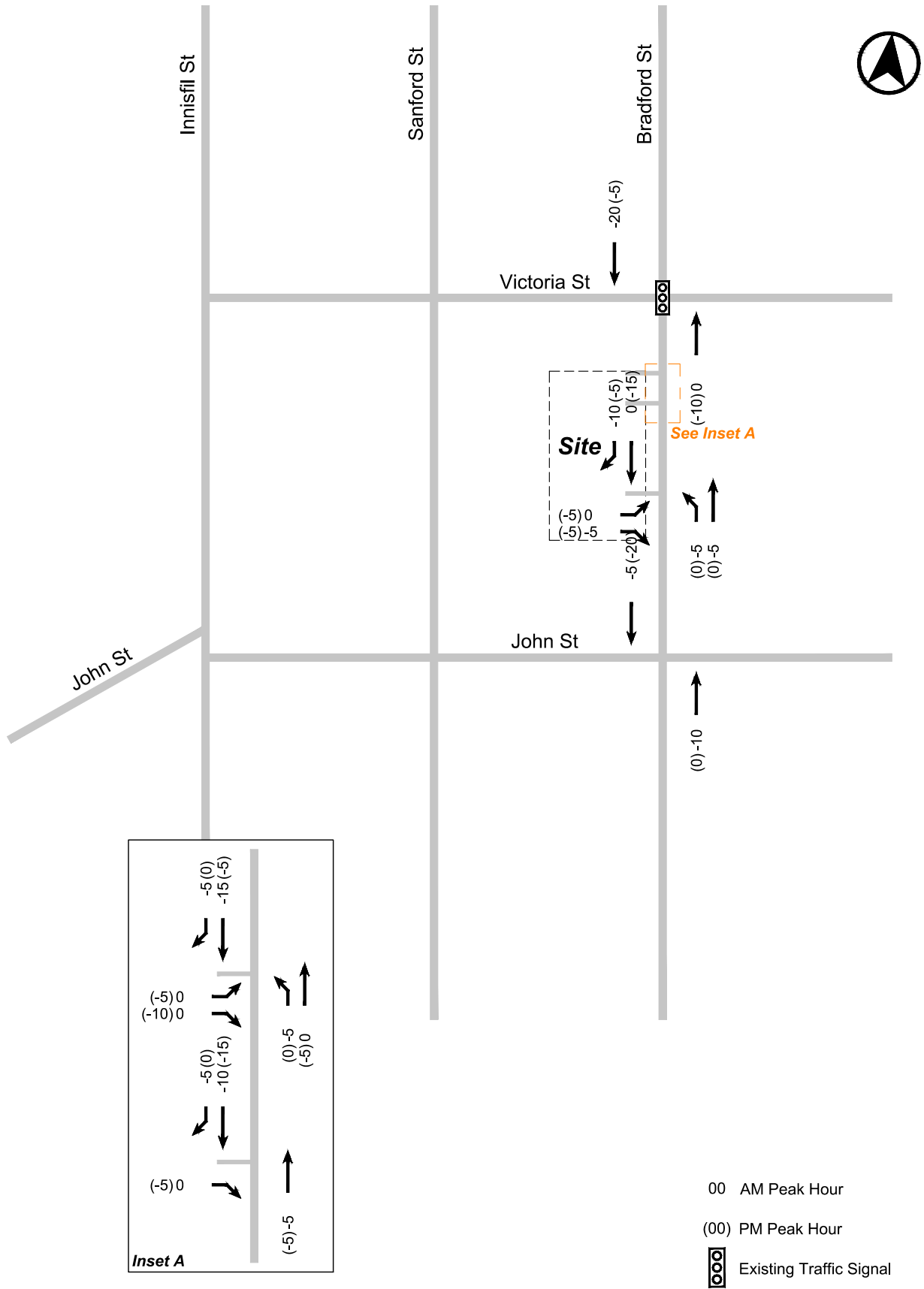


FIGURE 16 EXISTING SITE REMOVAL TRAFFIC VOLUMES

11.4.2 Site Vehicle Trip Generation

Future site-related vehicle travel demand was forecast in **Section 10.1.1**. The resultant vehicle trip generation for the overall development site is summarized in **Table 35**. As part of the analysis, it is assumed that vehicle trips include auto driver and auto passenger trips made by a vehicle.

Table 35 Summary of Net New Site Vehicle Traffic Volumes

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
New Residential Vehicle Trips	60	175	235	170	105	275
Existing Site Vehicle Trips <i>(To Be Removed)</i>	30	5	35	5	30	35
Net New Site Vehicle Trips	30	170	200	165	75	240

Notes:

1. Rounded to the nearest 5 vehicle trips.

Based on the foregoing, the site is anticipated to generate in the order of 200 and 240 net new two-way vehicle trips during the weekday morning and afternoon peak hours, respectively.

11.4.3 Trip Distribution and Assignment

The residential travel patterns for the forecast vehicular site traffic have been developed based on a review of the 2016 TTS data for home-based vehicle trips to and from the study area (i.e. 2006 TTS Traffic Zones 8501-8504 and 8525) during the weekday morning and afternoon peak periods. It should be noted that the resulting distribution of inbound and outbound residential vehicle trips were derived from the peak direction of travel during the peak hours. A summary of the adopted residential vehicle distribution is provided in **Table 36**. The detailed distributions derived from TTS queries are provided in **Appendix C**.

Table 36 Residential Site Traffic Distribution

To / From	Inbound	Outbound
North		
Bradford Street	51%	50%
South		
Bradford Street	41%	47%
East		
Victoria Street	5%	0%
West		
Victoria Street	2%	2%
John Street	1%	1%
Total	100%	100%

Notes:

1. Based on 2016 TTS data for home-based trips to and from 2006 TTS Traffic Zones 8501-8504 and 8525 during the weekday morning and afternoon peak periods.



It should be noted that the assignments of site-related trips are mostly distributed northbound and southbound along Bradford Street within the area road network. However, a portion of these trips utilize Bradford Street to eventually connect to Highway 400.

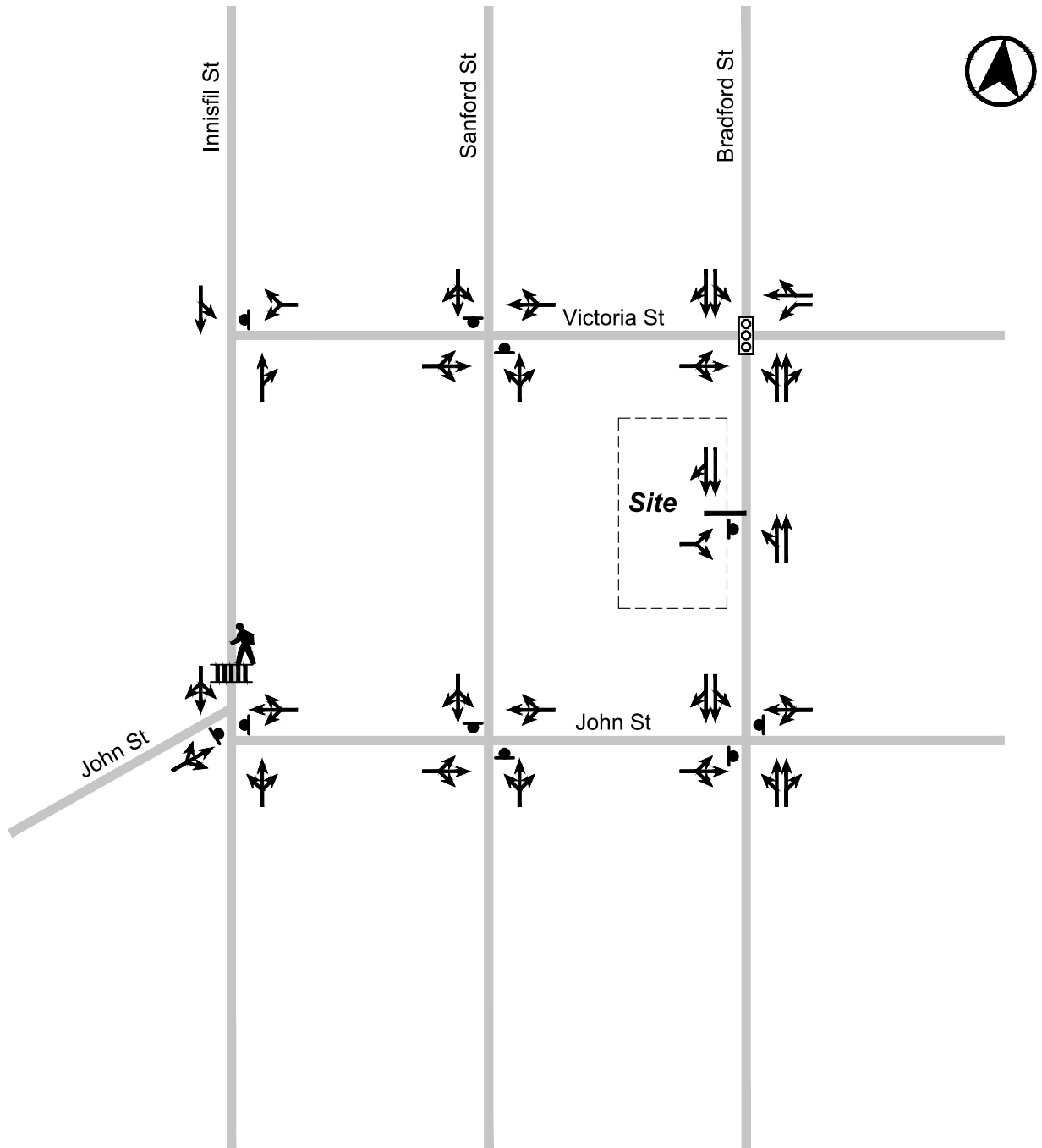
As a result of the redevelopment of the subject site, the future road network along Bradford Street will change (i.e. the removals of the existing site driveways and construction of the new future site driveway). **Figure 17** illustrates the future lane configurations for the future road network assessed in this study.

The forecast site traffic assigned to the future road network is illustrated on **Figure 18**. The net new site traffic volumes are illustrated on **Figure 19**.

11.5 Future Total Traffic Volumes

Future total traffic volumes were established by adding the net new site generated traffic to future background traffic volumes. **Figure 20, Figure 21, Figure 22** and figure illustrates the future total traffic volumes for the three horizon years during the weekday morning and afternoon peak hours.





-  Pedestrian Crossing
-  Stop Control
-  Existing Traffic Signal

FIGURE 17 FUTURE LANE CONFIGURATION AND TRAFFIC CONTROL

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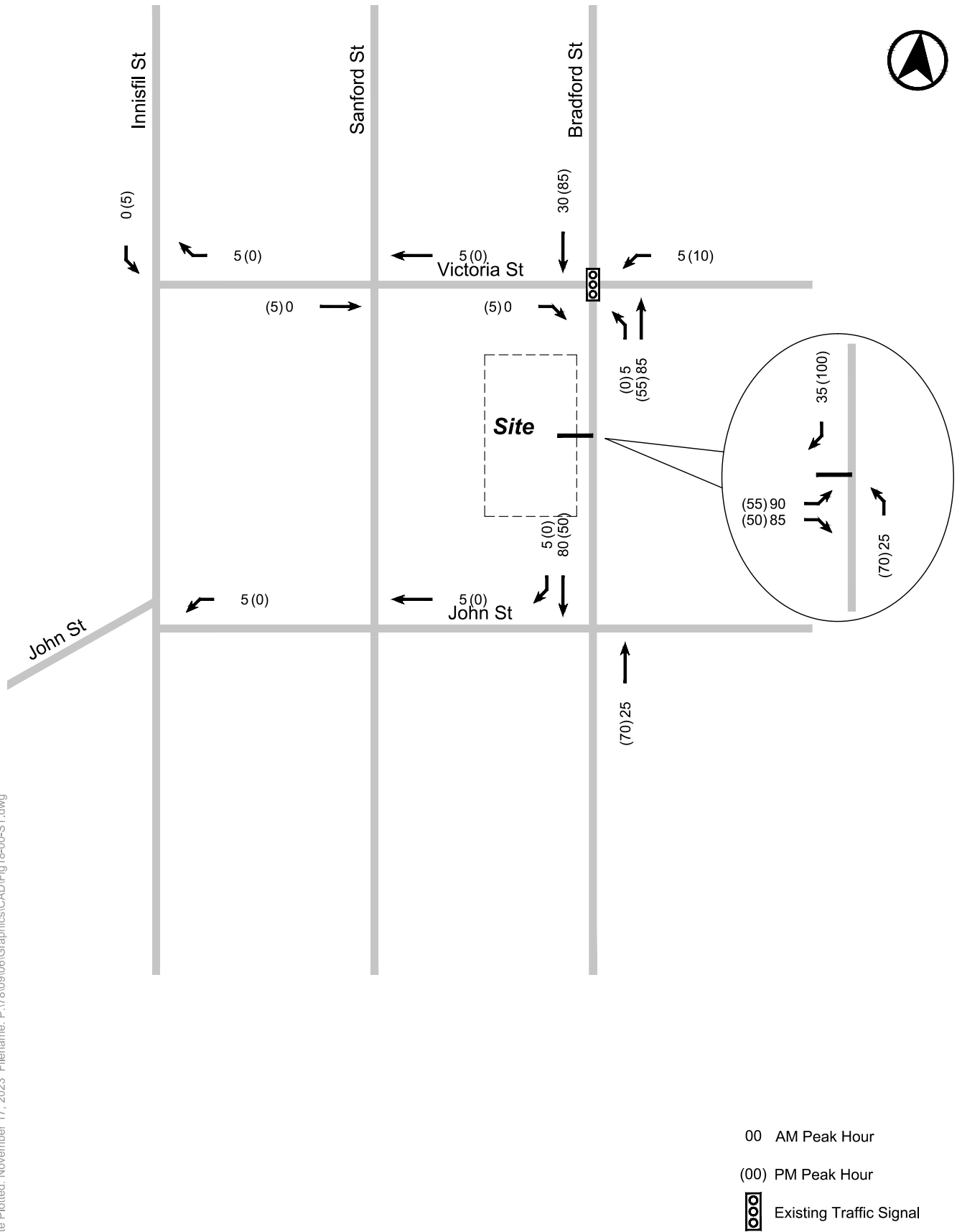
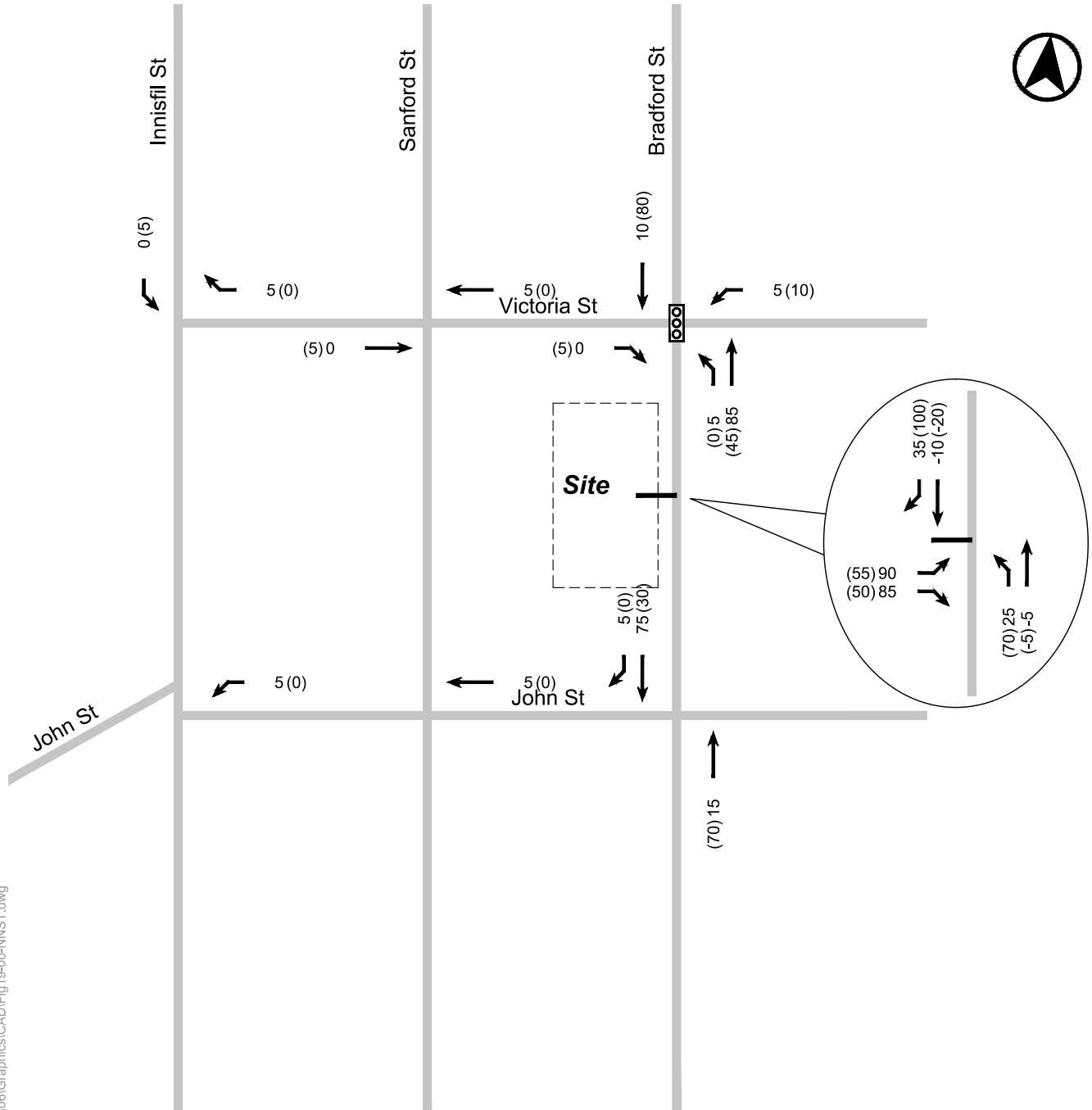


FIGURE 18 SITE TRAFFIC VOLUMES

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00 AM Peak Hour

(00) PM Peak Hour

 Existing Traffic Signal

FIGURE 19 NET NEW SITE TRAFFIC VOLUMES

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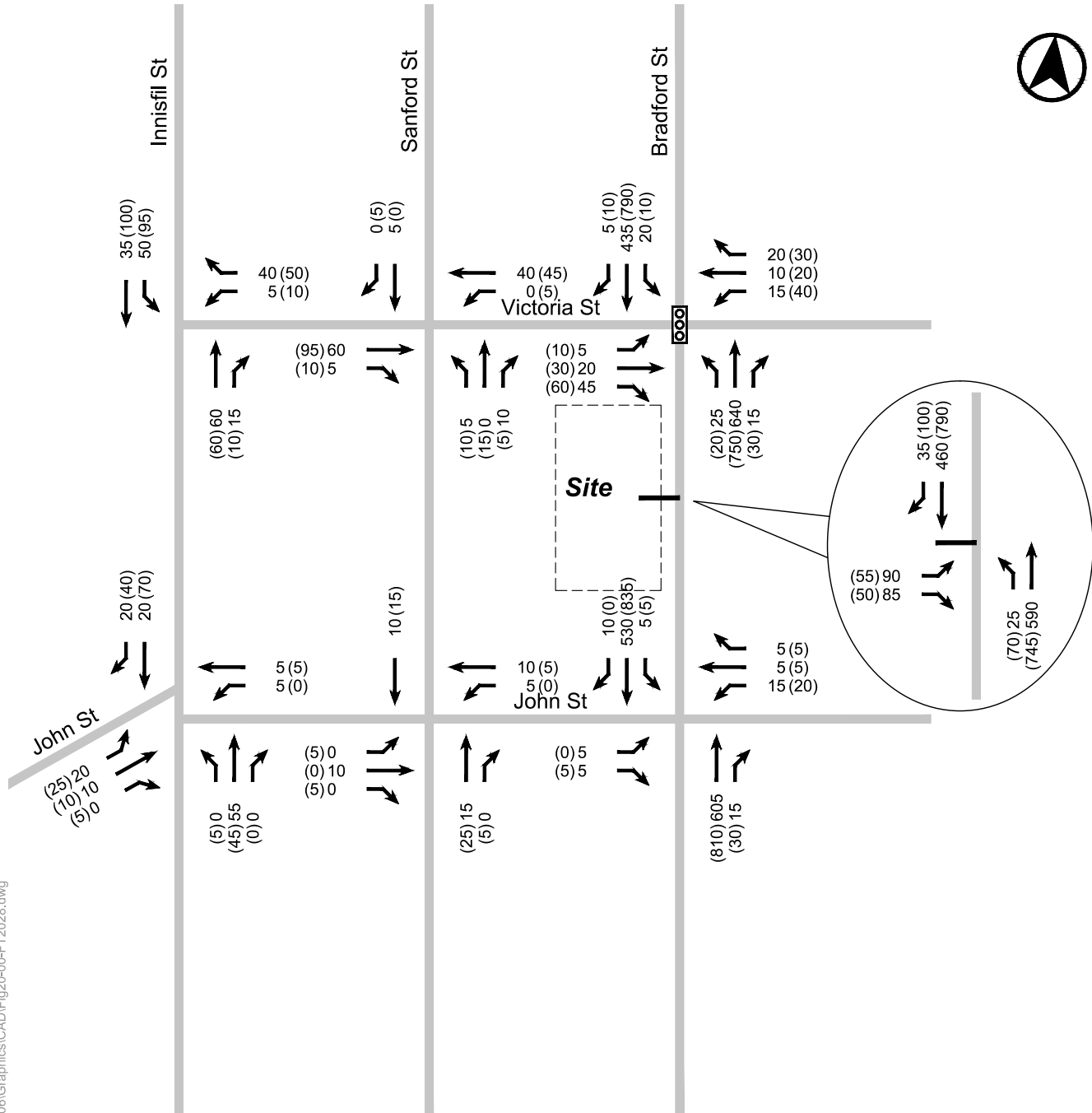


FIGURE 20 FUTURE TOTAL TRAFFIC VOLUMES 2028

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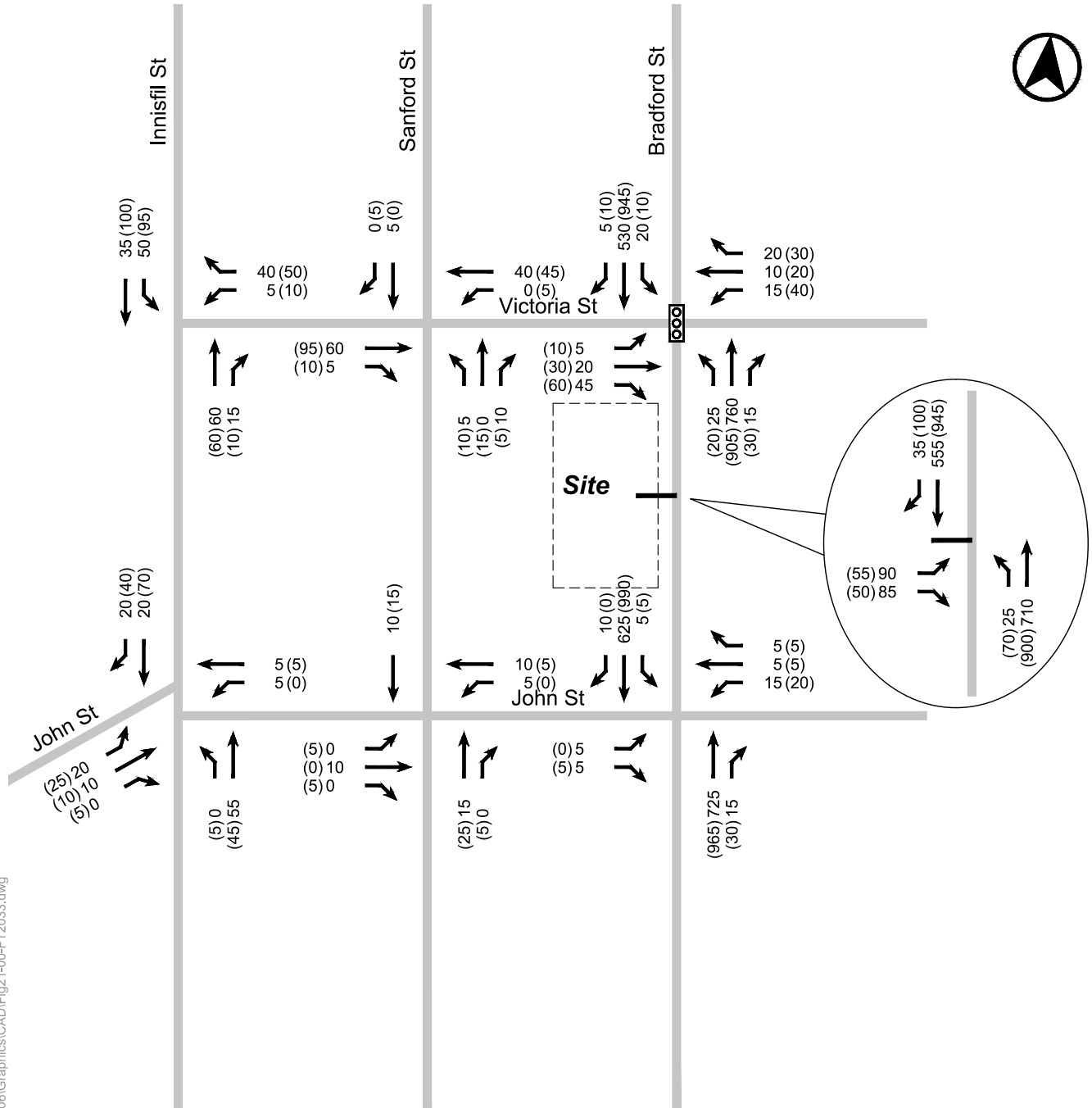


FIGURE 21 FUTURE TOTAL TRAFFIC VOLUMES 2033

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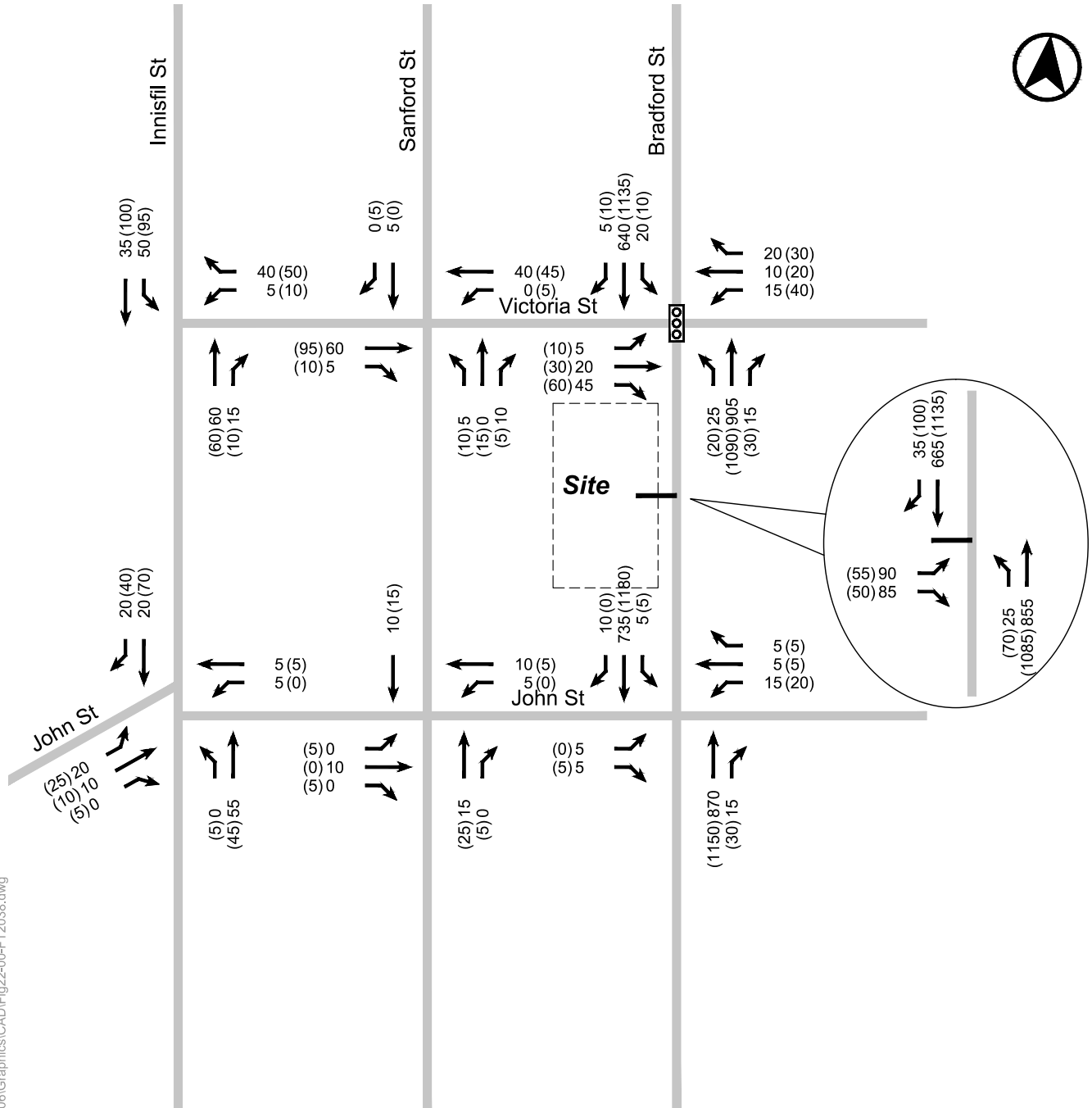


FIGURE 22 FUTURE TOTAL TRAFFIC VOLUMES 2038

12.0 VEHICLE TRAFFIC OPERATIONS ANALYSIS

12.1 Analysis Methodology and Assumptions

12.1.1 Intersection Capacity Analysis Methodology

Synchro Version 11.1 and the Highway Capacity Manual (HCM) methodology were used to analyze the study area intersections and site access points. All Synchro analyses performed conform to the capacity analysis methodology and assumption requirements of the City of Barrie's TIS Guidelines.

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, the 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.

12.1.2 Analysis Parameters

Heavy Vehicle Assumptions

Heavy and medium truck percentages incorporated into the analysis were based upon information provided as part of intersection turning movement counts. Where not available, a default value of 2 percent heavy vehicles was assumed.

Saturation Flow Assumptions

A base saturation flow rate of 1,900 passenger cars per hour of green time per lane (pcphgpl) for signalized and unsignalized intersections. These default rates were adopted in the analysis for the proposed development.

Signal Timings

Existing signal timing plans were obtained for all the signalized intersections within the study area from the City of Barrie and included in **Appendix E**. These parameters were adopted for the analysis of existing conditions and under future conditions at all intersections, unless otherwise discussed in the following section.

Peak Hour Factor

Site-specific peak hour factor (PHF) values, which were calculated from existing traffic count information were adopted for all intersections. For future intersections, a PHF of 0.92 was adopted for turn movements during the weekday morning and afternoon peak hours.

The calculated existing peak hour factors are summarized in **Table 37**.



Table 37 Summary of Calculated Peak Hour Factors

Intersection	Morning Peak	Afternoon Peak
Victoria Street / Bradford Street	0.90	0.94
Victoria Street / Sanford Street	0.65	0.93
Victoria Street / Innisfil Street	0.67	0.87
John Street / Innisfil Street	0.82	0.81
John Street / Sanford Street	0.92	0.79
John Street / Bradford Street	0.95	0.92
Bradford Street / Existing Site Access (North)	0.95	0.94
Bradford Street / Existing Site Access (Middle)	0.93	0.93
Bradford Street / Existing Site Access (South)	0.94	0.93
Bradford Street / Future Site Access	0.92	0.92

12.1.2.1 STUDY AREA INTERSECTIONS

Traffic operations and new site traffic related impacts have been reviewed at the following area intersections through capacity analysis:

Signalized Intersections

- Bradford Street / Victoria Street
- John Street / Innisfil Street

Unsignalized Intersections

- Victoria Street / Sanford Street
- Victoria Street / Innisfil Street
- John Street / Sanford Street
- John Street / Bradford Street
- Bradford Street / Existing Site Access (North)
- Bradford Street / Existing Site Access (Middle)
- Bradford Street / Existing Site Access (South)



12.2 Traffic Operations Analysis Review

A summary of the traffic analysis results for the signalized and unsignalized intersections within the study area is provided herein. Detailed Synchro analysis output sheets are included in **Appendix F**.

12.2.1 Key Area Signalized Intersections

The key area signalized intersections include:

- Bradford Street / Victoria Street; and
- Innisfil Street / John Street.

The Bradford Street / Victoria Street intersection operates under a traffic signal control with a cycle length of 70 seconds during the weekday morning and afternoon peak periods.

The Innisfil Street / John Street intersection operates under a pedestrian signal on the north leg of the intersection. Based on correspondence with City staff, BA Group adopted a cycle length of 70 seconds for the pedestrian signal at the Innisfil Street / John Street intersection during the weekday morning and afternoon peak periods. However, due to the low pedestrian crossing volumes, the intersection effectively operates as an unsignalized intersection with John Street movements under stop-controlled and Innisfil Street movements under free-flow conditions. The capacity analysis results for these key area signalized intersections at full site-build out are summarized in **Table 38**.

Table 38 Key Area Signalized Intersections – Capacity Analysis Results (Full Site Build-Out)

Lane Group	Existing		Future Background 2028		Future Total 2028	
	v/c	LOS	v/c	LOS	v/c	LOS
Bradford Street / Victoria Street						
EBLTR	0.16 (0.22)	C (C)	0.16 (0.22)	C (C)	0.16 (0.23)	C (C)
WBL	0.07 (0.15)	C (C)	0.07 (0.15)	C (C)	0.11 (0.21)	C (C)
WBTR	0.06 (0.11)	C (C)	0.06 (0.11)	C (C)	0.06 (0.11)	C (C)
NBLTR	0.24 (0.30)	A (A)	0.29 (0.36)	A (A)	0.34 (0.38)	A (A)
SBLTR	0.19 (0.28)	A (A)	0.23 (0.34)	A (A)	0.23 (0.38)	A (A)
Overall	0.23 (0.29)	A (A)	0.27 (0.34)	A (A)	0.31 (0.35)	A (A)
Innisfil Street / John Street						
EBTLR	0.09 (0.11)	B (C)	0.09 (0.11)	B (C)	0.09 (0.11)	B (C)
WBTLR	0.01 (0.01)	B (B)	0.01 (0.01)	B (B)	0.01 (0.01)	B (B)
NBTLR	0.01 (0.02)	A (A)	0.06 (0.06)	A (A)	0.06 (0.06)	A (A)
SBTLR	0.02 (0.05)	A (A)	0.04 (0.11)	A (A)	0.04 (0.11)	A (A)
Overall	0.04 (0.07)	B (B)	0.07 (0.11)	B (A)	0.07 (0.11)	B (A)

Notes:

1. xx (xx) – a.m. (p.m.)



Under existing traffic conditions, the area signalized intersections operate at acceptable capacity with overall volume-to-capacity (v/c) ratios of 0.29 or better during the weekday morning and afternoon peak hours.

Under future background 2028 traffic conditions with allowances of specific area developments and corridor growth, the area signalized intersections continue to operate at acceptable capacity with overall v/c ratios of 0.34 or better during the weekday morning and afternoon peak hours.

With the addition of site-related traffic under future total 2028 traffic conditions, as the proposed development is fully developed, the area signalized intersections continue to operate at acceptable capacity with overall v/c ratios of 0.35 or better during the weekday morning and afternoon peak hours.

As requested by the City of Barrie, additional traffic analyses were conducted for the post build-out of the site to consider additional corridor growth that may occur along the Bradford Street corridor in the next 5-year and 10-year horizon periods beyond the build-out of the site. The capacity analysis results for these key area signalized intersections at post build-out horizon periods are summarized in **Table 39**.

Table 39 Key Area Signalized Intersections – Capacity Analysis Results (Post Site Build-Out)

Lane Group	Future Background 2033		Future Background 2038		Future Total 2033		Future Total 2038	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
Bradford Street / Victoria Street								
EBLTR	0.16 (0.22)	C (C)	0.16 (0.32)	C (C)	0.16 (0.23)	C (C)	0.16 (0.33)	C (C)
WBL	0.07 (0.15)	C (C)	0.07 (0.18)	C (C)	0.11 (0.21)	C (C)	0.11 (0.21)	C (C)
WBTR	0.06 (0.11)	C (C)	0.06 (0.11)	C (C)	0.06 (0.11)	C (C)	0.06 (0.11)	C (C)
NBLTR	0.35 (0.43)	A (A)	0.43 (0.55)	A (A)	0.40 (0.45)	A (A)	0.48 (0.54)	A (A)
SBLTR	0.28 (0.41)	A (A)	0.33 (0.53)	A (A)	0.28 (0.45)	A (A)	0.34 (0.54)	A (A)
Overall	0.32 (0.40)	A (A)	0.38 (0.51)	A (A)	0.36 (0.42)	A (A)	0.42 (0.51)	A (A)
Sanford Street / John Street								
EBTLR	0.09 (0.11)	B (C)	0.09 (0.11)	B (C)	0.09 (0.11)	B (C)	0.09 (0.11)	B (C)
WBTLR	0.01 (0.01)	B (B)	0.01 (0.01)	B (B)	0.01 (0.01)	B (B)	0.01 (0.01)	B (B)
NBTLR	0.06 (0.06)	A (A)	0.06 (0.06)	A (A)	0.06 (0.06)	A (A)	0.06 (0.06)	A (A)
SBTLR	0.04 (0.11)	A (A)	0.04 (0.11)	A (A)	0.04 (0.11)	A (A)	0.04 (0.11)	A (A)
Overall	0.07 (0.11)	B (A)	0.07 (0.11)	B (A)	0.07 (0.11)	B (A)	0.07 (0.11)	B (A)

Notes:

1. xx (xx) – a.m. (p.m.)

In the future post build-out horizon (i.e. 2033 and 2038), the area signalized intersections operate at acceptable capacity with overall v/c ratios of 0.51 or better during the weekday morning and afternoon peak hours. The area signalized intersections are impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions.



Based on the foregoing, the traffic generated by the proposed development can be acceptably accommodated at the key area signalized intersections. No mitigation measures or improvements are recommended at the area signalized intersections.

12.2.2 Key Area Unsignalized Intersections

A summary of the capacity analysis results for the key area unsignalized intersections at full site build-out are provided in **Table 40**.

Table 40 Key Area Unsignalized Intersections – Capacity Analysis Results (Full Site Build-Out)

Lane Group	Existing		Future Background 2028		Future Total 2028	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
Sanford Street / Victoria Street						
EBTLR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
WBTLR	A (A)	0.0 (0.7)	A (A)	0.0 (0.7)	A (A)	0.0 (0.7)
NBTLR	A (A)	9.2 (9.9)	A (A)	9.2 (9.9)	A (A)	9.3 (10.0)
SBTLR	B (A)	10.1 (8.6)	B (A)	10.1 (8.6)	B (A)	10.1 (8.6)
Innisfil Street / Victoria Street						
WBLR	A (A)	9.0 (9.2)	A (A)	9.4 (9.6)	A (A)	9.4 (9.6)
SBTL	A (A)	5.5 (5.1)	A (A)	4.7 (3.9)	A (A)	4.7 (4.0)
Sanford Street / John Street						
EBTLR	A (A)	0.0 (3.6)	A (A)	0.0 (3.6)	A (A)	0.0 (3.6)
WBTLR	A (A)	3.8 (0.0)	A (A)	3.8 (0.0)	A (A)	3.8 (0.0)
NBTLR	A (A)	9.4 (9.2)	A (A)	9.4 (9.2)	A (A)	9.4 (9.2)
SBTLR	A (A)	9.3 (9.3)	A (A)	9.3 (9.3)	A (A)	9.3 (9.3)
Bradford Street / John Street						
EBTLR	B (B)	12.9 (10.2)	B (B)	14.5 (10.3)	C (B)	15.8 (10.5)
WBTLR	C (D)	17.5 (26.6)	C (E)	21.2 (36.3)	C (E)	23.1 (43.8)
NBTL	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
SBTL	A (A)	0.3 (0.2)	A (A)	0.2 (0.2)	A (A)	0.2 (0.2)

Notes:

1. xx (xx) – a.m. (p.m.)

Under existing traffic conditions, the key area unsignalized intersections operate at an acceptable level of service with individual movements functioning at LOS C or better during the weekday morning and afternoon peak hours.

Under future background 2028 traffic conditions, all individual movements at the key area unsignalized intersections operate at LOS C or better during the weekday morning and afternoon peak hours.



Under future total 2028 traffic conditions, the key area unsignalized intersections will operate at a busy, yet acceptable level of service with individual movements functioning at LOS E or better during the weekday morning and afternoon peak hours.

As requested by the City of Barrie, additional traffic analyses were conducted for the post build-out of the site to consider additional corridor growth that may occur along the Bradford Street corridor in the next 5-year and 10-year horizon periods beyond the build-out of the site. The capacity analysis results for these key area unsignalized intersections at post build-out horizon periods are summarized in **Table 41**.

Table 41 Key Area Unsignalized Intersections – Capacity Analysis Results (Post Site Build-Out)

Lane Group	Future Background 2033		Future Background 2038		Future Total 2033		Future Total 2038	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
Sanford Street / Victoria Street								
EBTLR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
WBTLR	A (A)	0.0 (0.7)	A (A)	0.0 (0.8)	A (A)	0.0 (0.7)	A (A)	0.0 (0.7)
NBTLR	A (A)	9.2 (9.9)	A (B)	9.2 (10.6)	A (A)	9.3 (10.0)	A (A)	9.3 (10.0)
SBTLR	B (A)	10.1 (8.6)	B (A)	10.1 (8.7)	B (A)	10.1 (8.6)	B (A)	10.1 (8.6)
Innisfil Street / Victoria Street								
WBLR	A (A)	9.4 (9.6)	A (B)	9.4 (10.1)	A (A)	9.4 (9.6)	A (A)	9.4 (9.6)
SBTL	A (A)	4.7 (3.9)	A (A)	4.7 (4.1)	A (A)	4.7 (4.0)	A (A)	4.7 (4.0)
Sanford Street / John Street								
EBTLR	A (A)	0.0 (3.6)	A (A)	0.0 (3.6)	A (A)	0.0 (3.6)	A (A)	0.0 (3.6)
WBTLR	A (A)	3.8 (0.0)	A (A)	3.8 (0.0)	A (A)	3.8 (0.0)	A (A)	3.8 (0.0)
NBTLR	A (A)	9.4 (9.2)	A (A)	9.4 (9.2)	A (A)	9.4 (9.2)	A (A)	9.4 (9.2)
SBTLR	A (A)	9.3 (9.3)	A (A)	9.3 (9.3)	A (A)	9.3 (9.3)	A (A)	9.3 (9.3)
Bradford Street / John Street								
EBTLR	C (B)	16.9 (10.4)	C (B)	19.9 (10.2)	C (B)	18.6 (10.5)	C (B)	22.3 (10.5)
WBTLR	D (F)	27.2 (59.0)	E (F)	37.0 (118.0)	D (F)	30.0 (74.4)	E (F)	41.4 (178.1)
NBTL	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
SBTL	A (A)	0.2 (0.2)	A (A)	0.2 (0.2)	A (A)	0.2 (0.2)	A (A)	0.2 (0.3)

Notes:

1. xx (xx) – a.m. (p.m.)



Under post site build-out horizon periods (i.e. 2033 and 2038), all individual movements at the key area unsignalized intersections generally operate at acceptable level of service, LOS E or better, with the exception of the westbound movement at the Bradford Street / John Street intersection during the weekday afternoon peak hour. In the future, it is anticipated that the westbound movement will operate at LOS F with an extended delay of 178 seconds during the weekday afternoon peak hour. Though the expected average delay experienced by each vehicle is large, the actual number of vehicles experiencing this larger delay is small. The extended delay for the westbound movement is primarily due to the substantial expected general corridor growth along Bradford Street, which produces less available gaps for westbound vehicles to cross the intersection. The area unsignalized intersections are impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions. In addition, this condition is expected to occur under the future background 2033 and 2038 traffic conditions, prior to any development related to the subject site.

Furthermore, a characteristic of the HCM 2000 analysis methodology for unsignalized intersections is that once a certain average vehicle delay threshold is exceeded, any modest increment in the major street traffic stream (along Bradford Street) results in a substantial increase in predicted vehicle delays of the minor street traffic stream (John Street). As such, the analysis results indicate a significant increase in vehicle delay at the John Street approach under the future background and future total conditions.

Based on the analysis, the area unsignalized intersections can appropriately accommodate the build-out of the site and the site-related traffic activity during the build-out horizon year (2028). It should be noted that the significant allowance for traffic growth along Bradford Street under the 5-year (2033) and 10-year (2038) post build-out horizon year scenarios result in a significant impact to the operations of the unsignalized intersections along Bradford Street. Given that this condition occurs regardless of any redevelopment of the site, no mitigation measures are recommended upon build-out of the proposed development.

It is however, anticipated that the City may wish to monitor the Bradford Street corridor and reassess the timeline to implement the preferred plan that was outlined in the City's Official Plan (OP) and Transportation Master Plan (TMP). Based on the analysis results, the significant operations impact to the Bradford Street corridor is expected to occur by the 2033 Future Background horizon year, regardless of any redevelopment on the subject site, which indicates that the potential need for mitigation measures (i.e. two-way left-turn (TWLT) median) is expected earlier than the proposed 2041 year in the OP and TMP.



12.2.3 Site Driveways

The site is currently accessed via three full-moves driveways onto Bradford Street, east of the site. These driveways currently operate under STOP control. The existing site driveways operate at an acceptable level of service, LOS D or better, under existing and future background traffic conditions. These driveways will be removed as part of the proposed development. A summary of the traffic analysis results for the existing site driveways are summarized in **Table 42**.

Table 42 Existing Site Driveways – Capacity Analysis Results

Lane Group	Existing		Future Background					
			2028		2033		2038	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
Bradford Street / Existing (North) Site Driveway								
EBLR	A (B)	0.0 (12.7)	A (B)	0.0 (14.3)	A (C)	0.0 (17.1)	A (C)	0.0 (21.8)
NBTL	A (A)	0.3 (0.0)	A (A)	0.2 (0.0)	A (A)	0.2 (0.0)	A (A)	0.2 (0.0)
Bradford Street / Existing (Middle) Site Driveway								
EBLR	A (A)	0.0 (9.7)	A (A)	0.0 (9.8)	A (B)	0.0 (10.0)	A (B)	0.0 (10.0)
NBTL	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
Bradford Street / Existing (South) Site Driveway								
EBLR	A (C)	9.5 (15.1)	A (C)	9.5 (17.7)	A (C)	9.6 (22.3)	A (D)	9.7 (30.3)
NBTL	A (A)	0.3 (0.0)	A (A)	0.2 (0.0)	A (A)	0.2 (0.0)	A (A)	0.2 (0.0)

Notes:

1. xx (xx) – a.m. (p.m.)

Vehicle access to the proposed development will be provided via a single driveway access onto Bradford Street. The proposed driveway will operate under STOP control and will provide convenient two-way vehicle access to the proposed development. A summary of the traffic analysis results for the proposed site driveway is summarized in **Table 43**.

Table 43 Proposed Site Driveway – Capacity Analysis Results

Lane Group	Future Total 2028		Future Total 2033		Future Total 2038	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
EBLR	C (E)	19.8 (43.5)	D (F)	25.5 (91.4)	E (F)	38.7 (285.3)
NBTL	A (A)	1.2 (3.2)	A (A)	1.1 (3.3)	A (A)	1.0 (3.8)

Notes:

1. xx (xx) – a.m. (p.m.)

Under future total 2028 traffic conditions, the proposed site driveway will function at a busy, yet acceptable level of service, LOS E or better, during the weekday morning and afternoon peak hours.



As requested by the City of Barrie, additional traffic analyses were conducted for the post build-out of the site to consider additional corridor growth that may occur along the Bradford Street corridor in the next 5-year and 10-year horizon periods beyond the build-out of the site.

Under post site build-out horizon periods (i.e. 2033 and 2038), the proposed site driveway will generally function at a busy, yet acceptable level of service, LOS E or better, except for the eastbound movement during the weekday afternoon peak hour. It is anticipated that the eastbound movement will operate at LOS F with an extended delay of 285 seconds during the weekday afternoon peak hour. The proposed site driveway is impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions.

As previously mentioned, as a characteristic of the HCM 2000 analysis methodology, the incremental average vehicle delay experienced by minor street traffic streams result in a substantial increase once a certain average vehicle delay threshold is exceeded. As such, the analysis results indicate a significant increase in the average vehicle delay at the future site driveway under the and future total conditions.

Given the substantial increase in background growth volumes along the Bradford Street corridor, under the 2033 and 2038 horizon years, vehicles making an outbound left-turn from the site may have difficulty to safely perform their movement by accessing gaps between conflicting (northbound and southbound) vehicles along Bradford Street. Since these operational impacts are expected to occur during the post build-out horizon year traffic scenarios, no mitigation measures are recommended as a result of the redevelopment of the subject site. However, the City may wish to implement potential mitigation measures in advance of 2041 to improve the corridor operations, which are in-line with the City of Barrie OP and TMP.

As part of the City of Barrie Official Plan and Transportation Master Plan, the road widening of Bradford Street includes the preferred plan to include a raised centre median or two-way left-turn (TWLT) median lane. While the planned road improvements along Bradford Street are outlined for a 2041 horizon, it should be noted that these improvements may occur earlier, as adjacent sites to Bradford Street redevelop, as stated in their TMP. It is anticipated that the City of Barrie may wish to reassess the timeline in which they can implement their preferred plan for the Bradford Street corridor. Furthermore, it is anticipated that the City of Barrie may wish to also monitor and study the future traffic operations along the Bradford Street corridor through other studies, as other sites intend to develop.

As a result, the site-related traffic activity under the full site build-out year (2028) has a minor impact of the area road network intersections. Notwithstanding, the redevelopment of the subject site does not need to rely on any road improvements. Based on the analysis, the proposed site driveway can acceptably accommodate the anticipated site-related traffic activity.

Under the 5-year (2033) and 10-year (2038) post build-out analysis horizon years, site-related traffic operations at the proposed site driveway are expected to operate above theoretical capacity during the weekday afternoon peak hour, due to the significant corridor traffic projected along Bradford Street (including general corridor growth and area background traffic allowances).



12.3 Traffic Operations Analysis Summary

The key findings from the traffic operations analysis are summarized by the following:

- Notwithstanding that the new site-related traffic impacts to the key area network intersections will be minor, all area network intersections will continue to operate below capacity under the build-out year (2028) horizon and can be acceptably accommodated on the road network. **No mitigation measures or road improvements are recommended as a result of the redevelopment of the subject site.**
- **Under the 5-year (2033) and 10-year (2038) post build-out horizon year traffic scenarios, during the weekday afternoon peak hour**, the Bradford Street / John Street and Bradford Street / Proposed Site Driveway intersections are expected to function at very busy level of service, LOS F during the weekday afternoon peak hour. This is a result of the significant traffic growth along the Bradford Street corridor, including the general corridor traffic growth and the allowance for future area background development traffic. **It should be noted that regardless of any redevelopment of the subject site, this condition is expected to occur under the future background traffic scenarios.**
- Although planned road improvements along the Bradford Street corridor, which are in-line with the Barrie OP and TMP are outlined for a 2041 horizon, these improvements may occur earlier, as adjacent sites to Bradford Street redevelop. While these improvements are not required as a result of the redevelopment of the subject site, **it is anticipated that the City of Barrie may wish to reassess the timeline in which they can implement their preferred plan for the Bradford Street corridor and may wish to also monitor and study the future traffic operations along the Bradford Street corridor through other studies, as other sites intend to develop.**



13.0 SENSITIVITY ANALYSIS

As outlined in **Section 12.3**, due to the substantial increase in traffic growth along the Bradford Street corridor during the 5-year (2033) and 10-year (2038) post build-out horizon periods, the Bradford Street / John Street and Bradford Street / Proposed Site Driveway intersections are expected to function at very busy level of service, LOS F during the weekday afternoon peak hour. It should be noted that these intersections are impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions.

While the site does not require any mitigation measures or road improvements within the area road network, there are planned road improvements anticipated to be implemented along the Bradford Street corridor as outlined in the Barrie OP and TMP. The Barrie OP and TMP outlines the provision of a two-way left-turn (TWLT) median lane to be implemented by 2041. As a result, BA Group has conducted a sensitivity analysis to assess the provision of a TWLT median lane along the Bradford Street corridor, which aligns with the Barrie OP and TMP.

As outlined in the Barrie OP and TMP, the implementation the planned road improvement along the Bradford Street corridor may occur earlier, as adjacent sites to Bradford Street redevelop. Note that at the full site build-out, the planned road improvement is not required given that traffic operations within the area road network operate at acceptable capacity and level of service conditions. The area road network is impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions. Notwithstanding, BA Group has assumed that the provision of a TWLT median lane along the Bradford Street corridor will be implemented prior to the build-out of the site.

The traffic analysis results for the sensitivity analysis at the Bradford Street / John Street and Bradford Street / Proposed Site Driveway intersections are summarized in **Table 44**. The resultant Synchro worksheets are provided in **Appendix G**.

Table 44 Sensitivity Analysis – Capacity Analysis Results

Lane Group	Future Background						Future Total					
	2028		2033		2038		2028		2033		2038	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Bradford Street / John Street												
EBTLR	B (B)	11.4 (10.3)	B (B)	12.1 (10.4)	B (B)	12.8 (10.2)	B (B)	12.0 (10.5)	B (B)	12.7 (10.5)	B (B)	13.4 (10.5)
WBTLR	B (C)	14.1 (17.1)	C (C)	15.8 (20.3)	C (D)	18.2 (25.4)	B (C)	14.5 (18.4)	C (C)	16.2 (22.0)	C (D)	18.7 (28.0)
NBL	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
SBL	A (A)	8.8 (9.5)	A (B)	9.3 (10.2)	A (B)	9.9 (11.1)	A (A)	8.9 (9.8)	A (B)	9.3 (10.6)	A (B)	9.9 (11.7)
Bradford Street / Proposed Site Driveway												
EBLR	Future site driveway built as part of the proposed development programme.						B (C)	13.3 (16.0)	B (C)	14.4 (18.2)	C (C)	15.8 (21.8)
NBL							A (B)	8.4 (10.2)	A (B)	8.7 (11.0)	A (B)	9.0 (12.3)

Notes:

1. xx (xx) – a.m. (p.m.)



With the provision of a TWLT median, the Bradford Street / John Street intersection is expected to function at an acceptable level of service, LOS D or better, during the weekday morning and afternoon peak hours for all future horizon years.

Similarly, the proposed site driveway is expected to function at an acceptable level of service with individual movements operating at LOS C or better under the future total traffic conditions during the weekday mornings and afternoon peak hours.

It should be noted that the Bradford Street / John Street and Bradford Street / Proposed Site Driveway intersections are anticipated to function acceptably at build-out (2028 horizon) regardless of the planned road improvement along the Bradford Street corridor. The planned road improvement of a TWLT median lane along the Bradford Street corridor will only further benefit the traffic operations at the intersection under the full site build-out horizon year (2028). The planned road improvement is anticipated to benefit the 2033 and 2038 horizon years by providing vehicles with the ability to perform a two-stage turning movement onto Bradford Street, due to the substantial increase in traffic growth along the Bradford Street corridor caused by non-site related traffic activities.

Based on the foregoing, the implementation of the City's preferred plan (i.e. provision of a TWLT median) as outlined in the Barrie OP and TMP, results in a significant improvement of the traffic operations along the Bradford Street corridor. Given the results of the traffic operations conducted as part of the sensitivity analysis, potential mitigation measures may be required earlier than the 2041 horizon, which has been indicated in the Barrie OP. Therefore, it is anticipated that the City may wish to reassess the timeline in which they can implement their preferred plan for the Bradford Street corridor. While the subject site does not require any road improvements or mitigation measures, the provision of a TWLT median lane will provide relief to intersections along the Bradford Street corridor under future traffic conditions, given the significant non-site related traffic growth projected by the City.



14.0 SUMMARY AND CONCLUSIONS

The following provides an overview of the key transportation study findings for the proposed development.

Introduction

1. BA Group has been retained by Crown (Bradford) Developments Inc. (referred to herein as the “applicant”) to provide transportation consulting services in relation to an OPA and ZBA application submission being made to the City of Barrie for the proposed mixed-use residential development municipally located at 126-140 Bradford Street (herein referred to as the “site” or “proposed development”).
2. The existing site comprises a mix of commercial developments, surface parking with 30 to 40 spaces, vehicle access via two all-moves driveways and an additional shared driveway with the neighbouring property on Bradford Street, pedestrian access via sidewalks on Bradford Street, and no formal cycling facilities or access. The existing site conditions are planned to be demolished to permit the proposed development.

Development Proposal

3. The development proposal includes two 45-storey mixed-use buildings (Building A and Building B) connected by a 7-storey podium to accommodate a total of 912 residential units (including 136 affordable and 776 market units) and 334 square metres of retail GFA. A total of 364 vehicle parking spaces are proposed to serve the development in addition to two loading spaces, 912 bicycle parking spaces, and four short-term (pick-up / drop-off) parking spaces. Parking will be supplied at-grade and within a six-level above-grade parking garage.
4. On-site public realm improvements, including landscaped buffers, building setbacks with primary entrances along Bradford Street, on-site pedestrian walkways and at-grade bicycle parking allow for convenient access to the residential and retail portions of the proposed development.
5. Vehicle access to / from the site will be provided via all-moves driveway on Bradford Street 85 metres to the south of the Bradford Street / Victoria Street intersection. The primary driveway will provide access to the parking ramp to the parking garage and the loading facilities. Access to bicycle parking is provided via building elevators and bicycle ramps. Lastly, pedestrian access is provided on Bradford Street and internally via pedestrian walkways.

Transportation Context

6. The site is located within the City’s newly defined Urban Growth Centre boundary as per the 2023 OP, which is generally designated for high intensification and is expected to provide improved and / or evolving levels of road, transit, pedestrian, and cycling service. In addition, following the latest OP update, the City is in the process of updating its Comprehensive Zoning By-law (Draft #2), which proposes significant changes to the bicycle and vehicle parking requirements for new developments in response to evolving transportation priorities and objectives.
7. The site is well-situated relative to existing and planned transit services operated by Barrie Transit, Metrolinx (GO) Transit, and Simcoe County Transit. Notably, the site is located within 200 from local bus stops that provide direct connections to key local and regional transit destinations, including the Barrie Bus Terminal (approximately one kilometre to the north) and Allandale Waterfront GO Station (approximately one kilometre to the south).



8. Several city-wide transit improvements are being planned in Barrie to allow greater opportunities for future site users to travel a more extensive distance and with enhanced service to other local and regional communities. Such improvements include the development of the Barrie Allandale Transit Terminal, Downtown Mini Hub, Allandale Waterfront GO improvements, and Barrie Transit Vision (2025 Transit Network).
9. The site and its immediate surrounding area provide adequate pedestrian infrastructure and is generally limited in cycling infrastructure. The existing infrastructure nearest the site includes a mix of one and two-sided sidewalks and a Waterfront Trail located within a walkable distance from the site. As per the TMP, future pedestrian facilities (additional sidewalk infrastructure) and bicycle facilities (cycle tracks along Bradford Street and bike lanes along Victoria Street and Innisfil Street) are expected to significantly enhance active connections in all directions.
10. Several local destinations, amenities, and services can be accessed on-foot within a reasonable time and distance via sidewalks and pedestrian crossings. Key destinations within a two-kilometre radius include a variety of food establishments and amenities, Centennial Park / Beach, the Allandale Waterfront GO Station, and Downtown Barrie (accessible to City Hall, the public library, and existing Barrie Bus Terminal).

Vehicle Parking Considerations

11. Following the recent OP update, the site is subject to City of Barrie Zoning By-law 2009-141 vehicle parking standards for the Urban Growth Centre area, which results in a minimum requirement of 926 spaces, consisting of 912 resident spaces (one space per unit; assumed to be inclusive of residential visitor spaces) and 14 retail spaces (one space per 24 square metres of GFA). As part of the total vehicle parking requirement, a minimum of 29 spaces are to be accessible.
12. For comparison purposes, it is appropriate to consider the proposed City of Barrie Draft Zoning By-law standards for Parking District 1, which results in a minimum vehicle parking requirement of 640 spaces, including 548 resident spaces (0.60 spaces per unit) and 92 residential visitor spaces (0.10 spaces per unit). As part of the total vehicle parking requirement, a minimum of 21 spaces are to be accessible.
13. It is proposed to provide a reduced parking supply that intends to meet the City and Province's overarching mobility goals / sustainability targets and is suitable for the site. The vehicle parking supply provides 364 resident spaces for all market housing units (approximately 0.469 spaces per unit), including 21 accessible spaces, as well as an additional four short-term spaces to accommodate on-site pick-up / drop-off activity. It is proposed to provide no residential visitor, affordable housing unit, or retail spaces.
14. Access to the underground parking facility is currently provided via driveway on Bradford Street for at-grade parking and via parking ramp from the primary driveway on Bradford Street.
15. The proposed (reduced) vehicle parking standards have been assessed based upon a comprehensive assessment of key considerations including the evolving provincial and municipal planning and policy context, evolving transportation context within the site area, review of progressive Zoning By-law standards and corresponding parking reductions across the Province, review of relatively low or decreasing resident market parking approvals across the Province, review of area public parking facilities, ancillary nature of retail use, review of "no minimum" retail parking approvals in Barrie, and diverse TDM strategies proposed for the site.



Bicycle Parking Considerations

16. The site is subject to City of Barrie Zoning By-law 2009-141 bicycle parking standards, which results in a minimum requirement of 182 indoor spaces for the residential use of the proposed development.
17. For comparison purposes, it is appropriate to consider the proposed City of Barrie Draft Zoning By-law standards for Parking District 1, which results in a minimum bicycle parking requirement of 1,558 spaces, including 1,370 indoor spaces (1.50 spaces per unit) and 188 outdoor spaces (approximately 0.20 spaces per unit) to serve the residential and retail uses of the proposed development.
18. An additional review of progressive province-wide bicycle parking zoning standards indicates ranges of 0.50 - 1.00 spaces per unit for indoor/long-term and 5 spaces - 0.20 spaces per 100 square metres outdoor/short-term currently in-effect. For ancillary retail uses (e.g. comparable to the size proposed for the site), no minimum bicycle parking standards were commonly observed.
19. Based on the foregoing, it is proposed to provide 912 bicycle parking spaces, consisting of 820 indoor spaces (approximately 0.90 spaces per unit) and 92 outdoor spaces (approximately 0.10 spaces per unit), to accommodate the future bicycle parking needs on-site.
20. Access to the indoor bicycle parking is provided via building entrance, elevators (to levels 2 to 4), or bicycle ramps at-grade (to upper mezzanine level) and on the upper parking levels. Access to the outdoor bicycle parking is provided at-grade via publicly accessible entrances and external network along the north and south boundaries of the site.
21. Based on the foregoing, the bicycle parking supply meets the current minimum zoning requirements and is expected to accommodate the needs of the proposed development.

Loading Considerations

22. The site is subject to City of Barrie Zoning By-law 2009-141 loading standards, which results in no minimum requirement for the scale of the proposed development.
23. It is noted that the Draft Zoning By-law provides loading standards that are unchanged from the current in-force Zoning By-law, which results in no minimum requirement.
24. For comparison purposes, consideration to more contemporary / progressive supply standards as per City of Toronto Zoning By-law 569-2013 loading standards results in a minimum loading requirement of 1 Type G space (typical loading space for residential garbage activity) and 1 shared Type C space (typical loading space for residential move-in / move-out and retail activity), for a total of two loading spaces.
25. It is proposed to provide two loading spaces, consisting of one loading space and per building, to accommodate the expected loading needs of the site per City of Toronto Zoning By-law 569-2013 supply standards.



26. Access to the loading facilities are provided via site driveway off Bradford Street for each building near its corresponding building cores.
27. It is noted that the garbage truck requires one correction when entering the loading space for each building.
28. The loading supply and its dimensions meet the current minimum zoning requirements of the proposed development.

Pick-up / Drop-off Considerations

29. Based on the emergence of auto-based shared mobility options and limited short-term parking within the immediate area, a pick-up / drop-off facility is recommended on-site.
30. It is proposed to provide four pick-up / drop-off parking spaces located at-grade (at the rear of the site near the building entrance) to accommodate short-term, delivery, or service maintenance activities expect to serve the site.
31. The provision of a pick-up / drop-off facility is expected to reduce the need for private vehicle ownership and reliance on the automobile for everyday needs. While not formally required, the proposed short-term parking supply on-site will meet the practical needs of the proposed development and help limit vehicular impacts to the area street network.

Multimodal Travel Demand Forecasting

32. The existing residential mode share for the site reflects a high auto travel mode approximately 87%-89% during the weekday peak periods and approximately 5% to 11% residents utilizing non-auto modes of travel (i.e. transit and active transportation such as walking and cycling). This mode share is consistent with the mode share adopted by the City of Barrie, presented in the 2019 TMP.
33. The TMP establishes a future target travel mode share, which estimates a decrease in vehicle modes of travel and an increase in non-vehicle modes. The target future mode share indicates a reduction in the auto modes of travel (approximately a reduction rate of 5%) and an increase in the utilization of non-auto transportation modes. This reflects planned improvements in transit services and active transportation infrastructure.
34. The adopted future mode share for the site was derived from a review of the City of Barrie's TMP travel mode share and discussions with the City of Barrie staff. The 5% reduction in the auto mode share was adopted and applied to the existing site mode share for both the weekday morning and afternoon peak hours, which resulted in approximately a decrease of 4 percentage points for auto travel modes.
35. Vehicle trip generation rates were derived from the ITE 11th Edition Trip Generation Manual for land use code (LUC) 222 – Multifamily housing (High-Rise), not close to rail transit) for the weekday morning and afternoon peak hours. As per City of Barrie TIS Guidelines 6.3.1 (January 12, 2021), since the AM and PM R² values for the fitted curve equations are less than 0.85, the ITE average trip rates for the weekday morning and afternoon peak hours were adopted for this study.



36. The adopted vehicle trip rates were further adjusted to account for the projected increase in transit services and active transportation infrastructure improvements. This allowance resulted in an auto trip rate reduction of 5% based on the City's suggested target and review of the City's 2019 TMP.
37. Application of the adopted vehicle trip rates to the development plan results in 235 and 275 two-way vehicle trips during the weekday morning and afternoon peak hours, respectively.
38. Using a backwards calculation methodology, the total person trips were derived based on the forecast vehicle trips. The resultant net person trips for each travel mode were then calculated based on the adopted mode share.
39. The site is forecast to generate a total of 285 and 325 two-way person trips during the weekday morning and afternoon peak hours, respectively. Of the total person trips, 235 and 275 two-way trips are forecast for the site during the weekday morning and afternoon peak hours, respectively.
40. The non-automobile travel modes reflect a much smaller portion of trips forecast for the site. 25 two-way person trips are anticipated to be made by transit modes during the weekday morning and afternoon peak hours, respectively. An additional 20 and 5 two-way non-automobile trips are forecast to be made by walking and cycling during the weekday morning and afternoon peak hours, respectively.

Vehicular Traffic Considerations

41. Existing baseline traffic volumes were established at intersections and driveways within the study area for the weekday morning and afternoon peak hour periods using traffic count information obtained from surveys undertaken by Spectrum Traffic Data Inc. on Wednesday, September 13, 2023.
42. Traffic allowances were made for other specific proposed developments in the area, based on a review of the City of Barrie's list of current development projects as of October 2023. These sites represent a total development of approximately 4,650 residential units, 145 hotel units, 5,100 m² of non-residential GFA.
43. An allowance for the general corridor growth of traffic along Bradford Road in the City of Barrie has been considered as part of this study. As part of the pre-consultation with the City, a 4% per annum growth rate was considered for the build-out, 5-year and 10-year post build-out horizon years.
44. Application of this growth rate in addition to the traffic allowances for background area development growth is considered excessive and does not represent reasonable traffic growth. Nevertheless, a review comparing the general corridor growth rates and the effective growth rates that represent the local area traffic of the total background development traffic was conducted.
45. Based on this review, BA Group conservatively adopted a resultant general corridor growth in addition to the area background development traffic allowances, which would result in a net growth of 4% per annum along Bradford Street northbound and southbound, which is the sum of the allowance of background development traffic and net corridor growth rate.



46. The existing site, as surveyed, generates approximately 35 two-way vehicle trips during the weekday morning and afternoon peak hours. As part of the redevelopment of the subject site, these trips will be removed from the road network.
47. The site is anticipated to generate in the order of 200 and 240 net new two-way vehicle trips during the weekday morning and afternoon peak hours, respectively.

Vehicle Traffic Operations Analysis

Signalized Intersections

48. The Innisfil Street / John Street intersection operates under a pedestrian signal on the north leg of the intersection. Based on correspondence with City staff, BA Group adopted a cycle length of 70 seconds for the pedestrian signal at the Innisfil Street / John Street intersection during the weekday morning and afternoon peak periods. However, due to the low pedestrian crossing volumes, the intersection effectively operates as an unsignalized intersection with John Street movements under stop-controlled and Innisfil Street movements under free-flow conditions.
49. Under existing, future background 2028, and future total 2028 traffic conditions, the key area signalized intersections operate at acceptable capacity during the weekday morning and afternoon peak hours with overall volume-to-capacity (v/c) ratios of 0.35 or better.
50. As requested by the City of Barrie, additional traffic analyses were conducted for the post build-out of the site to consider additional corridor growth that may occur along the Bradford Street corridor in the next 5-year and 10-year horizon periods beyond the build-out of the site.
51. In the future post build-out horizon (i.e. 2033 and 2038), the area signalized intersections operate at acceptable capacity with overall v/c ratios of 0.51 or better during the weekday morning and afternoon peak hours. The area signalized intersections are impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions.
52. Based on the foregoing, the traffic generated by the proposed development can be acceptably accommodated at the key area signalized intersections. No mitigation measures or improvements are recommended at the area signalized intersections.

Unsignalized Intersections

53. Under existing, future background 2028, and future total 2028 traffic conditions, the key area unsignalized intersections operate at an acceptable level of service with individual movements functioning at LOS E or better during the weekday morning and afternoon peak hours.



54. Under post site build-out horizon periods (i.e. 2033 and 2038), all individual movements at the key area unsignalized intersections generally operate at acceptable level of service, LOS E or better, with the exception of the westbound movement at the Bradford Street / John Street intersection during the weekday afternoon peak hour. In the future, it is anticipated that the westbound movement will operate at LOS F with an extended delay of 178 seconds during the weekday afternoon peak hour. The area unsignalized intersections are impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions. In addition, this condition is expected to occur under the future background 2033 and 2038 traffic conditions, prior to any development related to the subject site.
55. A characteristic of the HCM 2000 analysis methodology for unsignalized intersections is that once a certain average vehicle delay threshold is exceeded, any modest increment in the major street traffic stream (along Bradford Street) results in a substantial increase in predicted vehicle delays of the minor street traffic stream (John Street). As such, the analysis results indicate a significant increase in vehicle delay at the John Street approach under the future background and future total conditions.
56. Based on the analysis, the area unsignalized intersections can appropriately accommodate the build-out of the site and the site-related traffic activity during the build-out horizon year (2028). It should be noted that the significant allowance for traffic growth along Bradford Street under the 5-year (2033) and 10-year (2038) post build-out horizon year scenarios result in a significant impact to the operations of the unsignalized intersections along Bradford Street. Given that this condition occurs regardless of any redevelopment of the site, no mitigation measures are recommended upon build-out of the proposed development.
57. The existing site driveways currently operate under capacity with all movements functioning at LOS D or better under existing and future background traffic conditions.
58. Under future total 2028 traffic conditions, the proposed site driveway will function at a busy, yet acceptable level of service, LOS E or better, during the weekday morning and afternoon peak hours.
59. Under post site build-out horizon periods (i.e. 2033 and 2038), the proposed site driveway will generally function at a busy, yet acceptable level of service, LOS E or better, with the exception of the eastbound movement during the weekday afternoon peak hour. It is anticipated that the eastbound movement will operate at LOS F with an extended delay of 285 seconds during the weekday afternoon peak hour. The proposed site driveway is impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions.
60. As part of the City of Barrie Official Plan and Transportation Master Plan, the road widening of Bradford Street includes the preferred plan to include a raised centre median or two-way left-turn (TWLT) median lane. While the planned road improvements along Bradford Street are outlined for a 2041 horizon, it should be noted that these improvements may occur earlier, as adjacent sites to Bradford Street redevelop, as stated in their TMP. It is anticipated that the City of Barrie may wish to reassess the timeline in which they can implement their preferred plan for the Bradford Street corridor. Furthermore, it is anticipated that the City of Barrie may wish to also monitor and study the future traffic operations along the Bradford Street corridor through other studies, as other sites intend to develop.



Supplementary Analysis

61. Due to the substantial increase in traffic growth along the Bradford Street corridor during the 5-year (2033) and 10-year (2038) post build-out horizon periods, the Bradford Street / John Street and Bradford Street / Proposed Site Driveway intersections are expected to function at very busy level of service, LOS F during the weekday afternoon peak hour. It should be noted that these intersections are impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions.
62. While the site does not require any mitigation measures or road improvements within the area road network, there are planned road improvements anticipated to be implemented along the Bradford Street corridor as outlined in the Barrie OP and TMP. The Barrie OP and TMP outline the provision of a two-way left-turn (TWLT) median lane to be implemented by 2041. As a result, BA Group has conducted a sensitivity analysis to assess the provision of a TWLT median lane along the Bradford Street corridor, which aligns with the Barrie OP and TMP.
63. As outlined in the Barrie OP and TMP, the implementation of the planned road improvement along the Bradford Street corridor may occur earlier, as adjacent sites to Bradford Street redevelop. Note that at the full site build-out, the planned road improvement is not required given that traffic operations within the area road network operate at acceptable capacity and level of service conditions. The area road network is impacted by the addition of non-site related traffic growth since the site-related traffic volumes remain consistent from 2028 traffic conditions. Notwithstanding, BA Group has assumed that the provision of a TWLT median lane along the Bradford Street corridor will be implemented prior to the build-out of the site.
64. With the provision of a TWLT median, the Bradford Street / John Street and Bradford Street / Proposed Site Driveway intersections are expected to function at an acceptable level of service, LOS D or better, during the weekday morning and afternoon peak hours for all future horizon years.
65. Based on the foregoing, the implementation of the City's preferred plan (i.e. provision of a TWLT median) as outlined in the Barrie OP and TMP, results in a significant improvement of the traffic operations along the Bradford Street corridor. Given the results of the traffic operations conducted as part of the sensitivity analysis, potential mitigation measures may be required earlier than the 2041 horizon, which has been indicated in the Barrie OP. Therefore, it is anticipated that the City may wish to reassess the timeline in which they can implement their preferred plan for the Bradford Street corridor. While the subject site does not require any road improvements or mitigation measures, the provision of a TWLT median lane will provide relief to intersections along the Bradford Street corridor under future traffic conditions, given the significant non-site related traffic growth projected by the City.



Appendix A:

Reduced Scale Architectural Plans



126 BRADFORD ST

Proposed Residential Development



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DRAWING LIST				
Sheet Number	Sheet Name	Revised (A01.01 to A01.03)	Revised (A02.01 to A02.05)	Revised (A03.01 to A03.02)
A01.00	Cover Sheet	1		
A01.01	Project Information/Site Context/Statistics	1		
A01.02	Site Survey	1		
A01.03	Overall Site Plan	1		
A02.01	Parking Floor - Level 1	1		
A02.02	Parking Floor - Level 1 Upper	1		
A02.03	Parking Floor - Level 2	1		
A02.04	Parking Floor - Level 3-4	1		
A02.05	Parking Floor - Level 5	1		
A02.06	Parking Floor - Level 6	1		
A02.07	Level 7	1		
A02.08	Level 8-11	1		
A02.09	Level 12-15	1		
A02.10	Level 16-19	1		
A03.01	Elevations - North & East	1		
A03.02	Elevations - South & West	1		
A04.01	Sections	1		
A05.01	Sun Shadow Study - April 21	1		
A05.02	Sun Shadow Study - June 21	1		
A05.03	Sun Shadow Study - September 21	1		
A05.04	Sun Shadow Study - December 21	1		
A06.01	Perspectives	1		
TOTAL NUMBER OF SHEETS: 22				

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This Drawing is Not To Be Used For Construction Until Signed By The Architect.

Date:


SEAL MUST BE SIGNED TO BE VALID

KIRKOR
ARCHITECTS AND PLANNERS
20 De Boers Drive Suite 400
Toronto ON M3J 0H1

Revisions:

No.	Revision	Date
1	REVISION SUBMISSION	NOV 28 2023
No.	Issued For	Date

Client Logo Here

Client:
CROWN (BRADFORD) DEVELOPMENTS INC.
126 Bradford St, Barrie, ON L4N 3B3
Proposed Residential Development

Drawing Title:
Cover Sheet

Scale:

Drawn by:
A.P.

Checked by:
R.P.

Project No.:
23-072

Date:
NOV 28, 2023

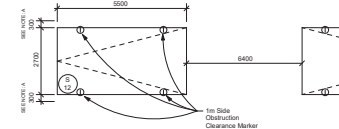
Drawing No.:
dA1.00



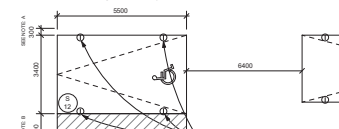
Site Context Plan 1
NTS dA1.01

TYPICAL PARKING SPACE:

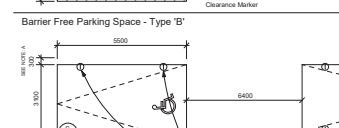
Drive Aisle @ 6.4m MIN.



Barrier Free Parking Space - Type 'A'



Barrier Free Parking Space - Type 'B'



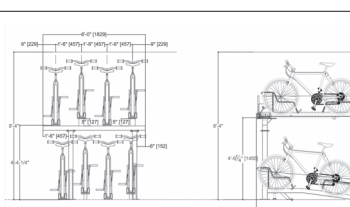
NOTES:
A. PROVIDE AN ADDITIONAL 300mm FOR PARKING SPACE WIDTH WHEN OBSTRUCTIONS OCCUR BETWEEN THE FRONT AND REAR 1000mm.
B. PROVIDE A 1800mm WALKWAY ON AT LEAST ONE SIDE OF AN ACCESSIBLE PARKING SPACE. THIS WALKWAY MAY BE SHARED WITH ADJOINING ACCESSIBLE SPACE.

Typical Parking Space Legend 2
NTS dA1.01

GENERAL PARKING LEVEL NOTES:

- FOR ALL PARKING GARAGE REQUIREMENTS FOR PAINTING, LIGHTING, LEVELS, ETC. SEE NOTES "STORAGE GARAGE CONFORMANCE REQUIREMENTS" ON DWG A8-X.
- ELEVATOR:
 - ELEVATOR SHAFT DIMENSIONS PROVIDED BY THE ELEVATOR CONSULTANT. A COPY OF THIS REPORT CAN BE OBTAINED FROM THE OWNER. COORDINATE SHAFT SIZE AND REQUIREMENTS WITH REVIEWED ELEVATOR SHOP DRAWINGS.
 - ELEVATOR PIT SHALL BE CO-ORDINATED WITH ELEVATOR SUPPLIER.
 - ELEVATOR SHAFT WALLS TO BE CONSTRUCTED TO ACHIEVE A MIN. FIRE RESISTANCE RATING OF 90 MIN.
 - AN APPROVED FIRE STOP MATERIAL IS TO BE USED TO SEAL INTERSECTION TOP OF CONCRETE BLOCK AT FLOOR SLABS.
 - ELEVATOR PIT LADDERS TO BE GALVANIZED STEEL, AND EXTEND 1200mm ABOVE SILL. LADDERS TO BE SUPPLIED & INSTALLED BY GENERAL CONTRACTOR.
- REFER TO INTERIOR DESIGN DRAWINGS FOR VESTIBULES, ELEVATOR LOBBIES, INTERIOR FINISHES AND SPECIFICATIONS.
- ALL AIR SHAFT SLABS SHOULD HAVE 2% SLOPE TOWARDS DRAIN.
- ELEVATOR PIT SHOULD HAVE 2% SLOPE TOWARDS DRAIN.
- PROVIDE 300X300 CHAMFER TO ALL CORNERS OF COLUMNS AND CONCRETE WALLS.
- ALL BUMP PITS TO BE PRECAST WITH AIR TIGHT FRAME AND COVER.
- FOR SAW CUT PATTERN, REFER TO STRUCTURAL DRAWINGS.
- FOR UNDER FLOOR DRAINAGE SEE MECHANICAL DRAWINGS.
- UNLESS OTHERWISE NOTED, ALL PARKING SPACES ARE 2.8M X 5.8M. DRIVEWAY ISLES 6.5M AND ALL PARKING SPACES ARE 3.0M X 5.8M.
- PROVIDE INSULATED HEATED PLENUM TO UNDERSIDE OF GROUND FLOOR AS DENOTED BY SHADDED AREA.
- PROVIDE SEMI-RIGID NON-COMBUSTIBLE INSULATION TO US OF NON-RESIDENTIAL HEATED AREAS AS DENOTED BY SHADDED AREA.
- PROVIDE TRAFFIC TOPPING ON LEVELS P1, P2, P3, P4 AND P5 SPECIFIED. ADJUST CONCRETE TO SATISFY TRAFFIC TOPPING SYSTEM. AT ALL DOORS FROM PARKING GARAGE TO COMMON AREAS, LOCKER ROOMS, LOBBIES AND VESTIBULES, PROVIDE INTERIOR FINISH AT DOORS TO MECHANICAL ROOMS. FEATHER TRAFFIC TOPPING AS REQUIRED.
- FOR EXHAUST AND INTAKE LOUVER SIZE AND LOCATION IN MECHANICAL, ELECTRICAL AND LOCKER ROOMS REFER TO MECHANICAL AND ELECTRICAL DRAWINGS.
- FOR SHORING AND CAISSON WALL LOCATION AND DETAILS REFER TO DRAWINGS PREPARED BY BREWSTER ASSOCIATES.
- PROVIDE PAINTED BLUE 600mm WIDE BAND, 900mm A.F.F., AT ALL COLUMN LOCATIONS WHICH HAVE A SECURITY PANG ALARM STATION. REFER TO ELECTRICAL DRAWINGS FOR LOCATIONS. ARCHITECT AND ENGINEER TO APPROVE COLOUR.
- LOCKER ROOM NOTES:
ALL LOCKER ABLES WITH TO BE 1100mm (TYP.) LOCKERS TO BE CONSTRUCTED WITH 6"x6" WIRE MESH PARTITIONS MINIMUM 2100mm HIGH. PROVIDE WIRE MESH DOOR AND CEILING. ALL WIRE MESH CEILING TO BE 450mm BELOW SPRINKLER DEFLECTOR THROUGHOUT.
REVIEW LOCKER ROOM LAYOUT PREPARED BY ARCHITECT AND INSTALLER TO PROVIDE INSTALLATION SHOP DRAWINGS FOR REVIEW BY OWNER AND ARCHITECT.
- BIKE CYCLE SPACE NOTES:
ALL BIKE CYCLE SPACES TO COMPLY WITH TORONTO BIKEWAY STANDARDS. HORIZONTAL RACKING 800 X 1800mm X 1800mm.
VERTICAL RACKING 800 X 1200mm X 1800mm.
- BIKE CYCLE LOCKER NOTES:
REFER TO TYPICAL BIKE CYCLE LOCKER DETAIL ON A1 AND A2 SERIES DRAWINGS.
- AT ALL STAIR PRESSURIZATION SHAFT ENCLOSURES, NO SERVICES SHALL BE ALLOWED TO PENETRATE OR PASS THRU THIS ENCLOSURE.
- CHANGE WALLS COLUMN DOORS ECT SHALL BE PAINTED IN ACCORDANCE WITH TORONTO MUNICIPAL CODE PROPERTY STANDARDS.
- PROVIDE ALL SIGNAGE, IDENTIFYING DEVICES AND HARDWARE AS REQUIRED BY TORONTO MUNICIPAL CODE PROPERTY STANDARDS S24-42, S24-41, S24-42 AND S24-43.

General Parking Levels Notes 3
NTS dA1.01

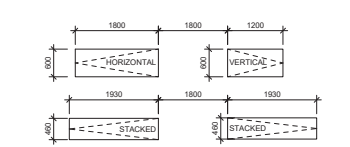


SPEC.
PRODUCT: The Lock-up stackable bike rack
Multiple stackable bike rack
SECTIONS: 2 sections, 4 sections, 6 sections, or 8 sections
CAPACITY: 3 bikes, 6 bikes, or 8 bikes
MATERIAL: HSS steel
FINISHES: Hot Dip Galvanized
SPACE USE: TRACKS - 12" center to center

Single Stackable Bike Rack Section

TYPICAL BIKE CYCLE PARKING SPACE:

WALKWAY: MINIMUM 1800mm
VERTICAL PARKING SPACE: 1200mm (L) x 600mm (W)
HORIZONTAL PARKING SPACE: 1800mm (L) x 600mm (W)
STACKED PARKING SPACE: 1500mm (L) x 400mm (W)



Project Statistics 4
NTS dA1.01

Typical Bicycle Parking Space Legend 5
NTS dA1.01

128 Bradford St, Barrie, ON

NTS dA1.01

NTS dA1.01

NTS dA1.01

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NTS dA1.01

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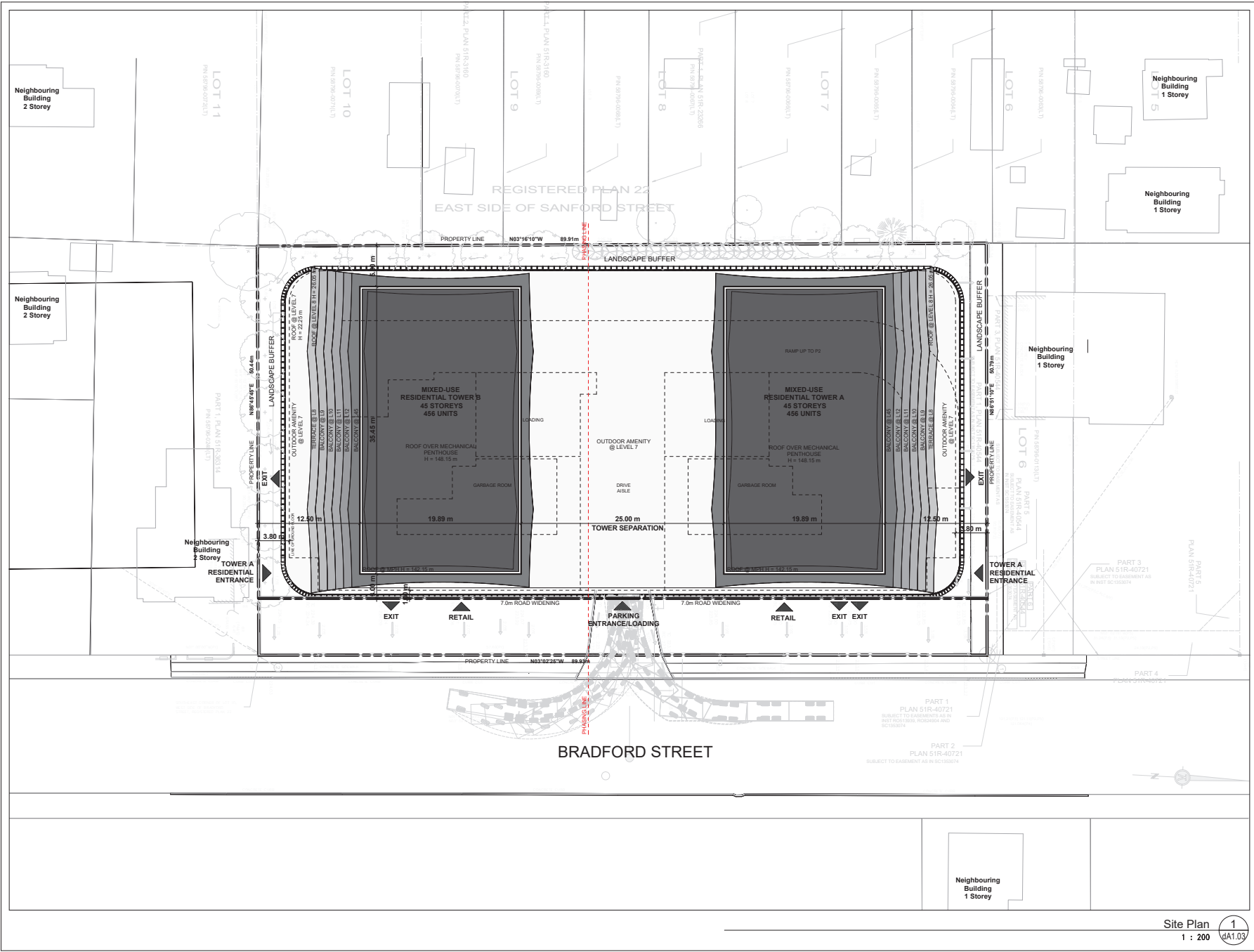
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No. Revision To Date

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SEAL MUST BE SHOWN TO BE VALID

KIRKOR

ARCHITECTS AND PLANNERS

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Toronto ON M3J 0H1

Revision:

No.	Revision	Date
1	REWORKING SUBMISSION	NOV 28, 2023
No.	Issued For	Date:

Client:

CROWN (BRADFORD) DEVELOPMENTS INC.

126 Bradford St, Barrie, ON L4N 3B3

Proposed Residential Development

Drawing Title:

Overall Site Plan

Scale:

1 : 200

Drawn by:

A.P.

Checked by:

R.P.

Project No.:

23-072

Date:

NOV 28, 2023

dA1.03

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Toronto ON M3J 0H1

Revision: No. Revision Date:

1	REVISION SUBMISSION	NOV 28 2023
No.	Issued For	Date:

Client:
CROWN (BRADFORD) DEVELOPMENTS INC.

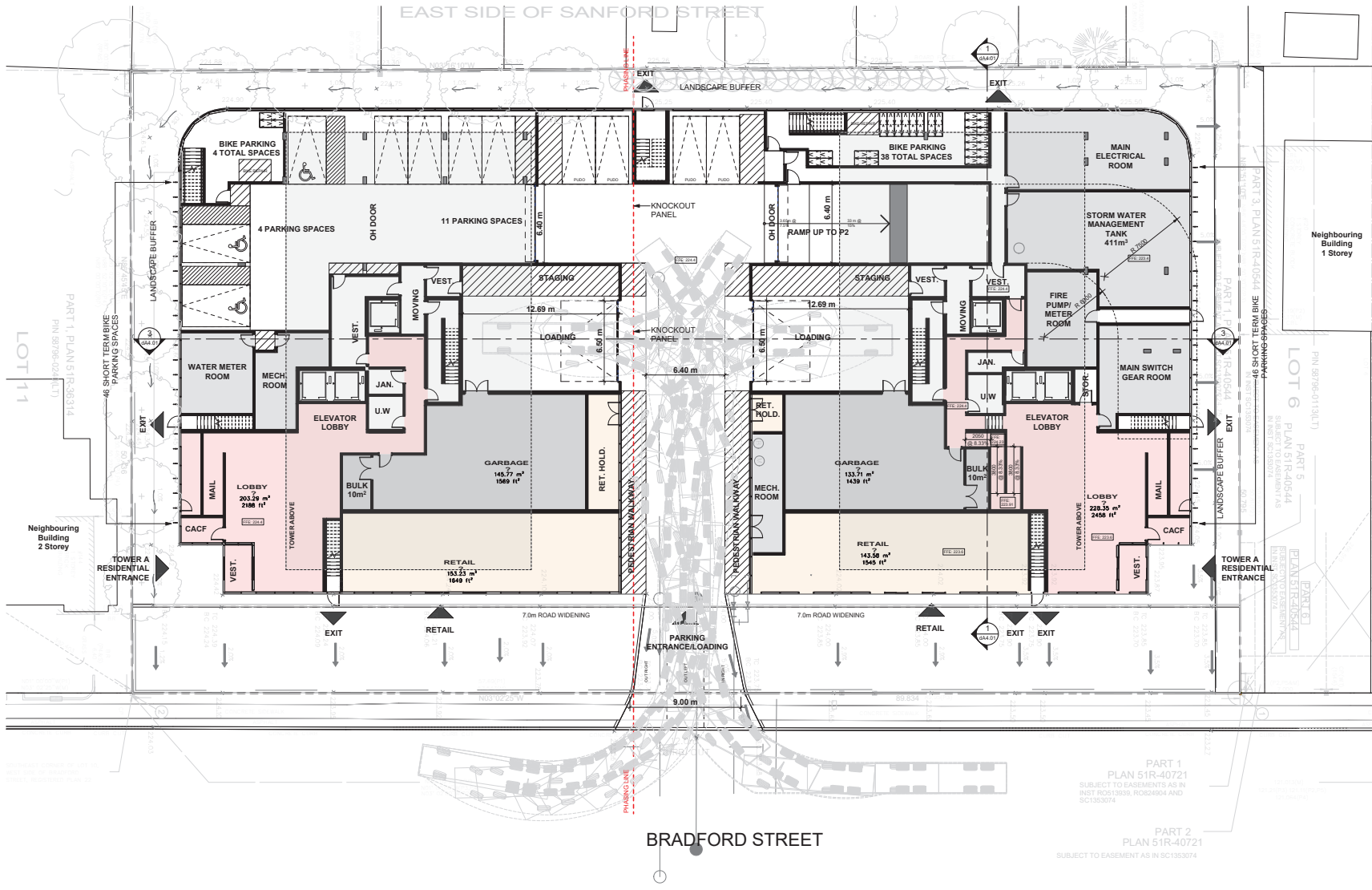
126 Bradford St, Barrie, ON L4N 3B3
Proposed Residential Development

Drawing Title:
Parking Floor - Level 1

Scale:
1 : 150
Drawn by:
A.P.
Checked by:
R.P.
Project No.:
23-072
Date:
NOV 28, 2023
Drawing No.:

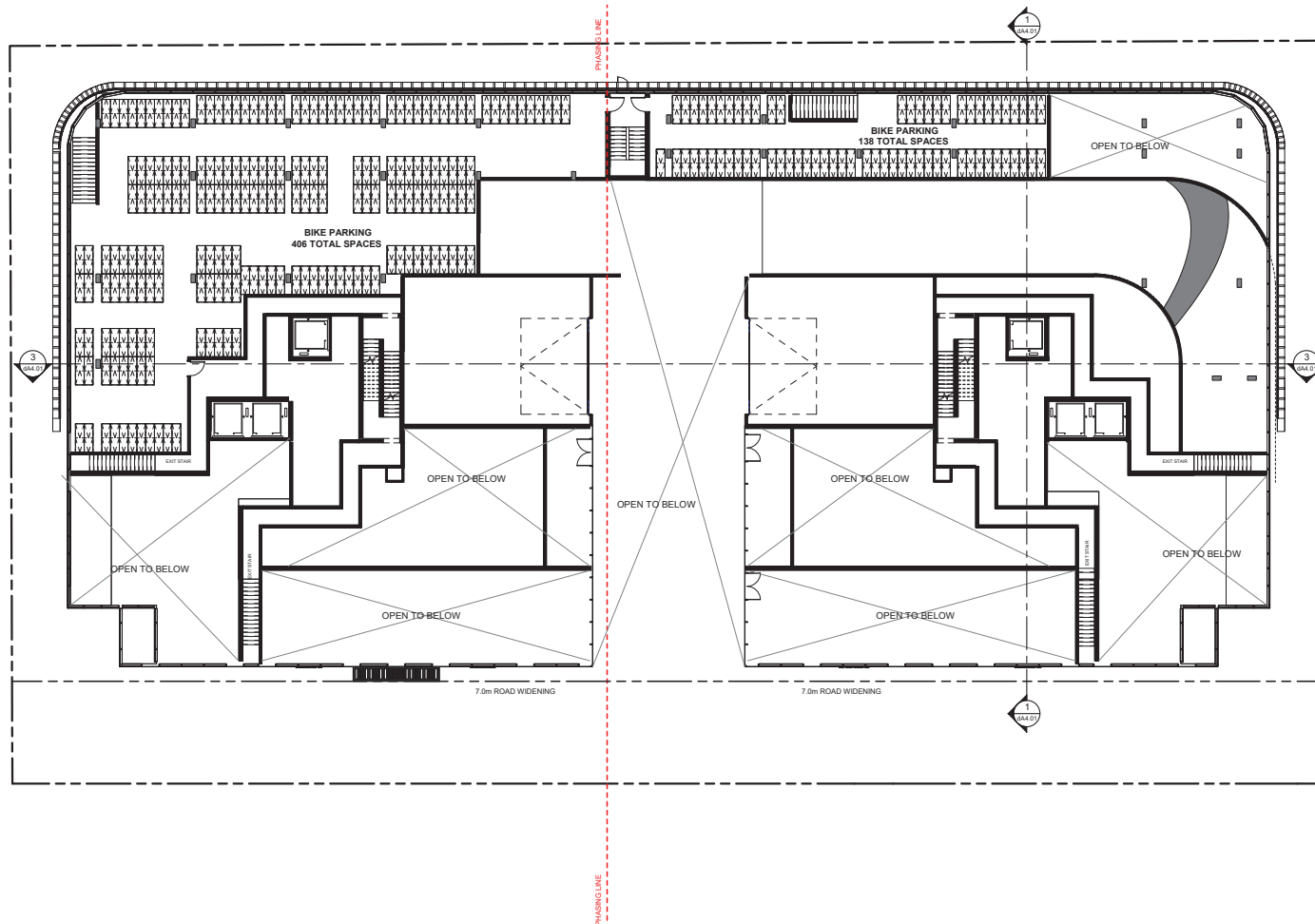


dA2.01



Floor Plan Level 1
1 : 150

1
dA2.01



Floor Plan Level 1 Upper
1 : 150

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1	REVISION SUBMISSION	NOV 28, 2023
No.	Issued For	Date:

Client:
CROWN (BRADFORD) DEVELOPMENTS INC.

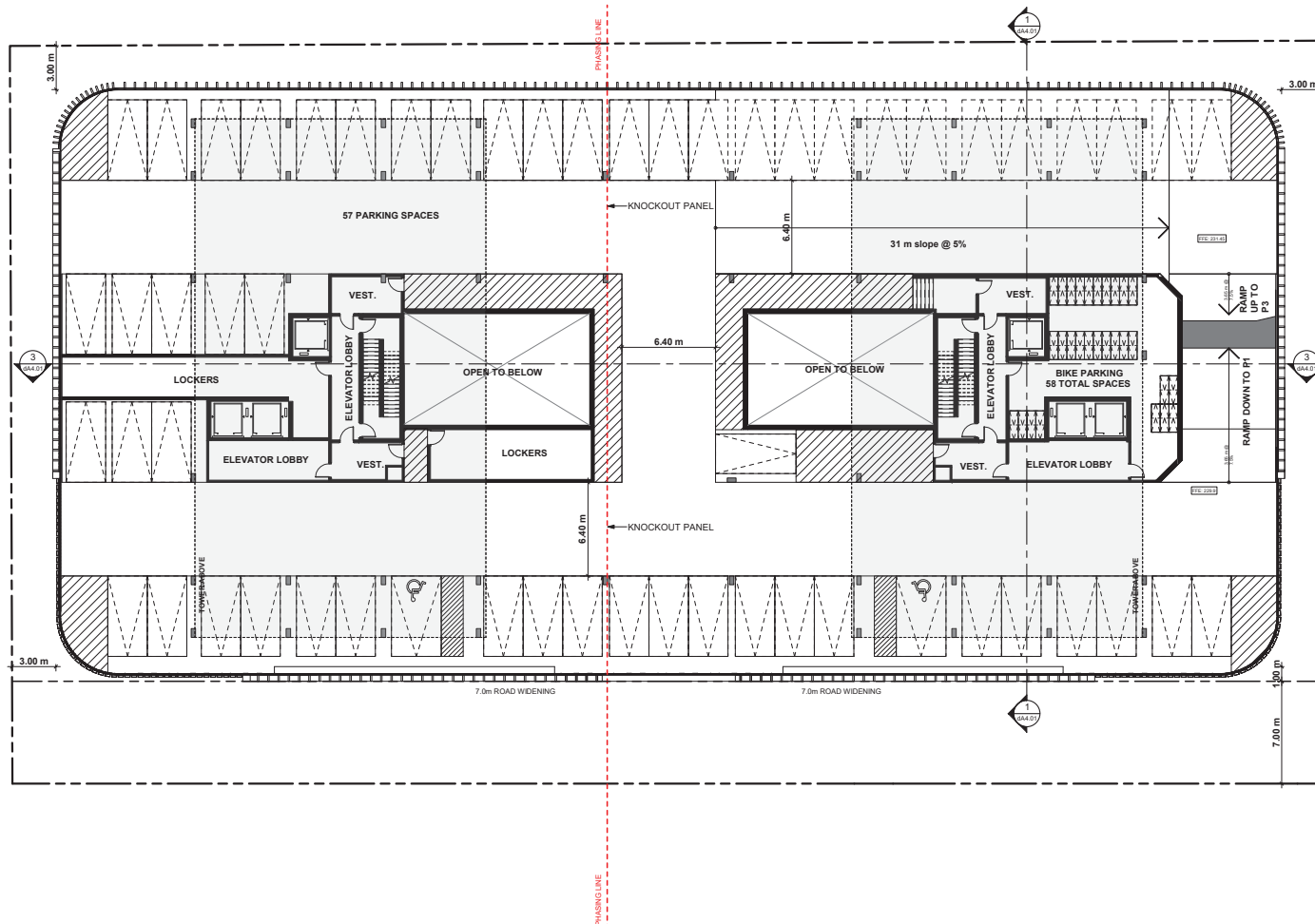
126 Bradford St, Barrie, ON L4N 3B3
Proposed Residential Development

Drawing Title:
Parking Floor - Level 1 Upper

Scale:
1 : 150
Drawn by:
A.P.
Checked by:
R.P.
Project No.:
23-072
Date:
NOV 28, 2023



dA2.02



Floor Plan Level 2
1 : 150

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No. Revision Date

1	REVISION SUBMISSION	NOV 28, 2023
No.	Issued For	Date:

Client:
CROWN (BRADFORD) DEVELOPMENTS INC.

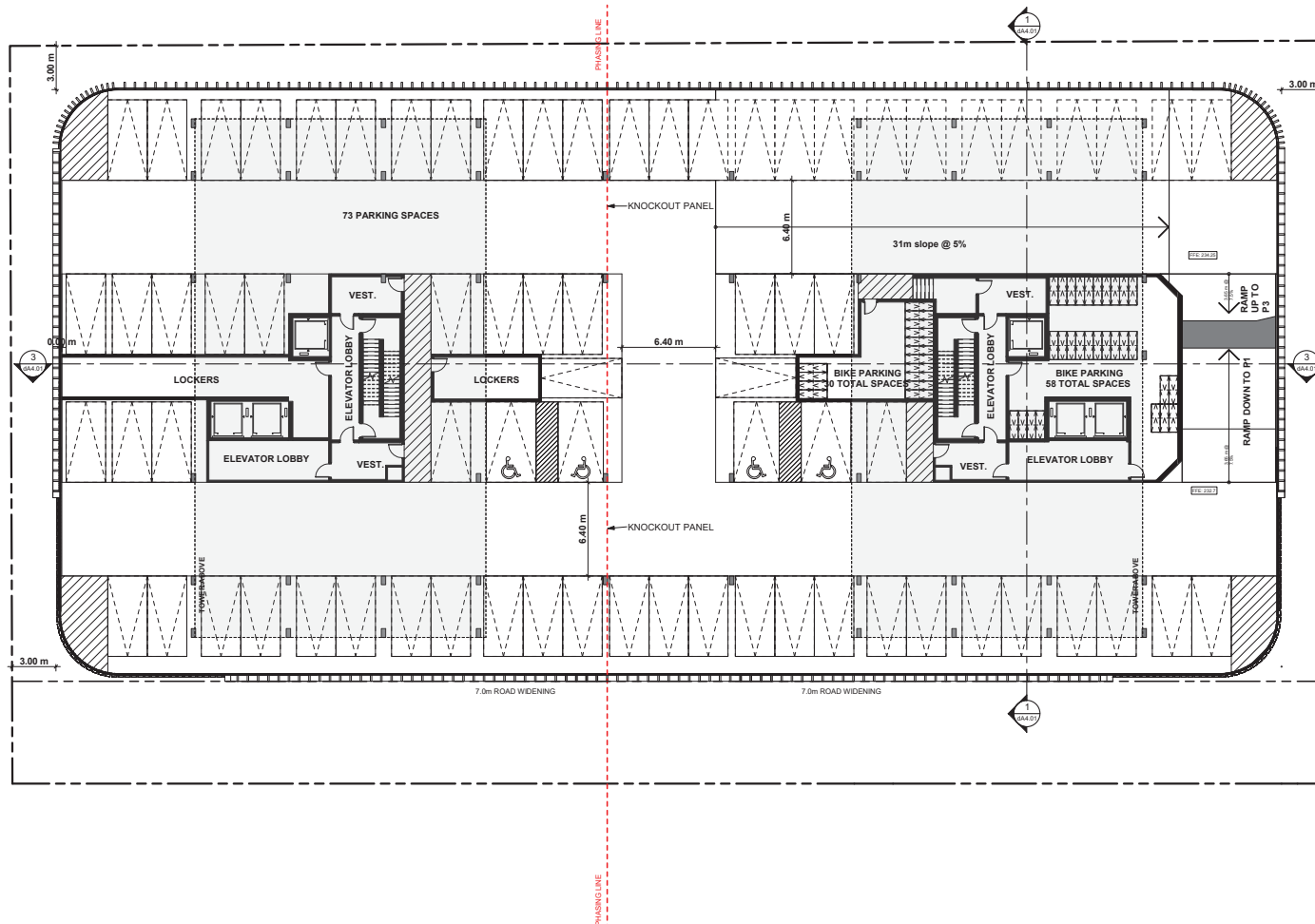
126 Bradford St, Barrie, ON L4N 3B3
Proposed Residential Development

Drawing Title:
Parking Floor - Level 2

Scale:
1 : 150
Drawn by:
A.P.
Checked by:
R.P.
Project No.:
23-072
Date:
NOV 28, 2023
Drawing No.:



dA2.03



Floor Plan - Level 3-4
1 : 150

1
dA2.04

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No.	Revision	Date

1	REVISION SUBMISSION	NOV 28, 2023
No.	Issued For	Date:

Client:
CROWN (BRADFORD) DEVELOPMENTS INC.

126 Bradford St, Barrie, ON L4N 3B3
Proposed Residential Development

Drawing Title:
Parking Floor - Level 3-4

Scale:

1 : 150

Drawn by:

A.P.

Checked by:

R.P.

Project No.:

23-072

Date:

NOV 28, 2023

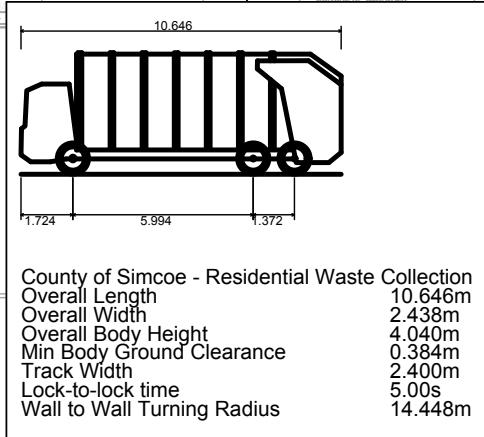
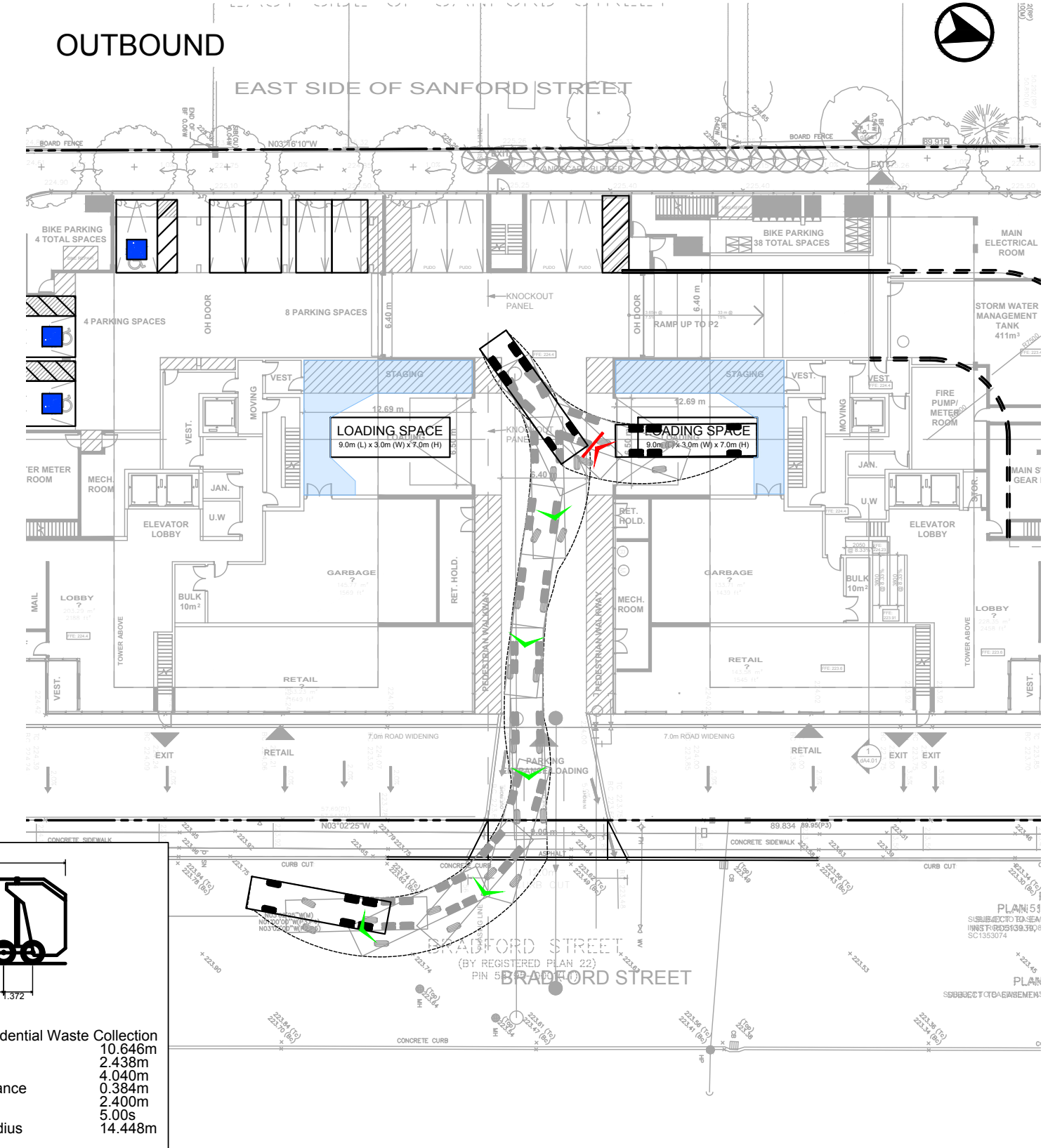
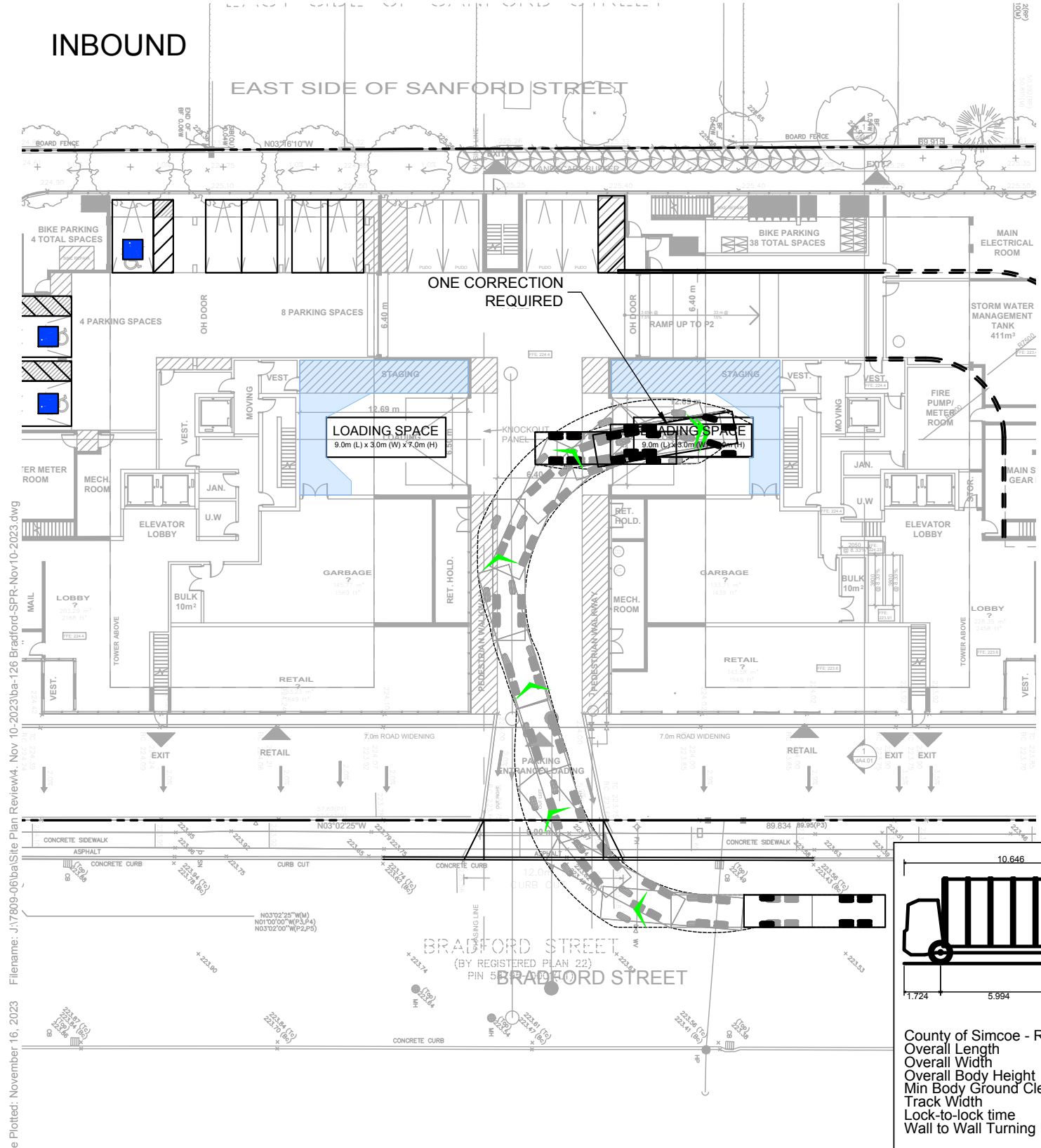
Drawing No.:

dA2.04



Appendix B: Vehicle Manoeuvring Diagrams



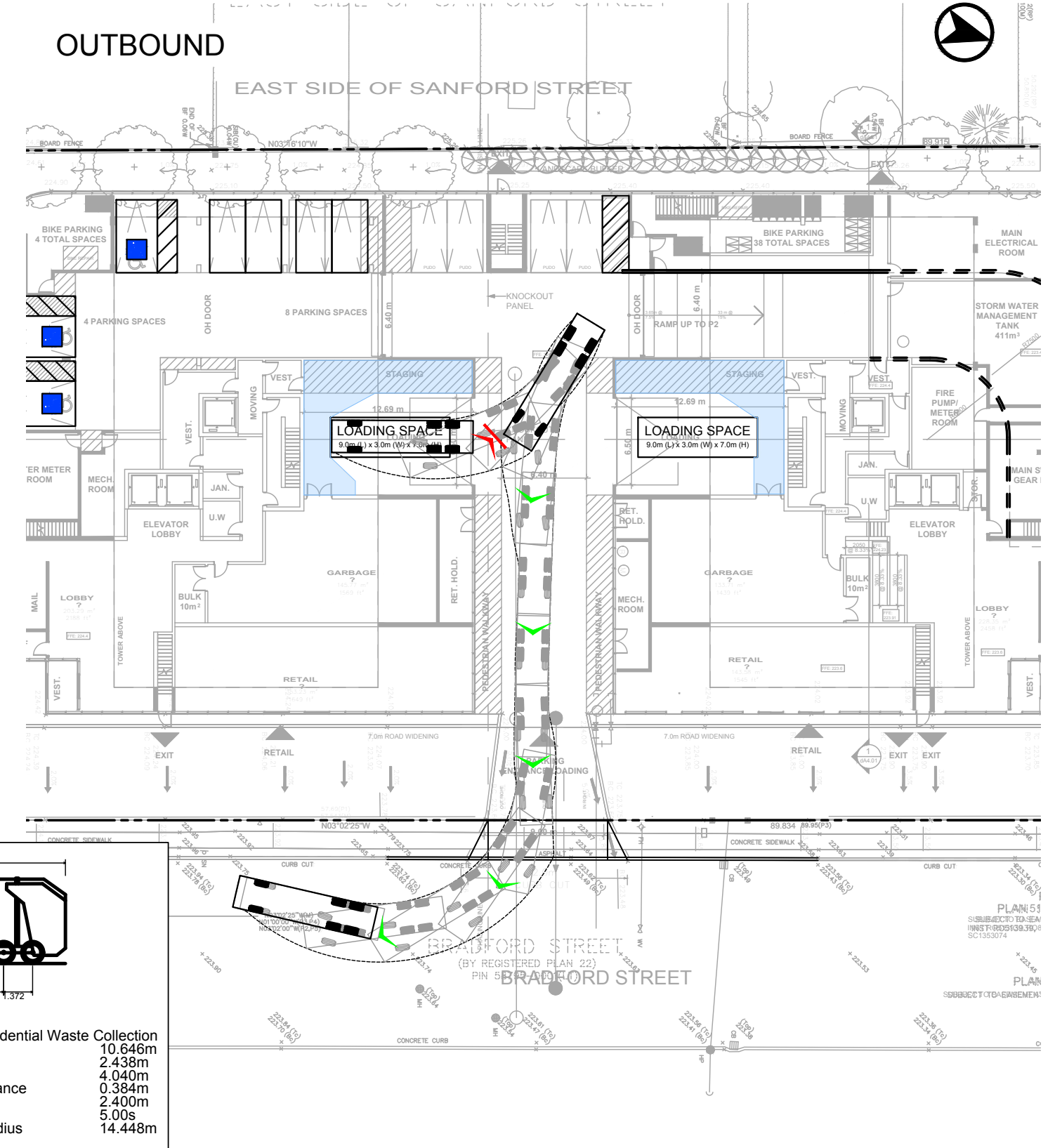
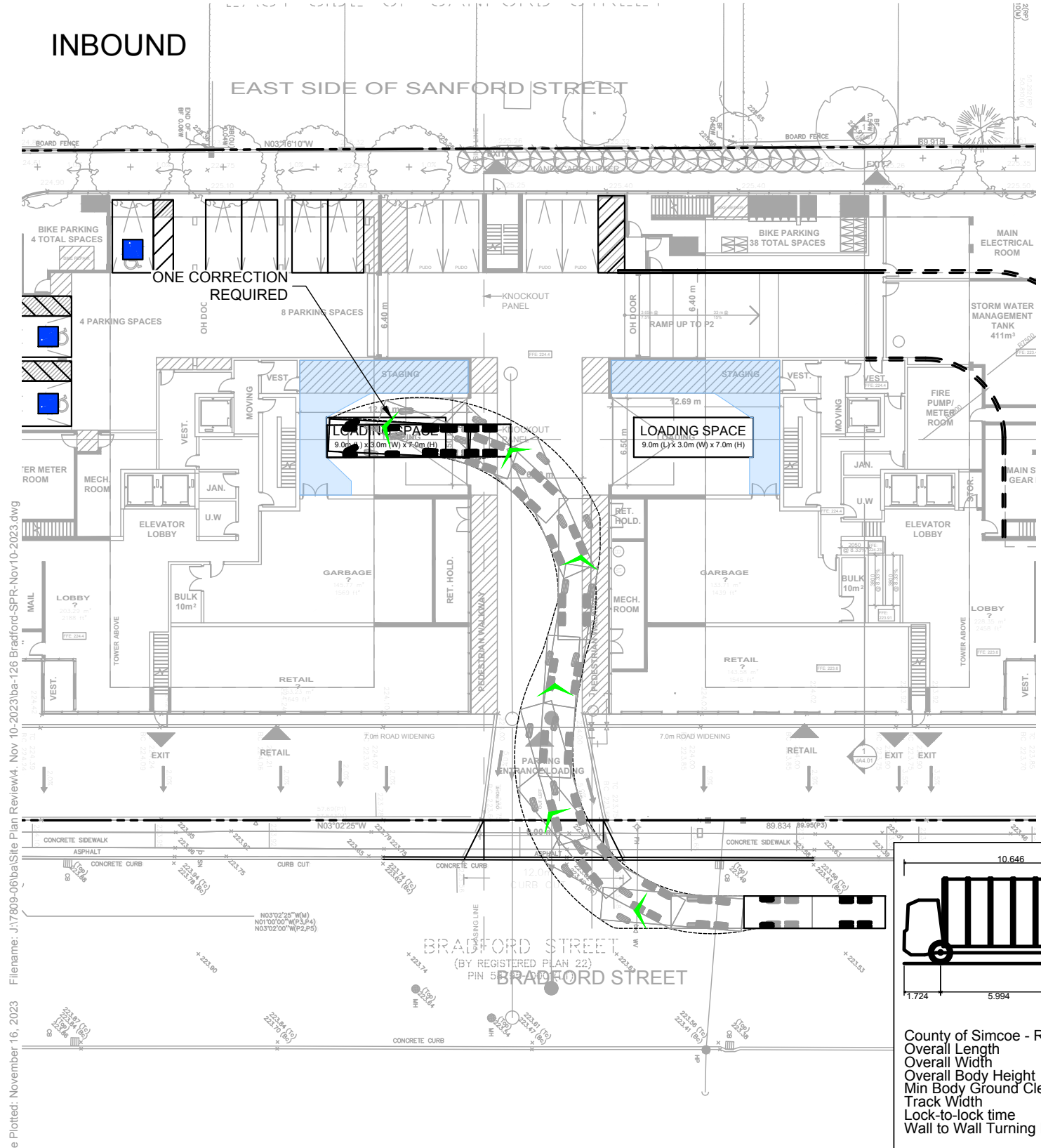




126 BRADFORD
VEHICLE MANOEUVRING DIAGRAM
CITY OF BARRIE GARBAGE TRUCK

Project: 126 Bradford
Project No. 7809-06
Date: November 16, 2023
Revised: --

Scale 0 2 4 6 8 10 20m
1:400
Drawing No. VMD-01



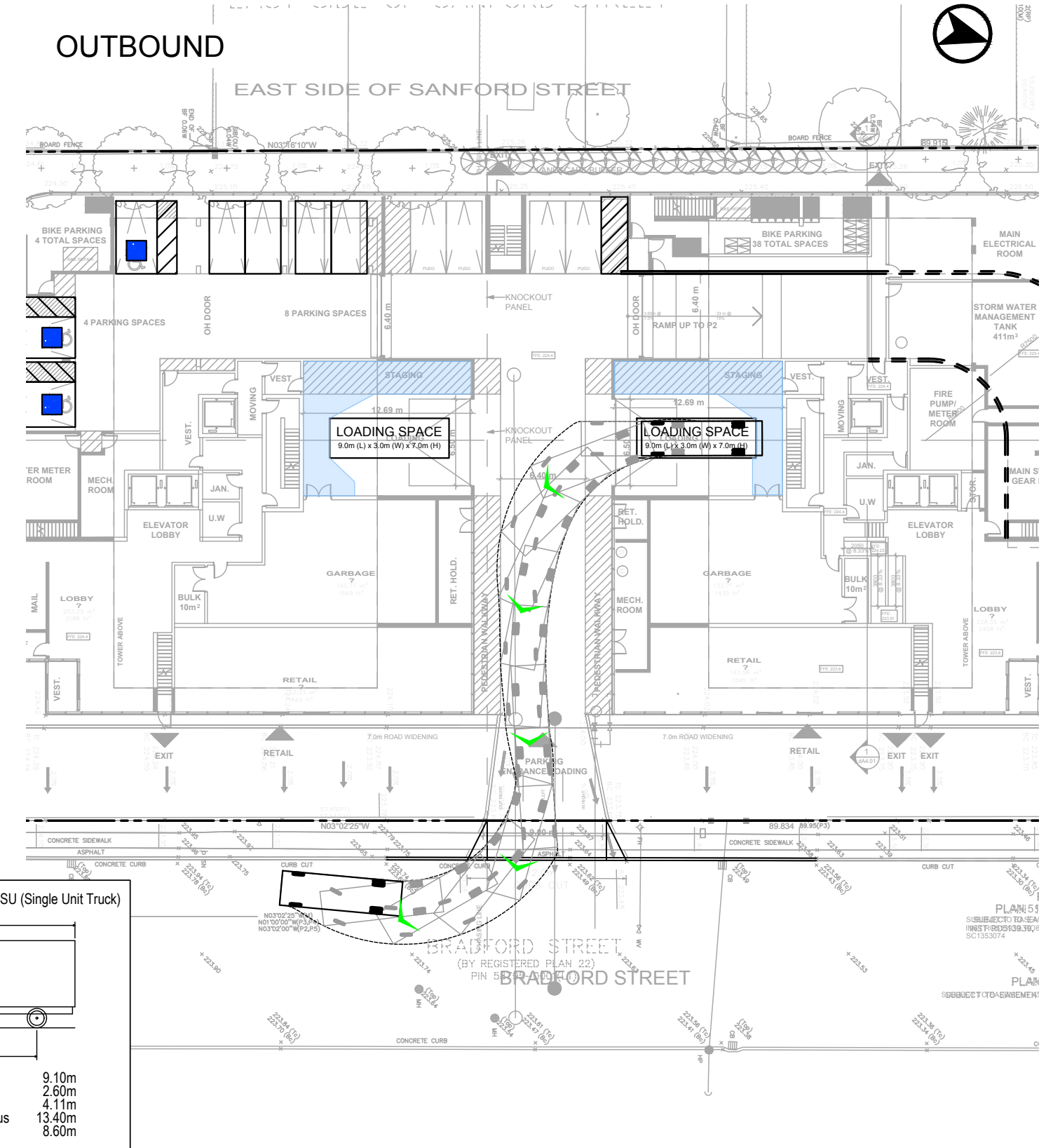
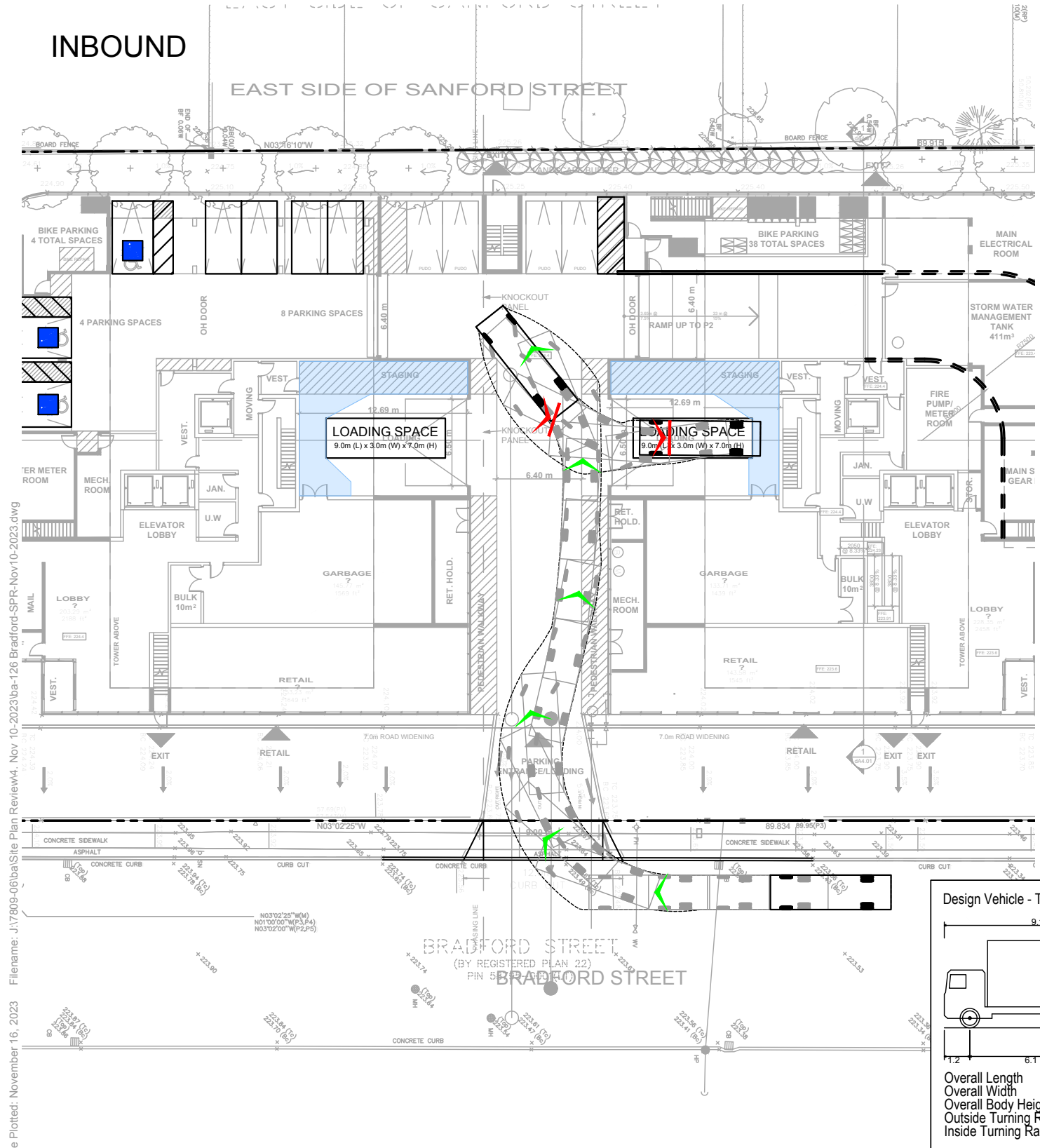
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Date Plotted: November 16, 2023

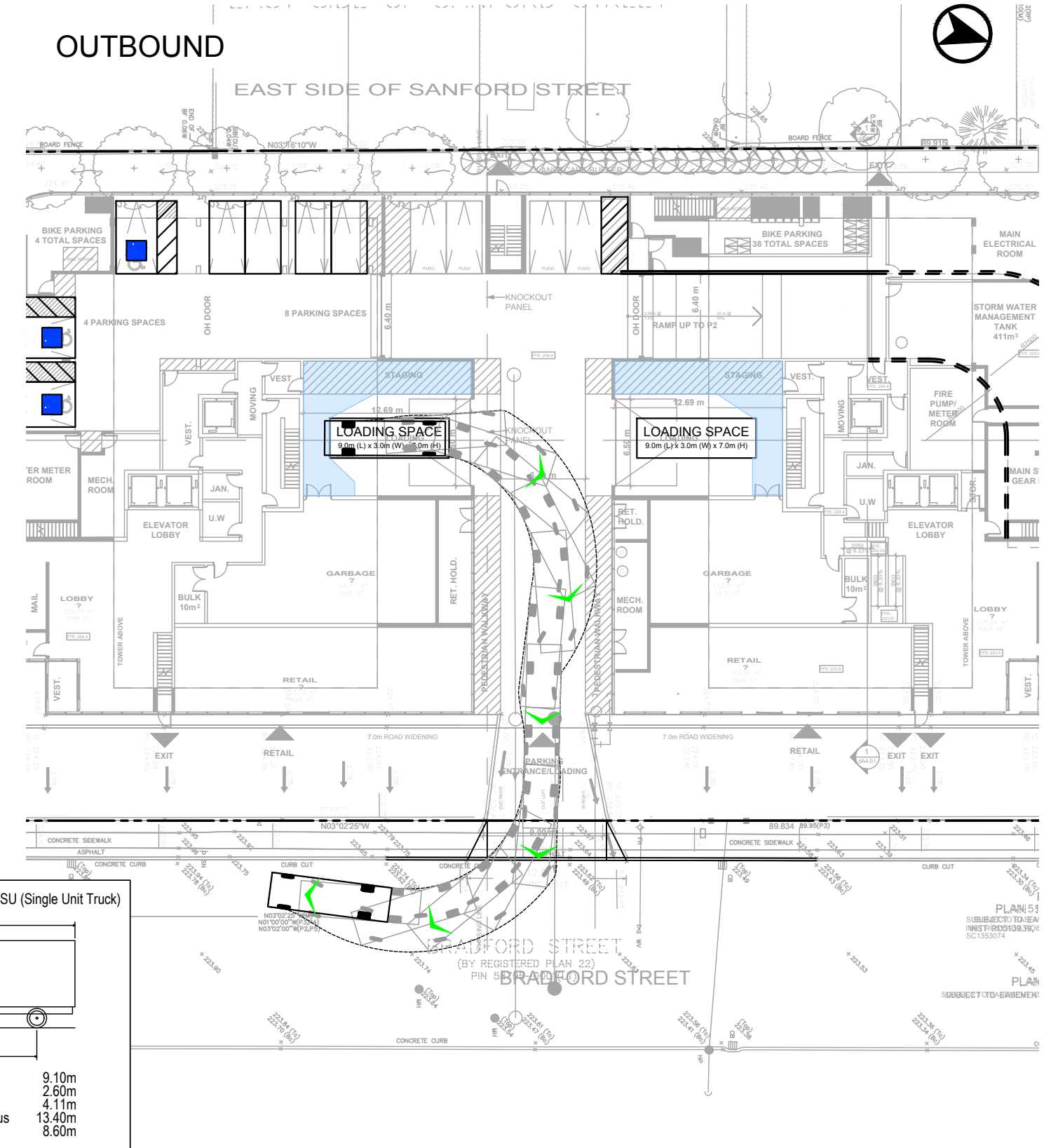
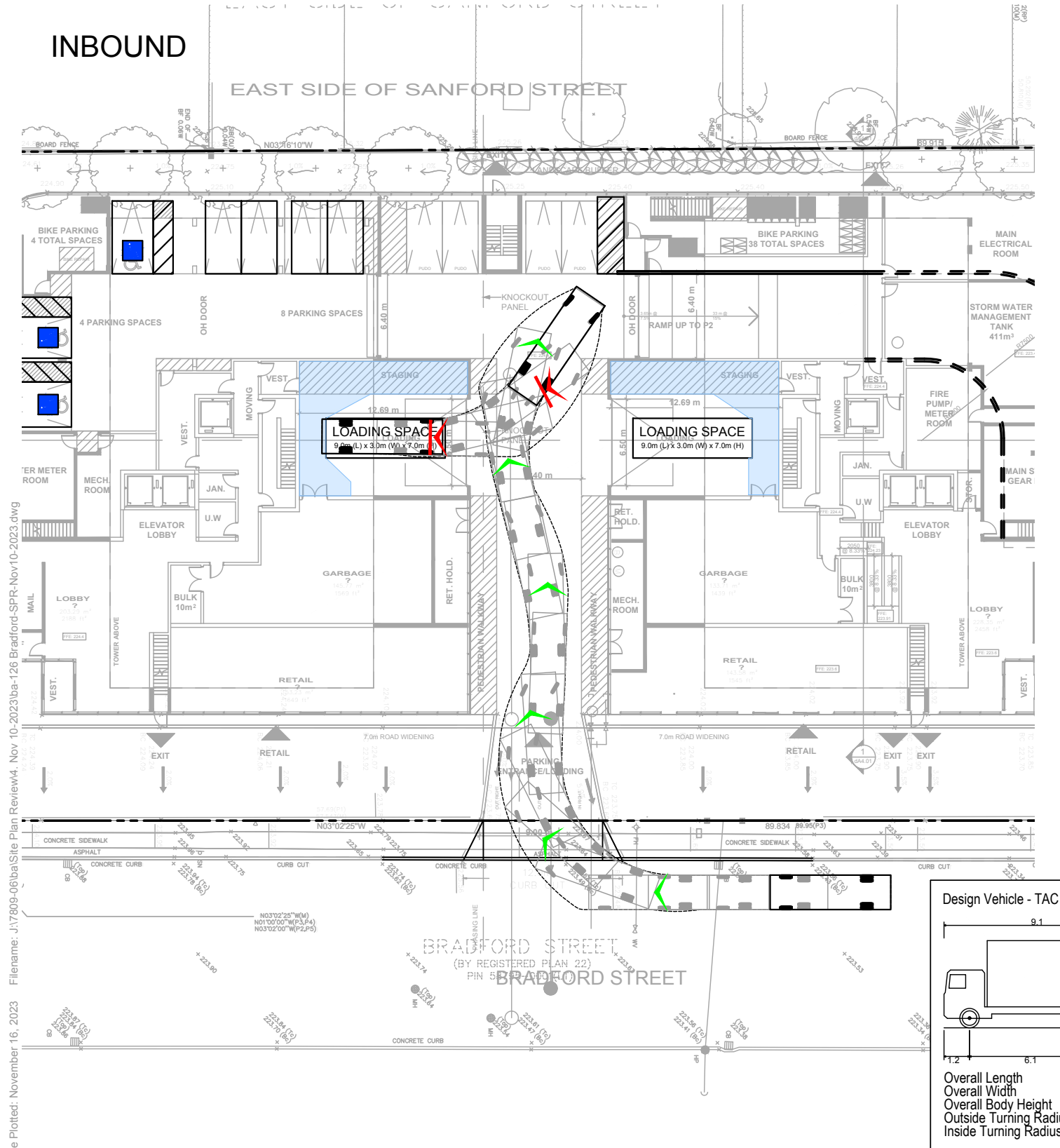


126 BRADFORD
VEHICLE MANOEUVRING DIAGRAM
CITY OF BARRIE GARBAGE TRUCK

Project: 126 Bradford
Project No. 7809-06
Date: November 16, 2023
Revised: --

Scale 0 2 4 6 8 10 20m
1:400
Drawing No. VMD-02





Appendix C: TTS Queries



Travel Modes	Existing (Site)		Adopted Future (Site)	
	AM	PM	AM	PM
Auto (Driver + Passenger)	87%	89%	83%	85%
Transit	6%	4%	8%	7%
Active (Walk + Cycle)	5%	1%	7%	2%
Other	2%	6%	2%	6%
Total	100%	100%	100%	100%

Travel Modes	Existing (2019 TMP)	Future (2019 TMP)	Percentage Point Change	Percent Change
	AM	AM		
Auto (Driver + Passenger)	82%	78%	-4%	5%
Transit	2%	7%	5%	
Active (Walk + Cycle)	9%	12%	3%	
Other	7%	3%	-4%	
Total	100%	100%		

Residential AM

Wed Sep 20 2023 18:05:05 GMT-0400 (Eastern Daylight Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:
Start time of trip - start_time In 600-859
and
Trip purpose of origin - purp_orig In H
and
2006 GTA zone of origin - gta06_orig In 8501,8502,8503,8504,852!
or
(Start time of trip - start_time In 600-859
and
Trip purpose of destination - purp_dest In H
and
2006 GTA zone of destination - gta06_dest In 8501,8502,8503,8504,8525'

Table: Trip 2016		
Row:	Count:	Expanded:
Transit excluding GO rail	3	111
Cycle	1	23
Auto driver	91	1997
GO rail only	2	39
Joint GO rail and local transit	1	4
Motorcycle	1	20
Auto passenger	15	267
School bus	3	52
Walk	5	103
Total:	122	2615

AM Peak	Trips	%	Rounded %
Auto (Driver + Passenger)	2264	86.54%	87%
Transit	154	5.89%	6%
Active (Walk + Cycle)	126	4.82%	5%
Other	72	2.75%	2%
Total	2616	100%	100%

*Other includes Motorcycle, Taxi Passenger, Paid Rideshare, School Bus, and other

Residential PM

Wed Sep 20 2023 18:12:21 GMT-0400 (Eastern Daylight Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:
Start time of trip - start_time In 1500-1759
and
Trip purpose of origin - purp_orig In H
and
2006 GTA zone of origin - gta06_orig In 8501,8502,8503,8504,852!
or
(Start time of trip - start_time In 1500-1759
and
Trip purpose of destination - purp_dest In H
and
2006 GTA zone of destination - gta06_dest In 8501,8502,8503,8504,8525'

Table: Trip 2016		
Row:	Count:	Expanded:
Transit excluding GO rail	5	160
Cycle	1	29
Auto driver	158	2918
GO rail only	2	24
Auto passenger	53	745
School bus	2	38
Taxi passenger	3	20
Walk	9	167
Total:	233	4100

PM Peak	Trips	%	Rounded %
Auto (Driver + Passenger)	3663	89.32%	89%
Transit	184	4.49%	4%
Active (Walk + Cycle)	58	1.41%	1%
Other	196	4.78%	6%
Total	4101	100%	100%

*Other includes Motorcycle, Taxi Passenger, Paid Rideshare, School Bus, and other

RESIDENTIAL AM OUT

Thu Sep 21 2023 13:46:22 GMT-0400 (Eastern Daylight Time) - Run Time: 3033ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest

Column: 2006 GTA zone of origin - gta06_orig

RowG:

ColG:(8501,8502,8503,8504,8525)

TblG:

Filters:

Start time of trip - start_time in 600-859

and

Trip purpose of origin - purp_orig in H

and

Primary travel mode of trip - mode_prime in D,U,M,P,T

Trip 2016

Table:

	Trips	%	North Bradford St	North Via Bradford Hwy 400	South Bradford St	South Via Bradford Hwy 400	East Via Bradford N	East Via Bradford S	East Victoria St	West Via Bradford N	West Via Bradford S	West Victoria St	West John St	North Bradford St	North Via Bradford Hwy 400	South Bradford St	South Via Bradford Hwy 400	East Via Bradford N	East Via Bradford S	East Victoria St	West Via Bradford N	West Via Bradford S	West Victoria St	West John St
PD 1 of Toronto	18	1%				100%								0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Newmarket	11	1%				100%								0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Markham	57	3%				100%								0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
King	23	1%				100%								0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Vaughan	94	4%				100%								0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Barrie	1496													0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8501	50	2%	60%		35%				5%					1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
8502	11	1%			100%									0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
8504	110	5%	80%									10%	10%	4%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
8505	47	2%	100%											2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8508	29	1%	100%											1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8509	92	4%	80%	20%										3%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8510	124	6%	80%	20%										5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8512	22	1%	100%											1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8513	21	1%	100%											1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8514	177	8%	100%											8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8515	63	3%	90%									10%		3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8516	7	0%	90%									10%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8518	56	3%	80%									20%		2%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
8521	171	8%	45%		45%							5%	5%	4%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%
8523	30	1%				30%					100%			0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
8524	139	6%									70%			0%	0%	0%	2%	0%	0%	0%	0%	4%	0%	0%
8525	38	2%			100%									0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
8527	200	9%			80%	20%								0%	0%	7%	2%	0%	0%	0%	0%	0%	0%	0%
8528	81	4%			100%									0%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%
8529	18	1%	100%											0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
8530	9	0%			100%									0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Innisfil	41	2%			20%	80%								0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Bradford-West Gwillimbury	53	2%				100%								0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
New Tecumseth	41	2%				75%								0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Esia	39	2%									25%			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Springwater	82	4%								75%				0%	0%	0%	0%	0%	0%	0%	3%	1%	0%	0%
Muskoka	50	2%		100%										0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Collingwood	38	2%								60%		40%		0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%
Penetanguishene	18	1%		100%										0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Midland	37	2%		100%										0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Oro-Medonte	27	1%					100%							0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Ramara	25	1%		20%			80%							0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Orillia	45	2%		20%			80%							0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%
	2194	100%												35.17%	7.39%	19.13%	18.29%	3.78%	0.00%	0.11%	3.84%	9.67%	1.72%	0.89%
														35%	7%	19%	18%	4%	0%	0%	4%	10%	2%	1%

Bradford N	Bradford S	Victoria St E	Victoria St W	John St W
50%	47%	0%	2%	1%

RESIDENTIAL PM IN

Thu Sep 21 2023 14:52:35 GMT-0400 (Eastern Daylight Time) - Run Time: 2600ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(8501,8502,8503,8504,8525
TblG:

Filters:
Start time of trip - start_time In 1500-1759
and
Trip purpose of destination - purp_dest In H
and
Primary travel mode of trip - mode_prime In D, U, M, P, T

Trip 2016

Table:

			North Bradford St	North Via Bradford Hwy 400	South Bradford St	South Via Bradford Hwy 400	East Via Bradford	East Via Bradford S	East Victoria St	West Via Bradford N	West Via Bradford S	West Victoria St	West John St	North Bradford St	North Via Bradford Hwy 400	South Bradford St	South Via Bradford Hwy 400	East Via Bradford N	East Via Bradford S	East Victoria St	West Via Bradford N	West Via Bradford S	West Victoria St	West John St
PD 1 of Toronto	Trips	%																						
	23	1%				100%								0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Newmarket	11	0%				100%								0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Markham	69	2%				100%								0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
King	23	1%				100%								0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Vaughan	39	1%				100%								0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Mississauga	56	2%				100%								0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Barrie	1979													0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8501	166	6%	60%		35%				5%					4%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
8502	52	2%			100%									0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
8503	14	0%								5%	10%	45%	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8504	162	6%	80%								10%	10%	10%	5%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
8505	54	2%	100%											2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8506	7	0%						80%						0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8509	90	3%	80%	20%					20%					3%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8510	124	4%	80%	20%										3%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8514	506	18%	100%											18%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8515	63	2%	90%									10%		2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8517	38	1%	80%									20%		1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8518	9	0%	80%									20%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8520	7	0%	45%		45%							5%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8521	133	5%	45%		45%							5%	5%	2%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
8522	61	2%									100%			0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%
8523	24	1%									100%			0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
8524	141	5%				40%					60%			0%	0%	0%	2%	0%	0%	0%	3%	0%	0%	0%
8526	73	3%			100%									0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%
8527	133	5%			80%	20%								0%	0%	4%	1%	0%	0%	0%	0%	0%	0%	0%
8528	49	2%			100%									0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
8529	75	3%			100%									0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%
Innisfil	147	5%			20%	80%								0%	0%	1%	4%	0%	0%	0%	0%	0%	0%	0%
New Tecumseth	71	3%				75%				25%				0%	0%	0%	2%	0%	0%	1%	0%	0%	0%	0%
Adjala-Tosoronto	18	1%				75%				25%				0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Essa	39	1%								100%				0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Clearview	56	2%							50%	50%				0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Springwater	110	4%							75%	25%				0%	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%
Collingwood	38	1%							60%	40%				0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%
Penetanguishene	18	1%		100%										0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Midland	37	1%		100%										0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Oro-Medonte	27	1%						100%						0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Orillia	43	2%		20%										0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Mulmur	25	1%								100%				0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
External	9	0%												39.36%	3.75%	17.81%	17.20%	2.36%	0.00%	5.04%	5.55%	6.02%	1.59%	1.01%
	2840	100%												39%	4%	18%	17%	2%	0%	5%	6%	6%	2%	1%

Bradford N	Bradford S	Victoria St E	Victoria St W	John St W
51%	41%	5%	2%	1%

Appendix D: Turning Movement Counts





Turning Movement Count (6 . BRADFORD ST & MIDDLE SITE ACCESS)

Start Time	N Approach BRADFORD ST					S Approach BRADFORD ST					W Approach MIDDLE SITE ACCESS					Int. Total (15 min)	Int. Total (1 hr)
	Right N-W	Thru N-S	UTurn N-N	Peds N:	Approach Total	Thru S-N	Left S-W	UTurn S-S	Peds S:	Approach Total	Right W-S	Left W-N	UTurn W-W	Peds W:	Approach Total		
07:00:00	0	44	0	0	44	58	0	1	0	59	0	0	0	0	0	103	
07:15:00	0	65	0	0	65	57	0	0	0	57	0	0	0	3	0	122	
07:30:00	0	83	0	0	83	78	0	0	0	78	0	0	0	1	0	161	
07:45:00	4	106	0	0	110	104	0	0	0	104	0	0	0	2	0	214	600
08:00:00	0	91	0	0	91	113	1	0	0	114	0	0	0	1	0	205	702
08:15:00	3	89	0	0	92	131	0	0	0	131	0	0	0	0	0	223	803
08:30:00	2	96	0	0	98	122	0	0	0	122	0	0	0	0	0	220	862
08:45:00	0	115	0	0	115	124	1	0	0	125	0	0	0	0	0	240	888
BREAK																	
16:00:00	0	160	0	0	160	127	0	0	0	127	0	0	0	0	0	287	
16:15:00	0	159	0	0	159	135	0	0	0	135	1	0	0	0	1	295	
16:30:00	0	165	0	0	165	128	0	0	0	128	0	0	0	0	0	293	
16:45:00	1	165	0	0	166	175	0	0	0	175	1	1	0	0	2	343	1218
17:00:00	0	162	0	0	162	166	0	0	0	166	3	0	0	0	3	331	1262
17:15:00	0	145	0	0	145	165	0	0	0	165	0	0	0	0	0	310	1277
17:30:00	0	128	0	0	128	137	0	0	0	137	0	0	0	0	0	265	1249
17:45:00	1	106	0	0	107	123	0	0	0	123	0	1	0	0	1	231	1137
Grand Total	11	1879	0	0	1890	1943	2	1	0	1946	5	2	0	7	7	3843	-
Approach%	0.6%	99.4%	0%		-	99.8%	0.1%	0.1%		-	71.4%	28.6%	0%		-	-	-
Totals	0.3%	48.9%	0%		49.2%	50.6%	0.1%	0%		50.6%	0.1%	0.1%	0%		0.2%	-	-
Heavy	0	64	0		-	58	0	0		-	0	0	0		-	-	-
Heavy %	0%	3.4%	0%		-	3%	0%	0%		-	0%	0%	0%		-	-	-
Bicycles	0	3	0		-	7	0	0		-	0	0	0		-	-	-
Bicycle %	0%	0.2%	0%		-	0.4%	0%	0%		-	0%	0%	0%		-	-	-



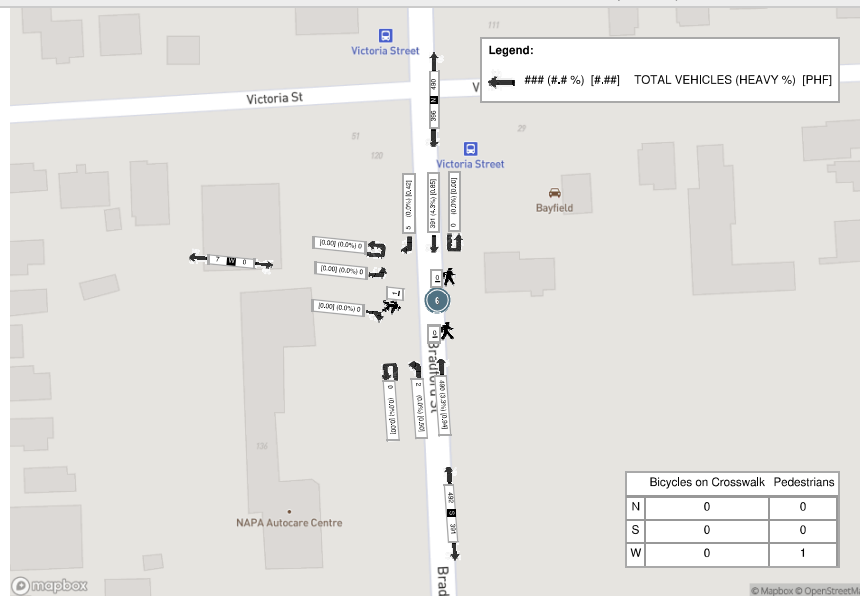
Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)

Start Time	N Approach BRADFORD ST					S Approach BRADFORD ST					W Approach MIDDLE SITE ACCESS					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
08:00:00	0	91	0	0	91	113	1	0	0	114	0	0	0	1	0	205
08:15:00	3	89	0	0	92	131	0	0	0	131	0	0	0	0	0	223
08:30:00	2	96	0	0	98	122	0	0	0	122	0	0	0	0	0	220
08:45:00	0	115	0	0	115	124	1	0	0	125	0	0	0	0	0	240
Grand Total	5	391	0	0	396	490	2	0	0	492	0	0	0	1	0	888
Approach%	1.3%	98.7%	0%		-	99.6%	0.4%	0%		-	0%	0%	0%		-	-
Totals %	0.6%	44%	0%		44.6%	55.2%	0.2%	0%		55.4%	0%	0%	0%		0%	-
PHF	0.42	0.85	0		0.86	0.94	0.5	0		0.94	0	0	0		0	-
Heavy	0	17	0		17	16	0	0		16	0	0	0		0	-
Heavy %	0%	4.3%	0%		4.3%	3.3%	0%	0%		3.3%	0%	0%	0%		0%	-
Lights	5	374	0		379	474	2	0		476	0	0	0		0	-
Lights %	100%	95.7%	0%		95.7%	96.7%	100%	0%		96.7%	0%	0%	0%		0%	-
Single-Unit Trucks	0	7	0		7	1	0	0		1	0	0	0		0	-
Single-Unit Trucks %	0%	1.8%	0%		1.8%	0.2%	0%	0%		0.2%	0%	0%	0%		0%	-
Buses	0	10	0		10	15	0	0		15	0	0	0		0	-
Buses %	0%	2.6%	0%		2.5%	3.1%	0%	0%		3%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	100%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Road	0	2	0	0	-	1	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

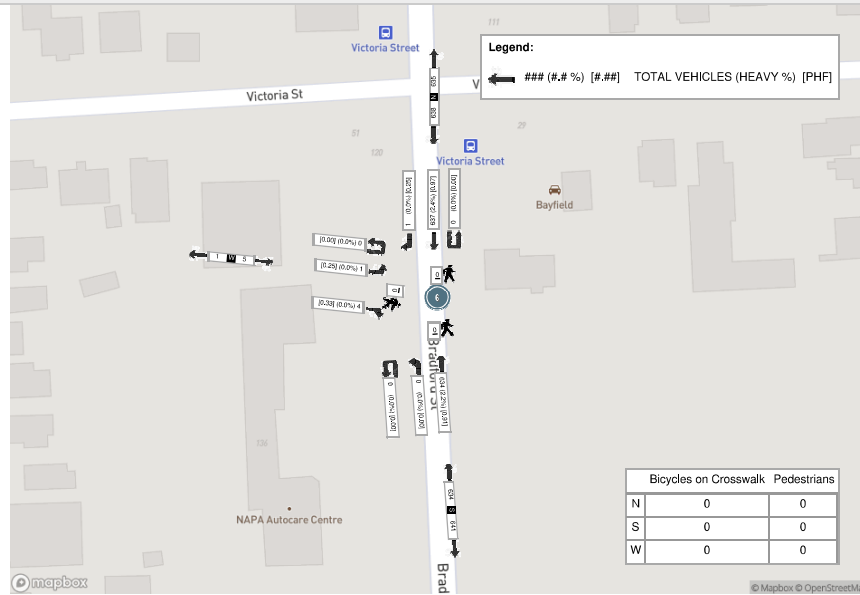
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)

Start Time	N Approach BRADFORD ST					S Approach BRADFORD ST					W Approach MIDDLE SITE ACCESS					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
16:30:00	0	165	0	0	165	128	0	0	0	128	0	0	0	0	0	293
16:45:00	1	165	0	0	166	175	0	0	0	175	1	1	0	0	2	343
17:00:00	0	162	0	0	162	166	0	0	0	166	3	0	0	0	3	331
17:15:00	0	145	0	0	145	165	0	0	0	165	0	0	0	0	0	310
Grand Total	1	637	0	0	638	634	0	0	0	634	4	1	0	0	5	1277
Approach%	0.2%	99.8%	0%		-	100%	0%	0%		-	80%	20%	0%		-	-
Totals %	0.1%	49.9%	0%		50%	49.6%	0%	0%		49.6%	0.3%	0.1%	0%		0.4%	-
PHF	0.25	0.97	0		0.96	0.91	0	0		0.91	0.33	0.25	0		0.42	-
Heavy	0	15	0		15	14	0	0		14	0	0	0		0	-
Heavy %	0%	2.4%	0%		2.4%	2.2%	0%	0%		2.2%	0%	0%	0%		0%	-
Lights	1	622	0		623	620	0	0		620	4	1	0		5	-
Lights %	100%	97.6%	0%		97.6%	97.8%	0%	0%		97.8%	100%	100%	0%		100%	-
Single-Unit Trucks	0	2	0		2	5	0	0		5	0	0	0		0	-
Single-Unit Trucks %	0%	0.3%	0%		0.3%	0.8%	0%	0%		0.8%	0%	0%	0%		0%	-
Buses	0	13	0		13	9	0	0		9	0	0	0		0	-
Buses %	0%	2%	0%		2%	1.4%	0%	0%		1.4%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians %	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk %	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	-	3	0	0	0	-	0	0	0	0	-	-
Bicycles on Road %	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)



Turning Movement Count (5 . BRADFORD ST & NORTH SITE ACCESS)

Start Time	N Approach BRADFORD ST					S Approach BRADFORD ST					W Approach NORTH SITE ACCESS					Int. Total (15 min)	Int. Total (1 hr)
	Right N-W	Thru N-S	UTurn N-N	Peds N:	Approach Total	Thru S-N	Left S-W	UTurn S-S	Peds S:	Approach Total	Right W-S	Left W-N	UTurn W-W	Peds W:	Approach Total		
07:00:00	0	43	0	0	43	58	0	1	0	59	0	0	0	0	0	102	
07:15:00	0	66	0	0	66	57	0	0	0	57	0	1	0	0	1	124	
07:30:00	0	86	0	0	86	76	0	0	0	76	0	0	0	0	0	162	
07:45:00	3	108	0	0	111	106	0	0	0	106	0	0	0	0	0	217	605
08:00:00	0	95	0	0	95	112	2	0	0	114	0	0	0	0	0	209	712
08:15:00	3	95	0	0	98	132	0	0	0	132	0	0	0	0	0	230	818
08:30:00	2	102	0	0	104	121	0	0	0	121	0	0	0	0	0	225	881
08:45:00	0	114	0	0	114	122	1	0	0	123	0	0	0	0	0	237	901
BREAK																	
16:00:00	1	163	0	0	164	125	0	0	0	125	1	0	0	0	1	290	
16:15:00	0	164	0	0	164	134	3	0	0	137	3	3	0	0	6	307	
16:30:00	0	179	0	0	179	126	1	0	0	127	0	1	0	0	1	307	
16:45:00	1	169	0	0	170	173	0	0	0	173	1	3	0	0	4	347	1251
17:00:00	0	162	0	0	162	166	0	0	0	166	5	1	0	0	6	334	1295
17:15:00	0	143	0	0	143	166	0	0	0	166	2	0	0	0	2	311	1299
17:30:00	0	127	0	0	127	137	1	0	0	138	0	2	0	0	2	267	1259
17:45:00	1	106	0	0	107	121	0	0	0	121	4	2	0	0	6	234	1146
Grand Total	11	1922	0	0	1933	1932	8	1	0	1941	16	13	0	0	29	3903	-
Approach%	0.6%	99.4%	0%		-	99.5%	0.4%	0.1%		-	55.2%	44.8%	0%		-	-	-
Totals %	0.3%	49.2%	0%		49.5%	49.5%	0.2%	0%		49.7%	0.4%	0.3%	0%		0.7%	-	-
Heavy	0	47	0		-	55	0	0		-	0	0	0		-	-	-
Heavy %	0%	2.4%	0%		-	2.8%	0%	0%		-	0%	0%	0%		-	-	-
Bicycles	0	3	0		-	1	0	0		-	0	0	0		-	-	-
Bicycle %	0%	0.2%	0%		-	0.1%	0%	0%		-	0%	0%	0%		-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)

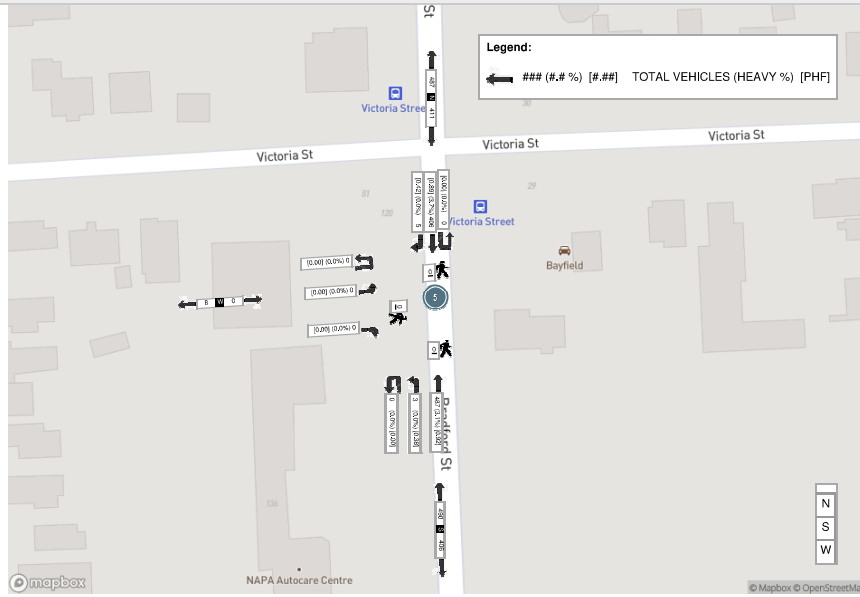
Start Time	N Approach BRADFORD ST					S Approach BRADFORD ST					W Approach NORTH SITE ACCESS					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
08:00:00	0	95	0	0	95	112	2	0	0	114	0	0	0	0	0	209
08:15:00	3	95	0	0	98	132	0	0	0	132	0	0	0	0	0	230
08:30:00	2	102	0	0	104	121	0	0	0	121	0	0	0	0	0	225
08:45:00	0	114	0	0	114	122	1	0	0	123	0	0	0	0	0	237
Grand Total	5	406	0	0	411	487	3	0	0	490	0	0	0	0	0	901
Approach%	1.2%	98.8%	0%		-	99.4%	0.6%	0%		-	0%	0%	0%		-	-
Totals %	0.6%	45.1%	0%		45.6%	54.1%	0.3%	0%		54.4%	0%	0%	0%		0%	-
PHF	0.42	0.89	0		0.9	0.92	0.38	0		0.93	0	0	0		0	-
Heavy	0	15	0		15	15	0	0		15	0	0	0		0	-
Heavy %	0%	3.7%	0%		3.6%	3.1%	0%	0%		3.1%	0%	0%	0%		0%	-
Lights	5	391	0		396	472	3	0		475	0	0	0		0	-
Lights %	100%	96.3%	0%		96.4%	96.9%	100%	0%		96.9%	0%	0%	0%		0%	-
Single-Unit Trucks	0	6	0		6	0	0	0		0	0	0	0		0	-
Single-Unit Trucks %	0%	1.5%	0%		1.5%	0%	0%	0%		0%	0%	0%	0%		0%	-
Buses	0	9	0		9	15	0	0		15	0	0	0		0	-
Buses %	0%	2.2%	0%		2.2%	3.1%	0%	0%		3.1%	0%	0%	0%		0%	-
Bicycles on Road	0	2	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	%		-	-	-	%		-	-	-	%		-



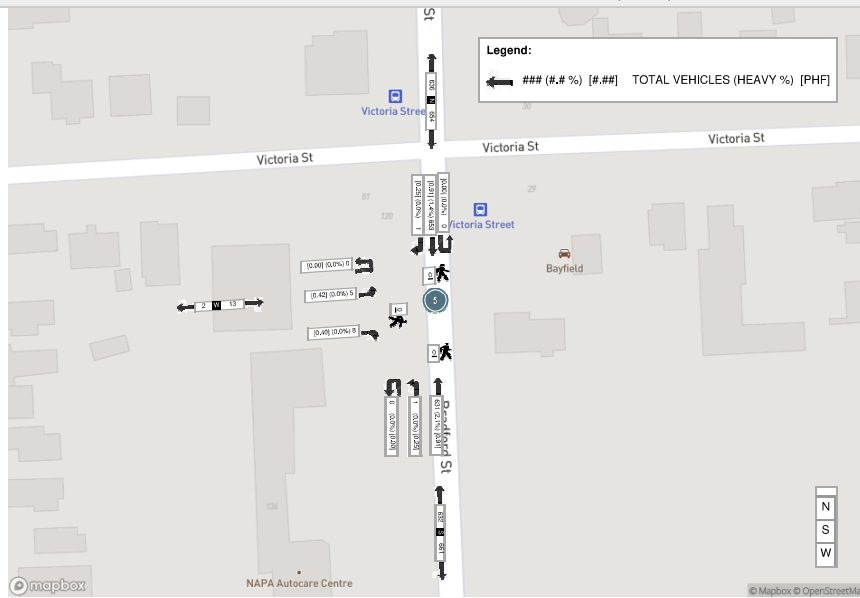
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)

Start Time	N Approach BRADFORD ST					S Approach BRADFORD ST					W Approach NORTH SITE ACCESS					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
16:30:00	0	179	0	0	179	126	1	0	0	127	0	1	0	0	1	307
16:45:00	1	169	0	0	170	173	0	0	0	173	1	3	0	0	4	347
17:00:00	0	162	0	0	162	166	0	0	0	166	5	1	0	0	6	334
17:15:00	0	143	0	0	143	166	0	0	0	166	2	0	0	0	2	311
Grand Total	1	653	0	0	654	631	1	0	0	632	8	5	0	0	13	1299
Approach%	0.2%	99.8%	0%		-	99.8%	0.2%	0%		-	61.5%	38.5%	0%		-	-
Totals %	0.1%	50.3%	0%		50.3%	48.6%	0.1%	0%		48.7%	0.6%	0.4%	0%		1%	-
PHF	0.25	0.91	0		0.91	0.91	0.25	0		0.91	0.4	0.42	0		0.54	-
Heavy	0	9	0		9	13	0	0		13	0	0	0		0	-
Heavy %	0%	1.4%	0%		1.4%	2.1%	0%	0%		2.1%	0%	0%	0%		0%	-
Lights	1	644	0		645	618	1	0		619	8	5	0		13	-
Lights %	100%	98.6%	0%		98.6%	97.9%	100%	0%		97.9%	100%	100%	0%		100%	-
Single-Unit Trucks	0	1	0		1	3	0	0		3	0	0	0		0	-
Single-Unit Trucks %	0%	0.2%	0%		0.2%	0.5%	0%	0%		0.5%	0%	0%	0%		0%	-
Buses	0	8	0		8	10	0	0		10	0	0	0		0	-
Buses %	0%	1.2%	0%		1.2%	1.6%	0%	0%		1.6%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	%		-	-	-	%		-	-	-	%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)





Turning Movement Count (7 . BRADFORD ST & SOUTH SITE ACCESS)

Start Time	N Approach BRADFORD ST					S Approach BRADFORD ST					W Approach SOUTH SITE ACCESS					Int. Total (15 min)	Int. Total (1 hr)
	Right N-W	Thru N-S	UTurn N-N	Peds N:	Approach Total	Thru S-N	Left S-W	UTurn S-S	Peds S:	Approach Total	Right W-S	Left W-N	UTurn W-W	Peds W:	Approach Total		
07:00:00	0	44	0	0	44	58	0	0	0	58	0	0	0	2	0	102	
07:15:00	0	66	0	0	66	57	1	0	0	58	1	0	0	2	1	125	
07:30:00	0	84	0	0	84	79	0	0	0	79	0	0	0	1	0	163	
07:45:00	0	105	0	0	105	107	1	0	0	108	2	0	0	1	2	215	605
08:00:00	1	93	0	0	94	114	1	0	0	115	2	1	0	2	3	212	715
08:15:00	1	91	0	0	92	132	0	0	0	132	1	1	0	0	2	226	816
08:30:00	1	99	0	0	100	121	1	0	0	122	1	0	0	0	1	223	876
08:45:00	5	109	0	0	114	125	1	0	0	126	1	0	0	2	1	241	902
BREAK																	
16:00:00	3	167	0	0	170	124	0	0	0	124	3	2	0	2	5	299	
16:15:00	2	162	0	0	164	134	3	0	0	137	1	2	0	0	3	304	
16:30:00	0	181	0	0	181	126	1	0	0	127	1	2	0	0	3	311	
16:45:00	2	176	0	0	178	174	0	0	0	174	4	2	0	2	6	358	1272
17:00:00	1	173	0	0	174	165	0	0	0	165	1	1	0	3	2	341	1314
17:15:00	1	147	0	0	148	166	0	0	0	166	1	0	0	3	1	315	1325
17:30:00	1	129	0	0	130	138	1	0	0	139	0	2	0	1	2	271	1285
17:45:00	0	106	0	0	106	124	1	0	0	125	4	1	0	2	5	236	1163
Grand Total	18	1932	0	0	1950	1944	11	0	0	1955	23	14	0	23	37	3942	-
Approach%	0.9%	99.1%	0%		-	99.4%	0.6%	0%		-	62.2%	37.8%	0%		-	-	-
Totals	0.5%	49%	0%		49.5%	49.3%	0.3%	0%		49.6%	0.6%	0.4%	0%		0.9%	-	-
Heavy	0	73	0		-	66	1	0		-	1	0	0		-	-	-
Heavy %	0%	3.8%	0%		-	3.4%	9.1%	0%		-	4.3%	0%	0%		-	-	-
Bicycles	1	2	0		-	2	0	0		-	0	0	0		-	-	-
Bicycle %	5.6%	0.1%	0%		-	0.1%	0%	0%		-	0%	0%	0%		-	-	-



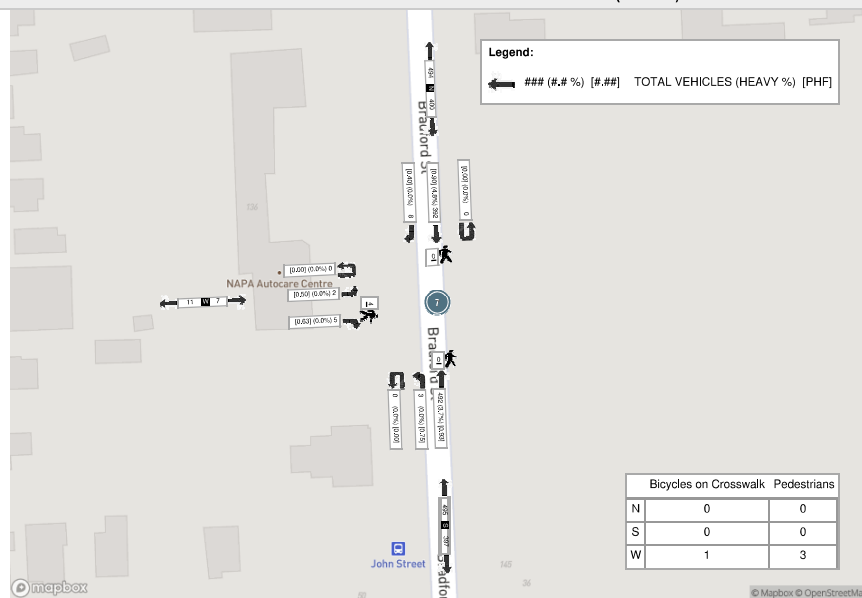
Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)

Start Time	N Approach BRADFORD ST					S Approach BRADFORD ST					W Approach SOUTH SITE ACCESS					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
08:00:00	1	93	0	0	94	114	1	0	0	115	2	1	0	2	3	212
08:15:00	1	91	0	0	92	132	0	0	0	132	1	1	0	0	2	226
08:30:00	1	99	0	0	100	121	1	0	0	122	1	0	0	0	1	223
08:45:00	5	109	0	0	114	125	1	0	0	126	1	0	0	2	1	241
Grand Total	8	392	0	0	400	492	3	0	0	495	5	2	0	4	7	902
Approach%	2%	98%	0%		-	99.4%	0.6%	0%		-	71.4%	28.6%	0%		-	-
Totals	0.9%	43.5%	0%		44.3%	54.5%	0.3%	0%		54.9%	0.6%	0.2%	0%		0.8%	-
PHF	0.4	0.9	0		0.88	0.93	0.75	0		0.94	0.63	0.5	0		0.58	-
Heavy	0	19	0		19	18	0	0		18	0	0	0		0	-
Heavy %	0%	4.8%	0%		4.8%	3.7%	0%	0%		3.6%	0%	0%	0%		0%	-
Lights	8	373	0		381	474	3	0		477	5	2	0		7	-
Lights %	100%	95.2%	0%		95.3%	96.3%	100%	0%		96.4%	100%	100%	0%		100%	-
Single-Unit Trucks	0	5	0		5	2	0	0		2	0	0	0		0	-
Single-Unit Trucks %	0%	1.3%	0%		1.3%	0.4%	0%	0%		0.4%	0%	0%	0%		0%	-
Buses	0	11	0		11	16	0	0		16	0	0	0		0	-
Buses %	0%	2.8%	0%		2.8%	3.3%	0%	0%		3.2%	0%	0%	0%		0%	-
Articulated Trucks	0	3	0		3	0	0	0		0	0	0	0		0	-
Articulated Trucks %	0%	0.8%	0%		0.8%	0%	0%	0%		0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	3	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	75%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	25%	-	-
Bicycles on Road	0	1	0	0	-	1	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

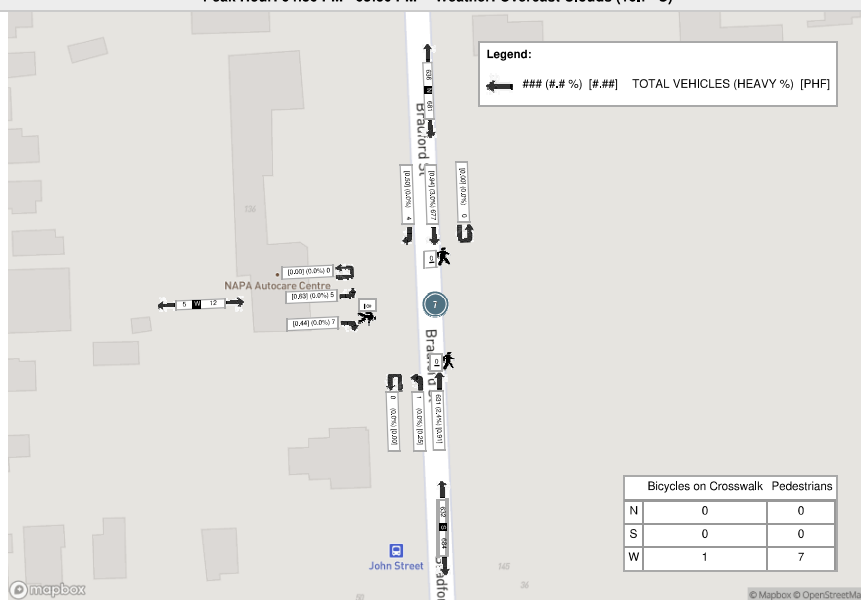
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)

Start Time	N Approach BRADFORD ST					S Approach BRADFORD ST					W Approach SOUTH SITE ACCESS					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
16:30:00	0	181	0	0	181	126	1	0	0	127	1	2	0	0	3	311
16:45:00	2	176	0	0	178	174	0	0	0	174	4	2	0	2	6	358
17:00:00	1	173	0	0	174	165	0	0	0	165	1	1	0	3	2	341
17:15:00	1	147	0	0	148	166	0	0	0	166	1	0	0	3	1	315
Grand Total	4	677	0	0	681	631	1	0	0	632	7	5	0	8	12	1325
Approach%	0.6%	99.4%	0%		-	99.8%	0.2%	0%		-	58.3%	41.7%	0%		-	-
Totals %	0.3%	51.1%	0%		51.4%	47.6%	0.1%	0%		47.7%	0.5%	0.4%	0%		0.9%	-
PHF	0.5	0.94	0		0.94	0.91	0.25	0		0.91	0.44	0.63	0		0.5	-
Heavy	0	20	0		20	15	0	0		15	0	0	0		0	-
Heavy %	0%	3%	0%		2.9%	2.4%	0%	0%		2.4%	0%	0%	0%		0%	-
Lights	4	657	0		661	616	1	0		617	7	5	0		12	-
Lights %	100%	97%	0%		97.1%	97.6%	100%	0%		97.6%	100%	100%	0%		100%	-
Single-Unit Trucks	0	4	0		4	3	0	0		3	0	0	0		0	-
Single-Unit Trucks %	0%	0.6%	0%		0.6%	0.5%	0%	0%		0.5%	0%	0%	0%		0%	-
Buses	0	16	0		16	10	0	0		10	0	0	0		0	-
Buses %	0%	2.4%	0%		2.3%	1.6%	0%	0%		1.6%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0		0	2	0	0		2	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	0.3%	0%	0%		0.3%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	7	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	87.5%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	12.5%	-	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)

Turning Movement
Count

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Turning Movement Count (10 . JOHN ST & BRADFORD ST)

Start Time	N Approach BRADFORD ST					Approach Total	E Approach JOHN ST					Approach Total	S Approach BRADFORD ST					Approach Total	W Approach JOHN ST					Approach Total	Int. Total (15min)	Int. Total (1 hr)
	Right N/W	Thru N/S	Left N/E	UTurn N/N	Peds: N:		Right E/N	Thru E/W	Left E/S	UTurn E/E	Peds: E:		Right S/E	Thru S/N	Left S/W	UTurn S/S	Peds: S:		Right W/S	Thru W/E	Left W/N	UTurn W/W	Peds: W:			
07:00:00	0	43	1	0	0	44	2	0	5	0	0	7	1	53	0	0	2	54	2	0	1	0	1	3	108	
07:15:00	0	67	0	0	0	67	3	0	2	0	1	5	0	55	1	0	0	56	1	0	0	0	2	1	129	
07:30:00	0	84	1	0	0	85	2	0	4	0	4	6	1	75	1	0	0	77	2	0	1	0	1	3	171	
07:45:00	1	106	0	0	0	107	1	0	2	0	2	3	1	107	1	0	0	109	1	0	1	0	1	2	221	629
08:00:00	2	93	1	0	0	96	0	0	1	0	1	1	5	115	1	0	0	121	1	0	0	0	4	1	219	740
08:15:00	1	90	0	0	0	91	3	0	6	0	1	9	2	129	0	0	0	131	1	0	3	0	0	4	235	846
08:30:00	0	98	3	0	0	101	0	0	2	0	2	2	5	118	0	0	1	123	1	0	0	0	0	1	227	902
08:45:00	0	108	0	1	2	109	3	0	4	0	4	7	5	121	1	0	0	127	0	0	0	0	0	0	243	924
BREAK																										
16:00:00	0	168	0	0	3	168	2	1	5	0	6	8	7	118	0	0	3	125	4	0	1	0	2	5	306	
16:15:00	0	160	2	0	0	162	1	0	4	0	1	5	6	141	0	0	0	147	0	1	0	0	1	1	315	
16:30:00	0	180	0	0	0	180	0	2	4	0	1	6	9	125	0	0	0	134	1	0	0	0	0	1	321	
16:45:00	0	179	1	0	0	180	0	0	4	0	1	4	7	177	2	0	0	186	2	0	0	0	2	2	372	1314
17:00:00	0	175	1	0	0	176	1	0	4	0	2	5	8	161	0	0	1	169	1	0	1	0	3	2	352	1360
17:15:00	0	143	0	1	0	144	2	1	6	0	0	9	6	160	0	0	0	166	2	0	1	0	2	3	322	1367
17:30:00	0	126	3	0	1	129	1	0	4	0	1	5	9	138	0	0	0	147	4	0	0	0	1	4	285	1331
17:45:00	0	108	2	0	0	110	1	0	1	0	0	2	6	128	1	0	1	135	1	0	0	0	4	1	248	1207
Grand Total	4	1928	15	2	6	1949	22	4	58	0	27	84	78	1921	8	0	8	2007	24	1	9	0	24	34	4074	-
Approach%	0.2%	98.9%	0.8%	0.1%	-	-	26.2%	4.8%	69%	0%	-	-	3.9%	95.7%	0.4%	0%	-	-	70.6%	2.9%	26.5%	0%	-	-	-	-
Totals %	0.1%	47.3%	0.4%	0%	-	47.8%	0.5%	0.1%	1.4%	0%	-	2.1%	1.9%	47.2%	0.2%	0%	-	48.3%	0.6%	0%	0.2%	0%	-	0.8%	-	-
Heavy	1	75	0	0	-	-	0	0	1	0	-	-	2	73	0	0	-	-	0	0	1	0	-	-	-	-
Heavy %	25%	3.9%	0%	0%	-	-	0%	0%	1.7%	0%	-	-	2.6%	3.8%	0%	0%	-	-	0%	0%	11.1%	0%	-	-	-	-
Bicycles	0	0	0	0	-	-	0	0	0	0	-	-	0	0	0	0	-	-	1	0	0	0	-	-	-	-
Bicycle %	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	-	4.2%	0%	0%	0%	-	-	-	-

Turning Movement
Count

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BAC23Y9L



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)

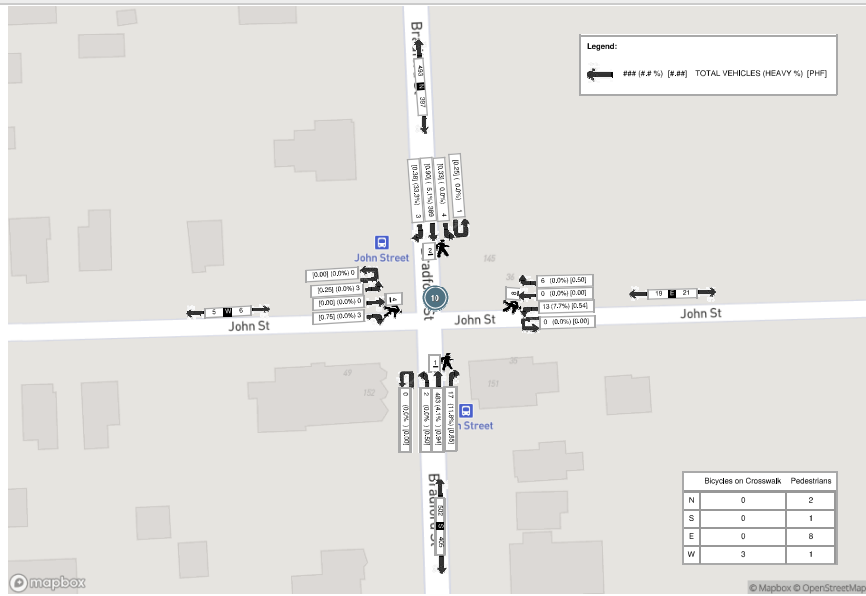
Start Time	N Approach BRADFORD ST						E Approach JOHN ST						S Approach BRADFORD ST						W Approach JOHN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	2	93	1	0	0	96	0	0	1	0	1	1	5	115	1	0	0	121	1	0	0	0	4	1	219
08:15:00	1	90	0	0	0	91	3	0	6	0	1	9	2	129	0	0	0	131	1	0	3	0	0	4	235
08:30:00	0	98	3	0	0	101	0	0	2	0	2	2	5	118	0	0	1	123	1	0	0	0	0	1	227
08:45:00	0	108	0	1	2	109	3	0	4	0	4	7	5	121	1	0	0	127	0	0	0	0	0	0	243
Grand Total	3	389	4	1	2	397	6	0	13	0	8	19	17	483	2	0	1	502	3	0	3	0	4	6	924
Approach%	0.8%	98%	1%	0.3%	-	31.6%	0%	68.4%	0%	-	3.4%	86.2%	0.4%	0%	-	50%	0%	50%	0%	-	-	-	-	-	-
Totals %	0.3%	42.1%	0.4%	0.1%	43%	0.6%	0%	1.4%	0%	2.1%	1.8%	52.3%	0.2%	0%	54.3%	0.3%	0%	0.3%	0%	0.6%	-	-	-	-	-
PHF	0.38	0.9	0.33	0.25	0.91	0.5	0	0.54	0	0.53	0.85	0.94	0.5	0	0.96	0.75	0	0.25	0	0.38	-	-	-	-	-
Heavy	1	20	0	0	21	0	0	1	0	1	2	20	0	0	22	0	0	0	0	0	-	-	-	-	-
Heavy %	33.3%	5.1%	0%	0%	5.3%	0%	0%	7.7%	0%	5.3%	11.8%	4.1%	0%	0%	4.4%	0%	0%	0%	0%	0%	-	-	-	-	-
Lights	2	369	4	1	376	6	0	12	0	18	15	483	2	0	480	3	0	3	0	6	-	-	-	-	-
Lights %	66.7%	94.9%	100%	100%	94.7%	100%	0%	92.3%	0%	94.7%	88.2%	95.9%	100%	0%	95.6%	100%	0%	100%	0%	100%	-	-	-	-	-
Single-Unit Trucks	1	6	0	0	7	0	0	1	0	1	2	4	0	0	6	0	0	0	0	0	-	-	-	-	-
Single-Unit Trucks %	33.3%	1.5%	0%	0%	1.8%	0%	0%	7.7%	0%	5.3%	11.8%	0.8%	0%	0%	1.2%	0%	0%	0%	0%	0%	-	-	-	-	-
Buses	0	11	0	0	11	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	-	-	-	-	-
Buses %	0%	2.8%	0%	0%	2.8%	0%	0%	0%	0%	0%	0%	3.3%	0%	0%	3.2%	0%	0%	0%	0%	0%	-	-	-	-	-
Articulated Trucks	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Articulated Trucks %	0%	0.8%	0%	0%	0.8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	8	-	-	-	-	1	-	-	-	-	1	-	-	-	-
Pedestrians %	-	-	-	-	13.3%	-	-	-	-	-	53.3%	-	-	-	-	6.7%	-	-	-	-	6.7%	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	3	-	-	-	-	-
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	20%	-	-	-	-	-
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%	-	-	-	-	-



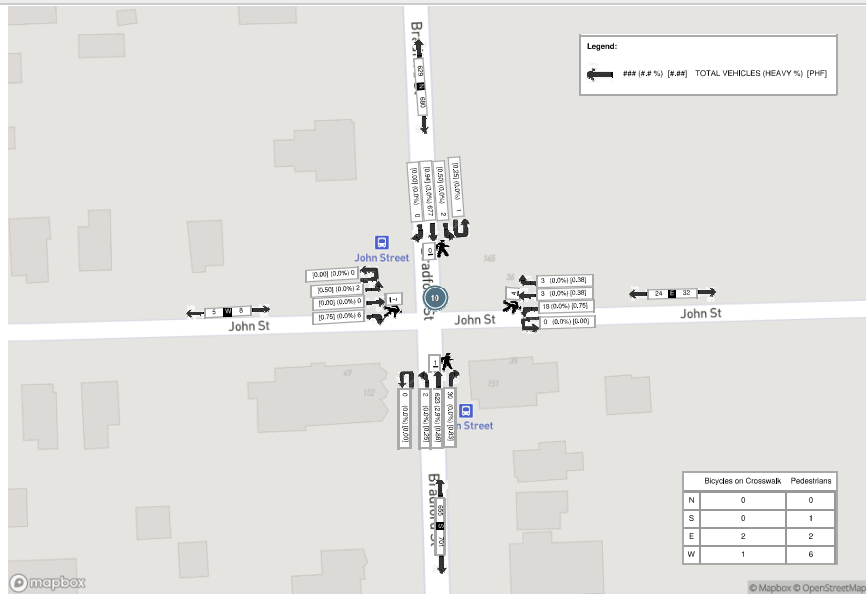
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)

Start Time	N Approach BRADFORD ST						E Approach JOHN ST						S Approach BRADFORD ST						W Approach JOHN ST						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	
16:30:00	0	180	0	0	0	180	0	2	4	0	1	6	9	125	0	0	0	134	1	0	0	0	0	1	321
16:45:00	0	179	1	0	0	180	0	0	4	0	1	4	7	177	2	0	0	186	2	0	0	0	2	2	372
17:00:00	0	175	1	0	0	176	1	0	4	0	2	5	8	161	0	0	1	169	1	0	1	0	3	2	352
17:15:00	0	143	0	1	0	144	2	1	6	0	0	9	6	160	0	0	0	166	2	0	1	0	2	3	322
Grand Total	0	677	2	1	0	680	3	3	18	0	4	24	30	623	2	0	1	655	6	0	2	0	7	8	1367
Approach%	0%	99.6%	0.3%	0.1%	-	12.5%	12.5%	75%	0%	-	4.6%	95.1%	0.3%	0%	-	75%	0%	25%	0%	-	-	-	-	-	-
Totals %	0%	49.5%	0.1%	0.1%	49.7%	0.2%	0.2%	1.3%	0%	1.8%	2.2%	45.6%	0.1%	0%	47.9%	0.4%	0%	0.1%	0%	0.6%	-	-	-	-	-
PHF	0	0.94	0.5	0.25	0.94	0.38	0.38	0.75	0	0.67	0.83	0.88	0.25	0	0.88	0.75	0	0.5	0	0.67	-	-	-	-	-
Heavy	0	20	0	0	20	0	0	0	0	0	0	18	0	0	0	18	0	0	0	0	0	-	-	-	-
Heavy %	0%	3%	0%	0%	2.9%	0%	0%	0%	0%	0%	0%	2.9%	0%	0%	0%	2.7%	0%	0%	0%	0%	0%	-	-	-	-
Lights	0	657	2	1	660	3	3	18	0	24	30	605	2	0	657	6	0	2	0	8	-	-	-	-	-
Lights %	0%	97%	100%	100%	97.1%	100%	100%	100%	0%	100%	100%	97.1%	100%	0%	97.3%	100%	0%	100%	0%	100%	-	-	-	-	-
Single-Unit Trucks	0	4	0	0	4	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	-	-	-	-	-
Single-Unit Trucks %	0%	0.6%	0%	0%	0.6%	0%	0%	0%	0%	0%	0%	0.8%	0%	0%	0.8%	0%	0%	0%	0%	0%	-	-	-	-	-
Buses	0	16	0	0	16	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	-	-	-	-	-
Buses %	0%	2.4%	0%	0%	2.4%	0%	0%	0%	0%	0%	0%	1.8%	0%	0%	1.7%	0%	0%	0%	0%	0%	-	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	-	-	-	-	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0.3%	0%	0%	0%	0%	0%	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	1	-	-	-	-	6	-	-	-	-
Pedestrians %	-	-	-	-	0%	-	-	-	-	-	16.7%	-	-	-	-	6.3%	-	-	-	-	50%	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	16.7%	-	-	-	-	0%	-	-	-	-	8.3%	-	-	-	-	-
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 (11.69 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)





Turning Movement Count (8. JOHN ST & INNISFIL ST)

Start Time	N Approach INNISFIL ST						E Approach JOHN ST						S Approach INNISFIL ST						W Approach JOHN ST						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			
07:00:00	1	1	0	0	2	2	1	1	0	0	0	2	1	3	0	0	0	4	1	1	2	0	0	4	12		
07:15:00	2	0	0	0	0	2	0	0	0	0	1	0	0	1	1	0	0	2	0	0	1	0	0	1	5		
07:30:00	1	1	0	0	0	2	1	1	0	0	0	2	1	1	0	0	0	2	1	1	2	0	0	4	10		
07:45:00	1	0	0	0	1	1	1	1	0	0	0	2	0	0	0	0	0	0	0	1	1	0	1	2	5	32	
08:00:00	3	0	0	0	0	3	0	1	0	0	0	1	0	0	1	0	0	1	0	0	5	0	0	5	10	30	
08:15:00	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	2	4	29	
08:30:00	2	0	0	0	0	2	1	1	0	0	0	2	0	0	0	0	0	0	0	1	5	1	0	7	11	30	
08:45:00	0	0	1	0	0	1	0	1	0	0	0	1	0	0	1	0	0	1	2	0	6	0	0	8	11	36	
BREAK																											
16:00:00	4	0	3	0	1	7	0	1	0	0	1	1	0	1	2	0	1	3	1	4	6	0	6	11	22		
16:15:00	2	0	1	0	6	3	3	0	0	0	1	3	0	0	1	0	0	1	0	0	4	0	0	4	11		
16:30:00	3	0	2	0	0	5	0	0	2	0	1	2	0	0	0	0	0	0	0	2	11	0	0	13	20		
16:45:00	3	1	0	0	1	4	0	0	0	0	0	0	0	0	1	0	0	1	4	4	4	0	0	12	17	70	
17:00:00	7	1	0	0	2	8	1	0	0	0	1	1	1	2	2	0	0	5	0	4	9	0	0	13	27	75	
17:15:00	2	3	1	0	0	6	0	1	1	0	0	2	0	3	3	0	0	6	2	1	7	0	0	10	24	88	
17:30:00	3	1	1	0	0	5	0	1	0	0	0	1	0	2	0	0	0	2	3	2	3	0	0	8	16	84	
17:45:00	2	2	0	0	1	4	1	1	0	0	2	2	0	4	1	0	1	5	2	2	6	0	1	10	21	88	
Grand Total	36	11	9	0	14	56	9	11	3	0	7	23	3	17	13	0	2	33	16	23	74	1	8	114	226	-	
Approach%	64.3%	19.6%	16.1%	0%	-	-	39.1%	47.8%	13%	0%	-	-	9.1%	51.5%	39.4%	0%	-	-	14%	20.2%	64.9%	0.9%	-	-	-	-	
Totals %	15.9%	4.9%	4%	0%	-	24.8%	4%	4.9%	1.3%	0%	-	10.2%	1.3%	7.5%	5.8%	0%	-	14.6%	7.1%	10.2%	32.7%	0.4%	-	50.4%	-	-	
Heavy	0	0	0	0	-	-	0	0	0	0	0	-	0	1	2	0	-	-	0	1	3	0	-	-	-	-	
Heavy %	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	5.9%	15.4%	0%	-	-	0%	4.3%	4.1%	0%	-	-	-	-	
Bicycles	0	2	0	0	-	-	0	0	0	0	-	-	0	3	0	0	-	-	0	0	4	0	-	-	-	-	
Bicycle %	0%	18.2%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	17.6%	0%	0%	-	-	0%	0%	5.4%	0%	-	-	-	-	

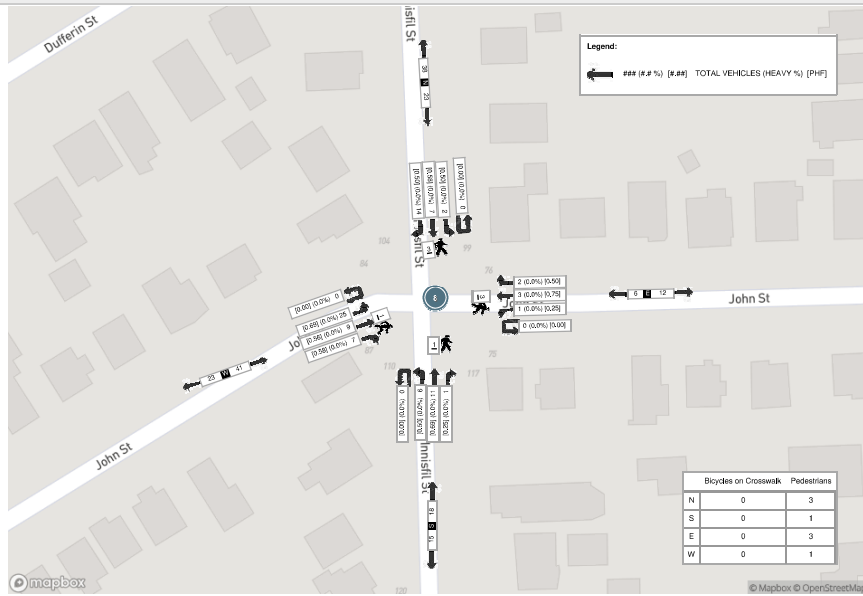


Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)

Start Time	N Approach INNISFIL ST						E Approach JOHN ST						S Approach INNISFIL ST						W Approach JOHN ST						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	3	0	0	0	0	3	0	1	0	0	0	1	0	0	1	0	0	1	0	0	5	0	0	5	10
08:15:00	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	2	4
08:30:00	2	0	0	0	0	2	1	1	0	0	0	2	0	0	0	0	0	0	0	1	5	1	0	7	11
08:45:00	0	0	1	0	0	1	0	1	0	0	0	1	0	0	1	0	0	1	2	0	6	0	0	8	11
Grand Total	5	1	1	0	0	7	1	4	0	0	0	5	0	0	2	0	0	2	2	1	16	1	0	22	36
Approach%	71.4%	14.3%	14.3%	0%	-	-	20%	80%	0%	0%	-	-	0%	0%	100%	0%	-	-	9.1%	4.5%	81.8%	4.5%	-	-	-
Totals %	13.9%	2.8%	2.8%	0%	-	19.4%	2.8%	11.1%	0%	0%	-	13.9%	0%	0%	5.6%	0%	-	5.6%	5.6%	2.8%	50%	2.8%	-	61.1%	-
PHF	0.42	0.25	0.25	0	-	0.58	0.25	1	0	0	-	0.63	0	0	0.5	0	-	0.5	0.25	0.25	0.75	0.25	-	0.69	-
Heavy	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	1	-
Heavy %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	5.8%	0%	-	4.5%	-
Lights	5	1	1	0	-	7	1	4	0	0	-	5	0	0	2	0	-	2	2	1	17	1	-	21	-
Lights %	100%	100%	100%	0%	-	100%	100%	100%	0%	0%	-	100%	0%	0%	100%	0%	-	100%	100%	100%	94.4%	100%	-	95.5%	-
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	5.6%	0%	-	4.5%	-
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Buses %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
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	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Turning Movement
Count

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (16.7 °C)



Turning Movement
Count

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Turning Movement Count (9 . JOHN ST & SANFORD ST)

Start Time	N Approach SANFORD ST					E Approach JOHN ST					S Approach SANFORD ST					W Approach JOHN ST					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	
07:00:00	0	2	0	0	4	2	0	1	0	0	0	1	0	2	0	0	0	2	0	2	0	0	1	2	7		
07:15:00	0	1	1	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3		
07:30:00	0	5	0	0	0	5	0	1	0	0	0	1	0	1	0	0	0	0	1	0	2	0	0	2	9		
07:45:00	0	1	1	0	1	2	0	1	0	0	0	1	1	3	1	0	0	5	1	0	0	0	0	1	9	28	
08:00:00	0	3	0	0	0	3	0	1	2	0	0	3	0	1	1	0	0	2	0	0	0	0	0	0	8	29	
08:15:00	0	1	1	0	0	2	0	0	1	0	0	1	1	3	0	0	0	4	0	0	0	0	0	0	7	33	
08:30:00	1	1	0	0	0	2	0	0	0	0	2	0	0	2	0	0	2	2	0	1	0	0	0	1	5	29	
08:45:00	0	4	0	0	0	4	0	1	0	0	1	1	0	2	0	0	0	2	0	0	0	0	0	0	7	27	
BREAK																											
16:00:00	0	1	1	0	0	2	0	1	0	0	2	1	1	3	0	0	0	2	4	3	3	0	0	3	6	13	
16:15:00	0	2	0	0	5	2	0	0	0	0	3	0	1	4	1	0	0	6	0	0	0	0	1	0	8		
16:30:00	1	3	0	0	0	4	0	1	1	0	2	2	2	4	1	0	3	7	3	0	1	0	4	4	17		
16:45:00	0	2	0	0	0	2	0	0	1	0	2	1	1	7	1	0	0	9	0	1	1	0	0	2	14	52	
17:00:00	0	3	0	0	1	3	0	0	0	0	0	0	0	6	0	0	0	6	0	2	1	0	0	0	3	12	51
17:15:00	1	8	1	0	0	10	0	0	0	0	1	0	1	6	0	0	0	7	2	1	0	0	1	3	20	63	
17:30:00	0	0	1	0	0	1	1	0	0	0	0	1	0	3	0	0	0	3	1	2	0	0	2	3	8	54	
17:45:00	0	4	0	0	0	4	0	0	0	0	5	0	0	3	1	0	1	4	0	0	0	0	1	0	8	48	
Grand Total	3	41	6	0	11	50	1	7	5	0	18	13	8	51	6	0	8	65	10	14	3	0	13	27	155	-	
Approach%	6%	82%	12%	0%	-	-	7.7%	53.8%	38.5%	0%	-	12.3%	78.5%	9.2%	0%	-	37%	51.9%	11.1%	0%	-	-	-	-	-	-	
Totals %	1.9%	26.5%	3.9%	0%	-	32.3%	0.6%	4.5%	3.2%	0%	-	8.4%	5.2%	32.9%	3.9%	0%	41.9%	6.5%	9%	1.9%	0%	-	17.4%	-	-	-	
Heavy	0	2	0	0	0	-	0	0	1	0	-	-	0	1	0	0	-	0	1	0	0	-	-	-	-	-	
Heavy %	0%	4.9%	0%	0%	-	-	0%	0%	20%	0%	-	-	0%	2%	0%	0%	-	0%	7.1%	0%	0%	-	-	-	-	-	
Bicycles	0	2	1	0	0	-	0	0	0	0	-	-	0	3	0	0	-	2	0	0	0	0	-	-	-	-	
Bicycle %	0%	4.9%	16.7%	0%	-	-	0%	0%	0%	0%	-	-	0%	5.9%	0%	0%	-	20%	0%	0%	0%	-	-	-	-	-	

Turning Movement
Count

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BAC23Y9L



Peak Hour: 07:30 AM - 08:30 AM Weather: Overcast Clouds (11.69 °C)

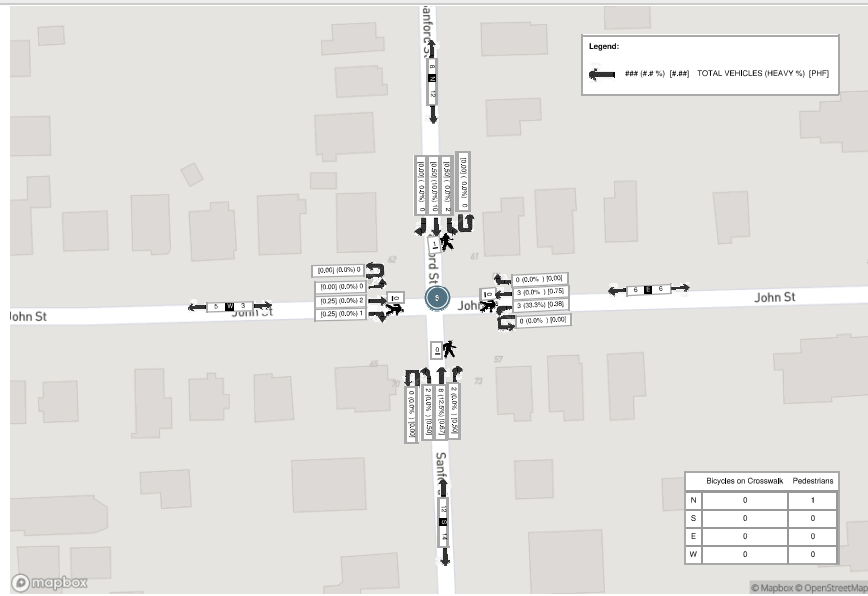
Start Time	N Approach SANFORD ST						E Approach JOHN ST						S Approach SANFORD ST						W Approach JOHN ST						Ht. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:30:00	0	5	0	0	0	5	0	1	0	0	0	1	0	1	0	0	0	1	0	2	0	0	0	2	9
07:45:00	0	1	1	0	1	2	0	1	0	0	0	1	1	3	1	0	0	5	1	0	0	0	0	1	9
08:00:00	0	3	0	0	0	3	0	1	2	0	0	3	0	1	1	0	0	2	0	0	0	0	0	0	8
08:15:00	0	1	1	0	0	2	0	0	1	0	0	1	1	3	0	0	0	4	0	0	0	0	0	0	7
Grand Total	0	10	2	0	1	12	0	3	3	0	0	6	2	8	2	0	0	12	1	2	0	0	0	3	33
Approach%	0%	83.3%	16.7%	0%	-	-	0%	50%	50%	0%	-	-	16.7%	66.7%	16.7%	0%	-	-	33.3%	66.7%	0%	0%	-	-	-
Totals %	0%	30.3%	6.1%	0%	36.4%	0%	9.1%	9.1%	0%	18.2%	6.1%	24.2%	6.1%	0%	36.4%	3%	6.1%	0%	0%	9.1%	-	-	-	-	-
PHF	0	0.5	0.5	0	0.6	0	0.75	0.38	0	0.5	0.5	0.67	0.5	0	0.6	0.25	0.25	0	0	0.38	-	-	-	-	-
Heavy	0	1	0	0	1	0	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0
Heavy %	0%	10%	0%	0%	8.3%	0%	0%	33.3%	0%	16.7%	0%	12.5%	0%	0%	8.3%	0%	0%	0%	0%	0%	-	-	-	-	-
Lights	0	9	2	0	11	0	3	2	0	5	2	7	2	0	11	1	2	0	0	3	-	-	-	-	-
Lights %	0%	90%	100%	0%	91.7%	0%	100%	66.7%	0%	83.3%	100%	87.5%	100%	0%	91.7%	100%	100%	0%	0%	100%	-	-	-	-	-
Single-Unit Trucks	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	33.3%	0%	16.7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Buses %	0%	10%	0%	0%	8.3%	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	1	0	0	0	1	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12.5%	0%	0%	0%	8.3%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	1	-	-	-	-	0	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-
Pedestrians %	-	-	-	-	100%	-	-	-	-	0%	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
Bicycles on Road	0	0	1	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-



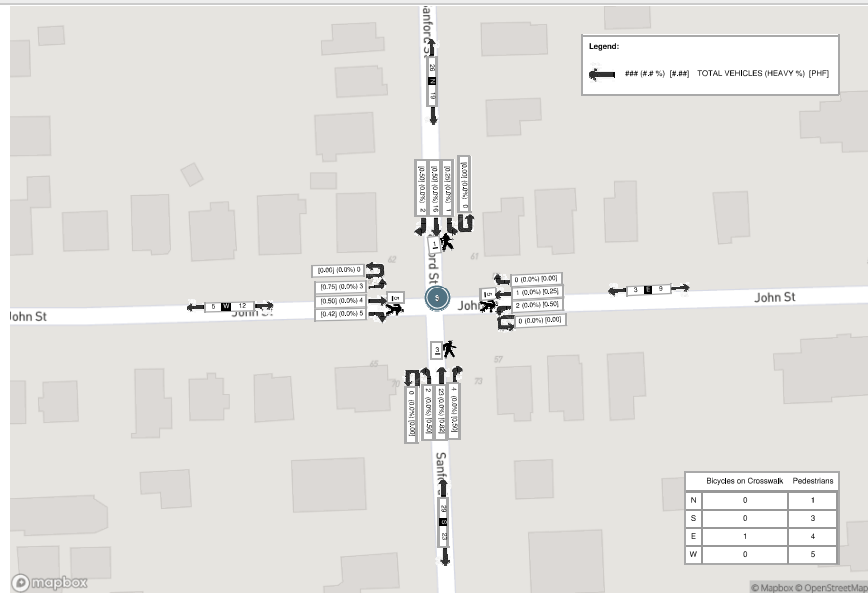
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)

Start Time	N Approach SANFORD ST						E Approach JOHN ST						S Approach SANFORD ST						W Approach JOHN ST						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		
16:30:00	1	3	0	0	0	4	0	1	1	0	2	2	2	4	1	0	0	3	7	3	0	1	0	4	4	17
16:45:00	0	2	0	0	0	2	0	0	1	0	2	1	1	7	1	0	0	9	0	1	1	0	0	2	14	
17:00:00	0	3	0	0	1	3	0	0	0	0	0	0	0	6	0	0	0	6	0	2	1	0	0	3	12	
17:15:00	1	8	1	0	0	10	0	0	0	0	1	0	1	6	0	0	0	7	2	1	0	0	1	3	20	
Grand Total	2	16	1	0	1	19	0	1	2	0	5	3	4	23	2	0	0	3	29	5	4	3	0	5	12	63
Approach%	10.5%	84.2%	5.3%	0%	-	-	0%	33.3%	66.7%	0%	-	-	13.8%	79.3%	6.9%	0%	-	-	41.7%	33.3%	25%	0%	-	-	-	
Totals %	3.2%	25.4%	1.6%	0%	30.2%	0%	1.6%	3.2%	0%	4.8%	6.3%	36.5%	3.2%	0%	48%	7.9%	6.3%	4.8%	0%	19%	-	-	-	-	-	
PHF	0.5	0.5	0.25	0	0.48	0	0.25	0.5	0	0.38	0.5	0.82	0.5	0	0.81	0.42	0.5	0.75	0	0.75	-	-	-	-	-	
Heavy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Heavy %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	
Lights	2	16	1	0	19	0	1	2	0	3	4	23	2	0	3	29	5	4	3	0	12	-	-	-	-	
Lights %	100%	100%	100%	0%	100%	0%	100%	100%	0%	100%	100%	100%	0%	100%	100%	100%	0%	100%	100%	100%	0%	100%	-	-	-	
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	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	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%	0%	0%	0%	0%	-	
Pedestrians	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	5	-	-	
Pedestrians%	-	-	-	-	7.1%	-	-	-	-	-	28.6%	-	-	-	-	-	21.4%	-	-	-	-	-	35.7%	-	-	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	7.1%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-	
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	

Peak Hour: 07:30 AM - 08:30 AM Weather: Overcast Clouds (11.69 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)





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

Start Time	N Approach BRADFORD ST						E Approach VICTORIA ST						S Approach BRADFORD ST						W Approach VICTORIA ST						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			
07:00:00	1	39	3	0	2	43	2	1	1	0	1	4	2	52	4	0	1	58	3	1	0	0	1	4	109		
07:15:00	2	53	2	0	5	57	4	3	4	0	0	11	0	55	2	0	1	57	9	5	1	0	3	15	140		
07:30:00	3	72	4	0	2	79	5	2	3	0	6	10	0	70	6	0	1	76	10	7	0	0	3	17	182		
07:45:00	3	99	4	0	2	106	4	4	3	0	2	11	2	102	3	0	0	107	8	4	0	0	1	12	236	667	
08:00:00	1	83	4	0	1	88	4	0	4	0	2	8	4	103	5	0	4	112	9	7	0	0	2	16	224	782	
08:15:00	1	80	3	0	0	84	3	1	2	0	1	6	4	123	3	0	0	130	13	2	1	0	0	16	236	878	
08:30:00	1	89	6	0	1	96	4	2	5	0	2	11	1	116	3	0	0	120	7	2	5	0	0	14	241	937	
08:45:00	0	97	8	0	1	105	7	5	1	0	2	13	5	114	9	0	0	128	14	9	1	0	0	24	270	971	
BREAK																											
16:00:00	3	139	4	0	0	146	12	6	15	0	5	33	4	118	6	0	4	128	12	6	4	0	2	22	329		
16:15:00	4	136	6	0	0	146	7	3	13	0	0	23	5	123	9	0	4	137	15	4	1	0	6	20	326		
16:30:00	3	158	2	0	2	163	8	6	6	0	2	20	5	116	6	0	1	127	15	8	2	0	0	25	335		
16:45:00	2	151	1	0	0	154	7	6	10	0	0	23	11	161	5	0	7	177	13	6	2	0	3	21	375	1365	
17:00:00	2	148	4	0	2	154	6	5	12	0	3	23	7	150	5	0	1	162	15	9	4	0	2	28	367	1403	
17:15:00	2	127	5	0	1	134	7	2	3	0	0	12	9	155	4	0	1	168	13	5	3	0	2	21	335	1412	
17:30:00	3	108	3	0	3	114	3	5	11	0	2	19	5	122	9	0	0	136	9	9	2	0	1	20	289	1366	
17:45:00	4	96	5	0	2	105	5	5	4	0	0	14	7	117	7	0	0	131	7	4	4	0	2	15	265	1256	
Grand Total	35	1675	64	0	24	1774	88	56	97	0	28	241	71	1797	86	0	25	1954	172	88	30	0	28	290	4299	-	
Approach%	2%	94.4%	3.6%	0%	-	-	36.5%	23.2%	40.2%	0%	-	-	3.6%	92%	4.4%	0%	-	-	58.3%	30.3%	10.3%	0%	-	-	-	-	-
Totals %	0.8%	39.3%	1.5%	0%	-	41.7%	2.1%	1.3%	2.3%	0%	-	5.7%	1.7%	42.2%	2%	0%	-	45.9%	4%	2.1%	0.7%	0%	-	6.8%	-	-	
Heavy	0	62	1	0	-	-	0	2	2	0	-	-	1	52	12	0	-	-	10	2	0	0	0	-	-	-	-
Heavy %	0%	3.7%	1.6%	0%	-	-	0%	3.6%	2.1%	0%	-	-	1.4%	2.9%	14%	0%	-	-	5.8%	2.3%	0%	0%	-	-	-	-	-
Bicycles	0	0	0	0	-	-	0	0	1	0	-	-	0	1	0	0	-	-	0	1	1	0	-	-	-	-	-
Bicycle%	0%	0%	0%	0%	-	-	0%	0%	1%	0%	-	-	0%	0.1%	0%	0%	-	-	0%	1.1%	3.3%	0%	-	-	-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)

Start Time	N Approach BRADFORD ST						E Approach VICTORIA ST						S Approach BRADFORD ST						W Approach VICTORIA ST						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	1	83	4	0	1	88	4	0	4	0	2	8	4	103	5	0	4	112	9	7	0	0	2	16	224
08:15:00	1	80	3	0	0	84	3	1	2	0	1	6	4	123	3	0	0	130	13	2	1	0	0	16	238
08:30:00	1	89	6	0	1	96	4	2	5	0	2	11	1	116	3	0	0	120	7	2	5	0	0	14	241
08:45:00	0	97	8	0	1	105	7	5	1	0	2	13	5	114	9	0	0	128	14	9	1	0	0	24	270
Grand Total	3	349	21	0	3	373	18	8	12	0	7	38	14	456	20	0	4	490	43	20	7	0	2	70	971
Approach%	0.8%	93.6%	5.6%	0%	-	-	47.4%	21.1%	31.6%	0%	-	-	2.9%	93.1%	4.1%	0%	-	-	61.4%	28.6%	10%	0%	-	-	-
Totals %	0.3%	35.9%	2.2%	0%	-	38.4%	1.9%	0.8%	1.2%	0%	-	3.9%	1.4%	47%	2.1%	0%	-	50.5%	4.4%	2.1%	0.7%	0%	-	7.2%	-
PHF	0.75	0.9	0.66	0	-	0.89	0.64	0.4	0.6	0	-	0.73	0.7	0.93	0.56	0	-	0.94	0.77	0.56	0.35	0	-	0.73	-
Heavy	0	14	1	0	-	15	0	0	2	0	-	2	1	13	4	0	-	18	4	2	0	0	-	6	-
Heavy %	0%	4%	4.8%	0%	-	4%	0%	0%	16.7%	0%	-	5.3%	7.1%	2.9%	20%	0%	-	3.7%	9.3%	10%	0%	0%	-	8.6%	-
Lights	3	335	20	0	-	358	18	8	10	0	-	36	13	443	16	0	-	472	39	18	7	0	-	64	-
Lights %	100%	96%	95.2%	0%	-	98%	100%	100%	83.3%	0%	-	94.7%	92.9%	97.1%	80%	0%	-	96.3%	90.7%	90%	100%	0%	-	91.4%	-
Single-Unit Trucks	0	5	0	0	-	5	0	0	1	0	-	1	0	2	0	0	-	2	1	0	0	0	-	1	-
Single-Unit Trucks %	0%	1.4%	0%	0%	-	1.3%	0%	0%	8.3%	0%	-	2.6%	0%	0.4%	0%	0%	-	0.4%	2.3%	0%	0%	0%	-	1.4%	-
Buses	0	8	1	0	-	9	0	0	0	0	-	0	1	11	4	0	-	16	3	2	0	0	-	5	-
Buses %	0%	2.3%	4.8%	0%	-	2.4%	0%	0%	0%	0%	-	0%	7.1%	2.4%	20%	0%	-	3.3%	7%	10%	0%	0%	-	7.1%	-
Articulated Trucks	0	1	0	0	-	1	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	-
Articulated Trucks %	0%	0.3%	0%	0%	-	0.3%	0%	0%	8.3%	0%	-	2.6%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	6	-	-	-	-	-	4	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	18.8%	-	-	-	-	-	37.5%	-	-	-	-	-	29%	-	-	-	-	-	6.3%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	6.3%	-	-	-	-	-	0%	-	-	-	-	-	6.3%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	1	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

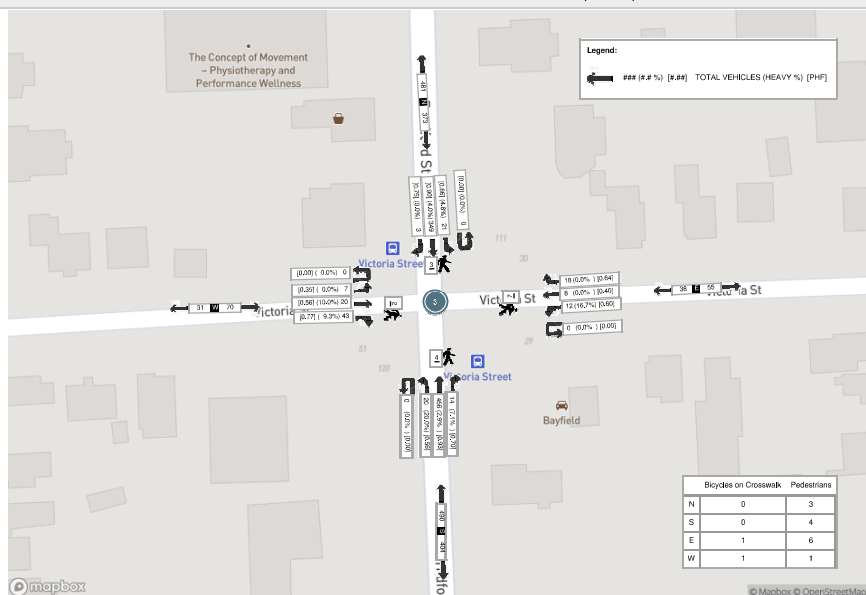


Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)

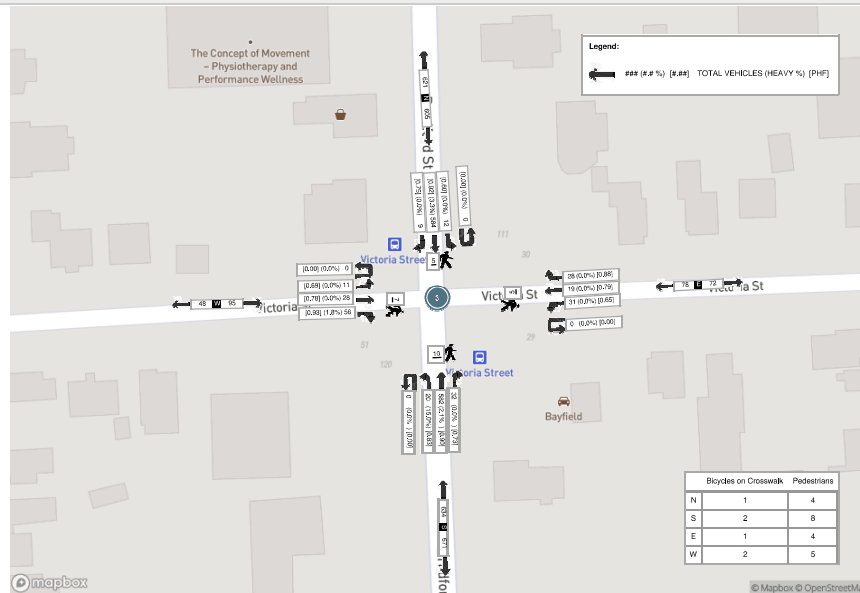
Start Time	N Approach BRADFORD ST						E Approach VICTORIA ST						S Approach BRADFORD ST						W Approach VICTORIA ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	3	158	2	0	2	163	8	6	6	0	2	20	5	116	6	0	1	127	15	8	2	0	0	25	335
16:45:00	2	151	1	0	0	154	7	6	10	0	0	23	11	161	5	0	7	177	13	6	2	0	3	21	375
17:00:00	2	148	4	0	2	154	6	5	12	0	3	23	7	155	5	0	1	162	15	9	4	0	2	28	267
17:15:00	2	127	5	0	1	134	7	2	3	0	0	12	9	155	4	0	1	168	13	5	3	0	2	21	335
Grand Total	9	584	12	0	5	605	28	19	31	0	5	78	32	582	20	0	10	634	56	28	11	0	7	95	1412
Approach%	1.5%	96.5%	2%	0%	-	-	35.9%	24.4%	39.7%	0%	-	-	5%	91.8%	3.2%	0%	-	-	58.9%	29.5%	11.6%	0%	-	-	-
Totals %	0.6%	41.4%	0.8%	0%	-	42.8%	2%	1.3%	2.2%	0%	-	5.5%	2.3%	41.2%	1.4%	0%	-	44.9%	4%	2%	0.8%	0%	-	6.7%	-
PHF	0.75	0.92	0.8	0	-	0.93	0.88	0.79	0.65	0	-	0.85	0.73	0.9	0.83	0	-	0.9	0.93	0.78	0.69	0	-	0.85	-
Heavy	0	19	0	0	-	19	0	0	0	0	-	0	0	12	3	0	-	15	1	0	0	0	-	1	-
Heavy %	0%	3.3%	0%	0%	-	3.1%	0%	0%	0%	0%	-	0%	0%	2.1%	15%	0%	-	2.4%	1.8%	0%	0%	0%	-	1.1%	-
Lights	9	565	12	0	-	586	28	19	31	0	-	78	32	570	17	0	-	619	55	28	11	0	-	94	-
Lights %	100%	96.7%	100%	0%	-	96.9%	100%	100%	100%	0%	-	100%	100%	97.9%	85%	0%	-	97.6%	98.2%	100%	100%	0%	-	98.9%	-
Single-Unit Trucks	0	4	0	0	-	4	0	0	0	0	-	0	0	2	1	0	-	3	0	0	0	0	-	0	-
Single-Unit Trucks %	0%	0.7%	0%	0%	-	0.7%	0%	0%	0%	0%	-	0%	0%	0.3%	5%	0%	-	0.5%	0%	0%	0%	0%	-	0%	-
Buses	0	15	0	0	-	15	0	0	0	0	-	0	0	8	2	0	-	10	1	0	0	0	-	1	-
Buses %	0%	2.6%	0%	0%	-	2.5%	0%	0%	0%	0%	-	0%	0%	1.4%	10%	0%	-	1.6%	1.8%	0%	0%	0%	-	1.1%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0.3%	0%	0%	-	0.3%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	4	-	-	-	-	-	8	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	14.8%	-	-	-	-	-	14.8%	-	-	-	-	-	29.6%	-	-	-	-	-	18.5%	-	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	-
Bicycles on Crosswalk %	-	-	-	-	3.7%	-	-	-	-	-	3.7%	-	-	-	-	-	7.4%	-	-	-	-	-	7.4%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	-
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)



Turning Movement Count (1 . VICTORIA ST & INNISFIL ST)

Start Time	N Approach INNISFIL ST					E Approach VICTORIA ST					S Approach INNISFIL ST					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		
07:00:00	2	2	0	2	4	5	3	0	2	8	2	6	0	0	8	20	
07:15:00	6	11	0	6	17	6	1	0	3	7	2	2	0	0	4	28	
07:30:00	3	16	0	0	19	7	1	0	0	8	1	4	0	0	5	32	
07:45:00	8	13	0	0	21	10	3	0	1	13	1	4	0	0	5	39	119
08:00:00	8	13	0	2	21	7	0	0	1	7	4	1	0	0	5	33	132
08:15:00	3	10	0	0	13	6	0	0	0	6	4	3	0	0	7	26	130
08:30:00	3	8	0	0	11	4	1	0	0	5	4	5	0	0	9	25	123
08:45:00	6	18	0	0	24	17	2	0	4	19	4	3	0	0	7	50	134
BREAK																	
16:00:00	16	21	0	3	37	12	2	0	3	14	2	7	0	3	9	60	
16:15:00	14	19	0	8	33	10	2	0	0	12	2	7	0	0	9	54	
16:30:00	9	25	0	2	34	15	4	0	0	19	8	9	0	0	17	70	
16:45:00	8	22	0	2	30	12	4	0	1	16	1	5	0	0	6	52	236
17:00:00	15	26	0	3	41	10	1	0	2	11	4	11	0	0	15	67	243
17:15:00	8	23	0	3	31	7	2	0	3	9	2	9	0	0	11	51	240
17:30:00	10	17	0	2	27	14	2	0	4	16	3	4	0	0	7	50	220
17:45:00	6	13	0	1	19	9	4	0	2	13	1	10	0	0	11	43	211
Grand Total	125	257	0	34	382	151	32	0	26	183	45	90	0	3	135	700	-
Approach%	32.7%	67.3%	0%	-	-	82.5%	17.5%	0%	-	-	33.3%	66.7%	0%	-	-	-	-
Totals %	17.9%	36.7%	0%	54.6%	21.6%	4.6%	0%	26.1%	6.4%	12.9%	0%	19.3%	-	-	-	-	-
Heavy	1	12	0	-	13	0	0	-	1	4	0	-	-	-	-	-	-
Heavy %	0.8%	4.7%	0%	-	8.6%	0%	0%	-	2.2%	4.4%	0%	-	-	-	-	-	-
Bicycles	3	2	0	-	1	0	0	-	3	6	0	-	-	-	-	-	-
Bicycle %	2.4%	0.8%	0%	-	0.7%	0%	0%	-	6.7%	6.7%	0%	-	-	-	-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)

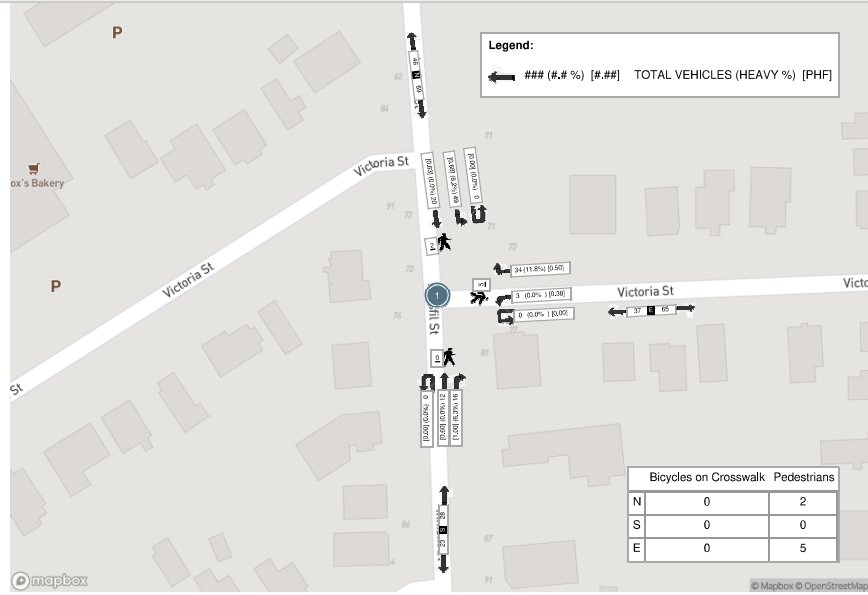
Start Time	N Approach INNISFIL ST					E Approach VICTORIA ST					S Approach INNISFIL ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
08:00:00	8	13	0	2	21	7	0	0	1	7	4	1	0	0	5	33
08:15:00	3	10	0	0	13	6	0	0	0	6	4	3	0	0	7	26
08:30:00	3	8	0	0	11	4	1	0	0	5	4	5	0	0	9	25
08:45:00	6	18	0	0	24	17	2	0	4	19	4	3	0	0	7	50
Grand Total	20	49	0	2	69	34	3	0	5	37	16	12	0	0	28	134
Approach%	29%	71%	0%	-	-	91.9%	8.1%	0%	-	-	57.1%	42.9%	0%	-	-	-
Totals %	14.9%	36.6%	0%	-	51.5%	25.4%	2.2%	0%	-	27.6%	11.9%	9%	0%	-	20.9%	-
PHF	0.63	0.68	0	-	0.72	0.5	0.38	0	-	0.49	1	0.6	0	-	0.78	-
Heavy	0	4	0	-	4	4	0	0	-	4	1	0	0	-	1	-
Heavy %	0%	8.2%	0%	-	5.8%	11.8%	0%	0%	-	10.8%	6.3%	0%	0%	-	3.6%	-
Lights	20	45	0	-	65	30	3	0	-	33	15	12	0	-	27	-
Lights %	100%	91.8%	0%	-	94.2%	88.2%	100%	0%	-	89.2%	93.8%	100%	0%	-	96.4%	-
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	-
Single-Unit Trucks %	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	-
Buses	0	4	0	-	4	4	0	0	-	4	1	0	0	-	1	-
Buses %	0%	8.2%	0%	-	5.8%	11.8%	0%	0%	-	10.8%	6.3%	0%	0%	-	3.6%	-
Articulated Trucks	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%	-
Pedestrians	-	-	-	2	-	-	-	-	5	-	-	-	-	0	-	-
Pedestrians%	-	-	-	28.6%	-	-	-	-	71.4%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-



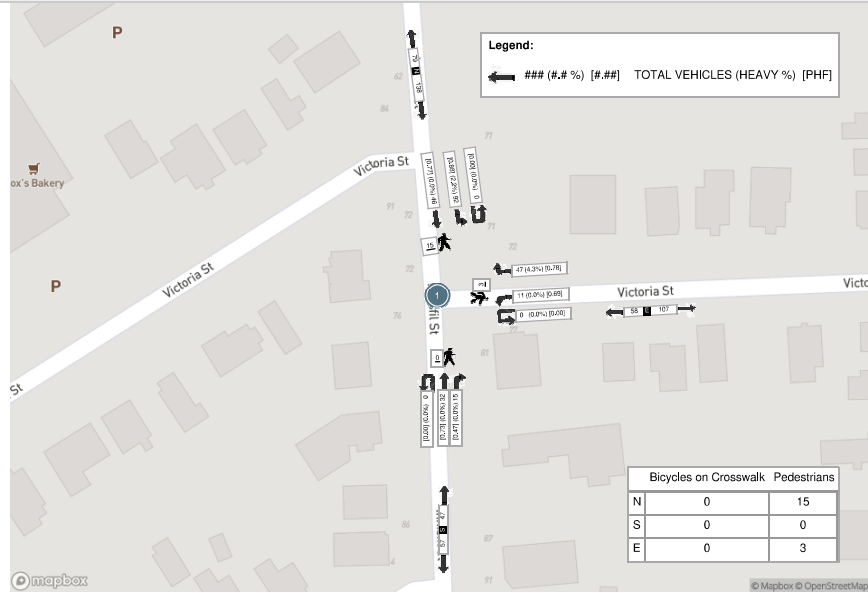
Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (16.7 °C)

Start Time	N Approach INNISFIL ST					E Approach VICTORIA ST					S Approach INNISFIL ST					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	14	19	0	8	33	10	2	0	0	12	2	7	0	0	9	54
16:30:00	9	25	0	2	34	15	4	0	0	19	8	9	0	0	17	70
16:45:00	8	22	0	2	30	12	4	0	1	16	1	5	0	0	6	52
17:00:00	15	26	0	3	41	10	1	0	2	11	4	11	0	0	15	67
Grand Total	46	92	0	15	138	47	11	0	3	58	15	32	0	0	47	243
Approach%	33.3%	66.7%	0%	-	-	81%	19%	0%	-	-	31.9%	68.1%	0%	-	-	-
Totals %	18.9%	37.9%	0%	-	56.8%	19.3%	4.5%	0%	-	23.9%	6.2%	13.2%	0%	-	19.3%	-
PHF	0.77	0.88	0	-	0.84	0.78	0.69	0	-	0.76	0.47	0.73	0	-	0.69	-
Heavy	0	2	0	-	2	2	0	0	-	2	0	0	0	-	0	-
Heavy %	0%	2.2%	0%	-	1.4%	4.3%	0%	0%	-	3.4%	0%	0%	0%	-	0%	-
Lights	46	90	0	-	136	45	11	0	-	56	15	32	0	-	47	-
Lights %	100%	97.8%	0%	-	98.6%	95.7%	100%	0%	-	96.6%	100%	100%	0%	-	100%	-
Single-Unit Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	-
Single-Unit Trucks %	0%	0%	0%	-	0%	2.1%	0%	0%	-	1.7%	0%	0%	0%	-	0%	-
Buses	0	2	0	-	2	1	0	0	-	1	0	0	0	-	0	-
Buses %	0%	2.2%	0%	-	1.4%	2.1%	0%	0%	-	1.7%	0%	0%	0%	-	0%	-
Articulated Trucks	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%	-
Pedestrians	-	-	-	15	-	-	-	-	3	-	-	-	-	0	-	-
Pedestrians%	-	-	-	83.3%	-	-	-	-	16.7%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Road	3	1	0	0	-	0	0	0	0	-	3	2	0	0	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (16.7 °C)





Turning Movement Count (2. VICTORIA ST & SANFORD ST)

Start Time	N Approach SANFORD ST						E Approach VICTORIA ST						S Approach SANFORD ST						W Approach VICTORIA ST						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			
07:00:00	0	1	2	0	1	3	1	6	0	0	0	7	0	3	0	0	1	3	1	3	0	0	1	4	17		
07:15:00	0	0	1	0	4	1	0	6	1	0	0	7	2	1	0	0	1	3	1	11	0	0	2	12	23		
07:30:00	0	0	2	0	2	2	2	9	1	0	0	12	0	1	0	0	1	1	3	15	0	0	0	18	33		
07:45:00	0	0	0	0	1	0	0	10	0	0	0	10	1	3	2	0	0	6	2	12	0	0	0	14	30	103	
08:00:00	0	1	0	0	0	1	0	6	0	0	0	6	0	1	1	0	2	2	2	15	0	0	0	17	26	112	
08:15:00	0	0	1	0	0	1	0	5	0	0	0	5	2	0	0	0	0	2	2	12	0	0	0	14	22	111	
08:30:00	0	1	0	0	2	1	0	6	0	0	1	6	3	0	1	0	3	4	0	12	0	0	0	12	23	101	
08:45:00	0	1	1	0	8	2	0	15	0	0	0	15	3	0	2	0	0	5	2	20	0	0	0	22	44	115	
BREAK																											
16:00:00	0	0	1	0	7	1	2	13	0	0	2	15	0	0	3	0	3	3	2	20	0	0	4	22	41		
16:15:00	0	0	0	0	5	0	3	10	1	0	0	14	1	2	1	0	0	4	2	18	0	0	0	20	38		
16:30:00	1	1	0	0	3	2	0	14	1	0	2	15	0	1	2	0	0	3	2	28	0	0	1	30	50		
16:45:00	0	0	0	0	0	0	0	12	2	0	0	14	2	3	4	0	3	9	3	20	0	0	2	23	46	175	
17:00:00	0	0	0	0	3	0	1	9	1	0	0	11	1	3	2	0	0	6	4	27	1	0	0	32	49	183	
17:15:00	0	1	0	0	3	1	1	7	1	0	1	9	1	3	2	0	1	6	7	18	0	0	1	25	41	186	
17:30:00	0	0	0	0	1	0	0	13	1	2	0	16	1	0	4	0	1	5	1	18	0	0	2	19	40	176	
17:45:00	0	1	0	0	1	1	0	11	0	0	0	11	2	0	1	0	0	3	3	11	0	0	3	14	29	159	
Grand Total	1	7	8	0	41	16	10	152	9	2	6	173	19	21	25	0	16	65	37	260	1	0	16	298	552	-	
Approach%	6.3%	43.8%	50%	0%	-	-	5.8%	87.9%	5.2%	1.2%	-	-	29.2%	32.3%	38.5%	0%	-	-	12.4%	87.2%	0.3%	0%	-	-	-	-	
Totals %	0.2%	1.3%	1.4%	0%	-	2.9%	1.8%	27.5%	1.6%	0.4%	-	31.3%	3.4%	3.8%	4.5%	0%	-	11.8%	6.7%	47.1%	0.2%	0%	54%	-	-	-	
Heavy	0	0	0	0	-	-	1	13	0	0	-	-	1	0	0	0	-	-	2	11	0	0	-	-	-	-	
Heavy %	0%	0%	0%	0%	-	-	10%	8.6%	0%	0%	-	-	5.3%	0%	0%	0%	-	-	5.4%	4.2%	0%	0%	-	-	-	-	
Bicycles	0	0	0	0	-	-	1	0	0	0	-	-	1	0	0	0	-	-	1	1	0	0	-	-	-	-	
Bicycle %	0%	0%	0%	0%	-	-	10%	0%	0%	0%	-	-	5.3%	0%	0%	0%	-	-	2.7%	0.4%	0%	0%	-	-	-	-	



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)

Start Time	N Approach SANFORD ST						E Approach VICTORIA ST						S Approach SANFORD ST						W Approach VICTORIA ST						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	0	1	0	0	0	1	0	6	0	0	0	6	0	1	1	0	2	2	2	15	0	0	0	17	26
08:15:00	0	0	1	0	0	1	0	5	0	0	0	5	2	0	0	0	0	2	2	12	0	0	0	14	22
08:30:00	0	1	0	0	2	1	0	6	0	0	1	6	3	0	1	0	3	4	0	12	0	0	0	12	23
08:45:00	0	1	1	0	8	2	0	15	0	0	0	15	3	0	2	0	0	5	2	20	0	0	0	22	44
Grand Total	0	3	2	0	10	5	0	32	0	0	1	32	8	1	4	0	5	13	6	59	0	0	0	65	115
Approach%	0%	60%	40%	0%	-	-	0%	100%	0%	0%	-	-	61.5%	7.7%	30.8%	0%	-	-	9.2%	90.8%	0%	0%	-	-	-
Totals %	0%	2.6%	1.7%	0%	-	4.3%	0%	27.8%	0%	0%	-	27.8%	7%	0.9%	3.5%	0%	-	11.3%	5.2%	51.3%	0%	0%	56.5%	-	-
PHF	0	0.75	0.5	0	-	0.63	0	0.53	0	0	-	0.53	0.67	0.25	0.5	0	-	0.65	0.75	0.74	0	0	-	0.74	-
Heavy	0	0	0	0	-	0	0	4	0	0	-	4	1	0	0	0	-	1	0	5	0	0	-	5	-
Heavy %	0%	0%	0%	0%	-	0%	0%	12.5%	0%	0%	-	12.5%	12.5%	0%	0%	0%	-	7.7%	0%	8.5%	0%	0%	-	7.7%	-
Lights	0	3	2	0	-	5	0	28	0	0	-	28	7	1	4	0	-	12	6	54	0	0	-	60	-
Lights %	0%	100%	100%	0%	-	100%	0%	87.5%	0%	0%	-	87.5%	87.5%	100%	100%	0%	-	92.3%	100%	91.5%	0%	0%	-	92.3%	-
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Buses	0	0	0	0	-	0	0	4	0	0	-	4	0	0	0	0	-	0	0	5	0	0	-	5	-
Buses %	0%	0%	0%	0%	-	0%	0%	12.5%	0%	0%	-	12.5%	0%	0%	0%	0%	-	0%	0%	8.5%	0%	0%	-	7.7%	-
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	12.5%	0%	0%	0%	-	7.7%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	10	-	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	0	-	-
Pedestrians %	-	-	-	-	82.0%	-	-	-	-	-	0%	-	-	-	-	-	31.3%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	-	6.3%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

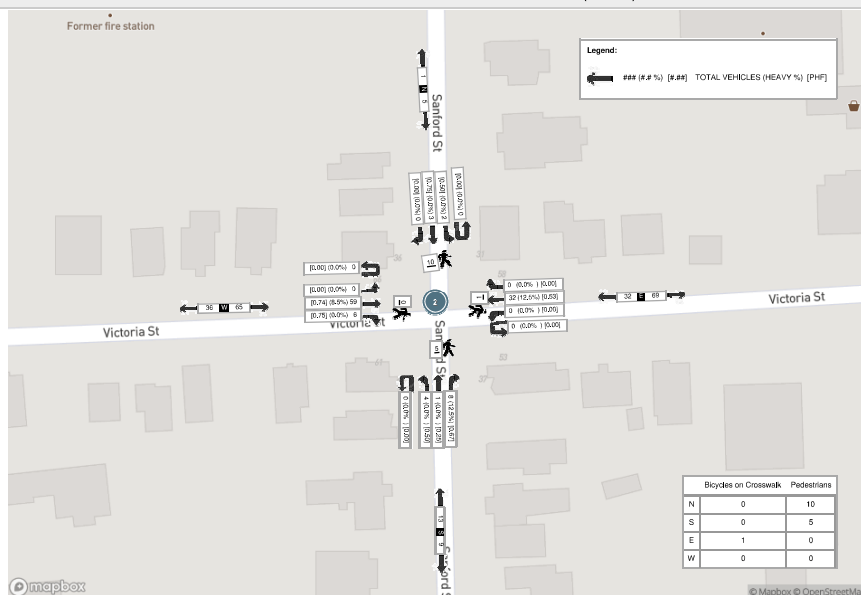


Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)

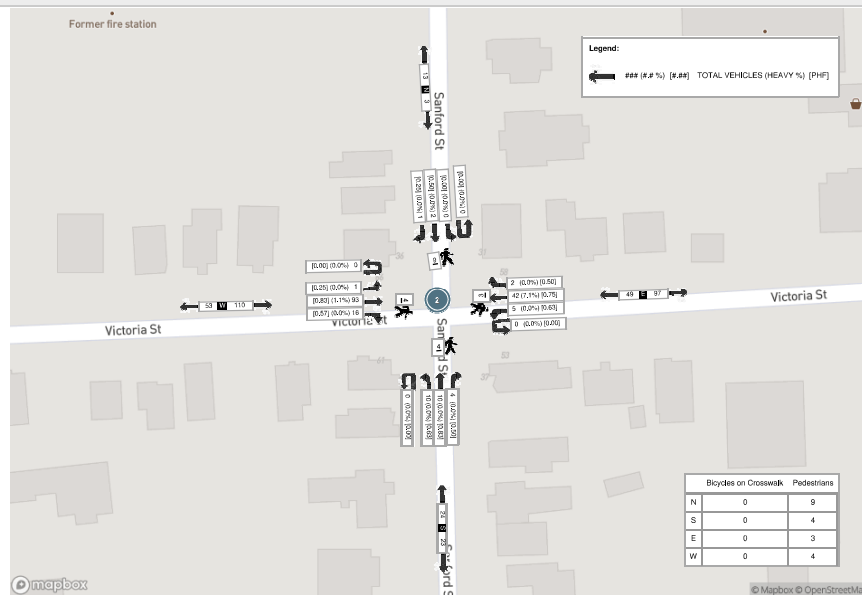
Start Time	N Approach SANFORD ST						E Approach VICTORIA ST						S Approach SANFORD ST						W Approach VICTORIA ST						Ht. Total (15 min)	
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total		
16:30:00	1	1	0	0	3	2	0	14	1	0	2	15	0	1	2	0	0	3	24	2	38	0	0	1	30	50
16:45:00	0	0	0	0	0	0	0	12	2	0	2	14	2	3	4	0	3	9	3	20	0	0	2	23	46	
17:00:00	0	0	0	0	3	0	1	9	1	0	0	11	1	3	2	0	0	6	4	27	1	0	0	32	49	
17:15:00	0	1	0	0	3	1	1	7	1	0	1	9	1	3	2	0	1	6	7	18	0	0	1	25	41	
Grand Total	1	2	0	0	9	3	2	42	5	0	3	49	4	10	10	0	4	24	16	93	1	0	4	110	186	
Approach%	33.3%	66.7%	0%	0%		-	4.1%	85.7%	10.2%	0%		-	16.7%	41.7%	41.7%	0%		-	14.5%	84.5%	0.9%	0%		-	-	
Totals %	0.5%	1.1%	0%	0%	1.6%	1.6%	1.1%	22.6%	2.7%	0%	26.3%	26.3%	2.2%	5.4%	5.4%	0%	12.9%	8.6%	50%	0.5%	0%		59.1%	-	-	
PHF	0.25	0.5	0	0	0.38	0.38	0.5	0.75	0.63	0	0.82	0.82	0.5	0.83	0.63	0	0.67	0.57	0.83	0.25	0		0.86	-	-	
Heavy	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	1	0	0	1	-	-	
Heavy %	0%	0%	0%	0%	0%	0%	0%	7.1%	0%	0%	6.1%	6.1%	0%	0%	0%	0%	0%	0%	1.1%	0%	0%		0.9%	-	-	
Lights	1	2	0	0	3	3	2	39	5	0	46	46	4	10	10	0	24	16	82	1	0		109	-	-	
Lights %	100%	100%	0%	0%	100%	100%	100%	92.9%	100%	0%	93.9%	93.9%	100%	100%	100%	0%	100%	100%	98.9%	100%	0%		99.1%	-	-	
Single-Unit Trucks	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	-	-	
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	2.4%	0%	0%	2%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	
Buses	0	0	0	0	0	0	0	2	2	0	0	2	0	0	0	0	0	0	0	1	0	0	1	-	-	
Buses %	0%	0%	0%	0%	0%	0%	0%	4.8%	0%	0%	4.1%	4.1%	0%	0%	0%	0%	0%	0%	1.1%	0%	0%		0.9%	-	-	
Articulated Trucks	0	0	0	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%	0%	0%	0%	-	-	
Pedestrians	-	-	-	-	9	-	-	-	-	-	3	-	-	-	-	-	4	-	-	-	-	4	-	-	-	
Pedestrians%	-	-	-	-	45%	-	-	-	-	-	15%	-	-	-	-	-	20%	-	-	-	-	20%	-	-	-	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-	
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	
Bicycles on Road	0	0	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	-	
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (11.69 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (16.7 °C)



Appendix E: Signal Timings



September 11, 2023

File: T07-SI

Dear Andrew T. Pasco

RE: Traffic Signal Timings – Lakeshore Drive and Victoria Street

With respect to your inquiry on August 28, 2023, the above intersection traffic signal timings are as follows:

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

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

The side street phases are actuated; meaning a vehicle or pedestrian must be present on the side street before the side street is given a green indication. Actuation at this intersection occurs in two ways: first, for vehicles a loop detector is imbedded into the roadway at the painted stop bar; and secondly, pushbuttons are located on each corner for pedestrians to activate their movement. Vehicle presence only on the side street would result in a possible green time of between the minimum and maximum times noted above, depending on demand.

Pedestrian "Walk" and "Flashing Don't Walk" times on the side street as noted would be used in the event that the pedestrian push button was activated. Should there be no demand on the actuated phases; the signals would rest in a green indication for the main street.

Should you require any further information please feel free to contact me at (705) 739-4220 ext. 5178.

Yours truly,

Justin MacDonald, C.E.T., PTP
Senior Transportation Technologist

Andrew T. Pasco

From: Justin MacDonald <Justin.MacDonald@barrie.ca>
Sent: October 19, 2023 10:13 AM
To: Andrew T. Pasco
Subject: RE: Signal Timing Request - Lakeshore Dr & Victoria St (7809-16)

Good morning Andrew,

I was not provided a formal memo style STP for the pedestrian signal at Innisfil and John - but was provided the following information.

Green Indication – 40 Seconds
Amber Indication - 4 seconds
Red Indication – 2 seconds

Hope this helps

Justin MacDonald, C.E.T., PTP
Project Delivery – Transportation Planning, Development Services
The City of Barrie
Mobile 705-734-8020
Please consider the environment before printing this email.

From: Andrew T. Pasco <pasco@bagroup.com>
Sent: Thursday, October 12, 2023 11:58 AM
To: Justin MacDonald <Justin.MacDonald@barrie.ca>
Subject: RE: Signal Timing Request - Lakeshore Dr & Victoria St (7809-16)

No problem Justin,

Thanks for your help on this file. We have one last Signal timing request for this project that we're hoping you can help us with. There is a traffic signal at John & Innisfil – it looks more like a pedestrian activated crossing, but if there are any timing plans available for that signal it would be greatly appreciated.

Thanks,

Andrew

From: Justin MacDonald <Justin.MacDonald@barrie.ca>
Sent: Wednesday, October 4, 2023 8:55 AM
To: Andrew T. Pasco <pasco@bagroup.com>
Subject: RE: Signal Timing Request - Lakeshore Dr & Victoria St (7809-16)

Good morning Andrew,

I do not have any historical counts for the John Street locations. The only historical count I was able to find from the below list was a 2014 count for Lakeshore Drive at Victoria Street.

Sorry I was not able to help.

Justin MacDonald, C.E.T., PTP
Project Delivery – Transportation Planning, Development Services
The City of Barrie
Mobile 705-734-8020
Please consider the environment before printing this email.

From: Andrew T. Pasco <pasco@bagroup.com>
Sent: Thursday, September 28, 2023 2:49 PM
To: Justin MacDonald <Justin.MacDonald@barrie.ca>
Subject: RE: Signal Timing Request - Lakeshore Dr & Victoria St (7809-16)

Hello Justin,

Thanks for assisting with the STP request, the project manager is now interested in obtaining historic counts. Can you please advise on what's available at the following locations:

1. Lakeshore Drive / Victoria Street
2. Bradford Street / Victoria Street
3. Sanford Street / Victoria Street
4. Innisfil Street / Victoria Street
5. Innisfil Street / John Street
6. Sanford Street / John Street
7. Bradford Street / John Street

We're particularly interested in the John St locations.

Thank you,

Andrew

From: Justin MacDonald <Justin.MacDonald@barrie.ca>
Sent: Thursday, August 31, 2023 2:50 PM
To: Andrew T. Pasco <pasco@bagroup.com>
Subject: RE: Signal Timing Request - Lakeshore Dr & Victoria St (7809-16)

Good afternoon Andrew,

Thanks for reaching out – I have requested the STP from our Traffic Systems group and should have them shortly.

Additionally, do you require any TMC's? I have counts for both intersections.

Thanks.

Justin MacDonald, C.E.T., PTP
Project Delivery – Transportation Planning, Development Services
The City of Barrie
Mobile 705-734-8020
Please consider the environment before printing this email.

From: Andrew T. Pasco <pasco@bagroup.com>
Sent: Monday, August 28, 2023 10:31 AM
To: Justin MacDonald <Justin.MacDonald@barrie.ca>
Subject: Signal Timing Request - Lakeshore Dr & Victoria St (7809-16)

Good morning Justin,

I'm looking to purchase the signal timing plans for two intersections in Barrie as part of a TIS. The locations are:

1. Lakeshore Drive / Victoria Street
2. Bradford Street / Victoria Street

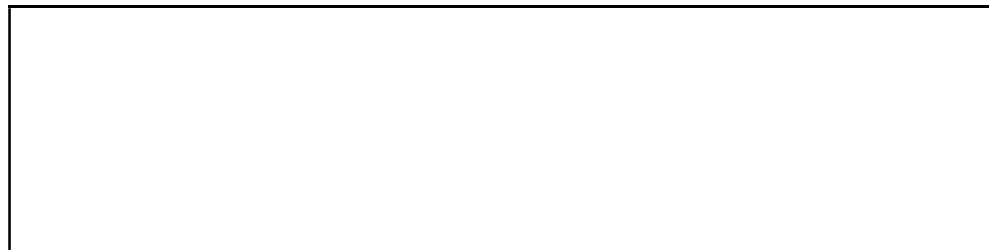
Any assistance would be greatly appreciated,

Thank you,

Andrew T. Pasco
Manager, Data Collection

BA Consulting Group Ltd.

45. St. Clair Avenue West, Suite 300 | Toronto
w: 416 961 7110 x168 | c: 416 509 7637 | pasco@bagroup.com



Effective September 5th, 2023, BA Group's Toronto office will move to 95 St. Clair Avenue West, Suite 1000.

Appendix F: Synchro Worksheets



Queues
2: Bradford St & Victoria St

Existing AM

	↖	→	↗	↖	↖	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↖	↗		↕		↕
Traffic Volume (vph)	5	20	10	10	20	455	20	350
Future Volume (vph)	5	20	10	10	20	455	20	350
Lane Group Flow (vph)	0	78	11	33	0	545	0	417
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.06	0.11		0.23		0.18
Control Delay		15.4	22.9	13.6		5.2		5.0
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		15.4	22.9	13.6		5.2		5.0
Queue Length 50th (m)		3.8	1.3	1.3		12.1		8.9
Queue Length 95th (m)		13.3	4.7	7.2		27.7		21.2
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2327		2296
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		0.14	0.03	0.06		0.23		0.18

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Existing AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	20	45	10	10	20	20	455	15	20	350	5
Future Volume (vph)	5	20	45	10	10	20	20	455	15	20	350	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frft		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3451			3453	
Flt Permitted		0.97		0.71	1.00			0.93			0.92	
Satd. Flow (perm)		1541		1142	1693			3220			3175	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	11	11	22	22	506	17	22	389	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	35	0	11	14	0	0	543	0	0	416	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2217			2186	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.17			0.13	
v/c Ratio		0.16		0.07	0.06			0.24			0.19	
Uniform Delay, d1		26.5		26.1	26.1			4.1			3.9	
Progression Factor		1.15		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		0.2	0.1			0.3			0.2	
Delay (s)		30.9		26.3	26.2			4.3			4.1	
Level of Service		C		C	C			A			A	
Approach Delay (s)		30.9			26.2			4.3			4.1	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 3: Sanford St & Victoria St

Existing AM

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	0	60	5	0	35	0	5	0	10	0	5	0		
Future Volume (Veh/h)	0	60	5	0	35	0	5	0	10	0	5	0		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65		
Hourly flow rate (vph)	0	92	8	0	54	0	8	0	15	0	8	0		
Pedestrians				1			5			10				
Lane Width (m)				3.6			3.6			3.6				
Walking Speed (m/s)				1.2			1.2			1.2				
Percent Blockage				0			0			1				
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)	118													
pX, platoon unblocked														
vC, conflicting volume	64				105				159	165	102	176	169	64
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	64				105				159	165	102	176	169	64
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100				100				99	100	98	100	99	100
cM capacity (veh/h)	1538				1493				793	722	919	764	718	998
Direction, Lane #	EB 1	WB 1	NB 1	SB 1										
Volume Total	100	54	23	8										
Volume Left	0	0	8	0										
Volume Right	8	0	15	0										
cSH	1538	1493	871	718										
Volume to Capacity	0.00	0.00	0.03	0.01										
Queue Length 95th (m)	0.0	0.0	0.7	0.3										
Control Delay (s)	0.0	0.0	9.2	10.1										
Lane LOS	A			B										
Approach Delay (s)	0.0	0.0	9.2	10.1										
Approach LOS	A			B										
Intersection Summary														
Average Delay	1.6													
Intersection Capacity Utilization	18.7%			ICU Level of Service			A							
Analysis Period (min)	15													

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Existing AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	35	10	15	50	20
Future Volume (Veh/h)	5	35	10	15	50	20
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	7	52	15	22	75	30
Pedestrians	5					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	211	33			42	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	211	33			42	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	95			95	
cM capacity (veh/h)	740	1007			1523	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	59	37	105			
Volume Left	7	0	75			
Volume Right	52	22	0			
cSH	965	1700	1523			
Volume to Capacity	0.06	0.02	0.05			
Queue Length 95th (m)	1.6	0.0	1.2			
Control Delay (s)	9.0	0.0	5.5			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	5.5			
Approach LOS	A					
Intersection Summary						
Average Delay			5.5			
Intersection Capacity Utilization		21.1%		ICU Level of Service		A
Analysis Period (min)			15			

Queues
5: Innisfil St & John St

Existing AM

	EBL	EBT	WBT	NBT	SBT
Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Configurations		↔	↔	↔	↔
Traffic Volume (vph)	20	10	5	5	5
Future Volume (vph)	20	10	5	5	5
Lane Group Flow (vph)	0	36	6	6	30
Turn Type	custom	NA	NA	NA	NA
Protected Phases				2	6
Permitted Phases	4	4	8		
Detector Phase				2	6
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Ped	C-Max	C-Max
v/c Ratio		0.09	0.01	0.01	0.03
Control Delay		20.6	18.4	6.6	3.5
Queue Delay		0.0	0.0	0.0	0.0
Total Delay		20.6	18.4	6.6	3.5
Queue Length 50th (m)		3.8	0.6	0.4	0.3
Queue Length 95th (m)		9.6	3.1	1.6	3.0
Internal Link Dist (m)		110.5	98.0	65.9	155.1
Turn Bay Length (m)					
Base Capacity (vph)		398	488	1085	978
Starvation Cap Reductn		0	0	0	0
Spillback Cap Reductn		0	0	0	0
Storage Cap Reductn		0	0	0	0
Reduced v/c Ratio		0.09	0.01	0.01	0.03

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis
5: Innisfil St & John St

Existing AM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	20	10	0	0	5	0	0	5	0	0	5	20
Future Volume (vph)	20	10	0	0	5	0	0	5	0	0	5	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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			1.00			0.89	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1768			1900			1900			1695	
Flt Permitted		0.85			1.00			1.00			1.00	
Satd. Flow (perm)		1549			1900			1900			1695	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	12	0	0	6	0	0	6	0	0	6	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	36	0	0	6	0	0	6	0	0	20	0
Heavy Vehicles (%)	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA			NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		398			488			1085			968	
v/s Ratio Prot								0.00			c0.01	
v/s Ratio Perm		c0.02			0.00							
v/c Ratio		0.09			0.01			0.01			0.02	
Uniform Delay, d1		19.8			19.4			6.4			6.5	
Progression Factor		1.00			0.94			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.0			0.0	
Delay (s)		19.9			18.2			6.5			6.5	
Level of Service		B			B			A			A	
Approach Delay (s)		19.9			18.2			6.5			6.5	
Approach LOS		B			B			A			A	

Intersection Summary

HCM 2000 Control Delay 13.6 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio 0.04
Actuated Cycle Length (s) 70.0 Sum of lost time (s) 12.0
Intersection Capacity Utilization 22.5% ICU Level of Service A
Analysis Period (min) 15

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: Sanford St & John St

Existing AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	0	10	0	5	5	0	0	15	0	0	10	0
Future Volume (Veh/h)	0	10	0	5	5	0	0	15	0	0	10	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	0	5	5	0	0	16	0	0	11	0
Pedestrians	1											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	122											
pX, platoon unblocked												
vC, conflicting volume	6			11			32	27	11	35	27	6
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6			11			32	27	11	35	27	6
tC, single (s)	4.1			4.4			7.1	6.6	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.5			3.5	4.1	3.3	3.5	4.1	3.3
p0 queue free %	100			100			100	98	100	100	99	100
cM capacity (veh/h)	1627			1428			969	841	1076	958	847	1082
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	11	10	16	11								
Volume Left	0	5	0	0								
Volume Right	0	0	0	0								
cSH	1627	1428	841	847								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (m)	0.0	0.1	0.5	0.3								
Control Delay (s)	0.0	3.8	9.4	9.3								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	3.8	9.4	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay	6.0											
Intersection Capacity Utilization	15.0%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
7: Bradford St & John St

Existing AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	490	15	5	380	5
Future Volume (Veh/h)	5	0	5	15	5	5	0	490	15	5	380	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	516	16	5	400	5
Pedestrians		4			8			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None		None		
Median storage (veh)												
Upstream signal (m)	181											
pX, platoon unblocked												
vC, conflicting volume	684	956	208	748	951	276	409			540		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	684	956	208	748	951	276	409			540		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	94	98	99	100			100		
cM capacity (veh/h)	326	256	801	283	258	721	1157			1032		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	10	26	258	274	205	205						
Volume Left	5	16	0	0	5	0						
Volume Right	5	5	0	16	0	5						
cSH	463	314	1157	1700	1032	1700						
Volume to Capacity	0.02	0.08	0.00	0.16	0.00	0.12						
Queue Length 95th (m)	0.5	2.2	0.0	0.0	0.1	0.0						
Control Delay (s)	12.9	17.5	0.0	0.0	0.3	0.0						
Lane LOS	B	C			A							
Approach Delay (s)	12.9	17.5	0.0		0.1							
Approach LOS	B	C										
Intersection Summary												
Average Delay	0.7											
Intersection Capacity Utilization	24.8%		ICU Level of Service				A					
Analysis Period (min)	15											

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

Existing AM

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	5	5	495	385	10
Future Volume (Veh/h)	0	5	5	495	385	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	5	5	527	410	11
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					103	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	693	214	425			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	677	195	407			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	385	812	1151			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	181	351	273	148	
Volume Left	0	5	0	0	0	
Volume Right	5	0	0	0	11	
cSH	812	1151	1700	1700	1700	
Volume to Capacity	0.01	0.00	0.21	0.16	0.09	
Queue Length 95th (m)	0.1	0.1	0.0	0.0	0.0	
Control Delay (s)	9.5	0.3	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	9.5	0.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			27.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
9: Bradford St & Existing Middle Site Dwy

Existing AM

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	0	0	495	395	5
Future Volume (Veh/h)	0	0	0	495	395	5
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)	0	0	0	532	425	5
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					65	
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	694	216	431			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	638	148	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 %	100	100	100			
cM capacity (veh/h)	403	857	1172			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	177	355	283	147	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	5	
cSH	1700	1172	1700	1700	1700	
Volume to Capacity	0.00	0.00	0.21	0.17	0.09	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			17.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
10: Bradford St & Existing North Site Dwy

Existing AM

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	5	490	400	5
Future Volume (Veh/h)	0	0	5	490	400	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	5	516	421	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					45	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	692	213	426			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	619	126	345			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	411	880	1188			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	177	344	281	145	
Volume Left	0	5	0	0	0	
Volume Right	0	0	0	0	5	
cSH	1700	1188	1700	1700	1700	
Volume to Capacity	0.00	0.00	0.20	0.17	0.09	
Queue Length 95th (m)	0.0	0.1	0.0	0.0	0.0	
Control Delay (s)	0.0	0.3	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	0.0	0.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			20.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

2: Bradford St & Victoria St

Existing PM

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	30	30	20	20	580	10	585
Future Volume (vph)	10	30	30	20	20	580	10	585
Lane Group Flow (vph)	0	102	32	53	0	670	0	644
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.31	0.12	0.17		0.29		0.27
Control Delay		15.5	24.2	13.8		5.4		5.4
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		15.5	24.2	13.8		5.4		5.4
Queue Length 50th (m)		5.6	3.9	2.6		15.5		14.9
Queue Length 95th (m)		16.0	9.5	9.8		34.7		33.3
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		599	524	606		2347		2384
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		0.17	0.06	0.09		0.29		0.27

Intersection Summary

Cycle Length: 70

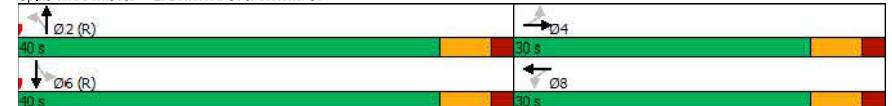
Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis

2: Bradford St & Victoria St

Existing PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	55	30	20	30	20	580	30	10	585	10
Future Volume (vph)	10	30	55	30	20	30	20	580	30	10	585	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00			1.00	
Frt		0.92		1.00	0.91			0.99			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1699		1788	1710			3493			3495	
Flt Permitted		0.96		0.81	1.00			0.93			0.94	
Satd. Flow (perm)		1637		1530	1710			3245			3298	
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)	11	32	59	32	21	32	21	617	32	11	622	11
RTOR Reduction (vph)	0	51	0	0	28	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	51	0	32	25	0	0	667	0	0	643	0
Confl. Peds. (#/hr)	5		10	10		5	7		5	5		7
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	15%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		229		214	239			2234			2270	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.03		0.02				c0.21			0.19	
v/c Ratio		0.22		0.15	0.11			0.30			0.28	
Uniform Delay, d1		26.7		26.4	26.3			4.3			4.2	
Progression Factor		1.06		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.5		0.3	0.2			0.3			0.3	
Delay (s)		28.9		26.8	26.5			4.6			4.5	
Level of Service		C		C	C			A			A	
Approach Delay (s)		28.9			26.6			4.6			4.5	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.5										
HCM 2000 Volume to Capacity ratio		0.29										
Actuated Cycle Length (s)		70.0						12.0				
Intersection Capacity Utilization		55.2%										
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Sanford St & Victoria St

Existing PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	90	10	5	45	0	10	15	5	0	0	5
Future Volume (Veh/h)	0	90	10	5	45	0	10	15	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	97	11	5	48	0	11	16	5	0	0	5
Pedestrians		4			3			4			9	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	57			112			174	174	110	186	179	61
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	57			112			174	174	110	186	179	61
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	98	99	100	100	99
cM capacity (veh/h)	1549			1485			776	713	944	747	708	999
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	108	53	32	5								
Volume Left	0	5	11	0								
Volume Right	11	0	5	5								
cSH	1549	1485	764	999								
Volume to Capacity	0.00	0.00	0.04	0.01								
Queue Length 95th (m)	0.0	0.1	1.0	0.1								
Control Delay (s)	0.0	0.7	9.9	8.6								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.7	9.9	8.6								
Approach LOS		A	A									
Intersection Summary												
Average Delay		2.0										
Intersection Capacity Utilization		23.8%										
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Existing PM

	←	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖		↗			↘
Traffic Volume (veh/h)	10	50	25	10	90	45
Future Volume (Veh/h)	10	50	25	10	90	45
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	11	57	29	11	103	52
Pedestrians	3					15
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					1
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	296	52			43	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	296	52			43	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			93	
cM capacity (veh/h)	652	994			1562	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	68	40	155			
Volume Left	11	0	103			
Volume Right	57	11	0			
cSH	916	1700	1562			
Volume to Capacity	0.07	0.02	0.07			
Queue Length 95th (m)	1.9	0.0	1.7			
Control Delay (s)	9.2	0.0	5.1			
Lane LOS	A		A			
Approach Delay (s)	9.2	0.0	5.1			
Approach LOS	A					
Intersection Summary						
Average Delay			5.4			
Intersection Capacity Utilization			28.9%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

5: Innisfil St & John St

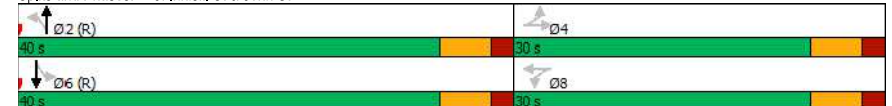
Existing PM

	↖	→	←	↗	↑	↓
Lane Group	EBL	EBT	WBT	NBL	NBT	SBT
Lane Configurations		↖	↗		↖	↗
Traffic Volume (vph)	25	10	5	5	10	15
Future Volume (vph)	25	10	5	5	10	15
Lane Group Flow (vph)	0	49	6	0	18	68
Turn Type	custom	NA	NA	Perm	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	2		
Detector Phase				2	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	C-Max	C-Max	C-Max
v/c Ratio		0.12	0.01		0.02	0.07
Control Delay		19.1	19.6		6.6	3.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		19.1	19.6		6.6	3.3
Queue Length 50th (m)		4.5	0.6		1.0	1.0
Queue Length 95th (m)		11.0	2.9		3.0	4.8
Internal Link Dist (m)		110.5	98.0		65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)		407	488		1033	986
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.12	0.01		0.02	0.07

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 40
 Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis 5: Innisfil St & John St

Existing PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Traffic Volume (vph)	25	10	5	0	5	0	5	10	0	0	15	40
Future Volume (vph)	25	10	5	0	5	0	5	10	0	0	15	40
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			1.00			0.90	
Flt Protected		0.97			1.00			0.98			1.00	
Satd. Flow (prot)		1800			1900			1868			1689	
Flt Permitted		0.84			1.00			0.95			1.00	
Satd. Flow (perm)		1567			1900			1808			1689	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	31	12	6	0	6	0	6	12	0	0	19	49
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	45	0	0	6	0	0	18	0	0	47	0
Confl. Peds. (#/hr)	3		1	1		3	1		3	3		1
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA		Perm	NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		402			488			1033			965	
v/s Ratio Prot											c0.03	
v/s Ratio Perm		c0.03			0.00			0.01				
v/c Ratio		0.11			0.01			0.02			0.05	
Uniform Delay, d1		19.9			19.4			6.5			6.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.0			0.1	
Delay (s)		20.0			19.4			6.5			6.7	
Level of Service		C			B			A			A	
Approach Delay (s)		20.0			19.4			6.5			6.7	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.8									B
HCM 2000 Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			70.0					Sum of lost time (s)			12.0	
Intersection Capacity Utilization			30.0%								ICU Level of Service	A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Existing PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Future Volume (Veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	6	0	6	0	6	0	0	32	6	0	19	0
Pedestrians		5			5			3			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		122										
pX, platoon unblocked												
vC, conflicting volume	7			9			38	25	11	49	28	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			9			38	25	11	49	28	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	96	99	100	98	100
cM capacity (veh/h)	1625			1620			944	866	1069	915	863	1069
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	6	38	19								
Volume Left	6	0	0	0								
Volume Right	6	0	6	0								
cSH	1625	1620	893	863								
Volume to Capacity	0.00	0.00	0.04	0.02								
Queue Length 95th (m)	0.1	0.0	1.1	0.5								
Control Delay (s)	3.6	0.0	9.2	9.3								
Lane LOS	A		A	A								
Approach Delay (s)	3.6	0.0	9.2	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay			7.6									
Intersection Capacity Utilization			17.6%								ICU Level of Service	A
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	0	5	20	5	5	0	615	30	5	680	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	615	30	5	680	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	668	33	5	739	0
Pedestrians	7			4			1					
Lane Width (m)	3.6			3.6			3.6					
Walking Speed (m/s)	1.2			1.2			1.2					
Percent Blockage	1			0			0					
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)	181											
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	1098	1461	378	1074	1444	354	746	705				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1027	1404	281	1003	1387	354	663	705				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	100	99	88	96	99	100	99				
cM capacity (veh/h)	175	134	692	188	137	646	897	899				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	5	32	334	367	374	370						
Volume Left	0	22	0	0	5	0						
Volume Right	5	5	0	33	0	0						
cSH	692	198	897	1700	899	1700						
Volume to Capacity	0.01	0.16	0.00	0.22	0.01	0.22						
Queue Length 95th (m)	0.2	4.5	0.0	0.0	0.1	0.0						
Control Delay (s)	10.2	26.6	0.0	0.0	0.2	0.0						
Lane LOS	B	D			A							
Approach Delay (s)	10.2	26.6	0.0	0.1								
Approach LOS	B	D										
Intersection Summary												
Average Delay	0.7											
Intersection Capacity Utilization	37.3%			ICU Level of Service				A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

8: Bradford St & Existing South Site Dwy

Existing PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	5	5	0	620	680	5
Future Volume (Veh/h)	5	5	0	620	680	5
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)	5	5	0	667	731	5
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)	103					
pX, platoon unblocked	0.94	0.94	0.94			
vC, conflicting volume	1075	376	744			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	957	215	605			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	243	745	919			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	10	222	445	487	249	
Volume Left	5	0	0	0	0	
Volume Right	5	0	0	0	5	
cSH	366	919	1700	1700	1700	
Volume to Capacity	0.03	0.00	0.26	0.29	0.15	
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	
Control Delay (s)	15.1	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	15.1	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	29.0%			ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9: Bradford St & Existing Middle Site Dwy

Existing PM

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕	↕	
Traffic Volume (veh/h)	0	5	0	625	680	0
Future Volume (Veh/h)	0	5	0	625	680	0
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)	0	5	0	672	731	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					65	
pX, platoon unblocked	0.94	0.94	0.94			
vC, conflicting volume	1067	366	731			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	935	185	576			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	251	778	943			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	224	448	487	244	
Volume Left	0	0	0	0	0	
Volume Right	5	0	0	0	0	
cSH	778	943	1700	1700	1700	
Volume to Capacity	0.01	0.00	0.26	0.29	0.14	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	9.7	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		28.8%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
10: Bradford St & Existing North Site Dwy

Existing PM

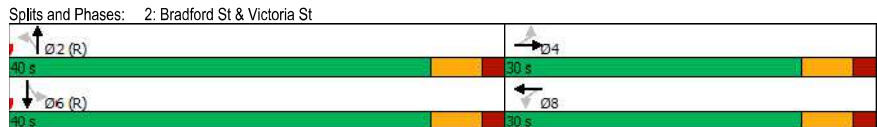
	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕	↕	
Traffic Volume (veh/h)	5	10	0	625	670	0
Future Volume (Veh/h)	5	10	0	625	670	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	11	0	665	713	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					45	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	1046	356	713			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	907	169	551			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	261	795	961			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	16	222	443	475	238	
Volume Left	5	0	0	0	0	
Volume Right	11	0	0	0	0	
cSH	485	961	1700	1700	1700	
Volume to Capacity	0.03	0.00	0.26	0.28	0.14	
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	
Control Delay (s)	12.7	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	12.7	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		28.5%		ICU Level of Service	A	
Analysis Period (min)		15				

Queues
2: Bradford St & Victoria St

Future Background AM
2028 Horizon Year

	↖	→	↗	↖	↖	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↗	↖		↕		↕
Traffic Volume (vph)	5	20	10	10	20	555	20	425
Future Volume (vph)	5	20	10	10	20	555	20	425
Lane Group Flow (vph)	0	78	11	33	0	656	0	500
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.06	0.11		0.28		0.22
Control Delay		13.7	22.9	13.6		5.4		5.2
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		13.7	22.9	13.6		5.4		5.2
Queue Length 50th (m)		3.5	1.3	1.3		15.2		11.1
Queue Length 95th (m)		12.8	4.7	7.2		34.1		25.6
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2333		2293
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		0.14	0.03	0.06		0.28		0.22

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Background AM
2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	20	45	10	10	20	20	555	15	20	425	5
Future Volume (vph)	5	20	45	10	10	20	20	555	15	20	425	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3460			3456	
Flt Permitted		0.97		0.71	1.00			0.93			0.92	
Satd. Flow (perm)		1541		1142	1693			3228			3174	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	11	11	22	22	617	17	22	472	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	35	0	11	14	0	0	654	0	0	499	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2222			2185	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.20			0.16	
v/c Ratio		0.16		0.07	0.06			0.29			0.23	
Uniform Delay, d1		26.5		26.1	26.1			4.3			4.0	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		0.2	0.1			0.3			0.2	
Delay (s)		26.8		26.3	26.2			4.6			4.3	
Level of Service		C		C	C			A			A	
Approach Delay (s)		26.8			26.2			4.6			4.3	
Approach LOS		C			C			A			A	

Intersection Summary	
HCM 2000 Control Delay	6.6
HCM 2000 Volume to Capacity ratio	0.27
Actuated Cycle Length (s)	70.0
Intersection Capacity Utilization	50.0%
Analysis Period (min)	15
c Critical Lane Group	
HCM 2000 Level of Service	A
Sum of lost time (s)	12.0
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis 3: Sanford St & Victoria St

Future Background AM
2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	60	5	0	35	0	5	0	10	0	5	0
Future Volume (Veh/h)	0	60	5	0	35	0	5	0	10	0	5	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	92	8	0	54	0	8	0	15	0	8	0
Pedestrians					1			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	64			105			159	165	102	176	169	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			105			159	165	102	176	169	64
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			100			99	100	98	100	99	100
cM capacity (veh/h)	1538			1493			793	722	919	764	718	998
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	100	54	23	8								
Volume Left	0	0	8	0								
Volume Right	8	0	15	0								
cSH	1538	1493	871	718								
Volume to Capacity	0.00	0.00	0.03	0.01								
Queue Length 95th (m)	0.0	0.0	0.7	0.3								
Control Delay (s)	0.0	0.0	9.2	10.1								
Lane LOS			A	B								
Approach Delay (s)	0.0	0.0	9.2	10.1								
Approach LOS			A	B								
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization		18.7%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Background AM
2028 Horizon Year

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	35	60	15	50	35
Future Volume (Veh/h)	5	35	60	15	50	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	7	52	90	22	75	52
Pedestrians	5					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	308	108			117	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	108			117	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	94			95	
cM capacity (veh/h)	650	914			1429	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	59	112	127			
Volume Left	7	0	75			
Volume Right	52	22	0			
cSH	872	1700	1429			
Volume to Capacity	0.07	0.07	0.05			
Queue Length 95th (m)	1.7	0.0	1.3			
Control Delay (s)	9.4	0.0	4.7			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	4.7			
Approach LOS	A					
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization		21.9%		ICU Level of Service		A
Analysis Period (min)		15				

Queues
5: Innisfil St & John St

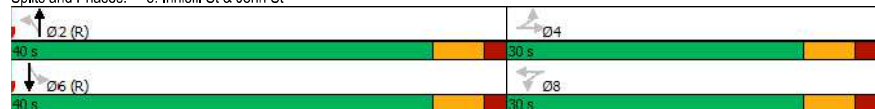
Future Background AM
2028 Horizon Year

	EBL	EBT	WBT	NBT	SBT
Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Configurations		↕	↕	↕	↕
Traffic Volume (vph)	20	10	5	55	20
Future Volume (vph)	20	10	5	55	20
Lane Group Flow (vph)	0	36	6	67	48
Turn Type	custom	NA	NA	NA	NA
Protected Phases				2	6
Permitted Phases	4	4	8		
Detector Phase				2	6
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Ped	C-Max	C-Max
v/c Ratio	0.09	0.01	0.01	0.06	0.05
Control Delay	20.6	18.0	6.9	4.3	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	20.6	18.0	6.9	4.3	
Queue Length 50th (m)		3.8	0.6	3.7	1.3
Queue Length 95th (m)		9.6	m3.1	7.7	4.6
Internal Link Dist (m)		110.5	98.0	65.9	155.1
Turn Bay Length (m)					
Base Capacity (vph)		398	488	1085	1022
Starvation Cap Reductn		0	0	0	0
Spillback Cap Reductn		0	0	0	0
Storage Cap Reductn		0	0	0	0
Reduced v/c Ratio		0.09	0.01	0.06	0.05

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis
5: Innisfil St & John St

Future Background AM
2028 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	10	0	0	5	0	0	55	0	0	20	20
Future Volume (vph)	20	10	0	0	5	0	0	55	0	0	20	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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			1.00			0.93	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1768			1900			1900			1772	
Flt Permitted		0.85			1.00			1.00			1.00	
Satd. Flow (perm)		1549			1900			1900			1772	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	12	0	0	6	0	0	67	0	0	24	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	36	0	0	6	0	0	67	0	0	38	0
Heavy Vehicles (%)	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA			NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		398			488			1085			1012	
v/s Ratio Prot								c0.04			0.02	
v/s Ratio Perm		c0.02			0.00							
v/c Ratio		0.09			0.01			0.06			0.04	
Uniform Delay, d1		19.8			19.4			6.7			6.6	
Progression Factor		1.00			0.91			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.1	
Delay (s)		19.9			17.7			6.8			6.6	
Level of Service		B			B			A			A	
Approach Delay (s)		19.9			17.7			6.8			6.6	
Approach LOS		B			B			A			A	

Intersection Summary

HCM 2000 Control Delay 10.2 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio 0.07
Actuated Cycle Length (s) 70.0 Sum of lost time (s) 12.0
Intersection Capacity Utilization 22.5% ICU Level of Service A
Analysis Period (min) 15
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Background AM
2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	5	5	0	0	15	0	0	10	0
Future Volume (Veh/h)	0	10	0	5	5	0	0	15	0	0	10	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	0	5	5	0	0	16	0	0	11	0
Pedestrians	1											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	122											
pX, platoon unblocked												
vC, conflicting volume	6			11			32	27	11	35	27	6
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6			11			32	27	11	35	27	6
tC, single (s)	4.1			4.4			7.1	6.6	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.5			3.5	4.1	3.3	3.5	4.1	3.3
p0 queue free %	100			100			100	98	100	100	99	100
cM capacity (veh/h)	1627			1428			969	841	1076	958	847	1082
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	11	10	16	11								
Volume Left	0	5	0	0								
Volume Right	0	0	0	0								
cSH	1627	1428	841	847								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (m)	0.0	0.1	0.5	0.3								
Control Delay (s)	0.0	3.8	9.4	9.3								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	3.8	9.4	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay	6.0											
Intersection Capacity Utilization	15.0%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Background AM
2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	590	15	5	455	5
Future Volume (Veh/h)	5	0	5	15	5	5	0	590	15	5	455	5
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	621	16	5	479	5
Pedestrians	4				8				1			
Lane Width (m)	3.6				3.6				3.6			
Walking Speed (m/s)	1.2				1.2				1.2			
Percent Blockage	0				1				0			
Right turn flare (veh)												
Median type	None								None			
Median storage veh												
Upstream signal (m)	181											
pX, platoon unblocked												
vC, conflicting volume	816	1140	247	892	1135	328	488	645				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	816	1140	247	892	1135	328	488	645				
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2	2.2				
p0 queue free %	98	100	99	93	98	99	100	99				
cM capacity (veh/h)	261	199	756	221	201	668	1082	943				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	10	26	310	326	244	244						
Volume Left	5	16	0	0	5	0						
Volume Right	5	5	0	16	0	5						
cSH	388	248	1082	1700	943	1700						
Volume to Capacity	0.03	0.10	0.00	0.19	0.01	0.14						
Queue Length 95th (m)	0.6	2.8	0.0	0.0	0.1	0.0						
Control Delay (s)	14.5	21.2	0.0	0.0	0.2	0.0						
Lane LOS	B	C			A							
Approach Delay (s)	14.5	21.2	0.0		0.1							
Approach LOS	B	C										
Intersection Summary												
Average Delay	0.6											
Intersection Capacity Utilization	27.5%			ICU Level of Service					A			
Analysis Period (min)	15											

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

Future Background AM
2028 Horizon Year

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	5	5	595	460	10
Future Volume (Veh/h)	0	5	5	595	460	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	5	5	633	489	11
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				103		
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	825	254	504			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	774	190	446			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	329	805	1096			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	216	422	326	174	
Volume Left	0	5	0	0	0	
Volume Right	5	0	0	0	11	
cSH	805	1096	1700	1700	1700	
Volume to Capacity	0.01	0.00	0.25	0.19	0.10	
Queue Length 95th (m)	0.2	0.1	0.0	0.0	0.0	
Control Delay (s)	9.5	0.2	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	9.5	0.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			30.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
9: Bradford St & Existing Middle Site Dwy

Future Background AM
2028 Horizon Year

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	0	0	595	470	5
Future Volume (Veh/h)	0	0	0	595	470	5
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)	0	0	0	640	505	5
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				65		
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	828	256	511			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	745	151	416			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	340	842	1111			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	213	427	337	173	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	5	
cSH	1700	1111	1700	1700	1700	
Volume to Capacity	0.00	0.00	0.25	0.20	0.10	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			19.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 10: Bradford St & Existing North Site Dwy

Future Background AM
2028 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (veh/h)	0	0	5	590	475	5
Future Volume (Veh/h)	0	0	5	590	475	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	5	621	500	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					45	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	823	252	505			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	727	131	395			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	347	862	1125			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	212	414	333	172	
Volume Left	0	5	0	0	0	
Volume Right	0	0	0	0	5	
cSH	1700	1125	1700	1700	1700	
Volume to Capacity	0.00	0.00	0.24	0.20	0.10	
Queue Length 95th (m)	0.0	0.1	0.0	0.0	0.0	
Control Delay (s)	0.0	0.2	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	0.0	0.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			23.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues 2: Bradford St & Victoria St

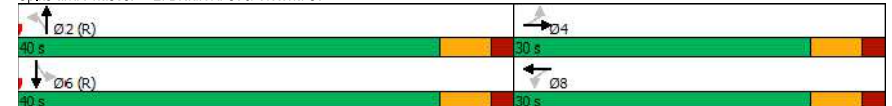
Future Background PM
2028 Horizon Year

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↕	↕		↕	↕	↕
Traffic Volume (vph)	10	30	30	20	20	705	10	710
Future Volume (vph)	10	30	30	20	20	705	10	710
Lane Group Flow (vph)	0	102	32	53	0	803	0	777
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.31	0.12	0.17		0.34		0.33
Control Delay		14.8	24.2	13.8		5.8		5.7
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		14.8	24.2	13.8		5.8		5.7
Queue Length 50th (m)		5.4	3.9	2.6		19.7		19.0
Queue Length 95th (m)		15.8	9.5	9.8		43.3		41.5
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		599	524	606		2348		2386
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		0.17	0.06	0.09		0.34		0.33

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis 2: Bradford St & Victoria St

Future Background PM
2028 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Traffic Volume (vph)	10	30	55	30	20	30	20	705	30	10	710	10
Future Volume (vph)	10	30	55	30	20	30	20	705	30	10	710	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Flpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00			1.00	
Frt		0.92		1.00	0.91			0.99			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1699		1788	1710			3501			3496	
Flt Permitted		0.96		0.81	1.00			0.93			0.94	
Satd. Flow (perm)		1637		1530	1710			3248			3299	
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)	11	32	59	32	21	32	21	750	32	11	755	11
RTOR Reduction (vph)	0	51	0	0	28	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	51	0	32	25	0	0	801	0	0	776	0
Confl. Peds. (#/hr)	5		10	10		5	7		5	5		7
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	15%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		229		214	239			2236			2271	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.03		0.02				c0.25			0.24	
v/c Ratio		0.22		0.15	0.11			0.36			0.34	
Uniform Delay, d1		26.7		26.4	26.3			4.5			4.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.5		0.3	0.2			0.4			0.4	
Delay (s)		27.3		26.8	26.5			5.0			4.9	
Level of Service		C		C	C			A			A	
Approach Delay (s)		27.3			26.6			5.0			4.9	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.2						HCM 2000 Level of Service		A		
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		70.0						Sum of lost time (s)		12.0		
Intersection Capacity Utilization		58.6%						ICU Level of Service		B		
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 3: Sanford St & Victoria St

Future Background PM
2028 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	90	10	5	45	0	10	15	5	0	0	5
Future Volume (Veh/h)	0	90	10	5	45	0	10	15	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	97	11	5	48	0	11	16	5	0	0	5
Pedestrians		4			3			4			9	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	57			112			174	174	110	186	179	61
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	57			112			174	174	110	186	179	61
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	98	99	100	100	99
cM capacity (veh/h)	1549			1485			776	713	944	747	708	999
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	108	53	32	5								
Volume Left	0	5	11	0								
Volume Right	11	0	5	5								
cSH	1549	1485	764	999								
Volume to Capacity	0.00	0.00	0.04	0.01								
Queue Length 95th (m)	0.0	0.1	1.0	0.1								
Control Delay (s)	0.0	0.7	9.9	8.6								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.7	9.9	8.6								
Approach LOS		A	A									
Intersection Summary												
Average Delay		2.0										
Intersection Capacity Utilization		23.8%						ICU Level of Service		A		
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Background PM
2028 Horizon Year

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	50	60	10	90	100
Future Volume (Veh/h)	10	50	60	10	90	100
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	11	57	69	11	103	115
Pedestrians	3				15	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)	179					
pX, platoon unblocked						
vC, conflicting volume	398	92			83	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	92			83	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			93	
cM capacity (veh/h)	568	945			1510	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	68	80	218			
Volume Left	11	0	103			
Volume Right	57	11	0			
cSH	853	1700	1510			
Volume to Capacity	0.08	0.05	0.07			
Queue Length 95th (m)	2.1	0.0	1.8			
Control Delay (s)	9.6	0.0	3.9			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	3.9			
Approach LOS	A					
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utilization			31.8%		ICU Level of Service	A
Analysis Period (min)			15			

Queues 5: Innisfil St & John St

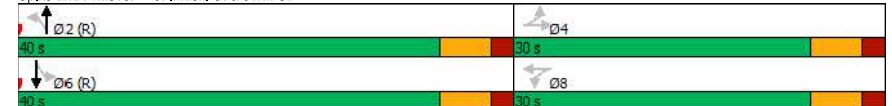
Future Background PM
2028 Horizon Year

						
Lane Group	EBL	EBT	WBT	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	25	10	5	5	45	70
Future Volume (vph)	25	10	5	5	45	70
Lane Group Flow (vph)	0	49	6	0	62	135
Turn Type	custom	NA	NA	Perm	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	2		
Detector Phase				2	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	C-Max	C-Max	C-Max
v/c Ratio		0.12	0.01		0.06	0.13
Control Delay		19.1	19.6		6.9	4.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		19.1	19.6		6.9	4.9
Queue Length 50th (m)		4.5	0.6		3.4	4.8
Queue Length 95th (m)		11.0	2.9		7.2	10.1
Internal Link Dist (m)		110.5	98.0		65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)		407	488		1065	1045
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.12	0.01		0.06	0.13

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis 5: Innisfil St & John St

Future Background PM
2028 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
Future Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			1.00			0.95	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1800			1900			1891			1793	
Flt Permitted		0.84			1.00			0.98			1.00	
Satd. Flow (perm)		1567			1900			1864			1793	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	31	12	6	0	6	0	6	56	0	0	86	49
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	45	0	0	6	0	0	62	0	0	114	0
Confl. Peds. (#/hr)	3		1	1		3	1		3	3		1
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA		Perm	NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		402			488			1065			1024	
v/s Ratio Prot											c0.06	
v/s Ratio Perm		c0.03			0.00			0.03				
v/c Ratio		0.11			0.01			0.06			0.11	
Uniform Delay, d1		19.9			19.4			6.6			6.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.2	
Delay (s)		20.0			19.4			6.8			7.1	
Level of Service		C			B			A			A	
Approach Delay (s)		20.0			19.4			6.8			7.1	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8									A
HCM 2000 Volume to Capacity ratio		0.11										
Actuated Cycle Length (s)		70.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		31.5%						ICU Level of Service				A
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Background PM
2028 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Future Volume (Veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	6	0	6	0	6	0	0	32	6	0	19	0
Pedestrians		5			5			3			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		122										
pX, platoon unblocked												
vC, conflicting volume	7			9			38	25	11	49	28	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			9			38	25	11	49	28	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	96	99	100	98	100
cM capacity (veh/h)	1625			1620			944	866	1069	915	863	1069
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	6	38	19								
Volume Left	6	0	0	0								
Volume Right	6	0	6	0								
cSH	1625	1620	893	863								
Volume to Capacity	0.00	0.00	0.04	0.02								
Queue Length 95th (m)	0.1	0.0	1.1	0.5								
Control Delay (s)	3.6	0.0	9.2	9.3								
Lane LOS	A		A	A								
Approach Delay (s)	3.6	0.0	9.2	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay		7.6										
Intersection Capacity Utilization		17.6%						ICU Level of Service		A		
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Background PM

2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	740	30	5	805	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	740	30	5	805	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	804	33	5	875	0
Pedestrians	7			4			1					
Lane Width (m)	3.6			3.6			3.6					
Walking Speed (m/s)	1.2			1.2			1.2					
Percent Blockage	1			0			0					
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												181
pX, platoon unblocked	0.94	0.94	0.94	0.94	0.94		0.94					
vC, conflicting volume	1302	1733	446	1278	1716	422	882	841				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1184	1645	269	1159	1628	422	735	841				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	100	99	84	95	99	100	99				
cM capacity (veh/h)	129	93	683	140	95	583	817	800				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	5	32	402	435	442	438						
Volume Left	0	22	0	0	5	0						
Volume Right	5	5	0	33	0	0						
cSH	683	147	817	1700	800	1700						
Volume to Capacity	0.01	0.22	0.00	0.26	0.01	0.26						
Queue Length 95th (m)	0.2	6.3	0.0	0.0	0.2	0.0						
Control Delay (s)	10.3	36.3	0.0	0.0	0.2	0.0						
Lane LOS	B	E			A							
Approach Delay (s)	10.3	36.3	0.0	0.1								
Approach LOS	B	E										
Intersection Summary												
Average Delay	0.7											
Intersection Capacity Utilization	40.8%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

8: Bradford St & Existing South Site Dwy

Future Background PM

2028 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	5	5	0	745	805	5
Future Volume (Veh/h)	5	5	0	745	805	5
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)	5	5	0	801	866	5
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					103	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1277	444	879			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1125	218	692			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	100			
cM capacity (veh/h)	184	724	833			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	10	267	534	577	294	
Volume Left	5	0	0	0	0	
Volume Right	5	0	0	0	5	
cSH	294	833	1700	1700	1700	
Volume to Capacity	0.03	0.00	0.31	0.34	0.17	
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	
Control Delay (s)	17.7	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	17.7	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			32.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
9: Bradford St & Existing Middle Site Dwy

Future Background PM
2028 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	5	0	750	805	0
Future Volume (Veh/h)	0	5	0	750	805	0
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)	0	5	0	806	866	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					65	
pX, platoon unblocked	0.91	0.91	0.91			
vC, conflicting volume	1269	433	866			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1108	194	667			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	190	751	852			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	269	537	577	289	
Volume Left	0	0	0	0	0	
Volume Right	5	0	0	0	0	
cSH	751	852	1700	1700	1700	
Volume to Capacity	0.01	0.00	0.32	0.34	0.17	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	9.8	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	9.8	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		32.3%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
10: Bradford St & Existing North Site Dwy

Future Background PM
2028 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	10	0	750	795	0
Future Volume (Veh/h)	5	10	0	750	795	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	11	0	798	846	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					45	
pX, platoon unblocked	0.91	0.91	0.91			
vC, conflicting volume	1245	423	846			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1079	179	642			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	100			
cM capacity (veh/h)	198	766	870			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	16	266	532	564	282	
Volume Left	5	0	0	0	0	
Volume Right	11	0	0	0	0	
cSH	404	870	1700	1700	1700	
Volume to Capacity	0.04	0.00	0.31	0.33	0.17	
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0	
Control Delay (s)	14.3	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	14.3	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		32.0%		ICU Level of Service	A	
Analysis Period (min)		15				

Queues
2: Bradford St & Victoria St

Future Background AM
2033 Horizon Year

	↖	→	↗	↖	↖	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↖	↗		↕		↕
Traffic Volume (vph)	5	20	10	10	20	675	20	520
Future Volume (vph)	5	20	10	10	20	675	20	520
Lane Group Flow (vph)	0	78	11	33	0	789	0	606
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.06	0.11		0.34		0.26
Control Delay		13.7	22.9	13.6		5.8		5.4
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		13.7	22.9	13.6		5.8		5.4
Queue Length 50th (m)		3.5	1.3	1.3		19.4		13.9
Queue Length 95th (m)		12.8	4.7	7.2		42.5		31.5
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2338		2293
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		0.14	0.03	0.06		0.34		0.26

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Background AM
2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	20	45	10	10	20	20	675	15	20	520	5
Future Volume (vph)	5	20	45	10	10	20	20	675	15	20	520	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frft		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3468			3459	
Flt Permitted		0.97		0.71	1.00			0.93			0.92	
Satd. Flow (perm)		1541		1142	1693			3233			3172	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	11	11	22	22	750	17	22	578	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	35	0	11	14	0	0	788	0	0	605	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2226			2184	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.24			0.19	
v/c Ratio		0.16		0.07	0.06			0.35			0.28	
Uniform Delay, d1		26.5		26.1	26.1			4.5			4.2	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		0.2	0.1			0.4			0.3	
Delay (s)		26.8		26.3	26.2			4.9			4.5	
Level of Service		C		C	C			A			A	
Approach Delay (s)		26.8			26.2			4.9			4.5	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 3: Sanford St & Victoria St

Future Background AM
2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	60	5	0	35	0	5	0	10	0	5	0
Future Volume (Veh/h)	0	60	5	0	35	0	5	0	10	0	5	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	92	8	0	54	0	8	0	15	0	8	0
Pedestrians					1			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	64			105			159	165	102	176	169	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			105			159	165	102	176	169	64
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			100			99	100	98	100	99	100
cM capacity (veh/h)	1538			1493			793	722	919	764	718	998
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	100	54	23	8								
Volume Left	0	0	8	0								
Volume Right	8	0	15	0								
cSH	1538	1493	871	718								
Volume to Capacity	0.00	0.00	0.03	0.01								
Queue Length 95th (m)	0.0	0.0	0.7	0.3								
Control Delay (s)	0.0	0.0	9.2	10.1								
Lane LOS			A	B								
Approach Delay (s)	0.0	0.0	9.2	10.1								
Approach LOS			A	B								
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization	18.7%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Background AM
2033 Horizon Year

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	35	60	15	50	35
Future Volume (Veh/h)	5	35	60	15	50	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	7	52	90	22	75	52
Pedestrians	5					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	308	108			117	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	108			117	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	94			95	
cM capacity (veh/h)	650	914			1429	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	59	112	127			
Volume Left	7	0	75			
Volume Right	52	22	0			
cSH	872	1700	1429			
Volume to Capacity	0.07	0.07	0.05			
Queue Length 95th (m)	1.7	0.0	1.3			
Control Delay (s)	9.4	0.0	4.7			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	4.7			
Approach LOS	A					
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization		21.9%		ICU Level of Service		A
Analysis Period (min)		15				

Queues
5: Innisfil St & John St

Future Background AM
2033 Horizon Year

	EBL	EBT	WBT	NBT	SBT
Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Configurations		↕	↕	↕	↕
Traffic Volume (vph)	20	10	5	55	20
Future Volume (vph)	20	10	5	55	20
Lane Group Flow (vph)	0	36	6	67	48
Turn Type	custom	NA	NA	NA	NA
Protected Phases				2	6
Permitted Phases	4	4	8		
Detector Phase				2	6
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Ped	C-Max	C-Max
v/c Ratio		0.09	0.01	0.06	0.05
Control Delay		20.6	17.6	6.9	4.3
Queue Delay		0.0	0.0	0.0	0.0
Total Delay		20.6	17.6	6.9	4.3
Queue Length 50th (m)		3.8	0.6	3.7	1.3
Queue Length 95th (m)		9.6	m2.7	7.7	4.6
Internal Link Dist (m)		110.5	98.0	65.9	155.1
Turn Bay Length (m)					
Base Capacity (vph)		398	488	1085	1022
Starvation Cap Reductn		0	0	0	0
Spillback Cap Reductn		0	0	0	0
Storage Cap Reductn		0	0	0	0
Reduced v/c Ratio		0.09	0.01	0.06	0.05

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis
5: Innisfil St & John St

Future Background AM
2033 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	10	0	0	5	0	0	55	0	0	20	20
Future Volume (vph)	20	10	0	0	5	0	0	55	0	0	20	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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			1.00			0.93	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1768			1900			1900			1772	
Flt Permitted		0.85			1.00			1.00			1.00	
Satd. Flow (perm)		1549			1900			1900			1772	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	12	0	0	6	0	0	67	0	0	24	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	36	0	0	6	0	0	67	0	0	38	0
Heavy Vehicles (%)	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA			NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		398			488			1085			1012	
v/s Ratio Prot								c0.04			0.02	
v/s Ratio Perm		c0.02			0.00							
v/c Ratio		0.09			0.01			0.06			0.04	
Uniform Delay, d1		19.8			19.4			6.7			6.6	
Progression Factor		1.00			0.90			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.1	
Delay (s)		19.9			17.5			6.8			6.6	
Level of Service		B			B			A			A	
Approach Delay (s)		19.9			17.5			6.8			6.6	
Approach LOS		B			B			A			A	

Intersection Summary

HCM 2000 Control Delay 10.1 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio 0.07
Actuated Cycle Length (s) 70.0 Sum of lost time (s) 12.0
Intersection Capacity Utilization 22.5% ICU Level of Service A
Analysis Period (min) 15
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Background AM
2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	5	5	0	0	15	0	0	10	0
Future Volume (Veh/h)	0	10	0	5	5	0	0	15	0	0	10	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	0	5	5	0	0	16	0	0	11	0
Pedestrians											1	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		122										
pX, platoon unblocked												
vC, conflicting volume	6			11			32	27	11	35	27	6
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6			11			32	27	11	35	27	6
tC, single (s)	4.1			4.4			7.1	6.6	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.5			3.5	4.1	3.3	3.5	4.1	3.3
p0 queue free %	100			100			100	98	100	100	99	100
cM capacity (veh/h)	1627			1428			969	841	1076	958	847	1082
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	11	10	16	11								
Volume Left	0	5	0	0								
Volume Right	0	0	0	0								
cSH	1627	1428	841	847								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (m)	0.0	0.1	0.5	0.3								
Control Delay (s)	0.0	3.8	9.4	9.3								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	3.8	9.4	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			15.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Background AM
2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	710	15	5	550	5
Future Volume (Veh/h)	5	0	5	15	5	5	0	710	15	5	550	5
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	747	16	5	579	5
Pedestrians	4				8				1			
Lane Width (m)	3.6				3.6				3.6			
Walking Speed (m/s)	1.2				1.2				1.2			
Percent Blockage	0				1				0			
Right turn flare (veh)												
Median type									None		None	
Median storage (veh)												
Upstream signal (m)	181											
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	978	1366	297	1068	1361	392	588	771				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	964	1355	278	1055	1350	392	571	771				
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2	2.2				
p0 queue free %	98	100	99	90	97	99	100	99				
cM capacity (veh/h)	201	147	717	166	148	608	1001	847				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	10	26	374	390	294	294						
Volume Left	5	16	0	0	5	0						
Volume Right	5	5	0	16	0	5						
cSH	313	188	1001	1700	847	1700						
Volume to Capacity	0.03	0.14	0.00	0.23	0.01	0.17						
Queue Length 95th (m)	0.8	3.8	0.0	0.0	0.1	0.0						
Control Delay (s)	16.9	27.2	0.0	0.0	0.2	0.0						
Lane LOS	C	D			A							
Approach Delay (s)	16.9	27.2	0.0		0.1							
Approach LOS	C	D										
Intersection Summary												
Average Delay	0.7											
Intersection Capacity Utilization	30.8%		ICU Level of Service					A				
Analysis Period (min)	15											

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

Future Background AM
2033 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕↕	↕↕	
Traffic Volume (veh/h)	0	5	5	715	555	10
Future Volume (Veh/h)	0	5	5	715	555	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	5	5	761	590	11
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				103		
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	990	304	605			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	903	187	501			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	267	792	1026			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	259	507	393	208	
Volume Left	0	5	0	0	0	
Volume Right	5	0	0	0	11	
cSH	792	1026	1700	1700	1700	
Volume to Capacity	0.01	0.00	0.30	0.23	0.12	
Queue Length 95th (m)	0.2	0.1	0.0	0.0	0.0	
Control Delay (s)	9.6	0.2	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	9.6	0.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			33.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 9: Bradford St & Existing Middle Site Dwy

Future Background AM
2033 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕↕	↕↕	
Traffic Volume (veh/h)	0	0	0	715	565	5
Future Volume (Veh/h)	0	0	0	715	565	5
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)	0	0	0	769	608	5
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				65		
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	996	308	614			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	883	156	480			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	273	821	1034			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	256	513	405	208	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	5	
cSH	1700	1034	1700	1700	1700	
Volume to Capacity	0.00	0.00	0.30	0.24	0.12	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			23.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 10: Bradford St & Existing North Site Dwy

Future Background AM
2033 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Volume (veh/h)	0	0	5	710	570	5
Future Volume (Veh/h)	0	0	5	710	570	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	5	747	600	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					45	
pX, platoon unblocked	0.94	0.94	0.94			
vC, conflicting volume	986	302	605			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	863	138	459			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	279	840	1049			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	254	498	400	205	
Volume Left	0	5	0	0	0	
Volume Right	0	0	0	0	5	
cSH	1700	1049	1700	1700	1700	
Volume to Capacity	0.00	0.00	0.29	0.24	0.12	
Queue Length 95th (m)	0.0	0.1	0.0	0.0	0.0	
Control Delay (s)	0.0	0.2	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	0.0	0.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			26.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues 2: Bradford St & Victoria St

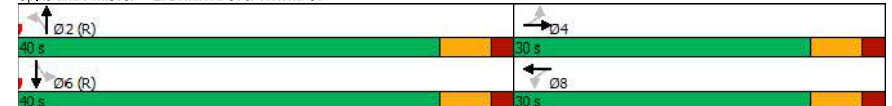
Future Background PM
2033 Horizon Year

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↕	↕		↕	↕	↕
Traffic Volume (vph)	10	30	30	20	20	860	10	865
Future Volume (vph)	10	30	30	20	20	860	10	865
Lane Group Flow (vph)	0	102	32	53	0	968	0	942
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.31	0.12	0.17		0.41		0.40
Control Delay		14.8	24.2	13.8		6.3		6.2
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		14.8	24.2	13.8		6.3		6.2
Queue Length 50th (m)		5.4	3.9	2.6		25.5		24.5
Queue Length 95th (m)		15.8	9.5	9.8		55.4		53.2
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		599	524	606		2349		2383
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		0.17	0.06	0.09		0.41		0.40

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis 2: Bradford St & Victoria St

Future Background PM
2033 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Traffic Volume (vph)	10	30	55	30	20	30	20	860	30	10	865	10
Future Volume (vph)	10	30	55	30	20	30	20	860	30	10	865	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00			1.00	
Frt		0.92		1.00	0.91			1.00			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1699		1788	1710			3507			3498	
Flt Permitted		0.96		0.81	1.00			0.92			0.94	
Satd. Flow (perm)		1637		1530	1710			3247			3297	
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)	11	32	59	32	21	32	21	915	32	11	920	11
RTOR Reduction (vph)	0	51	0	0	28	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	51	0	32	25	0	0	966	0	0	941	0
Confl. Peds. (#/hr)	5		10	10		5	7		5	5		7
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	15%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		229		214	239			2235			2270	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.03		0.02				c0.30			0.29	
v/c Ratio		0.22		0.15	0.11			0.43			0.41	
Uniform Delay, d1		26.7		26.4	26.3			4.8			4.8	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.5		0.3	0.2			0.6			0.6	
Delay (s)		27.3		26.8	26.5			5.4			5.3	
Level of Service		C		C	C			A			A	
Approach Delay (s)		27.3			26.6			5.4			5.3	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.3										
HCM 2000 Volume to Capacity ratio		0.40										
Actuated Cycle Length (s)		70.0						12.0				
Intersection Capacity Utilization		62.8%										
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 3: Sanford St & Victoria St

Future Background PM
2033 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	90	10	5	45	0	10	15	5	0	0	5
Future Volume (Veh/h)	0	90	10	5	45	0	10	15	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	97	11	5	48	0	11	16	5	0	0	5
Pedestrians		4			3			4			9	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	57			112			174	174	110	186	179	61
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	57			112			174	174	110	186	179	61
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	98	99	100	100	99
cM capacity (veh/h)	1549			1485			776	713	944	747	708	999
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	108	53	32	5								
Volume Left	0	5	11	0								
Volume Right	11	0	5	5								
cSH	1549	1485	764	999								
Volume to Capacity	0.00	0.00	0.04	0.01								
Queue Length 95th (m)	0.0	0.1	1.0	0.1								
Control Delay (s)	0.0	0.7	9.9	8.6								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.7	9.9	8.6								
Approach LOS		A	A									
Intersection Summary												
Average Delay		2.0										
Intersection Capacity Utilization		23.8%										
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Background PM
2033 Horizon Year

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	50	60	10	90	100
Future Volume (Veh/h)	10	50	60	10	90	100
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.87		0.87		0.87	
Hourly flow rate (vph)	11	57	69	11	103	115
Pedestrians	3				15	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)	179					
pX, platoon unblocked						
vC, conflicting volume	398	92			83	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	92			83	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			93	
cM capacity (veh/h)	568	945			1510	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	68	80	218			
Volume Left	11	0	103			
Volume Right	57	11	0			
cSH	853	1700	1510			
Volume to Capacity	0.08	0.05	0.07			
Queue Length 95th (m)	2.1	0.0	1.8			
Control Delay (s)	9.6	0.0	3.9			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	3.9			
Approach LOS	A					
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utilization			31.8%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

5: Innisfil St & John St

Future Background PM
2033 Horizon Year

						
Lane Group	EBL	EBT	WBT	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	25	10	5	5	45	70
Future Volume (vph)	25	10	5	5	45	70
Lane Group Flow (vph)	0	49	6	0	62	135
Turn Type	custom	NA	NA	Perm	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	2		
Detector Phase				2	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	C-Max	C-Max	C-Max
v/c Ratio		0.12	0.01		0.06	0.13
Control Delay		19.1	19.6		6.9	4.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		19.1	19.6		6.9	4.9
Queue Length 50th (m)		4.5	0.6		3.4	4.8
Queue Length 95th (m)		11.0	2.9		7.2	10.1
Internal Link Dist (m)		110.5	98.0		65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)		407	488		1065	1045
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.12	0.01		0.06	0.13

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis 5: Innisfil St & John St

Future Background PM
2033 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
Future Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			1.00			0.95	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1800			1900			1891			1793	
Flt Permitted		0.84			1.00			0.98			1.00	
Satd. Flow (perm)		1567			1900			1864			1793	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	31	12	6	0	6	0	6	56	0	0	86	49
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	45	0	0	6	0	0	62	0	0	114	0
Confl. Peds. (#/hr)	3		1	1		3	1		3	3		1
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA		Perm	NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		402			488			1065			1024	
v/s Ratio Prot											c0.06	
v/s Ratio Perm		c0.03			0.00			0.03				
v/c Ratio		0.11			0.01			0.06			0.11	
Uniform Delay, d1		19.9			19.4			6.6			6.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.2	
Delay (s)		20.0			19.4			6.8			7.1	
Level of Service		C			B			A			A	
Approach Delay (s)		20.0			19.4			6.8			7.1	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8									A
HCM 2000 Volume to Capacity ratio		0.11										
Actuated Cycle Length (s)		70.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		31.5%						ICU Level of Service				A
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Background PM
2033 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Future Volume (Veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	6	0	6	0	6	0	0	32	6	0	19	0
Pedestrians		5			5			3			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		122										
pX, platoon unblocked												
vC, conflicting volume	7			9			38	25	11	49	28	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			9			38	25	11	49	28	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	96	99	100	98	100
cM capacity (veh/h)	1625			1620			944	866	1069	915	863	1069
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	6	38	19								
Volume Left	6	0	0	0								
Volume Right	6	0	6	0								
cSH	1625	1620	893	863								
Volume to Capacity	0.00	0.00	0.04	0.02								
Queue Length 95th (m)	0.1	0.0	1.1	0.5								
Control Delay (s)	3.6	0.0	9.2	9.3								
Lane LOS	A		A	A								
Approach Delay (s)	3.6	0.0	9.2	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay		7.6										
Intersection Capacity Utilization		17.6%						ICU Level of Service		A		
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Background PM

2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	895	30	5	960	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	895	30	5	960	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	973	33	5	1043	0
Pedestrians	7			4			1					
Lane Width (m)	3.6			3.6			3.6					
Walking Speed (m/s)	1.2			1.2			1.2					
Percent Blockage	1			0			0					
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)	181											
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	1554	2070	530	1531	2054	507	1050	1010				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1390	1965	250	1365	1946	507	829	1010				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	100	99	77	91	99	100	99				
cM capacity (veh/h)	84	56	675	95	58	514	724	692				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	5	32	486	520	526	522						
Volume Left	0	22	0	0	5	0						
Volume Right	5	5	0	33	0	0						
cSH	675	98	724	1700	692	1700						
Volume to Capacity	0.01	0.33	0.00	0.31	0.01	0.31						
Queue Length 95th (m)	0.2	10.1	0.0	0.0	0.2	0.0						
Control Delay (s)	10.4	59.0	0.0	0.0	0.2	0.0						
Lane LOS	B	F			A							
Approach Delay (s)	10.4	59.0	0.0	0.1								
Approach LOS	B	F										
Intersection Summary												
Average Delay	1.0											
Intersection Capacity Utilization	45.0%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

8: Bradford St & Existing South Site Dwy

Future Background PM

2033 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	5	0	900	960	5
Future Volume (Veh/h)	5	5	0	900	960	5
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)	5	5	0	968	1032	5
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					103	
pX, platoon unblocked	0.89	0.89	0.89			
vC, conflicting volume	1526	526	1045			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1341	215	799			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	129	702	735			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	10	323	645	688	349	
Volume Left	5	0	0	0	0	
Volume Right	5	0	0	0	5	
cSH	218	735	1700	1700	1700	
Volume to Capacity	0.05	0.00	0.38	0.40	0.21	
Queue Length 95th (m)	1.1	0.0	0.0	0.0	0.0	
Control Delay (s)	22.3	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	22.3	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			36.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
9: Bradford St & Existing Middle Site Dwy

Future Background PM
2033 Horizon Year

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔			↕↕	↕↕	
Traffic Volume (veh/h)	0	5	0	905	960	0
Future Volume (Veh/h)	0	5	0	905	960	0
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)	0	5	0	973	1032	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					65	
pX, platoon unblocked	0.89	0.89	0.89			
vC, conflicting volume	1518	516	1032			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1329	198	780			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	132	724	750			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	324	649	688	344	
Volume Left	0	0	0	0	0	
Volume Right	5	0	0	0	0	
cSH	724	750	1700	1700	1700	
Volume to Capacity	0.01	0.00	0.38	0.40	0.20	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.0	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		36.5%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
10: Bradford St & Existing North Site Dwy

Future Background PM
2033 Horizon Year

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔			↕↕	↕↕	
Traffic Volume (veh/h)	5	10	0	905	950	0
Future Volume (Veh/h)	5	10	0	905	950	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	11	0	963	1011	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					45	
pX, platoon unblocked	0.89	0.89	0.89			
vC, conflicting volume	1492	506	1011			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1298	184	755			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	138	738	766			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	16	321	642	674	337	
Volume Left	5	0	0	0	0	
Volume Right	11	0	0	0	0	
cSH	313	766	1700	1700	1700	
Volume to Capacity	0.05	0.00	0.38	0.40	0.20	
Queue Length 95th (m)	1.3	0.0	0.0	0.0	0.0	
Control Delay (s)	17.1	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	17.1	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		36.3%		ICU Level of Service	A	
Analysis Period (min)		15				

Queues
2: Bradford St & Victoria St

Future Background AM
2038 Horizon Year

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	5	20	10	10	20	820	20	630
Future Volume (vph)	5	20	10	10	20	820	20	630
Lane Group Flow (vph)	0	78	11	33	0	950	0	728
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.06	0.11		0.41		0.32
Control Delay		13.7	22.9	13.6		6.3		5.7
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		13.7	22.9	13.6		6.3		5.7
Queue Length 50th (m)		3.5	1.3	1.3		25.0		17.6
Queue Length 95th (m)		12.8	4.7	7.2		54.3		39.0
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2340		2288
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		0.14	0.03	0.06		0.41		0.32

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Background AM
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	20	45	10	10	20	20	820	15	20	630	5
Future Volume (vph)	5	20	45	10	10	20	20	820	15	20	630	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3474			3461	
Flt Permitted		0.97		0.71	1.00			0.93			0.91	
Satd. Flow (perm)		1541		1142	1693			3237			3166	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	11	11	22	22	911	17	22	700	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	35	0	11	14	0	0	949	0	0	727	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2228			2180	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.29			0.23	
v/c Ratio		0.16		0.07	0.06			0.43			0.33	
Uniform Delay, d1		26.5		26.1	26.1			4.8			4.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		0.2	0.1			0.6			0.4	
Delay (s)		26.8		26.3	26.2			5.4			4.8	
Level of Service		C		C	C			A			A	
Approach Delay (s)		26.8			26.2			5.4			4.8	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 3: Sanford St & Victoria St

Future Background AM
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	60	5	0	35	0	5	0	10	0	5	0
Future Volume (Veh/h)	0	60	5	0	35	0	5	0	10	0	5	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	92	8	0	54	0	8	0	15	0	8	0
Pedestrians					1			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	64			105			159	165	102	176	169	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			105			159	165	102	176	169	64
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			100			99	100	98	100	99	100
cM capacity (veh/h)	1538			1493			793	722	919	764	718	998
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	100	54	23	8								
Volume Left	0	0	8	0								
Volume Right	8	0	15	0								
cSH	1538	1493	871	718								
Volume to Capacity	0.00	0.00	0.03	0.01								
Queue Length 95th (m)	0.0	0.0	0.7	0.3								
Control Delay (s)	0.0	0.0	9.2	10.1								
Lane LOS			A	B								
Approach Delay (s)	0.0	0.0	9.2	10.1								
Approach LOS			A	B								
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization		18.7%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Background AM
2038 Horizon Year

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	35	60	15	50	35
Future Volume (Veh/h)	5	35	60	15	50	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	7	52	90	22	75	52
Pedestrians	5					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	308	108			117	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	108			117	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	94			95	
cM capacity (veh/h)	650	914			1429	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	59	112	127			
Volume Left	7	0	75			
Volume Right	52	22	0			
cSH	872	1700	1429			
Volume to Capacity	0.07	0.07	0.05			
Queue Length 95th (m)	1.7	0.0	1.3			
Control Delay (s)	9.4	0.0	4.7			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	4.7			
Approach LOS	A					
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization		21.9%		ICU Level of Service	A	
Analysis Period (min)			15			

Queues
5: Innisfil St & John St

Future Background AM
2038 Horizon Year

					
Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	20	10	5	55	20
Future Volume (vph)	20	10	5	55	20
Lane Group Flow (vph)	0	36	6	67	48
Turn Type	custom	NA	NA	NA	NA
Protected Phases				2	6
Permitted Phases	4	4	8		
Detector Phase				2	6
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Ped	C-Max	C-Max
v/c Ratio		0.09	0.01	0.06	0.05
Control Delay		20.6	17.2	6.9	4.3
Queue Delay		0.0	0.0	0.0	0.0
Total Delay		20.6	17.2	6.9	4.3
Queue Length 50th (m)		3.8	0.6	3.7	1.3
Queue Length 95th (m)		9.6	m2.4	7.7	4.6
Internal Link Dist (m)		110.5	98.0	65.9	155.1
Turn Bay Length (m)					
Base Capacity (vph)		398	488	1085	1022
Starvation Cap Reductn		0	0	0	0
Spillback Cap Reductn		0	0	0	0
Storage Cap Reductn		0	0	0	0
Reduced v/c Ratio		0.09	0.01	0.06	0.05

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis
5: Innisfil St & John St

Future Background AM
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	10	0	0	5	0	0	55	0	0	20	20
Future Volume (vph)	20	10	0	0	5	0	0	55	0	0	20	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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			1.00			0.93	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1768			1900			1900			1772	
Flt Permitted		0.85			1.00			1.00			1.00	
Satd. Flow (perm)		1549			1900			1900			1772	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	12	0	0	6	0	0	67	0	0	24	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	36	0	0	6	0	0	67	0	0	38	0
Heavy Vehicles (%)	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA			NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		398			488			1085			1012	
v/s Ratio Prot								c0.04			0.02	
v/s Ratio Perm		c0.02			0.00							
v/c Ratio		0.09			0.01			0.06			0.04	
Uniform Delay, d1		19.8			19.4			6.7			6.6	
Progression Factor		1.00			0.88			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.1	
Delay (s)		19.9			17.0			6.8			6.6	
Level of Service		B			B			A			A	
Approach Delay (s)		19.9			17.0			6.8			6.6	
Approach LOS		B			B			A			A	

Intersection Summary

HCM 2000 Control Delay 10.1 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio 0.07
Actuated Cycle Length (s) 70.0 Sum of lost time (s) 12.0
Intersection Capacity Utilization 22.5% ICU Level of Service A
Analysis Period (min) 15
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Background AM
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	5	5	0	0	15	0	0	10	0
Future Volume (Veh/h)	0	10	0	5	5	0	0	15	0	0	10	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	0	5	5	0	0	16	0	0	11	0
Pedestrians	1											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	122											
pX, platoon unblocked												
vC, conflicting volume	6			11			32	27	11	35	27	6
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6			11			32	27	11	35	27	6
tC, single (s)	4.1			4.4			7.1	6.6	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.5			3.5	4.1	3.3	3.5	4.1	3.3
p0 queue free %	100			100			100	98	100	100	99	100
cM capacity (veh/h)	1627			1428			969	841	1076	958	847	1082
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	11	10	16	11								
Volume Left	0	5	0	0								
Volume Right	0	0	0	0								
cSH	1627	1428	841	847								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (m)	0.0	0.1	0.5	0.3								
Control Delay (s)	0.0	3.8	9.4	9.3								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	3.8	9.4	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay	6.0											
Intersection Capacity Utilization	15.0%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Background AM
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	855	15	5	660	5
Future Volume (Veh/h)	5	0	5	15	5	5	0	855	15	5	660	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	900	16	5	695	5
Pedestrians	4											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)	181											
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	1171	1636	355	1280	1630	468	704	924				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1105	1586	259	1217	1580	468	621	924				
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2	2.2				
p0 queue free %	97	100	99	87	95	99	100	99				
cM capacity (veh/h)	152	104	717	122	105	543	933	743				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	10	26	450	466	352	352						
Volume Left	5	16	0	0	5	0						
Volume Right	5	5	0	16	0	5						
cSH	251	138	933	1700	743	1700						
Volume to Capacity	0.04	0.19	0.00	0.27	0.01	0.21						
Queue Length 95th (m)	1.0	5.3	0.0	0.0	0.2	0.0						
Control Delay (s)	19.9	37.0	0.0	0.0	0.2	0.0						
Lane LOS	C	E			A							
Approach Delay (s)	19.9	37.0	0.0		0.1							
Approach LOS	C	E										
Intersection Summary												
Average Delay	0.7											
Intersection Capacity Utilization	34.8%			ICU Level of Service				A				
Analysis Period (min)	15											

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

Future Background AM
2038 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	5	5	860	665	10
Future Volume (Veh/h)	0	5	5	860	665	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	5	5	915	707	11
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				103		
pX, platoon unblocked	0.94	0.94	0.94			
vC, conflicting volume	1184	363	722			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1061	184	568			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	99			
cM capacity (veh/h)	206	777	947			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	310	610	471	247	
Volume Left	0	5	0	0	0	
Volume Right	5	0	0	0	11	
cSH	777	947	1700	1700	1700	
Volume to Capacity	0.01	0.01	0.36	0.28	0.15	
Queue Length 95th (m)	0.2	0.1	0.0	0.0	0.0	
Control Delay (s)	9.7	0.2	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	9.7	0.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			37.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 9: Bradford St & Existing Middle Site Dwy

Future Background AM
2038 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	860	675	5
Future Volume (Veh/h)	0	0	0	860	675	5
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)	0	0	0	925	726	5
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				65		
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	1192	366	732			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1051	160	555			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	209	799	951			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	308	617	484	247	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	5	
cSH	1700	951	1700	1700	1700	
Volume to Capacity	0.00	0.00	0.36	0.28	0.15	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			27.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 10: Bradford St & Existing North Site Dwy

Future Background AM
2038 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	5	855	680	5
Future Volume (Veh/h)	0	0	5	855	680	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	5	900	716	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					45	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1178	360	721			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1029	144	534			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	214	817	965			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	305	600	477	244	
Volume Left	0	5	0	0	0	
Volume Right	0	0	0	0	5	
cSH	1700	965	1700	1700	1700	
Volume to Capacity	0.00	0.01	0.35	0.28	0.14	
Queue Length 95th (m)	0.0	0.1	0.0	0.0	0.0	
Control Delay (s)	0.0	0.2	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	0.0	0.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			30.5%		ICU Level of Service	A
Analysis Period (min)			15			

Queues 2: Bradford St & Victoria St

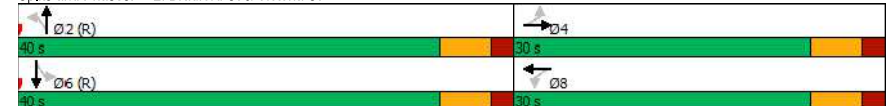
Future Background PM
2038 Horizon Year

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	30	30	20	20	1045	10	1055
Future Volume (vph)	10	30	30	20	20	1045	10	1055
Lane Group Flow (vph)	0	105	33	55	0	1216	0	1194
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.36	0.15	0.17		0.53		0.51
Control Delay		19.4	24.9	13.9		7.5		7.3
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		19.4	24.9	13.9		7.5		7.3
Queue Length 50th (m)		7.9	4.1	2.7		36.6		35.2
Queue Length 95th (m)		18.3	9.8	10.1		78.8		75.5
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		553	444	609		2309		2359
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		0.19	0.07	0.09		0.53		0.51

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis

2: Bradford St & Victoria St

Future Background PM

2038 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	55	30	20	30	20	1045	30	10	1055	10
Future Volume (vph)	10	30	55	30	20	30	20	1045	30	10	1055	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.92		1.00	0.91			1.00			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1592		1537	1713			3471			3465	
Flt Permitted		0.96		0.80	1.00			0.92			0.94	
Satd. Flow (perm)		1535		1296	1713			3192			3262	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	33	61	33	22	33	22	1161	33	11	1172	11
RTOR Reduction (vph)	0	36	0	0	28	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	69	0	33	27	0	0	1214	0	0	1193	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		214		181	239			2197			2246	
v/s Ratio Prot					0.02							
v/s Ratio Perm		c0.04		0.03				c0.38			0.37	
v/c Ratio		0.32		0.18	0.11			0.55			0.53	
Uniform Delay, d1		27.1		26.6	26.3			5.5			5.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.9		0.5	0.2			1.0			0.9	
Delay (s)		28.1		27.1	26.5			6.5			6.3	
Level of Service		C		C	C			A			A	
Approach Delay (s)		28.1			26.7			6.5			6.3	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.9										
HCM 2000 Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		70.0						12.0				
Intersection Capacity Utilization		67.0%										
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Sanford St & Victoria St

Future Background PM

2038 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	90	10	5	45	0	10	15	5	0	0	5
Future Volume (Veh/h)	0	90	10	5	45	0	10	15	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	138	15	8	69	0	15	23	8	0	0	8
Pedestrians					1			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	79			158			244	246	152	261	253	79
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	79			158			244	246	152	261	253	79
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			99			98	96	99	100	100	99
cM capacity (veh/h)	1519			1428			696	648	862	656	642	979
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	153	77	46	8								
Volume Left	0	8	15	0								
Volume Right	15	0	8	8								
cSH	1519	1428	694	979								
Volume to Capacity	0.00	0.01	0.07	0.01								
Queue Length 95th (m)	0.0	0.1	1.7	0.2								
Control Delay (s)	0.0	0.8	10.6	8.7								
Lane LOS		A	B	A								
Approach Delay (s)	0.0	0.8	10.6	8.7								
Approach LOS		B	A									
Intersection Summary												
Average Delay		2.2										
Intersection Capacity Utilization		23.6%										
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Background PM
2038 Horizon Year

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Volume (veh/h)	10	50	60	10	90	100
Future Volume (Veh/h)	10	50	60	10	90	100
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	15	75	90	15	134	149
Pedestrians	5					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	520	104			110	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	520	104			110	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	97	92			91	
cM capacity (veh/h)	470	918			1437	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	90	105	283			
Volume Left	15	0	134			
Volume Right	75	15	0			
cSH	792	1700	1437			
Volume to Capacity	0.11	0.06	0.09			
Queue Length 95th (m)	3.1	0.0	2.5			
Control Delay (s)	10.1	0.0	4.1			
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	4.1			
Approach LOS	B					
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			28.0%		ICU Level of Service	A
Analysis Period (min)			15			

Queues 5: Innisfil St & John St

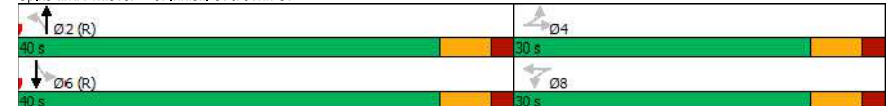
Future Background PM
2038 Horizon Year

Lane Group	EBL	EBT	WBT	NBL	NBT	SBT
Lane Configurations		↔	↔		↔	↔
Traffic Volume (vph)	25	10	5	5	45	70
Future Volume (vph)	25	10	5	5	45	70
Lane Group Flow (vph)	0	48	6	0	61	134
Turn Type	custom	NA	NA	Perm	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	2		
Detector Phase				2	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	C-Max	C-Max	C-Max
v/c Ratio		0.12	0.01		0.06	0.13
Control Delay		19.1	19.6		6.9	4.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		19.1	19.6		6.9	4.9
Queue Length 50th (m)		4.4	0.6		3.4	4.8
Queue Length 95th (m)		11.1	3.0		7.2	10.2
Internal Link Dist (m)		110.5	98.0		65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)		396	488		1065	1053
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.12	0.01		0.06	0.13

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis 5: Innisfil St & John St

Future Background PM
2038 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
Future Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			1.00			0.95	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1746			1900			1891			1806	
Flt Permitted		0.85			1.00			0.98			1.00	
Satd. Flow (perm)		1525			1900			1864			1806	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	30	12	6	0	6	0	6	55	0	0	85	49
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	44	0	0	6	0	0	61	0	0	113	0
Heavy Vehicles (%)	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA		Perm	NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		392			488			1065			1032	
v/s Ratio Prot											c0.06	
v/s Ratio Perm		c0.03			0.00			0.03				
v/c Ratio		0.11			0.01			0.06			0.11	
Uniform Delay, d1		19.9			19.4			6.6			6.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.2	
Delay (s)		20.0			19.4			6.7			7.1	
Level of Service		C			B			A			A	
Approach Delay (s)		20.0			19.4			6.7			7.1	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8									
HCM 2000 Volume to Capacity ratio			0.11									
Actuated Cycle Length (s)			70.0						12.0			
Intersection Capacity Utilization			25.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Background PM
2038 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Future Volume (Veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	0	5	0	0	27	5	0	16	0
Pedestrians											1	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		122										
pX, platoon unblocked												
vC, conflicting volume	6			5			26	18	2	37	21	6
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6			5			26	18	2	37	21	6
tC, single (s)	4.1			4.4			7.1	6.6	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.5			3.5	4.1	3.3	3.5	4.1	3.3
p0 queue free %	100			100			100	97	100	100	98	100
cM capacity (veh/h)	1627			1435			973	851	1087	942	854	1082
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	10	5	32	16								
Volume Left	5	0	0	0								
Volume Right	5	0	5	0								
cSH	1627	1435	881	854								
Volume to Capacity	0.00	0.00	0.04	0.02								
Queue Length 95th (m)	0.1	0.0	0.9	0.5								
Control Delay (s)	3.6	0.0	9.2	9.3								
Lane LOS	A		A	A								
Approach Delay (s)	3.6	0.0	9.2	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay			7.6									
Intersection Capacity Utilization			15.1%								A	
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Background PM

2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	1080	30	5	1150	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	1080	30	5	1150	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	5	21	5	5	0	1137	32	5	1211	0
Pedestrians	4			8			1			2		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	0			1			0			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												181
pX, platoon unblocked	0.85	0.85	0.85	0.85	0.85		0.85					
vC, conflicting volume	1803	2402	610	1782	2386	594	1215			1177		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1595	2298	194	1570	2279	594	904			1177		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	64	85	99	100			99		
cM capacity (veh/h)	54	33	696	58	34	449	646			597		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	5	31	568	600	610	606						
Volume Left	0	21	0	0	5	0						
Volume Right	5	5	0	32	0	0						
cSH	696	60	646	1700	597	1700						
Volume to Capacity	0.01	0.52	0.00	0.35	0.01	0.36						
Queue Length 95th (m)	0.2	16.5	0.0	0.0	0.2	0.0						
Control Delay (s)	10.2	118.0	0.0	0.0	0.2	0.0						
Lane LOS	B	F			A							
Approach Delay (s)	10.2	118.0	0.0		0.1							
Approach LOS	B	F										
Intersection Summary												
Average Delay	1.6											
Intersection Capacity Utilization	50.6%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

8: Bradford St & Existing South Site Dwy

Future Background PM

2038 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	5	5	0	1085	1150	5
Future Volume (Veh/h)	5	5	0	1085	1150	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	5	0	1154	1223	5
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					103	
pX, platoon unblocked	0.84	0.84	0.84			
vC, conflicting volume	1806	618	1232			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1582	170	900			
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	99	100			
cM capacity (veh/h)	85	713	641			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	10	385	769	815	413	
Volume Left	5	0	0	0	0	
Volume Right	5	0	0	0	5	
cSH	152	641	1700	1700	1700	
Volume to Capacity	0.07	0.00	0.45	0.48	0.24	
Queue Length 95th (m)	1.7	0.0	0.0	0.0	0.0	
Control Delay (s)	30.3	0.0	0.0	0.0	0.0	
Lane LOS	D					
Approach Delay (s)	30.3	0.0		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	41.9%			ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9: Bradford St & Existing Middle Site Dwy

Future Background PM
2038 Horizon Year

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔			↕↕	↕↕	
Traffic Volume (veh/h)	0	5	0	1090	1150	0
Future Volume (Veh/h)	0	5	0	1090	1150	0
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)	0	5	0	1172	1237	0
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					65	
pX, platoon unblocked	0.84	0.84	0.84			
vC, conflicting volume	1824	620	1238			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1598	162	900			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	83	721	640			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	391	781	825	412	
Volume Left	0	0	0	0	0	
Volume Right	5	0	0	0	0	
cSH	721	640	1700	1700	1700	
Volume to Capacity	0.01	0.00	0.46	0.49	0.24	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.0	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			41.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
10: Bradford St & Existing North Site Dwy

Future Background PM
2038 Horizon Year

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	↔			↕↕	↕↕	
Traffic Volume (veh/h)	5	10	0	1090	1140	0
Future Volume (Veh/h)	5	10	0	1090	1140	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	11	0	1147	1200	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					45	
pX, platoon unblocked	0.84	0.84	0.84			
vC, conflicting volume	1774	600	1200			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1537	137	853			
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	99	100			
cM capacity (veh/h)	91	748	666			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	16	382	765	800	400	
Volume Left	5	0	0	0	0	
Volume Right	11	0	0	0	0	
cSH	230	666	1700	1700	1700	
Volume to Capacity	0.07	0.00	0.45	0.47	0.24	
Queue Length 95th (m)	1.8	0.0	0.0	0.0	0.0	
Control Delay (s)	21.8	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	21.8	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			41.5%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
2: Bradford St & Victoria St

Future Total AM
2028 Horizon Year

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↗	↖		↕		↕
Traffic Volume (vph)	5	20	15	10	25	640	20	435
Future Volume (vph)	5	20	15	10	25	640	20	435
Lane Group Flow (vph)	0	78	17	33	0	756	0	511
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.09	0.11		0.33		0.22
Control Delay		13.7	23.7	13.6		5.7		5.2
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		13.7	23.7	13.6		5.7		5.2
Queue Length 50th (m)		3.5	2.1	1.3		18.4		11.4
Queue Length 95th (m)		12.9	6.2	7.2		40.6		26.2
Internal Link Dist (m)		94.2		216.2		58.5		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2320		2281
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		0.14	0.04	0.06		0.33		0.22

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Total AM
2028 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↗	↖			↕			↕	
Traffic Volume (vph)	5	20	45	15	10	20	25	640	15	20	435	5
Future Volume (vph)	5	20	45	15	10	20	25	640	15	20	435	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frft		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3460			3456	
Flt Permitted		0.97		0.71	1.00			0.93			0.91	
Satd. Flow (perm)		1541		1142	1693			3208			3157	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	17	11	22	28	711	17	22	483	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	35	0	17	14	0	0	755	0	0	510	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2208			2173	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.24			0.16	
v/c Ratio		0.16		0.11	0.06			0.34			0.23	
Uniform Delay, d1		26.5		26.3	26.1			4.4			4.0	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		0.3	0.1			0.4			0.3	
Delay (s)		26.9		26.6	26.2			4.9			4.3	
Level of Service		C		C	C			A			A	
Approach Delay (s)		26.9			26.3			4.9			4.3	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Sanford St & Victoria St

Future Total AM

2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	60	5	0	40	0	5	0	10	0	5	0
Future Volume (Veh/h)	0	60	5	0	40	0	5	0	10	0	5	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	92	8	0	62	0	8	0	15	0	8	0
Pedestrians					1		5				10	
Lane Width (m)					3.6		3.6				3.6	
Walking Speed (m/s)					1.2		1.2				1.2	
Percent Blockage					0		0				1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	118											
pX, platoon unblocked												
vC, conflicting volume	72				105				167	173	102	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	72				105				167	173	102	184
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1
tC, 2 stage (s)												
tF (s)	2.2				2.2				3.5	4.0	3.4	3.5
p0 queue free %	100				100				99	100	98	100
cM capacity (veh/h)	1528				1493				784	715	919	754
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	100	62	23	8								
Volume Left	0	0	8	0								
Volume Right	8	0	15	0								
cSH	1528	1493	867	711								
Volume to Capacity	0.00	0.00	0.03	0.01								
Queue Length 95th (m)	0.0	0.0	0.7	0.3								
Control Delay (s)	0.0	0.0	9.3	10.1								
Lane LOS	A			B								
Approach Delay (s)	0.0	0.0	9.3	10.1								
Approach LOS	A			B								
Intersection Summary												
Average Delay				1.5								
Intersection Capacity Utilization	18.7%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

4: Innisfil St & Victoria St

Future Total AM

2028 Horizon Year

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	40	60	15	50	35
Future Volume (Veh/h)	5	40	60	15	50	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	7	60	90	22	75	52
Pedestrians	5					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	308	108			117	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	108			117	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	93			95	
cM capacity (veh/h)	650	914			1429	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	67	112	127			
Volume Left	7	0	75			
Volume Right	60	22	0			
cSH	877	1700	1429			
Volume to Capacity	0.08	0.07	0.05			
Queue Length 95th (m)	2.0	0.0	1.3			
Control Delay (s)	9.4	0.0	4.7			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	4.7			
Approach LOS	A					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization		21.9%		ICU Level of Service		A
Analysis Period (min)			15			

Queues
5: Innisfil St & John St

Future Total AM
2028 Horizon Year

	↗	→	↘	←	↑	↓
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations		↕		↕	↕	↕
Traffic Volume (vph)	20	10	5	5	55	20
Future Volume (vph)	20	10	5	5	55	20
Lane Group Flow (vph)	0	36	0	12	67	48
Turn Type	custom	NA	custom	NA	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	8		
Detector Phase				8	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	Ped	C-Max	C-Max
v/c Ratio	0.09			0.03	0.06	0.05
Control Delay	20.6			17.9	6.9	4.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	20.6			17.9	6.9	4.3
Queue Length 50th (m)		3.8		1.3	3.7	1.3
Queue Length 95th (m)		9.6		4.6	7.7	4.6
Internal Link Dist (m)		110.5		98.0	65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)		397		590	1085	1022
Starvation Cap Reductn		0		0	0	0
Spillback Cap Reductn		0		0	0	0
Storage Cap Reductn		0		0	0	0
Reduced v/c Ratio		0.09		0.02	0.06	0.05

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis
5: Innisfil St & John St

Future Total AM
2028 Horizon Year

	↗	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↕			↕			↕			↕			
Traffic Volume (vph)	20	10	0	5	5	0	0	55	0	0	20	20		
Future Volume (vph)	20	10	0	5	5	0	0	55	0	0	20	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			
Lane Util. Factor		1.00			1.00			1.00			1.00			
Frt		1.00			1.00			1.00			0.93			
Flt Protected		0.97			0.98			1.00			1.00			
Satd. Flow (prot)		1768			1854			1900			1772			
Flt Permitted		0.85			0.91			1.00			1.00			
Satd. Flow (perm)		1544			1721			1900			1772			
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82		
Adj. Flow (vph)	24	12	0	6	6	0	0	67	0	0	24	24		
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	10	0		
Lane Group Flow (vph)	0	36	0	0	12	0	0	67	0	0	38	0		
Heavy Vehicles (%)	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Turn Type	custom	NA		custom	NA			NA			NA			
Protected Phases								2			6			
Permitted Phases	4	4		8	8			2			6			
Actuated Green, G (s)		18.0			18.0			40.0			40.0			
Effective Green, g (s)		18.0			18.0			40.0			40.0			
Actuated g/C Ratio		0.26			0.26			0.57			0.57			
Clearance Time (s)		6.0			6.0			6.0			6.0			
Vehicle Extension (s)		3.0			3.0			3.0			3.0			
Lane Grp Cap (vph)		397			442			1085			1012			
v/s Ratio Prot								c0.04			0.02			
v/s Ratio Perm		c0.02			0.01									
v/c Ratio		0.09			0.03			0.06			0.04			
Uniform Delay, d1		19.8			19.5			6.7			6.6			
Progression Factor		1.00			0.90			1.00			1.00			
Incremental Delay, d2		0.1			0.0			0.1			0.1			
Delay (s)		19.9			17.6			6.8			6.6			
Level of Service		B			B			A			A			
Approach Delay (s)		19.9			17.6			6.8			6.6			
Approach LOS		B			B			A			A			

Intersection Summary

HCM 2000 Control Delay 10.4 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio 0.07
Actuated Cycle Length (s) 70.0 Sum of lost time (s) 12.0
Intersection Capacity Utilization 20.0% ICU Level of Service A
Analysis Period (min) 15
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Total AM
2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	5	10	0	0	15	0	0	10	0
Future Volume (Veh/h)	0	10	0	5	10	0	0	15	0	0	10	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	0	5	11	0	0	16	0	0	11	0
Pedestrians	1											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	122											
pX, platoon unblocked												
vC, conflicting volume	12			11			38	33	11	41	33	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			11			38	33	11	41	33	12
tC, single (s)	4.1			4.4			7.1	6.6	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.5			3.5	4.1	3.3	3.5	4.1	3.3
p0 queue free %	100			100			100	98	100	100	99	100
cM capacity (veh/h)	1619			1428			960	835	1076	950	840	1074
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	11	16	16	11								
Volume Left	0	5	0	0								
Volume Right	0	0	0	0								
cSH	1619	1428	835	840								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (m)	0.0	0.1	0.5	0.3								
Control Delay (s)	0.0	2.4	9.4	9.3								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	2.4	9.4	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay	5.4											
Intersection Capacity Utilization	15.2%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Total AM
2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	605	15	5	530	10
Future Volume (Veh/h)	5	0	5	15	5	5	0	605	15	5	530	10
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	637	16	5	558	11
Pedestrians	4											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)	181											
pX, platoon unblocked												
vC, conflicting volume	906	1238	290	948	1236	336	573				661	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	906	1238	290	948	1236	336	573				661	
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2				2.2	
p0 queue free %	98	100	99	92	97	99	100				99	
cM capacity (veh/h)	224	174	710	201	175	660	1007				931	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	10	26	318	334	284	290						
Volume Left	5	16	0	0	5	0						
Volume Right	5	5	0	16	0	11						
cSH	340	225	1007	1700	931	1700						
Volume to Capacity	0.03	0.12	0.00	0.20	0.01	0.17						
Queue Length 95th (m)	0.7	3.1	0.0	0.0	0.1	0.0						
Control Delay (s)	15.9	23.1	0.0	0.0	0.2	0.0						
Lane LOS	C	C			A							
Approach Delay (s)	15.9	23.1	0.0	0.1								
Approach LOS	C	C										
Intersection Summary												
Average Delay	0.6											
Intersection Capacity Utilization	29.1%			ICU Level of Service				A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 11: Bradford St & Future Site Dwy

Future Total AM
2028 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	85	25	590	460	35
Future Volume (Veh/h)	90	85	25	590	460	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)	98	92	27	641	500	38
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					83	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	898	273	542			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	817	168	447			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	67	89	97			
cM capacity (veh/h)	298	819	1078			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	190	241	427	333	205	
Volume Left	98	27	0	0	0	
Volume Right	92	0	0	0	38	
cSH	431	1078	1700	1700	1700	
Volume to Capacity	0.44	0.03	0.25	0.20	0.12	
Queue Length 95th (m)	17.6	0.6	0.0	0.0	0.0	
Control Delay (s)	19.8	1.2	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	19.8	0.4		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			51.1%		ICU Level of Service	A
Analysis Period (min)			15			

Queues 2: Bradford St & Victoria St

Future Total PM
2028 Horizon Year

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	30	40	20	20	750	10	790
Future Volume (vph)	10	30	40	20	20	750	10	790
Lane Group Flow (vph)	0	107	43	53	0	851	0	862
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.33	0.17	0.17		0.36		0.36
Control Delay		14.4	25.1	13.8		6.0		6.0
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		14.4	25.1	13.8		6.0		6.0
Queue Length 50th (m)		5.4	5.3	2.6		21.3		21.7
Queue Length 95th (m)		15.8	11.6	9.8		46.5		47.3
Internal Link Dist (m)		94.2		216.2		58.5		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		601	511	606		2344		2386
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		0.18	0.08	0.09		0.36		0.36

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis

2: Bradford St & Victoria St

Future Total PM

2028 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	60	40	20	30	20	750	30	10	790	10
Future Volume (vph)	10	30	60	40	20	30	20	750	30	10	790	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00			1.00	
Frt		0.92		1.00	0.91			0.99			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1693		1788	1710			3503			3497	
Flt Permitted		0.96		0.79	1.00			0.92			0.94	
Satd. Flow (perm)		1634		1493	1710			3242			3300	
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)	11	32	64	43	21	32	21	798	32	11	840	11
RTOR Reduction (vph)	0	55	0	0	28	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	52	0	43	25	0	0	849	0	0	861	0
Confl. Peds. (#/hr)	5		10	10		5	7		5	5		7
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	15%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		228		209	239			2232			2272	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.03		0.03				c0.26			0.26	
v/c Ratio		0.23		0.21	0.11			0.38			0.38	
Uniform Delay, d1		26.7		26.7	26.3			4.6			4.6	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.5		0.5	0.2			0.5			0.5	
Delay (s)		27.3		27.1	26.5			5.1			5.1	
Level of Service		C		C	C			A			A	
Approach Delay (s)		27.3			26.8			5.1			5.1	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.4										
HCM 2000 Volume to Capacity ratio		0.35										
Actuated Cycle Length (s)		70.0						12.0				
Intersection Capacity Utilization		60.0%										
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Sanford St & Victoria St

Future Total PM

2028 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	95	10	5	45	0	10	15	5	0	0	5
Future Volume (Veh/h)	0	95	10	5	45	0	10	15	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	102	11	5	48	0	11	16	5	0	0	5
Pedestrians		4			3			4			9	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	57			117			178	178	114	190	184	61
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	57			117			178	178	114	190	184	61
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	98	99	100	100	99
cM capacity (veh/h)	1549			1479			770	709	938	741	704	999
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	113	53	32	5								
Volume Left	0	5	11	0								
Volume Right	11	0	5	5								
cSH	1549	1479	759	999								
Volume to Capacity	0.00	0.00	0.04	0.01								
Queue Length 95th (m)	0.0	0.1	1.1	0.1								
Control Delay (s)	0.0	0.7	10.0	8.6								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.7	10.0	8.6								
Approach LOS		A	A									
Intersection Summary												
Average Delay		2.0										
Intersection Capacity Utilization		23.8%										
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Total PM
2028 Horizon Year

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Volume (veh/h)	10	50	60	10	95	100
Future Volume (Veh/h)	10	50	60	10	95	100
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	11	57	69	11	109	115
Pedestrians	3					15
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					1
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	410	92			83	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410	92			83	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			93	
cM capacity (veh/h)	556	945			1510	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	68	80	224			
Volume Left	11	0	109			
Volume Right	57	11	0			
cSH	849	1700	1510			
Volume to Capacity	0.08	0.05	0.07			
Queue Length 95th (m)	2.1	0.0	1.9			
Control Delay (s)	9.6	0.0	4.0			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	4.0			
Approach LOS	A					
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			32.1%		ICU Level of Service	A
Analysis Period (min)			15			

Queues 5: Innisfil St & John St

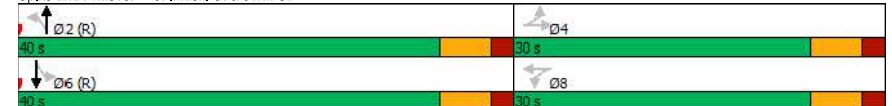
Future Total PM
2028 Horizon Year

Lane Group	EBL	EBT	WBT	NBL	NBT	SBT
Lane Configurations		↔	↔		↔	↔
Traffic Volume (vph)	25	10	5	5	45	70
Future Volume (vph)	25	10	5	5	45	70
Lane Group Flow (vph)	0	49	6	0	62	135
Turn Type	custom	NA	NA	Perm	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	2		
Detector Phase				2	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	C-Max	C-Max	C-Max
v/c Ratio		0.12	0.01		0.06	0.13
Control Delay		19.1	19.6		6.9	4.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		19.1	19.6		6.9	4.9
Queue Length 50th (m)		4.5	0.6		3.4	4.8
Queue Length 95th (m)		11.0	2.9		7.2	10.1
Internal Link Dist (m)		110.5	98.0		65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)		407	488		1065	1045
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.12	0.01		0.06	0.13

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis 5: Innisfil St & John St

Future Total PM
2028 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
Future Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			1.00			0.95	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1800			1900			1891			1793	
Flt Permitted		0.84			1.00			0.98			1.00	
Satd. Flow (perm)		1567			1900			1864			1793	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	31	12	6	0	6	0	6	56	0	0	86	49
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	45	0	0	6	0	0	62	0	0	114	0
Confl. Peds. (#/hr)	3		1	1		3	1		3	3		1
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA		Perm	NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		402			488			1065			1024	
v/s Ratio Prot											c0.06	
v/s Ratio Perm		c0.03			0.00			0.03				
v/c Ratio		0.11			0.01			0.06			0.11	
Uniform Delay, d1		19.9			19.4			6.6			6.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.2	
Delay (s)		20.0			19.4			6.8			7.1	
Level of Service		C			B			A			A	
Approach Delay (s)		20.0			19.4			6.8			7.1	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8									A
HCM 2000 Volume to Capacity ratio		0.11										
Actuated Cycle Length (s)		70.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		31.5%						ICU Level of Service				A
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Total PM
2028 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Future Volume (Veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	6	0	6	0	6	0	0	32	6	0	19	0
Pedestrians		5			5			3			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		122										
pX, platoon unblocked												
vC, conflicting volume	7			9			38	25	11	49	28	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			9			38	25	11	49	28	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	96	99	100	98	100
cM capacity (veh/h)	1625			1620			944	866	1069	915	863	1069
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	6	38	19								
Volume Left	6	0	0	0								
Volume Right	6	0	6	0								
cSH	1625	1620	893	863								
Volume to Capacity	0.00	0.00	0.04	0.02								
Queue Length 95th (m)	0.1	0.0	1.1	0.5								
Control Delay (s)	3.6	0.0	9.2	9.3								
Lane LOS	A		A	A								
Approach Delay (s)	3.6	0.0	9.2	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay			7.6									
Intersection Capacity Utilization		17.6%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Total PM

2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	810	30	5	835	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	810	30	5	835	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	880	33	5	908	0
Pedestrians		7			4			1				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		1			0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											181	
pX, platoon unblocked	0.94	0.94	0.94	0.94	0.94		0.94					
vC, conflicting volume	1372	1842	462	1370	1826	460	915			917		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1264	1765	293	1262	1747	460	776			917		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	81	94	99	100			99		
cM capacity (veh/h)	112	78	661	118	80	551	791			750		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	5	32	440	473	459	454						
Volume Left	0	22	0	0	5	0						
Volume Right	5	5	0	33	0	0						
cSH	661	124	791	1700	750	1700						
Volume to Capacity	0.01	0.26	0.00	0.28	0.01	0.27						
Queue Length 95th (m)	0.2	7.7	0.0	0.0	0.2	0.0						
Control Delay (s)	10.5	43.8	0.0	0.0	0.2	0.0						
Lane LOS	B	E			A							
Approach Delay (s)	10.5	43.8	0.0		0.1							
Approach LOS	B	E										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			41.6%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Bradford St & Future Site Dwy

Future Total PM

2028 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	50	70	745	790	100
Future Volume (Veh/h)	55	50	70	745	790	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	54	76	810	859	109
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						83
pX, platoon unblocked	0.90	0.90	0.90			
vC, conflicting volume	1478	492	976			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1313	219	755			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	51	92	90			
cM capacity (veh/h)	123	709	774			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	114	346	540	573	395	
Volume Left	60	76	0	0	0	
Volume Right	54	0	0	0	109	
cSH	202	774	1700	1700	1700	
Volume to Capacity	0.56	0.10	0.32	0.34	0.23	
Queue Length 95th (m)	24.3	2.6	0.0	0.0	0.0	
Control Delay (s)	43.5	3.2	0.0	0.0	0.0	
Lane LOS	E	A				
Approach Delay (s)	43.5	1.2	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay	3.1					
Intersection Capacity Utilization	63.9%			ICU Level of Service		B
Analysis Period (min)	15					

Queues
2: Bradford St & Victoria St

Future Total AM
2033 Horizon Year

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	5	20	15	10	25	760	20	530
Future Volume (vph)	5	20	15	10	25	760	20	530
Lane Group Flow (vph)	0	78	17	33	0	889	0	617
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.09	0.11		0.38		0.27
Control Delay		13.7	23.7	13.6		6.1		5.4
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		13.7	23.7	13.6		6.1		5.4
Queue Length 50th (m)		3.5	2.1	1.3		22.9		14.3
Queue Length 95th (m)		12.9	6.2	7.2		49.9		32.2
Internal Link Dist (m)		94.2		216.2		58.5		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2320		2283
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		0.14	0.04	0.06		0.38		0.27

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Total AM
2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	20	45	15	10	20	25	760	15	20	530	5
Future Volume (vph)	5	20	45	15	10	20	25	760	15	20	530	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3467			3459	
Flt Permitted		0.97		0.71	1.00			0.92			0.91	
Satd. Flow (perm)		1541		1142	1693			3209			3156	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	17	11	22	28	844	17	22	589	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	35	0	17	14	0	0	888	0	0	616	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2209			2173	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.28			0.20	
v/c Ratio		0.16		0.11	0.06			0.40			0.28	
Uniform Delay, d1		26.5		26.3	26.1			4.7			4.2	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		0.3	0.1			0.5			0.3	
Delay (s)		26.9		26.6	26.2			5.2			4.5	
Level of Service		C		C	C			A			A	
Approach Delay (s)		26.9			26.3			5.2			4.5	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Sanford St & Victoria St

Future Total AM

2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	60	5	0	40	0	5	0	10	0	5	0
Future Volume (Veh/h)	0	60	5	0	40	0	5	0	10	0	5	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	92	8	0	62	0	8	0	15	0	8	0
Pedestrians					1		5				10	
Lane Width (m)					3.6		3.6				3.6	
Walking Speed (m/s)					1.2		1.2				1.2	
Percent Blockage					0		0				1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	118											
pX, platoon unblocked												
vC, conflicting volume	72				105				167	173	102	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	72				105				167	173	102	184
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1
tC, 2 stage (s)												
tF (s)	2.2				2.2				3.5	4.0	3.4	3.5
p0 queue free %	100				100				99	100	98	100
cM capacity (veh/h)	1528				1493				784	715	919	754
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	100	62	23	8								
Volume Left	0	0	8	0								
Volume Right	8	0	15	0								
cSH	1528	1493	867	711								
Volume to Capacity	0.00	0.00	0.03	0.01								
Queue Length 95th (m)	0.0	0.0	0.7	0.3								
Control Delay (s)	0.0	0.0	9.3	10.1								
Lane LOS	A			B								
Approach Delay (s)	0.0	0.0	9.3	10.1								
Approach LOS	A			B								
Intersection Summary												
Average Delay	1.5											
Intersection Capacity Utilization	18.7%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

4: Innisfil St & Victoria St

Future Total AM

2033 Horizon Year

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	40	60	15	50	35
Future Volume (Veh/h)	5	40	60	15	50	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	7	60	90	22	75	52
Pedestrians	5					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	308	108			117	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	108			117	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	93			95	
cM capacity (veh/h)	650	914			1429	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	67	112	127			
Volume Left	7	0	75			
Volume Right	60	22	0			
cSH	877	1700	1429			
Volume to Capacity	0.08	0.07	0.05			
Queue Length 95th (m)	2.0	0.0	1.3			
Control Delay (s)	9.4	0.0	4.7			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	4.7			
Approach LOS	A					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization		21.9%		ICU Level of Service		A
Analysis Period (min)			15			

Queues
5: Innisfil St & John St

Future Total AM
2033 Horizon Year

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations		↕		↕	↕	↕
Traffic Volume (vph)	20	10	5	5	55	20
Future Volume (vph)	20	10	5	5	55	20
Lane Group Flow (vph)	0	36	0	12	67	48
Turn Type	custom	NA	custom	NA	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	8		
Detector Phase				8	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	Ped	C-Max	C-Max
v/c Ratio		0.09		0.03	0.06	0.05
Control Delay		20.6		17.2	6.9	4.3
Queue Delay		0.0		0.0	0.0	0.0
Total Delay		20.6		17.2	6.9	4.3
Queue Length 50th (m)		3.8		1.2	3.7	1.3
Queue Length 95th (m)		9.6		4.4	7.7	4.6
Internal Link Dist (m)		110.5		98.0	65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)		397		590	1085	1022
Starvation Cap Reductn		0		0	0	0
Spillback Cap Reductn		0		0	0	0
Storage Cap Reductn		0		0	0	0
Reduced v/c Ratio		0.09		0.02	0.06	0.05

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis
5: Innisfil St & John St

Future Total AM
2033 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	10	0	5	5	0	0	55	0	0	20	20
Future Volume (vph)	20	10	0	5	5	0	0	55	0	0	20	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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			1.00			0.93	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1768			1854			1900			1772	
Flt Permitted		0.85			0.91			1.00			1.00	
Satd. Flow (perm)		1544			1721			1900			1772	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	12	0	6	6	0	0	67	0	0	24	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	36	0	0	12	0	0	67	0	0	38	0
Heavy Vehicles (%)	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA		custom	NA			NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8			2		6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		397			442			1085			1012	
v/s Ratio Prot								c0.04			0.02	
v/s Ratio Perm		c0.02			0.01							
v/c Ratio		0.09			0.03			0.06			0.04	
Uniform Delay, d1		19.8			19.5			6.7			6.6	
Progression Factor		1.00			0.87			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.1	
Delay (s)		19.9			16.9			6.8			6.6	
Level of Service		B			B			A			A	
Approach Delay (s)		19.9			16.9			6.8			6.6	
Approach LOS		B			B			A			A	

Intersection Summary

HCM 2000 Control Delay: 10.4 HCM 2000 Level of Service: B
HCM 2000 Volume to Capacity ratio: 0.07
Actuated Cycle Length (s): 70.0 Sum of lost time (s): 12.0
Intersection Capacity Utilization: 20.0% ICU Level of Service: A
Analysis Period (min): 15

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Total AM
2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	5	10	0	0	15	0	0	10	0
Future Volume (Veh/h)	0	10	0	5	10	0	0	15	0	0	10	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	0	5	11	0	0	16	0	0	11	0
Pedestrians	1											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	122											
pX, platoon unblocked												
vC, conflicting volume	12			11			38	33	11	41	33	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			11			38	33	11	41	33	12
tC, single (s)	4.1			4.4			7.1	6.6	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.5			3.5	4.1	3.3	3.5	4.1	3.3
p0 queue free %	100			100			100	98	100	100	99	100
cM capacity (veh/h)	1619			1428			960	835	1076	950	840	1074
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	11	16	16	11								
Volume Left	0	5	0	0								
Volume Right	0	0	0	0								
cSH	1619	1428	835	840								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (m)	0.0	0.1	0.5	0.3								
Control Delay (s)	0.0	2.4	9.4	9.3								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	2.4	9.4	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay	5.4											
Intersection Capacity Utilization	15.2%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Total AM
2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	725	15	5	625	10
Future Volume (Veh/h)	5	0	5	15	5	5	0	725	15	5	625	10
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	763	16	5	658	11
Pedestrians	4											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)	181											
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	1068	1464	340	1124	1462	400	673	787				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1053	1452	318	1109	1449	400	654	787				
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2	2.2				
p0 queue free %	97	100	99	89	96	99	100	99				
cM capacity (veh/h)	172	129	675	151	129	601	932	836				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	10	26	382	398	334	340						
Volume Left	5	16	0	0	5	0						
Volume Right	5	5	0	16	0	11						
cSH	274	170	932	1700	836	1700						
Volume to Capacity	0.04	0.15	0.00	0.23	0.01	0.20						
Queue Length 95th (m)	0.9	4.2	0.0	0.0	0.1	0.0						
Control Delay (s)	18.6	29.9	0.0	0.0	0.2	0.0						
Lane LOS	C	D			A							
Approach Delay (s)	18.6	29.9	0.0		0.1							
Approach LOS	C	D										
Intersection Summary												
Average Delay	0.7											
Intersection Capacity Utilization	31.8%			ICU Level of Service				A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 11: Bradford St & Future Site Dwy

Future Total AM
2033 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Volume (veh/h)	90	85	25	710	555	35
Future Volume (Veh/h)	90	85	25	710	555	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)	98	92	27	772	603	38
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					83	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	1066	324	645			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	955	171	510			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	59	89	97			
cM capacity (veh/h)	239	801	1005			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	190	284	515	402	239	
Volume Left	98	27	0	0	0	
Volume Right	92	0	0	0	38	
cSH	361	1005	1700	1700	1700	
Volume to Capacity	0.53	0.03	0.30	0.24	0.14	
Queue Length 95th (m)	23.4	0.7	0.0	0.0	0.0	
Control Delay (s)	25.5	1.1	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	25.5	0.4		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			54.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues 2: Bradford St & Victoria St

Future Total PM
2033 Horizon Year

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↕	↕		↕		↕
Traffic Volume (vph)	10	30	40	20	20	905	10	945
Future Volume (vph)	10	30	40	20	20	905	10	945
Lane Group Flow (vph)	0	107	43	53	0	1016	0	1027
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.33	0.17	0.17		0.43		0.43
Control Delay		14.4	25.1	13.8		6.5		6.5
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		14.4	25.1	13.8		6.5		6.5
Queue Length 50th (m)		5.4	5.3	2.6		27.4		27.8
Queue Length 95th (m)		15.8	11.6	9.8		59.3		59.9
Internal Link Dist (m)		94.2		216.2		58.5		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		601	511	606		2344		2383
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		0.18	0.08	0.09		0.43		0.43
Intersection Summary								
Cycle Length: 70								
Actuated Cycle Length: 70								
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green								
Natural Cycle: 65								
Control Type: Actuated-Coordinated								

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis

2: Bradford St & Victoria St

Future Total PM

2033 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Traffic Volume (vph)	10	30	60	40	20	30	20	905	30	10	945	10
Future Volume (vph)	10	30	60	40	20	30	20	905	30	10	945	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Flpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00			1.00	
Frt		0.92		1.00	0.91			1.00			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1693		1788	1710			3509			3498	
Flt Permitted		0.96		0.79	1.00			0.92			0.94	
Satd. Flow (perm)		1634		1493	1710			3241			3299	
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)	11	32	64	43	21	32	21	963	32	11	1005	11
RTOR Reduction (vph)	0	55	0	0	28	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	52	0	43	25	0	0	1014	0	0	1026	0
Confl. Peds. (#/hr)	5		10	10		5	7		5	5		7
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	15%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		228		209	239			2231			2271	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.03		0.03				c0.31			0.31	
v/c Ratio		0.23		0.21	0.11			0.45			0.45	
Uniform Delay, d1		26.7		26.7	26.3			4.9			4.9	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.5		0.5	0.2			0.7			0.7	
Delay (s)		27.3		27.1	26.5			5.6			5.6	
Level of Service		C		C	C			A			A	
Approach Delay (s)		27.3			26.8			5.6			5.6	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.5										
HCM 2000 Volume to Capacity ratio		0.42										
Actuated Cycle Length (s)		70.0						12.0				
Intersection Capacity Utilization		64.2%										
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Sanford St & Victoria St

Future Total PM

2033 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	0	95	10	5	45	0	10	15	5	0	0	5
Future Volume (Veh/h)	0	95	10	5	45	0	10	15	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	102	11	5	48	0	11	16	5	0	0	5
Pedestrians		4			3			4			9	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	57			117			178	178	114	190	184	61
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	57			117			178	178	114	190	184	61
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	98	99	100	100	99
cM capacity (veh/h)	1549			1479			770	709	938	741	704	999
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	113	53	32	5								
Volume Left	0	5	11	0								
Volume Right	11	0	5	5								
cSH	1549	1479	759	999								
Volume to Capacity	0.00	0.00	0.04	0.01								
Queue Length 95th (m)	0.0	0.1	1.1	0.1								
Control Delay (s)	0.0	0.7	10.0	8.6								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.7	10.0	8.6								
Approach LOS		A	A									
Intersection Summary												
Average Delay		2.0										
Intersection Capacity Utilization		23.8%										
Analysis Period (min)		15										
ICU Level of Service												

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Total PM
2033 Horizon Year

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	50	60	10	95	100
Future Volume (Veh/h)	10	50	60	10	95	100
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	11	57	69	11	109	115
Pedestrians	3					15
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					1
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	410	92			83	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410	92			83	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			93	
cM capacity (veh/h)	556	945			1510	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	68	80	224			
Volume Left	11	0	109			
Volume Right	57	11	0			
cSH	849	1700	1510			
Volume to Capacity	0.08	0.05	0.07			
Queue Length 95th (m)	2.1	0.0	1.9			
Control Delay (s)	9.6	0.0	4.0			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	4.0			
Approach LOS	A					
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			32.1%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

5: Innisfil St & John St

Future Total PM
2033 Horizon Year

Lane Group	EBL	EBT	WBT	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	25	10	5	5	45	70
Future Volume (vph)	25	10	5	5	45	70
Lane Group Flow (vph)	0	49	6	0	62	135
Turn Type	custom	NA	NA	Perm	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	2		
Detector Phase				2	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	C-Max	C-Max	C-Max
v/c Ratio		0.12	0.01		0.06	0.13
Control Delay		19.1	19.6		6.9	4.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		19.1	19.6		6.9	4.9
Queue Length 50th (m)		4.5	0.6		3.4	4.8
Queue Length 95th (m)		11.0	2.9		7.2	10.1
Internal Link Dist (m)		110.5	98.0		65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)		407	488		1065	1045
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.12	0.01		0.06	0.13

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis 5: Innisfil St & John St

Future Total PM
2033 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
Future Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			1.00			0.95	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1800			1900			1891			1793	
Flt Permitted		0.84			1.00			0.98			1.00	
Satd. Flow (perm)		1567			1900			1864			1793	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	31	12	6	0	6	0	6	56	0	0	86	49
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	45	0	0	6	0	0	62	0	0	114	0
Confl. Peds. (#/hr)	3		1	1		3	1		3	3		1
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA		Perm	NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		402			488			1065			1024	
v/s Ratio Prot											c0.06	
v/s Ratio Perm		c0.03			0.00			0.03				
v/c Ratio		0.11			0.01			0.06			0.11	
Uniform Delay, d1		19.9			19.4			6.6			6.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.2	
Delay (s)		20.0			19.4			6.8			7.1	
Level of Service		C			B			A			A	
Approach Delay (s)		20.0			19.4			6.8			7.1	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8									A
HCM 2000 Volume to Capacity ratio		0.11										
Actuated Cycle Length (s)		70.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		31.5%						ICU Level of Service				A
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Total PM
2033 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Future Volume (Veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	6	0	6	0	6	0	0	32	6	0	19	0
Pedestrians		5			5			3			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		122										
pX, platoon unblocked												
vC, conflicting volume	7			9			38	25	11	49	28	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			9			38	25	11	49	28	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	96	99	100	98	100
cM capacity (veh/h)	1625			1620			944	866	1069	915	863	1069
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	6	38	19								
Volume Left	6	0	0	0								
Volume Right	6	0	6	0								
cSH	1625	1620	893	863								
Volume to Capacity	0.00	0.00	0.04	0.02								
Queue Length 95th (m)	0.1	0.0	1.1	0.5								
Control Delay (s)	3.6	0.0	9.2	9.3								
Lane LOS	A		A	A								
Approach Delay (s)	3.6	0.0	9.2	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay		7.6										
Intersection Capacity Utilization		17.6%						ICU Level of Service		A		
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Total PM

2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	965	30	5	990	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	965	30	5	990	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	1049	33	5	1076	0
Pedestrians		7			4			1				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		1			0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											181	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	1625	2179	546	1624	2162	545	1083			1086		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1468	2085	266	1466	2067	545	864			1086		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	72	90	99	100			99		
cM capacity (veh/h)	73	47	659	80	49	486	702			648		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	5	32	524	558	543	538						
Volume Left	0	22	0	0	5	0						
Volume Right	5	5	0	33	0	0						
cSH	659	82	702	1700	648	1700						
Volume to Capacity	0.01	0.39	0.00	0.33	0.01	0.32						
Queue Length 95th (m)	0.2	12.3	0.0	0.0	0.2	0.0						
Control Delay (s)	10.5	74.4	0.0	0.0	0.2	0.0						
Lane LOS	B	F			A							
Approach Delay (s)	10.5	74.4	0.0		0.1							
Approach LOS	B	F										
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			45.9%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Bradford St & Future Site Dwy

Future Total PM

2033 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	55	50	70	900	945	100
Future Volume (Veh/h)	55	50	70	900	945	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	54	76	978	1027	109
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					83	
pX, platoon unblocked	0.87	0.87	0.87			
vC, conflicting volume	1730	576	1144			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1542	216	868			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	28	92	89			
cM capacity (veh/h)	83	688	678			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	114	402	652	685	451	
Volume Left	60	76	0	0	0	
Volume Right	54	0	0	0	109	
cSH	142	678	1700	1700	1700	
Volume to Capacity	0.80	0.11	0.38	0.40	0.27	
Queue Length 95th (m)	40.1	3.0	0.0	0.0	0.0	
Control Delay (s)	91.4	3.3	0.0	0.0	0.0	
Lane LOS	F	A				
Approach Delay (s)	91.4	1.3		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay	5.1					
Intersection Capacity Utilization	72.4%			ICU Level of Service		C
Analysis Period (min)	15					

Queues
2: Bradford St & Victoria St

Future Total AM
2038 Horizon Year

	↖	→	↗	↖	↖	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↗	↖		↕		↕
Traffic Volume (vph)	5	20	15	10	25	905	20	640
Future Volume (vph)	5	20	15	10	25	905	20	640
Lane Group Flow (vph)	0	78	17	33	0	1051	0	739
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.09	0.11		0.45		0.32
Control Delay		13.7	23.7	13.6		6.8		5.8
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		13.7	23.7	13.6		6.8		5.8
Queue Length 50th (m)		3.5	2.1	1.3		29.1		18.0
Queue Length 95th (m)		12.9	6.2	7.2		62.8		39.9
Internal Link Dist (m)		94.2		216.2		58.5		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2321		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		0.14	0.04	0.06		0.45		0.32

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Total AM
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	20	45	15	10	20	25	905	15	20	640	5
Future Volume (vph)	5	20	45	15	10	20	25	905	15	20	640	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frft		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3473			3461	
Flt Permitted		0.97		0.71	1.00			0.92			0.91	
Satd. Flow (perm)		1541		1142	1693			3210			3149	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	17	11	22	28	1006	17	22	711	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	35	0	17	14	0	0	1050	0	0	738	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2210			2168	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.33			0.23	
v/c Ratio		0.16		0.11	0.06			0.48			0.34	
Uniform Delay, d1		26.5		26.3	26.1			5.0			4.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		0.3	0.1			0.7			0.4	
Delay (s)		26.9		26.6	26.2			5.8			4.9	
Level of Service		C		C	C			A			A	
Approach Delay (s)		26.9			26.3			5.8			4.9	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 3: Sanford St & Victoria St

Future Total AM
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	60	5	0	40	0	5	0	10	0	5	0
Future Volume (Veh/h)	0	60	5	0	40	0	5	0	10	0	5	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	92	8	0	62	0	8	0	15	0	8	0
Pedestrians					1		5				10	
Lane Width (m)					3.6		3.6				3.6	
Walking Speed (m/s)					1.2		1.2				1.2	
Percent Blockage					0		0				1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	118											
pX, platoon unblocked												
vC, conflicting volume	72				105			167	173	102	184	177
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	72				105			167	173	102	184	177
tC, single (s)	4.1				4.1			7.1	6.5	6.3	7.1	6.5
tC, 2 stage (s)												
tF (s)	2.2				2.2			3.5	4.0	3.4	3.5	4.0
p0 queue free %	100				100			99	100	98	100	99
cM capacity (veh/h)	1528				1493			784	715	919	754	711
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	100	62	23	8								
Volume Left	0	0	8	0								
Volume Right	8	0	15	0								
cSH	1528	1493	867	711								
Volume to Capacity	0.00	0.00	0.03	0.01								
Queue Length 95th (m)	0.0	0.0	0.7	0.3								
Control Delay (s)	0.0	0.0	9.3	10.1								
Lane LOS	A			B								
Approach Delay (s)	0.0	0.0	9.3	10.1								
Approach LOS	A			B								
Intersection Summary												
Average Delay	1.5											
Intersection Capacity Utilization	18.7%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Total AM
2038 Horizon Year

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	40	60	15	50	35
Future Volume (Veh/h)	5	40	60	15	50	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	7	60	90	22	75	52
Pedestrians	5					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	308	108			117	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	108			117	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	99	93			95	
cM capacity (veh/h)	650	914			1429	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	67	112	127			
Volume Left	7	0	75			
Volume Right	60	22	0			
cSH	877	1700	1429			
Volume to Capacity	0.08	0.07	0.05			
Queue Length 95th (m)	2.0	0.0	1.3			
Control Delay (s)	9.4	0.0	4.7			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	4.7			
Approach LOS	A					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization		21.9%		ICU Level of Service		A
Analysis Period (min)			15			

Queues
5: Innisfil St & John St

Future Total AM
2038 Horizon Year

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations		↕		↕	↕	↕
Traffic Volume (vph)	20	10	5	5	55	20
Future Volume (vph)	20	10	5	5	55	20
Lane Group Flow (vph)	0	36	0	12	67	48
Turn Type	custom	NA	custom	NA	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	8		
Detector Phase				8	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	Ped	C-Max	C-Max
v/c Ratio	0.09			0.03	0.06	0.05
Control Delay	20.6			16.8	6.9	4.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	20.6			16.8	6.9	4.3
Queue Length 50th (m)	3.8			1.2	3.7	1.3
Queue Length 95th (m)	9.6			m3.9	7.7	4.6
Internal Link Dist (m)	110.5			98.0	65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)	397			590	1085	1022
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.09			0.02	0.06	0.05
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						
Natural Cycle: 40						
Control Type: Actuated-Coordinated						
m Volume for 95th percentile queue is metered by upstream signal.						

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis
5: Innisfil St & John St

Future Total AM
2038 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	10	0	5	5	0	0	55	0	0	20	20
Future Volume (vph)	20	10	0	5	5	0	0	55	0	0	20	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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			1.00			0.93	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1768			1854			1900			1772	
Flt Permitted		0.85			0.91			1.00			1.00	
Satd. Flow (perm)		1544			1721			1900			1772	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	12	0	6	6	0	0	67	0	0	24	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	36	0	0	12	0	0	67	0	0	38	0
Heavy Vehicles (%)	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA		custom	NA			NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8			2		6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		397			442			1085			1012	
v/s Ratio Prot								c0.04			0.02	
v/s Ratio Perm		c0.02			0.01							
v/c Ratio		0.09			0.03			0.06			0.04	
Uniform Delay, d1		19.8			19.5			6.7			6.6	
Progression Factor		1.00			0.85			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.1	
Delay (s)		19.9			16.5			6.8			6.6	
Level of Service		B			B			A			A	
Approach Delay (s)		19.9			16.5			6.8			6.6	
Approach LOS		B			B			A			A	

Intersection Summary

HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.07		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 6: Sanford St & John St

Future Total AM
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	5	10	0	0	15	0	0	10	0
Future Volume (Veh/h)	0	10	0	5	10	0	0	15	0	0	10	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	0	5	11	0	0	16	0	0	11	0
Pedestrians	1											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	122											
pX, platoon unblocked												
vC, conflicting volume	12			11			38	33	11	41	33	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			11			38	33	11	41	33	12
tC, single (s)	4.1			4.4			7.1	6.6	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.5			3.5	4.1	3.3	3.5	4.1	3.3
p0 queue free %	100			100			100	98	100	100	99	100
cM capacity (veh/h)	1619			1428			960	835	1076	950	840	1074
Direction, Lane #	EB 1	WB 1		NB 1	SB 1							
Volume Total	11	16		16	11							
Volume Left	0	5	0	0								
Volume Right	0	0	0	0								
cSH	1619	1428		835	840							
Volume to Capacity	0.00	0.00		0.02	0.01							
Queue Length 95th (m)	0.0	0.1		0.5	0.3							
Control Delay (s)	0.0	2.4		9.4	9.3							
Lane LOS		A		A	A							
Approach Delay (s)	0.0	2.4		9.4	9.3							
Approach LOS				A	A							
Intersection Summary												
Average Delay	5.4											
Intersection Capacity Utilization	15.2%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Total AM
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	870	15	5	735	10
Future Volume (Veh/h)	5	0	5	15	5	5	0	870	15	5	735	10
Sign Control	Stop				Stop		Free			Free		
Grade	0%				0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	916	16	5	774	11
Pedestrians	4				8		1			2		
Lane Width (m)	3.6				3.6		3.6			3.6		
Walking Speed (m/s)	1.2				1.2		1.2			1.2		
Percent Blockage	0				1		0			0		
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												181
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	1261	1734	398	1335	1731	476	789	940				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1194	1685	298	1271	1682	476	704	940				
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2	2.2				
p0 queue free %	96	100	99	86	94	99	100	99				
cM capacity (veh/h)	130	90	676	111	90	536	867	733				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	10	26	458	474	392	398						
Volume Left	5	16	0	0	5	0						
Volume Right	5	5	0	16	0	11						
cSH	218	124	867	1700	733	1700						
Volume to Capacity	0.05	0.21	0.00	0.28	0.01	0.23						
Queue Length 95th (m)	1.2	6.0	0.0	0.0	0.2	0.0						
Control Delay (s)	22.3	41.4	0.0	0.0	0.2	0.0						
Lane LOS	C	E			A							
Approach Delay (s)	22.3	41.4	0.0	0.1								
Approach LOS	C	E										
Intersection Summary												
Average Delay	0.8											
Intersection Capacity Utilization	35.2%		ICU Level of Service				A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 11: Bradford St & Future Site Dwy

Future Total AM
2038 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	85	25	855	665	35
Future Volume (Veh/h)	90	85	25	855	665	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)	98	92	27	929	723	38
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					83	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	1264	384	765			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1124	173	584			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	46	88	97			
cM capacity (veh/h)	181	781	922			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	190	337	619	482	279	
Volume Left	98	27	0	0	0	
Volume Right	92	0	0	0	38	
cSH	288	922	1700	1700	1700	
Volume to Capacity	0.66	0.03	0.36	0.28	0.16	
Queue Length 95th (m)	34.4	0.7	0.0	0.0	0.0	
Control Delay (s)	38.7	1.0	0.0	0.0	0.0	
Lane LOS	E	A				
Approach Delay (s)	38.7	0.4		0.0		
Approach LOS	E					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			58.5%		ICU Level of Service	B
Analysis Period (min)			15			

Queues 2: Bradford St & Victoria St

Future Total PM
2038 Horizon Year

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	30	40	20	20	1090	10	1135
Future Volume (vph)	10	30	40	20	20	1090	10	1135
Lane Group Flow (vph)	0	107	43	53	0	1213	0	1229
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.35	0.17	0.17		0.52		0.52
Control Delay		20.2	25.1	13.8		7.4		7.4
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		20.2	25.1	13.8		7.4		7.4
Queue Length 50th (m)		8.9	5.3	2.6		36.2		36.6
Queue Length 95th (m)		19.1	11.6	9.8		77.6		78.3
Internal Link Dist (m)		94.2		216.2		58.5		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		584	511	606		2339		2383
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		0.18	0.08	0.09		0.52		0.52

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis

2: Bradford St & Victoria St

Future Total PM

2038 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	60	40	20	30	20	1090	30	10	1135	10
Future Volume (vph)	10	30	60	40	20	30	20	1090	30	10	1135	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Flpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00			1.00	
Frt		0.92		1.00	0.91			1.00			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1693		1788	1710			3514			3500	
Flt Permitted		0.96		0.79	1.00			0.92			0.94	
Satd. Flow (perm)		1634		1493	1710			3234			3296	
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)	11	32	64	43	21	32	21	1160	32	11	1207	11
RTOR Reduction (vph)	0	32	0	0	28	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	75	0	43	25	0	0	1211	0	0	1228	0
Confl. Peds. (#/hr)	5		10	10		5	7		5	5		7
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	15%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		228		209	239			2226			2269	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.05		0.03				c0.37			0.37	
v/c Ratio		0.33		0.21	0.11			0.54			0.54	
Uniform Delay, d1		27.1		26.7	26.3			5.4			5.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.9		0.5	0.2			1.0			0.9	
Delay (s)		28.1		27.1	26.5			6.4			6.3	
Level of Service		C		C	C			A			A	
Approach Delay (s)		28.1			26.8			6.4			6.3	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.0										
HCM 2000 Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		70.0						12.0				
Intersection Capacity Utilization		69.2%										
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Sanford St & Victoria St

Future Total PM

2038 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	95	10	5	45	0	10	15	5	0	0	5
Future Volume (Veh/h)	0	95	10	5	45	0	10	15	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	102	11	5	48	0	11	16	5	0	0	5
Pedestrians		4			3			4			9	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					118							
pX, platoon unblocked												
vC, conflicting volume	57			117			178	178	114	190	184	61
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	57			117			178	178	114	190	184	61
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	98	99	100	100	99
cM capacity (veh/h)	1549			1479			770	709	938	741	704	999
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	113	53	32	5								
Volume Left	0	5	11	0								
Volume Right	11	0	5	5								
cSH	1549	1479	759	999								
Volume to Capacity	0.00	0.00	0.04	0.01								
Queue Length 95th (m)	0.0	0.1	1.1	0.1								
Control Delay (s)	0.0	0.7	10.0	8.6								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.7	10.0	8.6								
Approach LOS		A	A									
Intersection Summary												
Average Delay		2.0										
Intersection Capacity Utilization		23.8%										
Analysis Period (min)		15										

ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis 4: Innisfil St & Victoria St

Future Total PM
2038 Horizon Year

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Volume (veh/h)	10	50	60	10	95	100
Future Volume (Veh/h)	10	50	60	10	95	100
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	11	57	69	11	109	115
Pedestrians	3					15
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	0					1
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			179			
pX, platoon unblocked						
vC, conflicting volume	410	92			83	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410	92			83	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			93	
cM capacity (veh/h)	556	945			1510	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	68	80	224			
Volume Left	11	0	109			
Volume Right	57	11	0			
cSH	849	1700	1510			
Volume to Capacity	0.08	0.05	0.07			
Queue Length 95th (m)	2.1	0.0	1.9			
Control Delay (s)	9.6	0.0	4.0			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	4.0			
Approach LOS	A					
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			32.1%		ICU Level of Service	A
Analysis Period (min)			15			

Queues 5: Innisfil St & John St

Future Total PM
2038 Horizon Year

Lane Group	EBL	EBT	WBT	NBL	NBT	SBT
Lane Configurations		↔	↔		↔	↔
Traffic Volume (vph)	25	10	5	5	45	70
Future Volume (vph)	25	10	5	5	45	70
Lane Group Flow (vph)	0	49	6	0	62	135
Turn Type	custom	NA	NA	Perm	NA	NA
Protected Phases					2	6
Permitted Phases	4	4	8	2		
Detector Phase				2	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	11.0	11.0	11.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Ped	Ped	Ped	C-Max	C-Max	C-Max
v/c Ratio		0.12	0.01		0.06	0.13
Control Delay		19.1	19.6		6.9	4.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		19.1	19.6		6.9	4.9
Queue Length 50th (m)		4.5	0.6		3.4	4.8
Queue Length 95th (m)		11.0	2.9		7.2	10.1
Internal Link Dist (m)		110.5	98.0		65.9	155.1
Turn Bay Length (m)						
Base Capacity (vph)		407	488		1065	1045
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.12	0.01		0.06	0.13

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: Innisfil St & John St



HCM Signalized Intersection Capacity Analysis

5: Innisfil St & John St

Future Total PM

2038 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
Future Volume (vph)	25	10	5	0	5	0	5	45	0	0	70	40
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			1.00			0.95	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1800			1900			1891			1793	
Flt Permitted		0.84			1.00			0.98			1.00	
Satd. Flow (perm)		1567			1900			1864			1793	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	31	12	6	0	6	0	6	56	0	0	86	49
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	45	0	0	6	0	0	62	0	0	114	0
Confl. Peds. (#/hr)	3		1	1		3	1		3	3		1
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	custom	NA			NA		Perm	NA			NA	
Protected Phases								2			6	
Permitted Phases	4	4		8	8		2			6		
Actuated Green, G (s)		18.0			18.0			40.0			40.0	
Effective Green, g (s)		18.0			18.0			40.0			40.0	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		402			488			1065			1024	
v/s Ratio Prot											c0.06	
v/s Ratio Perm		c0.03			0.00			0.03				
v/c Ratio		0.11			0.01			0.06			0.11	
Uniform Delay, d1		19.9			19.4			6.6			6.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.0			0.1			0.2	
Delay (s)		20.0			19.4			6.8			7.1	
Level of Service		C			B			A			A	
Approach Delay (s)		20.0			19.4			6.8			7.1	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8									A
HCM 2000 Volume to Capacity ratio			0.11									
Actuated Cycle Length (s)			70.0					Sum of lost time (s)			12.0	
Intersection Capacity Utilization			31.5%								ICU Level of Service	A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Sanford St & John St

Future Total PM

2038 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Future Volume (Veh/h)	5	0	5	0	5	0	0	25	5	0	15	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	6	0	6	0	6	0	0	32	6	0	19	0
Pedestrians		5			5			3			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		122										
pX, platoon unblocked												
vC, conflicting volume	7			9			38	25	11	49	28	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			9			38	25	11	49	28	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	96	99	100	98	100
cM capacity (veh/h)	1625			1620			944	866	1069	915	863	1069
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	6	38	19								
Volume Left	6	0	0	0								
Volume Right	6	0	6	0								
cSH	1625	1620	893	863								
Volume to Capacity	0.00	0.00	0.04	0.02								
Queue Length 95th (m)	0.1	0.0	1.1	0.5								
Control Delay (s)	3.6	0.0	9.2	9.3								
Lane LOS	A		A	A								
Approach Delay (s)	3.6	0.0	9.2	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay			7.6									
Intersection Capacity Utilization			17.6%					ICU Level of Service			A	
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Total PM

2038 Horizon Year

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	0	0	5	20	5	5	0	1150	30	5	1180	0	
Future Volume (Veh/h)	0	0	5	20	5	5	0	1150	30	5	1180	0	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	0	5	22	5	5	0	1250	33	5	1283	0	
Pedestrians	7			4			1						
Lane Width (m)	3.6			3.6			3.6						
Walking Speed (m/s)	1.2			1.2			1.2						
Percent Blockage	1			0			0						
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (m)	181												
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84						
vC, conflicting volume	1932	2587	650	1928	2570	646	1290	1287					
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1737	2511	218	1731	2492	646	976	1287					
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1					
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2					
p0 queue free %	100	100	99	54	80	99	100	99					
cM capacity (veh/h)	39	24	665	48	25	418	600	544					
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	5	32	625	658	646	642							
Volume Left	0	22	0	0	5	0							
Volume Right	5	5	0	33	0	0							
cSH	665	47	600	1700	544	1700							
Volume to Capacity	0.01	0.68	0.00	0.39	0.01	0.38							
Queue Length 95th (m)	0.2	21.2	0.0	0.0	0.2	0.0							
Control Delay (s)	10.5	178.1	0.0	0.0	0.3	0.0							
Lane LOS	B	F			A								
Approach Delay (s)	10.5	178.1	0.0	0.1									
Approach LOS	B	F											
Intersection Summary													
Average Delay	2.3												
Intersection Capacity Utilization	51.1%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis

11: Bradford St & Future Site Dwy

Future Total PM

2038 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	55	50	70	1085	1135	100
Future Volume (Veh/h)	55	50	70	1085	1135	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	54	76	1179	1234	109
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					83	
pX, platoon unblocked	0.83	0.83	0.83			
vC, conflicting volume	2038	680	1351			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1837	194	1006			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	92	87			
cM capacity (veh/h)	49	674	572			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	114	469	786	823	520	
Volume Left	60	76	0	0	0	
Volume Right	54	0	0	0	109	
cSH	87	572	1700	1700	1700	
Volume to Capacity	1.31	0.13	0.46	0.48	0.31	
Queue Length 95th (m)	67.3	3.6	0.0	0.0	0.0	
Control Delay (s)	285.3	3.8	0.0	0.0	0.0	
Lane LOS	F	A				
Approach Delay (s)	285.3	1.4		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay	12.6					
Intersection Capacity Utilization	82.8%			ICU Level of Service		E
Analysis Period (min)	15					

Appendix G: Supplementary Analysis Worksheets



HCM Unsignalized Intersection Capacity Analysis
7: Bradford St & John St

Future Background AM - TWLT
2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	590	15	5	455	5
Future Volume (Veh/h)	5	0	5	15	5	5	0	590	15	5	455	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	621	16	5	479	5
Pedestrians	4			8			1			2		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	0			1			0			0		
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (m)										181		
pX, platoon unblocked												
vC, conflicting volume	816	1140	247	892	1135	328	488				645	
vC1, stage 1 conf vol	496	496		637	637							
vC2, stage 2 conf vol	320	645		256	498							
vCu, unblocked vol	816	1140	247	892	1135	328	488				645	
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1				4.1	
tC, 2 stage (s)	6.5	5.5		6.7	5.5							
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2				2.2	
p0 queue free %	99	100	99	96	99	99	100				99	
cM capacity (veh/h)	458	388	756	385	392	668	1082				943	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	10	26	0	414	223	5	319	165				
Volume Left	5	16	0	0	0	5	0	0				
Volume Right	5	5	0	0	16	0	0	5				
cSH	571	421	1700	1700	1700	943	1700	1700				
Volume to Capacity	0.02	0.06	0.00	0.24	0.13	0.01	0.19	0.10				
Queue Length 95th (m)	0.4	1.6	0.0	0.0	0.0	0.1	0.0	0.0				
Control Delay (s)	11.4	14.1	0.0	0.0	0.0	8.8	0.0	0.0				
Lane LOS	B	B				A						
Approach Delay (s)	11.4	14.1	0.0	0.1								
Approach LOS	B	B										
Intersection Summary												
Average Delay	0.5											
Intersection Capacity Utilization	27.5%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
7: Bradford St & John St

Future Background PM - TWLT
2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	740	30	5	805	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	740	30	5	805	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	804	33	5	875	0
Pedestrians	7			4			1					
Lane Width (m)	3.6			3.6			3.6					
Walking Speed (m/s)	1.2			1.2			1.2					
Percent Blockage	1			0			0					
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (m)										181		
pX, platoon unblocked	0.94	0.94	0.94	0.94	0.94		0.94					
vC, conflicting volume	1302	1733	446	1278	1716	422	882	841				
vC1, stage 1 conf vol	892	892		824	824							
vC2, stage 2 conf vol	410	841		454	892							
vCu, unblocked vol	1186	1647	271	1161	1629	422	738	841				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	100	99	93	98	99	100	99				
cM capacity (veh/h)	310	280	681	310	284	583	817	800				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	5	32	0	536	301	5	583	292				
Volume Left	0	22	0	0	0	5	0	0				
Volume Right	5	5	0	0	33	0	0	0				
cSH	681	330	1700	1700	1700	800	1700	1700				
Volume to Capacity	0.01	0.10	0.00	0.32	0.18	0.01	0.34	0.17				
Queue Length 95th (m)	0.2	2.6	0.0	0.0	0.0	0.2	0.0	0.0				
Control Delay (s)	10.3	17.1	0.0	0.0	0.0	9.5	0.0	0.0				
Lane LOS	B	C				A						
Approach Delay (s)	10.3	17.1	0.0	0.1								
Approach LOS	B	C										
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	37.3%			ICU Level of Service				A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Background AM - TWLT
2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	710	15	5	550	5
Future Volume (Veh/h)	5	0	5	15	5	5	0	710	15	5	550	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	747	16	5	579	5
Pedestrians	4			8			1			2		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	0			1			0			0		
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (m)										181		
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	978	1366	297	1068	1361	392	588			771		
vC1, stage 1 conf vol	596	596		763	763							
vC2, stage 2 conf vol	383	771		306	598							
vCu, unblocked vol	963	1354	276	1054	1348	392	569			771		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.7	5.5							
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	99	95	99	99	100			99		
cM capacity (veh/h)	401	335	719	324	339	608	1002			847		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	10	26	0	498	265	5	386	198				
Volume Left	5	16	0	0	0	5	0	0				
Volume Right	5	5	0	0	16	0	0	5				
cSH	515	359	1700	1700	1700	847	1700	1700				
Volume to Capacity	0.02	0.07	0.00	0.29	0.16	0.01	0.23	0.12				
Queue Length 95th (m)	0.5	1.9	0.0	0.0	0.0	0.1	0.0	0.0				
Control Delay (s)	12.1	15.8	0.0	0.0	0.0	9.3	0.0	0.0				
Lane LOS	B	C				A						
Approach Delay (s)	12.1	15.8	0.0	0.1								
Approach LOS	B	C										
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	30.8%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Background PM - TWLT
2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	895	30	5	960	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	895	30	5	960	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	973	33	5	1043	0
Pedestrians	7			4			1					
Lane Width (m)	3.6			3.6			3.6					
Walking Speed (m/s)	1.2			1.2			1.2					
Percent Blockage	1			0			0					
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (m)										181		
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90	0.90						
vC, conflicting volume	1554	2070	530	1531	2054	507	1050	1010				
vC1, stage 1 conf vol	1060	1060	994			994						
vC2, stage 2 conf vol	494	1010	538			1060						
vCu, unblocked vol	1393	1966	254	1367	1948	507	832	1010				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)	6.5	5.5	6.5			5.5						
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	100	99	91	98	99	100	99				
cM capacity (veh/h)	258	230	672	248	235	514	724	692				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	5	32	0	649	357	5	695	348				
Volume Left	0	22	0	0	0	5	0	0				
Volume Right	5	5	0	0	33	0	0	0				
cSH	672	267	1700	1700	1700	692	1700	1700				
Volume to Capacity	0.01	0.12	0.00	0.38	0.21	0.01	0.41	0.20				
Queue Length 95th (m)	0.2	3.2	0.0	0.0	0.0	0.2	0.0	0.0				
Control Delay (s)	10.4	20.3	0.0	0.0	0.0	10.2	0.0	0.0				
Lane LOS	B	C				B						
Approach Delay (s)	10.4	20.3	0.0	0.0								
Approach LOS	B	C										
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	41.5%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Background AM - TWLT
2038 Horizon Year

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	5	0	5	15	5	5	0	855	15	5	660	5	
Future Volume (Veh/h)	5	0	5	15	5	5	0	855	15	5	660	5	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	5	0	5	16	5	5	0	900	16	5	695	5	
Pedestrians	4			8			1			2			
Lane Width (m)	3.6			3.6			3.6			3.6			
Walking Speed (m/s)	1.2			1.2			1.2			1.2			
Percent Blockage	0			1			0			0			
Right turn flare (veh)													
Median type							TWLTL				TWLTL		
Median storage (veh)							2				2		
Upstream signal (m)											181		
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97	0.97							
vC, conflicting volume	1171	1636	355	1280	1630	468	704	924					
vC1, stage 1 conf vol	712	712	916		916								
vC2, stage 2 conf vol	460	924	364		714								
vCu, unblocked vol	1105	1586	259	1217	1580	468	621	924					
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1	4.1					
tC, 2 stage (s)	6.5	5.5	6.7		5.5								
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2	2.2					
p0 queue free %	99	100	99	94	98	99	100	99					
cM capacity (veh/h)	354	285	717	263	289	543	933	743					
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3					
Volume Total	10	26	0	600	316	5	463	237					
Volume Left	5	16	0	0	0	5	0	0					
Volume Right	5	5	0	0	16	0	0	5					
cSH	474	298	1700	1700	1700	743	1700	1700					
Volume to Capacity	0.02	0.09	0.00	0.35	0.19	0.01	0.27	0.14					
Queue Length 95th (m)	0.5	2.3	0.0	0.0	0.0	0.2	0.0	0.0					
Control Delay (s)	12.8	18.2	0.0	0.0	0.0	9.9	0.0	0.0					
Lane LOS	B	C	A										
Approach Delay (s)	12.8	18.2	0.0	0.1									
Approach LOS	B	C											
Intersection Summary													
Average Delay	0.4												
Intersection Capacity Utilization	34.8%			ICU Level of Service					A				
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis 7: Bradford St & John St

Future Background PM - TWLT
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	1080	30	5	1150	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	1080	30	5	1150	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	5	21	5	5	0	1137	32	5	1211	0
Pedestrians	4			8			1			2		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	0			1			0			0		
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (m)										181		
pX, platoon unblocked	0.85	0.85	0.85	0.85	0.85		0.85					
vC, conflicting volume	1803	2402	610	1782	2386	594	1215	1177				
vC1, stage 1 conf vol	1225	1225		1161	1161							
vC2, stage 2 conf vol	578	1177		622	1225							
vCu, unblocked vol	1597	2299	200	1573	2280	594	908	1177				
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1	4.1				
tC, 2 stage (s)	6.5	5.5		6.7	5.5							
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2	2.2				
p0 queue free %	100	100	99	89	97	99	100	99				
cM capacity (veh/h)	218	191	692	186	195	449	645	597				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	5	31	0	758	411	5	807	404				
Volume Left	0	21	0	0	0	5	0	0				
Volume Right	5	5	0	0	32	0	0	0				
cSH	692	207	1700	1700	1700	597	1700	1700				
Volume to Capacity	0.01	0.15	0.00	0.45	0.24	0.01	0.47	0.24				
Queue Length 95th (m)	0.2	4.1	0.0	0.0	0.0	0.2	0.0	0.0				
Control Delay (s)	10.2	25.4	0.0	0.0	0.0	11.1	0.0	0.0				
Lane LOS	B	D				B						
Approach Delay (s)	10.2	25.4	0.0	0.0								
Approach LOS	B	D										
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	47.2%			ICU Level of Service				A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Total AM - TWLT

2028 Horizon Year

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	5	0	5	15	5	5	0	605	15	5	530	10	
Future Volume (Veh/h)	5	0	5	15	5	5	0	605	15	5	530	10	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	5	0	5	16	5	5	0	637	16	5	558	11	
Pedestrians	4			8			1			2			
Lane Width (m)	3.6			3.6			3.6			3.6			
Walking Speed (m/s)	1.2			1.2			1.2			1.2			
Percent Blockage	0			1			0			0			
Right turn flare (veh)													
Median type							TWLTL			TWLTL			
Median storage (veh)							2			2			
Upstream signal (m)										181			
pX, platoon unblocked													
vC, conflicting volume	906	1238	290	948	1236	336	573				661		
vC1, stage 1 conf vol	578	578		653	653								
vC2, stage 2 conf vol	328	661		295	583								
vCu, unblocked vol	906	1238	290	948	1236	336	573				661		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1				4.1		
tC, 2 stage (s)	6.5	5.5		6.7	5.5								
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2				2.2		
p0 queue free %	99	100	99	96	99	99	100				99		
cM capacity (veh/h)	417	366	710	372	369	660	1007				931		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3					
Volume Total	10	26	0	425	228	5	372	197					
Volume Left	5	16	0	0	0	5	0	0					
Volume Right	5	5	0	0	16	0	0	11					
cSH	525	406	1700	1700	1700	931	1700	1700					
Volume to Capacity	0.02	0.06	0.00	0.25	0.13	0.01	0.22	0.12					
Queue Length 95th (m)	0.5	1.6	0.0	0.0	0.0	0.1	0.0	0.0					
Control Delay (s)	12.0	14.5	0.0	0.0	0.0	8.9	0.0	0.0					
Lane LOS	B	B				A							
Approach Delay (s)	12.0	14.5	0.0	0.1									
Approach LOS	B	B											
Intersection Summary													
Average Delay	0.4												
Intersection Capacity Utilization	27.9%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis

11: Bradford St & Future Site Dwy

Future Total AM - TWLT

2028 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	85	25	590	460	35
Future Volume (Veh/h)	90	85	25	590	460	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)	98	92	27	641	500	38
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage (veh)				2	2	
Upstream signal (m)				83		
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	898	273	542			
vC1, stage 1 conf vol	523					
vC2, stage 2 conf vol	374					
vCu, unblocked vol	816	168	447			
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 %	81	89	97			
cM capacity (veh/h)	506	819	1079			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	190	27	320	320	333	205
Volume Left	98	27	0	0	0	0
Volume Right	92	0	0	0	0	38
cSH	621	1079	1700	1700	1700	1700
Volume to Capacity	0.31	0.03	0.19	0.19	0.20	0.12
Queue Length 95th (m)	10.3	0.6	0.0	0.0	0.0	0.0
Control Delay (s)	13.3	8.4	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	13.3	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	2.0					
Intersection Capacity Utilization	37.4%			ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Total PM - TWLT

2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	810	30	5	835	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	810	30	5	835	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	880	33	5	908	0
Pedestrians	7			4			1					
Lane Width (m)	3.6			3.6			3.6					
Walking Speed (m/s)	1.2			1.2			1.2					
Percent Blockage	1			0			0					
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (m)										181		
pX, platoon unblocked	0.94	0.94	0.94	0.94	0.94		0.94					
vC, conflicting volume	1372	1842	462	1370	1826	460	915			917		
vC1, stage 1 conf vol	925	925		900	900							
vC2, stage 2 conf vol	448	917		470	925							
vCu, unblocked vol	1266	1766	296	1264	1749	460	778			917		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	92	98	99	100			99		
cM capacity (veh/h)	291	260	659	280	265	551	791			750		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	5	32	0	587	326	5	605	303				
Volume Left	0	22	0	0	0	5	0	0				
Volume Right	5	5	0	0	33	0	0	0				
cSH	659	300	1700	1700	1700	750	1700	1700				
Volume to Capacity	0.01	0.11	0.00	0.35	0.19	0.01	0.36	0.18				
Queue Length 95th (m)	0.2	2.8	0.0	0.0	0.0	0.2	0.0	0.0				
Control Delay (s)	10.5	18.4	0.0	0.0	0.0	9.8	0.0	0.0				
Lane LOS	B	C				A						
Approach Delay (s)	10.5	18.4	0.0				0.1					
Approach LOS	B	C										
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	38.4%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

11: Bradford St & Future Site Dwy

Future Total PM - TWLT

2028 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	50	70	745	790	100
Future Volume (Veh/h)	55	50	70	745	790	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	54	76	810	859	109
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type	TWLTL TWLTL					
Median storage veh	2 2					
Upstream signal (m)	83					
pX, platoon unblocked	0.90	0.90	0.90			
vC, conflicting volume	1478	492	976			
vC1, stage 1 conf vol	922					
vC2, stage 2 conf vol	557					
vCu, unblocked vol	1314	221	757			
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 %	82	92	90			
cM capacity (veh/h)	330	707	773			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	114	76	405	405	573	395
Volume Left	60	76	0	0	0	0
Volume Right	54	0	0	0	0	109
cSH	441	773	1700	1700	1700	1700
Volume to Capacity	0.26	0.10	0.24	0.24	0.34	0.23
Queue Length 95th (m)	8.2	2.6	0.0	0.0	0.0	0.0
Control Delay (s)	16.0	10.2	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	16.0	0.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay	1.3					
Intersection Capacity Utilization	45.1%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Total AM - TWLT

2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	15	5	5	0	725	15	5	625	10
Future Volume (Veh/h)	5	0	5	15	5	5	0	725	15	5	625	10
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	5	16	5	5	0	763	16	5	658	11
Pedestrians	4			8			1			2		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	0			1			0			0		
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (m)										181		
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99	0.99						
vC, conflicting volume	1068	1464	340	1124	1462	400	673				787	
vC1, stage 1 conf vol	678	678			779	779						
vC2, stage 2 conf vol	391	787			345	683						
vCu, unblocked vol	1051	1451	316	1107	1448	400	652				787	
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1				4.1	
tC, 2 stage (s)	6.5	5.5			6.7	5.5						
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2				2.2	
p0 queue free %	99	100	99	95	98	99	100				99	
cM capacity (veh/h)	366	317	677	313	320	601	933				836	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	10	26	0	509	270	5	439	230				
Volume Left	5	16	0	0	0	5	0	0				
Volume Right	5	5	0	0	16	0	0	11				
cSH	475	347	1700	1700	1700	836	1700	1700				
Volume to Capacity	0.02	0.07	0.00	0.30	0.16	0.01	0.26	0.14				
Queue Length 95th (m)	0.5	1.9	0.0	0.0	0.0	0.1	0.0	0.0				
Control Delay (s)	12.7	16.2	0.0	0.0	0.0	9.3	0.0	0.0				
Lane LOS	B	C				A						
Approach Delay (s)	12.7	16.2	0.0				0.1					
Approach LOS	B	C										
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	31.2%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

11: Bradford St & Future Site Dwy

Future Total AM - TWLT

2033 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	90	85	25	710	555	35
Future Volume (Veh/h)	90	85	25	710	555	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)	98	92	27	772	603	38
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage (veh)				2	2	
Upstream signal (m)					83	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	1066	324	645			
vC1, stage 1 conf vol	626					
vC2, stage 2 conf vol	440					
vCu, unblocked vol	956	172	511			
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 %	78	88	97			
cM capacity (veh/h)	453	800	1004			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	190	27	386	386	402	239
Volume Left	98	27	0	0	0	0
Volume Right	92	0	0	0	0	38
cSH	573	1004	1700	1700	1700	1700
Volume to Capacity	0.33	0.03	0.23	0.23	0.24	0.14
Queue Length 95th (m)	11.6	0.7	0.0	0.0	0.0	0.0
Control Delay (s)	14.4	8.7	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	14.4	0.3			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay	1.8					
Intersection Capacity Utilization	37.6%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

7: Bradford St & John St

Future Total PM - TWLT

2033 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	965	30	5	990	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	965	30	5	990	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	1049	33	5	1076	0
Pedestrians		7			4			1				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		1			0			0				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (m)											181	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	1625	2179	546	1624	2162	545	1083			1086		
vC1, stage 1 conf vol	1093	1093		1070	1070							
vC2, stage 2 conf vol	532	1086		554	1093							
vCu, unblocked vol	1470	2086	269	1468	2068	545	867			1086		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	90	98	99	100			99		
cM capacity (veh/h)	244	215	656	224	219	486	702			648		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	5	32	0	699	383	5	717	359				
Volume Left	0	22	0	0	0	5	0	0				
Volume Right	5	5	0	0	33	0	0	0				
cSH	656	243	1700	1700	1700	648	1700	1700				
Volume to Capacity	0.01	0.13	0.00	0.41	0.23	0.01	0.42	0.21				
Queue Length 95th (m)	0.2	3.6	0.0	0.0	0.0	0.2	0.0	0.0				
Control Delay (s)	10.5	22.0	0.0	0.0	0.0	10.6	0.0	0.0				
Lane LOS	B	C				B						
Approach Delay (s)	10.5	22.0	0.0			0.0						
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			42.7%			ICU Level of Service				A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Bradford St & Future Site Dwy

Future Total PM - TWLT

2033 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	55	50	70	900	945	100
Future Volume (Veh/h)	55	50	70	900	945	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	54	76	978	1027	109
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage (veh)				2	2	
Upstream signal (m)				83		
pX, platoon unblocked	0.87	0.87	0.87			
vC, conflicting volume	1730	576	1144			
vC1, stage 1 conf vol	1090					
vC2, stage 2 conf vol	641					
vCu, unblocked vol	1544	220	871			
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 %	78	92	89			
cM capacity (veh/h)	278	685	678			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	114	76	489	489	685	451
Volume Left	60	76	0	0	0	0
Volume Right	54	0	0	0	0	109
cSH	386	678	1700	1700	1700	1700
Volume to Capacity	0.30	0.11	0.29	0.29	0.40	0.27
Queue Length 95th (m)	9.7	3.0	0.0	0.0	0.0	0.0
Control Delay (s)	18.2	11.0	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	18.2	0.8	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay	1.3					
Intersection Capacity Utilization	49.4%			ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
7: Bradford St & John St

Future Total AM - TWLT
2038 Horizon Year

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	5	0	5	15	5	5	0	725	15	5	625	10	
Future Volume (Veh/h)	5	0	5	15	5	5	0	725	15	5	625	10	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	5	0	5	16	5	5	0	763	16	5	658	11	
Pedestrians	4			8			1			2			
Lane Width (m)	3.6			3.6			3.6			3.6			
Walking Speed (m/s)	1.2			1.2			1.2			1.2			
Percent Blockage	0			1			0			0			
Right turn flare (veh)													
Median type							TWLTL			TWLTL			
Median storage (veh)							2			2			
Upstream signal (m)										181			
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99						
vC, conflicting volume	1068	1464	340	1124	1462	400	673	787					
vC1, stage 1 conf vol	678	678		779	779								
vC2, stage 2 conf vol	391	787		345	683								
vCu, unblocked vol	1051	1451	316	1107	1448	400	652	787					
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1	4.1					
tC, 2 stage (s)	6.5	5.5		6.7	5.5								
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2	2.2					
p0 queue free %	99	100	99	95	98	99	100	99					
cM capacity (veh/h)	366	317	677	313	320	601	933	836					
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3					
Volume Total	10	26	0	509	270	5	439	230					
Volume Left	5	16	0	0	0	5	0	0					
Volume Right	5	5	0	0	16	0	0	11					
cSH	475	347	1700	1700	1700	836	1700	1700					
Volume to Capacity	0.02	0.07	0.00	0.30	0.16	0.01	0.26	0.14					
Queue Length 95th (m)	0.5	1.9	0.0	0.0	0.0	0.1	0.0	0.0					
Control Delay (s)	12.7	16.2	0.0	0.0	0.0	9.3	0.0	0.0					
Lane LOS	B	C				A							
Approach Delay (s)	12.7	16.2	0.0	0.1									
Approach LOS	B	C											
Intersection Summary													
Average Delay	0.4												
Intersection Capacity Utilization	31.2%			ICU Level of Service					A				
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
11: Bradford St & Future Site Dwy

Future Total AM - TWLT
2038 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	90	85	25	710	555	35
Future Volume (Veh/h)	90	85	25	710	555	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)	98	92	27	772	603	38
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				TWLT	TWLT	
Median storage (veh)				2	2	
Upstream signal (m)					83	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	1066	324	645			
vC1, stage 1 conf vol	626					
vC2, stage 2 conf vol	440					
vCu, unblocked vol	956	172	511			
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 %	78	88	97			
cM capacity (veh/h)	453	800	1004			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	190	27	386	386	402	239
Volume Left	98	27	0	0	0	0
Volume Right	92	0	0	0	0	38
cSH	573	1004	1700	1700	1700	1700
Volume to Capacity	0.33	0.03	0.23	0.23	0.24	0.14
Queue Length 95th (m)	11.6	0.7	0.0	0.0	0.0	0.0
Control Delay (s)	14.4	8.7	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	14.4	0.3			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			37.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: Bradford St & John St

Future Total PM - TWLT
2038 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	20	5	5	0	1150	30	5	1180	0
Future Volume (Veh/h)	0	0	5	20	5	5	0	1150	30	5	1180	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	22	5	5	0	1250	33	5	1283	0
Pedestrians	7			4			1					
Lane Width (m)	3.6			3.6			3.6					
Walking Speed (m/s)	1.2			1.2			1.2					
Percent Blockage	1			0			0					
Right turn flare (veh)												
Median type							TWLTL			TWLTL		
Median storage (veh)							2			2		
Upstream signal (m)										181		
pX, platoon unblocked	0.85	0.85	0.85	0.85	0.85		0.85					
vC, conflicting volume	1932	2587	650	1928	2570	646	1290	1287				
vC1, stage 1 conf vol	1300	1300		1270	1270							
vC2, stage 2 conf vol	632	1287		658	1300							
vCu, unblocked vol	1739	2512	224	1734	2493	646	980	1287				
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1				
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	100	99	87	97	99	100	99				
cM capacity (veh/h)	195	170	661	171	174	418	600	544				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	5	32	0	833	450	5	855	428				
Volume Left	0	22	0	0	0	5	0	0				
Volume Right	5	5	0	0	33	0	0	0				
cSH	661	189	1700	1700	1700	544	1700	1700				
Volume to Capacity	0.01	0.17	0.00	0.49	0.26	0.01	0.50	0.25				
Queue Length 95th (m)	0.2	4.8	0.0	0.0	0.0	0.2	0.0	0.0				
Control Delay (s)	10.5	28.0	0.0	0.0	0.0	11.7	0.0	0.0				
Lane LOS	B	D				B						
Approach Delay (s)	10.5	28.0	0.0				0.0					
Approach LOS	B	D										
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	47.8%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
11: Bradford St & Future Site Dwy

Future Total PM - TWLT
2038 Horizon Year

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	55	50	70	1085	1135	100
Future Volume (Veh/h)	55	50	70	1085	1135	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	54	76	1179	1234	109
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage (veh)				2	2	
Upstream signal (m)					83	
pX, platoon unblocked	0.83	0.83	0.83			
vC, conflicting volume	2038	680	1351			
vC1, stage 1 conf vol	1296					
vC2, stage 2 conf vol	742					
vCu, unblocked vol	1839	200	1010			
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 %	73	92	87			
cM capacity (veh/h)	224	670	571			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	114	76	590	590	823	520
Volume Left	60	76	0	0	0	0
Volume Right	54	0	0	0	0	109
cSH	327	571	1700	1700	1700	1700
Volume to Capacity	0.35	0.13	0.35	0.35	0.48	0.31
Queue Length 95th (m)	12.1	3.7	0.0	0.0	0.0	0.0
Control Delay (s)	21.8	12.3	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	21.8	0.7			0.0	
Approach LOS	C					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization		54.6%		ICU Level of Service		A
Analysis Period (min)		15				

Queues
2: Bradford St & Victoria St

Future Background AM - Signal
2028 Horizon Year

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↖	↗		↕		↕
Traffic Volume (vph)	5	20	10	10	20	555	20	425
Future Volume (vph)	5	20	10	10	20	555	20	425
Lane Group Flow (vph)	0	78	11	33	0	656	0	500
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.06	0.11		0.28		0.22
Control Delay		13.7	22.9	13.6		4.0		5.2
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		13.7	22.9	13.6		4.0		5.2
Queue Length 50th (m)		3.5	1.3	1.3		15.2		11.1
Queue Length 95th (m)		12.8	4.7	7.2		14.3		25.6
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2333		2293
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		0.14	0.03	0.06		0.28		0.22

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Background AM - Signal
2028 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗			↕			↕	
Traffic Volume (vph)	5	20	45	10	10	20	20	555	15	20	425	5
Future Volume (vph)	5	20	45	10	10	20	20	555	15	20	425	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frft		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3460			3456	
Flt Permitted		0.97		0.71	1.00			0.93			0.92	
Satd. Flow (perm)		1541		1142	1693			3228			3174	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	11	11	22	22	617	17	22	472	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	35	0	11	14	0	0	654	0	0	499	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2222			2185	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.20			0.16	
v/c Ratio		0.16		0.07	0.06			0.29			0.23	
Uniform Delay, d1		26.5		26.1	26.1			4.3			4.0	
Progression Factor		1.00		1.00	1.00			0.73			1.00	
Incremental Delay, d2		0.4		0.2	0.1			0.3			0.2	
Delay (s)		26.8		26.3	26.2			3.4			4.3	
Level of Service		C		C	C			A			A	
Approach Delay (s)		26.8		26.2				3.4			4.3	
Approach LOS		C		C				A			A	

Intersection Summary

HCM 2000 Control Delay	6.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
7: Bradford St & John St

Future Background AM - Signal
2028 Horizon Year

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations		↔		↔	↔		↔
Traffic Volume (vph)	5	0	15	5	590	5	455
Future Volume (vph)	5	0	15	5	590	5	455
Lane Group Flow (vph)	0	10	0	26	637	0	489
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA
Protected Phases		4		8	2		6
Permitted Phases	4		8			6	
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.5	25.5	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0	
Total Lost Time (s)		6.0		6.0		6.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
v/c Ratio		0.04		0.11	0.22		0.18
Control Delay		10.5		20.6	3.6		2.4
Queue Delay		0.0		0.0	0.0		0.0
Total Delay		10.5		20.6	3.6		2.4
Queue Length 50th (m)		0.0		2.6	0.0		0.0
Queue Length 95th (m)		0.0		7.6	32.3		14.0
Internal Link Dist (m)		97.0		101.6	295.6		54.2
Turn Bay Length (m)							
Base Capacity (vph)		529		489	2926		2759
Starvation Cap Reductn		0		0	0		0
Spillback Cap Reductn		0		0	0		0
Storage Cap Reductn		0		0	0		0
Reduced v/c Ratio		0.02		0.05	0.22		0.18

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis
7: Bradford St & John St

Future Background AM - Signal
2028 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔		
Traffic Volume (vph)	5	0		5	15	5	5	0	590	15	5	455
Future Volume (vph)	5	0		5	15	5	5	0	590	15	5	455
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.93			0.97			1.00			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1715			1705			3449			3422	
Flt Permitted		0.83			0.81			1.00			0.95	
Satd. Flow (perm)		1457			1418			3449			3254	
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)	5	0		5	16	5	5	0	621	16	5	479
RTOR Reduction (vph)	0	9		0	0	5	0	0	1	0	0	1
Lane Group Flow (vph)	0	1		0	0	21	0	0	636	0	0	488
Confl. Peds. (#/hr)	2		1	1		2	4		8	8		4
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	4%	12%	0%	5%	33%
Turn Type	Perm	NA		Perm	NA		NA		Perm	NA		NA
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		120			117			2571			2426	
v/s Ratio Prot								c0.18				
v/s Ratio Perm		0.00			c0.02						0.15	
v/c Ratio		0.01			0.18			0.25			0.20	
Uniform Delay, d1		29.5			29.9			2.8			2.7	
Progression Factor		1.00			1.00			1.00			0.67	
Incremental Delay, d2		0.0			0.8			0.2			0.2	
Delay (s)		29.5			30.7			3.0			2.9	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			30.7			3.0			2.9	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Bradford St & Victoria St

Future Background PM - Signal
2028 Horizon Year

	↖	→	↗	↖	↖	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↖	↗		↕	↖	↗
Traffic Volume (vph)	10	30	30	20	20	705	10	710
Future Volume (vph)	10	30	30	20	20	705	10	710
Lane Group Flow (vph)	0	102	32	53	0	803	0	777
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.31	0.12	0.17		0.34		0.33
Control Delay		14.8	24.2	13.8		4.1		5.7
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		14.8	24.2	13.8		4.1		5.7
Queue Length 50th (m)		5.4	3.9	2.6		19.7		19.0
Queue Length 95th (m)		15.8	9.5	9.8		15.6		41.5
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		599	524	606		2348		2386
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		0.17	0.06	0.09		0.34		0.33

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Background PM - Signal
2028 Horizon Year

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	55	30	20	30	20	705	30	10	710	10
Future Volume (vph)	10	30	55	30	20	30	20	705	30	10	710	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00			1.00	
Frft		0.92		1.00	0.91			0.99			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1699		1788	1710			3501			3496	
Flt Permitted		0.96		0.81	1.00			0.93			0.94	
Satd. Flow (perm)		1637		1530	1710			3248			3299	
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)	11	32	59	32	21	32	21	750	32	11	755	11
RTOR Reduction (vph)	0	51	0	0	28	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	51	0	32	25	0	0	801	0	0	776	0
Confl. Peds. (#/hr)	5		10	10		5	7		5	5		7
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	15%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		229		214	239			2236			2271	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.03		0.02				c0.25			0.24	
v/c Ratio		0.22		0.15	0.11			0.36			0.34	
Uniform Delay, d1		26.7		26.4	26.3			4.5			4.4	
Progression Factor		1.00		1.00	1.00			0.69			1.00	
Incremental Delay, d2		0.5		0.3	0.2			0.4			0.4	
Delay (s)		27.3		26.8	26.5			3.5			4.9	
Level of Service		C		C	C			A			A	
Approach Delay (s)		27.3			26.6			3.5			4.9	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
7: Bradford St & John St

Future Background PM - Signal
2028 Horizon Year

	→	↖	←	↑	↗	↓
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations	↔		↔	↔		↔
Traffic Volume (vph)	0	20	5	740	5	805
Future Volume (vph)	0	20	5	740	5	805
Lane Group Flow (vph)	5	0	32	837	0	880
Turn Type	NA	Perm	NA	NA	Perm	NA
Protected Phases	4					6
Permitted Phases		8			6	
Detector Phase	4	8	8	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0		6.0	6.0		6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.01		0.13	0.28		0.31
Control Delay	0.0		21.5	3.9		2.6
Queue Delay	0.0		0.0	0.0		0.0
Total Delay	0.0		21.5	3.9		2.6
Queue Length 50th (m)	0.0		3.3	0.0		0.0
Queue Length 95th (m)	0.0		8.9	44.1		23.7
Internal Link Dist (m)	97.0		101.6	295.6		54.2
Turn Bay Length (m)						
Base Capacity (vph)	619		507	2958		2829
Starvation Cap Reductn	0		0	0		0
Spillback Cap Reductn	0		0	0		0
Storage Cap Reductn	0		0	0		0
Reduced v/c Ratio	0.01		0.06	0.28		0.31

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis
7: Bradford St & John St

Future Background PM - Signal
2028 Horizon Year

	↖	→	↗	↖	←	↖	↗	↑	↗	↖	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	5	20	5	5	0	740	30	5	805	0
Future Volume (vph)	0	0	5	20	5	5	0	740	30	5	805	0
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.86			0.98			0.99			1.00	
Flt Protected		1.00			0.97			1.00			1.00	
Satd. Flow (prot)		1622			1797			3485			3504	
Flt Permitted		1.00			0.79			1.00			0.95	
Satd. Flow (perm)		1622			1472			3485			3335	
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)	0	0	5	22	5	5	0	804	33	5	875	0
RTOR Reduction (vph)	0	5	0	0	5	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	27	0	0	835	0	0	880	0
Confl. Peds. (#/hr)			1	1			7		4	4		7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type	NA			Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		134			121			2598			2486	
v/s Ratio Prot		0.00						0.24				
v/s Ratio Perm					c0.02						c0.26	
v/c Ratio		0.00			0.23			0.32			0.35	
Uniform Delay, d1		29.4			30.0			3.0			3.1	
Progression Factor		1.00			1.00			1.00			0.60	
Incremental Delay, d2		0.0			1.0			0.3			0.4	
Delay (s)		29.5			31.0			3.3			2.2	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			31.0			3.3			2.2	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Bradford St & Victoria St

Future Background AM - Signal
2033 Horizon Year

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↖	↗		↕		↕
Traffic Volume (vph)	5	20	10	10	20	675	20	520
Future Volume (vph)	5	20	10	10	20	675	20	520
Lane Group Flow (vph)	0	78	11	33	0	789	0	606
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.06	0.11		0.34		0.26
Control Delay		13.7	22.9	13.6		4.2		5.4
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		13.7	22.9	13.6		4.2		5.4
Queue Length 50th (m)		3.5	1.3	1.3		19.4		13.9
Queue Length 95th (m)		12.8	4.7	7.2		16.8		31.5
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2338		2293
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		0.14	0.03	0.06		0.34		0.26

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Background AM - Signal
2033 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗			↕			↕	
Traffic Volume (vph)	5	20	45	10	10	20	20	675	15	20	520	5
Future Volume (vph)	5	20	45	10	10	20	20	675	15	20	520	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frft		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3468			3459	
Flt Permitted		0.97		0.71	1.00			0.93			0.92	
Satd. Flow (perm)		1541		1142	1693			3233			3172	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	11	11	22	22	750	17	22	578	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	35	0	11	14	0	0	788	0	0	605	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2226			2184	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.24			0.19	
v/c Ratio		0.16		0.07	0.06			0.35			0.28	
Uniform Delay, d1		26.5		26.1	26.1			4.5			4.2	
Progression Factor		1.00		1.00	1.00			0.71			1.00	
Incremental Delay, d2		0.4		0.2	0.1			0.4			0.3	
Delay (s)		26.8		26.3	26.2			3.6			4.5	
Level of Service		C		C	C			A			A	
Approach Delay (s)		26.8			26.2			3.6			4.5	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
7: Bradford St & John St

Future Background AM - Signal
2033 Horizon Year

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations		↔		↔	↔		↔
Traffic Volume (vph)	5	0	15	5	710	5	550
Future Volume (vph)	5	0	15	5	710	5	550
Lane Group Flow (vph)	0	10	0	26	763	0	589
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA
Protected Phases		4		8	2		6
Permitted Phases	4		8			6	
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0		6.0	6.0		6.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
v/c Ratio		0.04		0.11	0.26		0.21
Control Delay		10.5		20.6	3.8		2.4
Queue Delay		0.0		0.0	0.0		0.0
Total Delay		10.5		20.6	3.8		2.4
Queue Length 50th (m)		0.0		2.6	0.0		0.0
Queue Length 95th (m)		0.0		7.6	39.8		15.7
Internal Link Dist (m)		97.0		101.6	295.6		54.2
Turn Bay Length (m)							
Base Capacity (vph)		529		489	2931		2763
Starvation Cap Reductn		0		0	0		0
Spillback Cap Reductn		0		0	0		0
Storage Cap Reductn		0		0	0		0
Reduced v/c Ratio		0.02		0.05	0.26		0.21

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St

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HCM Signalized Intersection Capacity Analysis
7: Bradford St & John St

Future Background AM - Signal
2033 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔		
Traffic Volume (vph)	5	0	5	15	5	5	0	710	15	5	550	5
Future Volume (vph)	5	0	5	15	5	5	0	710	15	5	550	5
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.93			0.97			1.00			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1715			1705			3453			3425	
Flt Permitted		0.83			0.81			1.00			0.95	
Satd. Flow (perm)		1457			1418			3453			3256	
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)	5	0	5	16	5	5	0	747	16	5	579	5
RTOR Reduction (vph)	0	9	0	0	5	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	1	0	0	21	0	0	762	0	0	588	0
Confl. Peds. (#/hr)	2		1	1		2	4		8	8		4
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	4%	12%	0%	5%	33%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		120			117			2574			2428	
v/s Ratio Prot								c0.22				
v/s Ratio Perm		0.00			c0.02						0.18	
v/c Ratio		0.01			0.18			0.30			0.24	
Uniform Delay, d1		29.5			29.9			2.9			2.8	
Progression Factor		1.00			1.00			1.00			0.64	
Incremental Delay, d2		0.0			0.8			0.3			0.2	
Delay (s)		29.5			30.7			3.2			2.0	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			30.7			3.2			2.0	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Bradford St & Victoria St

Future Background PM - Signal
2033 Horizon Year

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↕	↕		↕	↕	↕
Traffic Volume (vph)	10	30	30	20	20	860	10	865
Future Volume (vph)	10	30	30	20	20	860	10	865
Lane Group Flow (vph)	0	102	32	53	0	968	0	942
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.31	0.12	0.17		0.41		0.40
Control Delay		14.8	24.2	13.8		4.4		6.2
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		14.8	24.2	13.8		4.4		6.2
Queue Length 50th (m)		5.4	3.9	2.6		25.5		24.5
Queue Length 95th (m)		15.8	9.5	9.8		18.4		53.2
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		599	524	606		2349		2383
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		0.17	0.06	0.09		0.41		0.40

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Background PM - Signal
2033 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕		↕	↕	
Traffic Volume (vph)	10	30	55	30	20	30	20	860	30	10	865	10
Future Volume (vph)	10	30	55	30	20	30	20	860	30	10	865	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00			1.00	
Frft		0.92		1.00	0.91			1.00			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1699		1788	1710			3507			3498	
Flt Permitted		0.96		0.81	1.00			0.92			0.94	
Satd. Flow (perm)		1637		1530	1710			3247			3297	
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)	11	32	59	32	21	32	21	915	32	11	920	11
RTOR Reduction (vph)	0	51	0	0	28	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	51	0	32	25	0	0	966	0	0	941	0
Confl. Peds. (#/hr)	5		10	10		5	7		5	5		7
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	15%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		229		214	239			2235			2270	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.03		0.02				c0.30			0.29	
v/c Ratio		0.22		0.15	0.11			0.43			0.41	
Uniform Delay, d1		26.7		26.4	26.3			4.8			4.8	
Progression Factor		1.00		1.00	1.00			0.67			1.00	
Incremental Delay, d2		0.5		0.3	0.2			0.6			0.6	
Delay (s)		27.3		26.8	26.5			3.8			5.3	
Level of Service		C		C	C			A			A	
Approach Delay (s)		27.3			26.6			3.8			5.3	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
7: Bradford St & John St

Future Background PM - Signal
2033 Horizon Year

	→	↖	←	↑	↗	↓
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations	↔		↔	↔		↔
Traffic Volume (vph)	0	20	5	895	5	960
Future Volume (vph)	0	20	5	895	5	960
Lane Group Flow (vph)	5	0	32	1006	0	1048
Turn Type	NA	Perm	NA	NA	Perm	NA
Protected Phases	4		8	2		6
Permitted Phases		8			6	
Detector Phase	4	8	8	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0		6.0	6.0		6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.02		0.13	0.34		0.37
Control Delay	0.0		21.5	4.2		2.7
Queue Delay	0.0		0.0	0.0		0.0
Total Delay	0.0		21.5	4.2		2.7
Queue Length 50th (m)	0.0		3.3	0.0		0.0
Queue Length 95th (m)	0.0		8.9	56.0		26.4
Internal Link Dist (m)	97.0		101.6	295.6		54.2
Turn Bay Length (m)						
Base Capacity (vph)	594		507	2961		2829
Starvation Cap Reductn	0		0	0		0
Spillback Cap Reductn	0		0	0		0
Storage Cap Reductn	0		0	0		0
Reduced v/c Ratio	0.01		0.06	0.34		0.37

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis
7: Bradford St & John St

Future Background PM - Signal
2033 Horizon Year

	↖	→	↗	↖	←	↖	↗	↑	↖	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	5	20	5	5	0	895	30	5	960	0
Future Volume (vph)	0	0	5	20	5	5	0	895	30	5	960	0
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.86			0.98			1.00			1.00	
Flt Protected		1.00			0.97			1.00			1.00	
Satd. Flow (prot)		1622			1797			3488			3504	
Flt Permitted		1.00			0.79			1.00			0.95	
Satd. Flow (perm)		1622			1472			3488			3334	
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)	0	0	5	22	5	5	0	973	33	5	1043	0
RTOR Reduction (vph)	0	5	0	0	5	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	27	0	0	1004	0	0	1048	0
Confl. Peds. (#/hr)			1	1			7		4	4		7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type	NA			Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		134			121			2601			2486	
v/s Ratio Prot		0.00						0.29				
v/s Ratio Perm					c0.02						c0.31	
v/c Ratio		0.00			0.23			0.39			0.42	
Uniform Delay, d1		29.4			30.0			3.2			3.3	
Progression Factor		1.00			1.00			1.00			0.56	
Incremental Delay, d2		0.0			1.0			0.4			0.5	
Delay (s)		29.5			31.0			3.6			2.3	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			31.0			3.6			2.3	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	3.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Bradford St & Victoria St

Future Background AM - Signal
2038 Horizon Year

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↖	↗		↕		↕
Traffic Volume (vph)	5	20	10	10	20	820	20	630
Future Volume (vph)	5	20	10	10	20	820	20	630
Lane Group Flow (vph)	0	78	11	33	0	950	0	728
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.26	0.06	0.11		0.41		0.32
Control Delay		13.7	22.9	13.6		4.5		5.7
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		13.7	22.9	13.6		4.5		5.7
Queue Length 50th (m)		3.5	1.3	1.3		25.0		17.6
Queue Length 95th (m)		12.8	4.7	7.2		19.7		39.0
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		560	391	594		2340		2288
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		0.14	0.03	0.06		0.41		0.32

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Background AM - Signal
2038 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗			↕			↕	
Traffic Volume (vph)	5	20	45	10	10	20	20	820	15	20	630	5
Future Volume (vph)	5	20	45	10	10	20	20	820	15	20	630	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frft		0.91		1.00	0.90			1.00			1.00	
Flt Protected		1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1537	1693			3474			3461	
Flt Permitted		0.97		0.71	1.00			0.93			0.91	
Satd. Flow (perm)		1541		1142	1693			3237			3166	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	22	50	11	11	22	22	911	17	22	700	6
RTOR Reduction (vph)	0	43	0	0	19	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	35	0	11	14	0	0	949	0	0	727	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		215		159	237			2228			2180	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.02		0.01				c0.29			0.23	
v/c Ratio		0.16		0.07	0.06			0.43			0.33	
Uniform Delay, d1		26.5		26.1	26.1			4.8			4.4	
Progression Factor		1.00		1.00	1.00			0.69			1.00	
Incremental Delay, d2		0.4		0.2	0.1			0.6			0.4	
Delay (s)		26.8		26.3	26.2			3.9			4.8	
Level of Service		C		C	C			A			A	
Approach Delay (s)		26.8		26.2				3.9			4.8	
Approach LOS		C		C				A			A	

Intersection Summary

HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
7: Bradford St & John St

Future Background AM - Signal
2038 Horizon Year

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations		↔		↔	↔		↔
Traffic Volume (vph)	5	0	15	5	855	5	660
Future Volume (vph)	5	0	15	5	855	5	660
Lane Group Flow (vph)	0	10	0	26	916	0	705
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA
Protected Phases		4		8	2		6
Permitted Phases	4		8			6	
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0	
Total Lost Time (s)		6.0		6.0		6.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
v/c Ratio		0.04		0.11	0.31		0.26
Control Delay		10.5		20.6	4.1		2.4
Queue Delay		0.0		0.0	0.0		0.0
Total Delay		10.5		20.6	4.1		2.4
Queue Length 50th (m)		0.0		2.6	0.0		0.0
Queue Length 95th (m)		0.0		7.6	50.1		17.7
Internal Link Dist (m)		97.0		101.6	295.6		54.2
Turn Bay Length (m)							
Base Capacity (vph)		529		489	2931		2764
Starvation Cap Reductn		0		0	0		0
Spillback Cap Reductn		0		0	0		0
Storage Cap Reductn		0		0	0		0
Reduced v/c Ratio		0.02		0.05	0.31		0.26

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis
7: Bradford St & John St

Future Background AM - Signal
2038 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔		
Traffic Volume (vph)	5	0		5	15	5	5	0	855	15	5	660
Future Volume (vph)	5	0		5	15	5	5	0	855	15	5	660
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.93			0.97			1.00			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1715			1705			3456			3427	
Flt Permitted		0.83			0.81			1.00			0.95	
Satd. Flow (perm)		1457			1418			3456			3257	
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)	5	0		5	16	5	5	0	900	16	5	695
RTOR Reduction (vph)	0	9		0	0	5	0	0	1	0	0	0
Lane Group Flow (vph)	0	1		0	0	21	0	0	915	0	0	705
Confl. Peds. (#/hr)	2		1	1			2	4		8	8	4
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	4%	12%	0%	5%	33%
Turn Type	Perm	NA		Perm	NA		NA	NA	Perm	NA	NA	NA
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		120			117			2577			2428	
v/s Ratio Prot								c0.26				
v/s Ratio Perm		0.00			c0.02						0.22	
v/c Ratio		0.01			0.18			0.36			0.29	
Uniform Delay, d1		29.5			29.9			3.1			2.9	
Progression Factor		1.00			1.00			1.00			0.61	
Incremental Delay, d2		0.0			0.8			0.4			0.3	
Delay (s)		29.5			30.7			3.5			2.1	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			30.7			3.5			2.1	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Bradford St & Victoria St

Future Background PM - Signal
2038 Horizon Year

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕	↕	↕		↕	↕	↕
Traffic Volume (vph)	10	30	30	20	20	1045	10	1055
Future Volume (vph)	10	30	30	20	20	1045	10	1055
Lane Group Flow (vph)	0	105	33	55	0	1216	0	1194
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.36	0.15	0.17		0.53		0.51
Control Delay		19.4	24.9	13.9		5.2		7.3
Queue Delay		0.0	0.0	0.0		0.0		0.0
Total Delay		19.4	24.9	13.9		5.2		7.3
Queue Length 50th (m)		7.9	4.1	2.7		36.6		35.2
Queue Length 95th (m)		18.3	9.8	10.1		24.7		75.5
Internal Link Dist (m)		94.2		216.2		21.1		426.8
Turn Bay Length (m)			15.0					
Base Capacity (vph)		553	444	609		2309		2359
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		0.19	0.07	0.09		0.53		0.51

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Bradford St & Victoria St



HCM Signalized Intersection Capacity Analysis
2: Bradford St & Victoria St

Future Background PM - Signal
2038 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕		↕	↕	
Traffic Volume (vph)	10	30	55	30	20	30	20	1045	30	10	1055	10
Future Volume (vph)	10	30	55	30	20	30	20	1045	30	10	1055	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frft		0.92		1.00	0.91			1.00			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1592		1537	1713			3471			3465	
Flt Permitted		0.96		0.80	1.00			0.92			0.94	
Satd. Flow (perm)		1535		1296	1713			3192			3262	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	33	61	33	22	33	22	1161	33	11	1172	11
RTOR Reduction (vph)	0	36	0	0	28	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	69	0	33	27	0	0	1214	0	0	1193	0
Confl. Peds. (#/hr)	3		4	4		3	2		7	7		2
Heavy Vehicles (%)	0%	10%	9%	17%	0%	0%	20%	3%	7%	5%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8		9.8	9.8			48.2			48.2	
Effective Green, g (s)		9.8		9.8	9.8			48.2			48.2	
Actuated g/C Ratio		0.14		0.14	0.14			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		214		181	239			2197			2246	
v/s Ratio Prot					0.02							
v/s Ratio Perm		c0.04		0.03				c0.38			0.37	
v/c Ratio		0.32		0.18	0.11			0.55			0.53	
Uniform Delay, d1		27.1		26.6	26.3			5.5			5.4	
Progression Factor		1.00		1.00	1.00			0.66			1.00	
Incremental Delay, d2		0.9		0.5	0.2			1.0			0.9	
Delay (s)		28.1		27.1	26.5			4.6			6.3	
Level of Service		C		C	C			A			A	
Approach Delay (s)		28.1			26.7			4.6			6.3	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
7: Bradford St & John St

Future Background PM - Signal
2038 Horizon Year

	→	↖	←	↑	↗	↓
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations	↔		↔	↔		↔
Traffic Volume (vph)	0	20	5	1080	5	1150
Future Volume (vph)	0	20	5	1080	5	1150
Lane Group Flow (vph)	5	0	31	1169	0	1216
Turn Type	NA	Perm	NA	NA	Perm	NA
Protected Phases	4		8	2		6
Permitted Phases		8			6	
Detector Phase	4	8	8	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0		6.0	6.0		6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.02		0.13	0.40		0.44
Control Delay	0.0		21.5	4.7		2.8
Queue Delay	0.0		0.0	0.0		0.0
Total Delay	0.0		21.5	4.7		2.8
Queue Length 50th (m)	0.0		3.2	0.0		0.0
Queue Length 95th (m)	0.0		8.7	70.0		30.3
Internal Link Dist (m)	97.0		101.6	295.6		54.2
Turn Bay Length (m)						
Base Capacity (vph)	587		481	2926		2775
Starvation Cap Reductn	0		0	0		0
Spillback Cap Reductn	0		0	0		0
Storage Cap Reductn	0		0	0		0
Reduced v/c Ratio	0.01		0.06	0.40		0.44

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St

↑ Ø2 (R)	→ Ø4
40 s	30 s
↓ Ø6 (R)	← Ø8
40 s	30 s

HCM Signalized Intersection Capacity Analysis
7: Bradford St & John St

Future Background PM - Signal
2038 Horizon Year

	↖	→	↗	↖	←	↖	↗	↑	↗	↖	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	5	20	5	5	0	1080	30	5	1150	0
Future Volume (vph)	0	0	5	20	5	5	0	1080	30	5	1150	0
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.86			0.98			1.00			1.00	
Flt Protected		1.00			0.97			1.00			1.00	
Satd. Flow (prot)		1622			1700			3447			3438	
Flt Permitted		1.00			0.79			1.00			0.95	
Satd. Flow (perm)		1622			1396			3447			3270	
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)	0	0	5	21	5	5	0	1137	32	5	1211	0
RTOR Reduction (vph)	0	5	0	0	5	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	26	0	0	1168	0	0	1216	0
Confl. Peds. (#/hr)	2		1	1		2	4		8	8		4
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	4%	12%	0%	5%	33%
Turn Type	NA			Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		134			115			2570			2438	
v/s Ratio Prot		0.00						0.34				
v/s Ratio Perm					c0.02						c0.37	
v/c Ratio		0.00			0.23			0.45			0.50	
Uniform Delay, d1		29.4			30.0			3.4			3.6	
Progression Factor		1.00			1.00			1.00			0.52	
Incremental Delay, d2		0.0			1.0			0.6			0.7	
Delay (s)		29.5			31.0			4.0			2.5	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			31.0			4.0			2.5	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
7: Bradford St & John St

Future Total AM - Signal
2028 Horizon Year

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations		↔		↔	↔		↔
Traffic Volume (vph)	5	0	15	5	605	5	530
Future Volume (vph)	5	0	15	5	605	5	530
Lane Group Flow (vph)	0	10	0	26	653	0	574
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA
Protected Phases		4		8	2		6
Permitted Phases	4		8			6	
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0			0.0
Total Lost Time (s)		6.0		6.0			6.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max
v/c Ratio		0.04		0.11	0.22		0.21
Control Delay		10.5		20.6	3.7		2.6
Queue Delay		0.0		0.0	0.0		0.0
Total Delay		10.5		20.6	3.7		2.6
Queue Length 50th (m)		0.0		2.6	0.0		0.0
Queue Length 95th (m)		0.0		7.6	33.2		17.8
Internal Link Dist (m)		97.0		101.6	295.6		75.0
Turn Bay Length (m)							
Base Capacity (vph)		529		489	2926		2752
Starvation Cap Reductn		0		0	0		0
Spillback Cap Reductn		0		0	0		0
Storage Cap Reductn		0		0	0		0
Reduced v/c Ratio		0.02		0.05	0.22		0.21

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis
7: Bradford St & John St

Future Total AM - Signal
2028 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (vph)	5	0		5	15		5	0	605	15	5	530
Future Volume (vph)	5	0		5	15		5	0	605	15	5	530
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frft		0.93			0.97			1.00			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1715			1705			3450			3409	
Flt Permitted		0.83			0.81			1.00			0.95	
Satd. Flow (perm)		1457			1418			3450			3243	
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)	5	0		5	16		5	0	637	16	5	558
RTOR Reduction (vph)	0	9		0	0		5	0	1	0	0	1
Lane Group Flow (vph)	0	1		0	0		21	0	0	652	0	573
Confl. Peds. (#/hr)	2		1	1		2	4		8	8		4
Heavy Vehicles (%)	0%	0%		0%	0%		0%	4%	12%	0%	5%	33%
Turn Type	Perm	NA		Perm	NA		NA	NA	Perm	NA	NA	NA
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		120			117			2572			2418	
v/s Ratio Prot								c0.19				
v/s Ratio Perm		0.00			c0.02						0.18	
v/c Ratio		0.01			0.18			0.25			0.24	
Uniform Delay, d1		29.5			29.9			2.8			2.7	
Progression Factor		1.00			1.00			1.00			0.70	
Incremental Delay, d2		0.0			0.8			0.2			0.2	
Delay (s)		29.5			30.7			3.0			2.2	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			30.7			3.0			2.2	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: Bradford St & Future Site Dwy

Future Total AM - Signal
2028 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	85	25	590	460	35
Future Volume (Veh/h)	90	85	25	590	460	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)	98	92	27	641	500	38
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				99	83	
pX, platoon unblocked	0.97	0.96	0.96			
vC, conflicting volume	898	273	542			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	669	168	447			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	89	97			
cM capacity (veh/h)	374	819	1078			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	190	241	427	333	205	
Volume Left	98	27	0	0	0	
Volume Right	92	0	0	0	38	
cSH	508	1078	1700	1700	1700	
Volume to Capacity	0.37	0.03	0.25	0.20	0.12	
Queue Length 95th (m)	13.8	0.6	0.0	0.0	0.0	
Control Delay (s)	16.3	1.2	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	16.3	0.4		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			51.1%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
7: Bradford St & John St

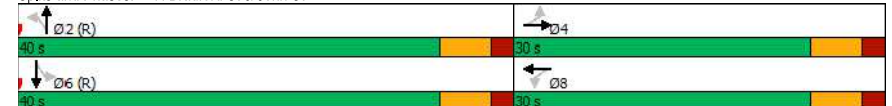
Future Total PM - Signal
2028 Horizon Year

Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	20	5	810	5	835
Future Volume (vph)	0	20	5	810	5	835
Lane Group Flow (vph)	5	0	32	913	0	913
Turn Type	NA	Perm	NA	NA	Perm	NA
Protected Phases	4			2		6
Permitted Phases		8			6	
Detector Phase	4	8	8	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0		6.0	6.0		6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.01		0.13	0.31		0.32
Control Delay	0.0		21.5	4.1		2.7
Queue Delay	0.0		0.0	0.0		0.0
Total Delay	0.0		21.5	4.1		2.7
Queue Length 50th (m)	0.0		3.3	0.0		0.0
Queue Length 95th (m)	0.0		8.9	49.2		25.6
Internal Link Dist (m)	97.0		101.6	295.6		75.0
Turn Bay Length (m)						
Base Capacity (vph)	613		507	2961		2829
Starvation Cap Reductn	0		0	0		0
Spillback Cap Reductn	0		0	0		0
Storage Cap Reductn	0		0	0		0
Reduced v/c Ratio	0.01		0.06	0.31		0.32

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis 7: Bradford St & John St

Future Total PM - Signal
2028 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	5	20	5	5	0	810	30	5	835	0
Future Volume (vph)	0	0	5	20	5	5	0	810	30	5	835	0
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.86			0.98			0.99			1.00	
Flt Protected		1.00			0.97			1.00			1.00	
Satd. Flow (prot)		1622			1797			3486			3504	
Flt Permitted		1.00			0.79			1.00			0.95	
Satd. Flow (perm)		1622			1472			3486			3334	
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)	0	0	5	22	5	5	0	880	33	5	908	0
RTOR Reduction (vph)	0	5	0	0	5	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	27	0	0	911	0	0	913	0
Confl. Peds. (#/hr)			1	1			7		4	4		7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type		NA		Perm	NA		NA		Perm	NA		NA
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		134			121			2599			2486	
v/s Ratio Prot		0.00						0.26				
v/s Ratio Perm					c0.02						c0.27	
v/c Ratio		0.00			0.23			0.35			0.37	
Uniform Delay, d1		29.4			30.0			3.1			3.1	
Progression Factor		1.00			1.00			1.00			0.61	
Incremental Delay, d2		0.0			1.0			0.4			0.4	
Delay (s)		29.5			31.0			3.4			2.3	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			31.0			3.4			2.3	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		3.4			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.35										
Actuated Cycle Length (s)		70.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		46.9%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 11: Bradford St & Future Site Dwy

Future Total PM - Signal
2028 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	55	50	70	745	790	100
Future Volume (Veh/h)	55	50	70	745	790	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	54	76	810	859	109
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				99	83	
pX, platoon unblocked	0.94	0.90	0.90			
vC, conflicting volume	1478	492	976			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	989	219	755			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	92	90			
cM capacity (veh/h)	209	709	774			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	114	346	540	573	395	
Volume Left	60	76	0	0	0	
Volume Right	54	0	0	0	109	
cSH	314	774	1700	1700	1700	
Volume to Capacity	0.36	0.10	0.32	0.34	0.23	
Queue Length 95th (m)	12.9	2.6	0.0	0.0	0.0	
Control Delay (s)	22.9	3.2	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	22.9	1.2		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay				1.9		
Intersection Capacity Utilization			63.9%	ICU Level of Service		B
Analysis Period (min)			15			

Queues
7: Bradford St & John St

Future Total AM - Signal
2033 Horizon Year

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	5	0	15	5	725	5	625
Future Volume (vph)	5	0	15	5	725	5	625
Lane Group Flow (vph)	0	10	0	26	779	0	674
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA
Protected Phases		4		8	2		6
Permitted Phases	4		8			6	
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0	
Total Lost Time (s)		6.0		6.0		6.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max
v/c Ratio		0.04		0.11	0.27		0.24
Control Delay		10.5		20.6	3.9		2.6
Queue Delay		0.0		0.0	0.0		0.0
Total Delay		10.5		20.6	3.9		2.6
Queue Length 50th (m)		0.0		2.6	0.0		0.0
Queue Length 95th (m)		0.0		7.6	40.8		19.5
Internal Link Dist (m)		97.0		101.6	295.6		75.0
Turn Bay Length (m)							
Base Capacity (vph)		529		489	2931		2757
Starvation Cap Reductn		0		0	0		0
Spillback Cap Reductn		0		0	0		0
Storage Cap Reductn		0		0	0		0
Reduced v/c Ratio		0.02		0.05	0.27		0.24

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis
7: Bradford St & John St

Future Total AM - Signal
2033 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	5	15	5	5	0	725	15	5	625	10
Future Volume (vph)	5	0	5	15	5	5	0	725	15	5	625	10
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frft		0.93			0.97			1.00			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1715			1705			3453			3413	
Flt Permitted		0.83			0.81			1.00			0.95	
Satd. Flow (perm)		1457			1418			3453			3246	
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)	5	0	5	16	5	5	0	763	16	5	658	11
RTOR Reduction (vph)	0	9	0	0	5	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	1	0	0	21	0	0	778	0	0	673	0
Confl. Peds. (#/hr)	2		1	1		2	4		8	8		4
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	4%	12%	0%	5%	33%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		120			117			2574			2420	
v/s Ratio Prot								c0.23				
v/s Ratio Perm		0.00			c0.02						0.21	
v/c Ratio		0.01			0.18			0.30			0.28	
Uniform Delay, d1		29.5			29.9			2.9			2.9	
Progression Factor		1.00			1.00			1.00			0.67	
Incremental Delay, d2		0.0			0.8			0.3			0.3	
Delay (s)		29.5			30.7			3.2			2.2	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			30.7			3.2			2.2	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 11: Bradford St & Future Site Dwy

Future Total AM - Signal
2033 Horizon Year

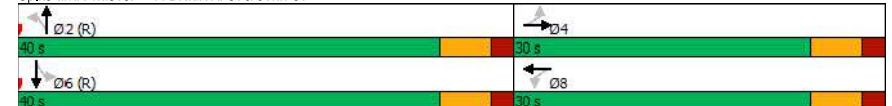
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Volume (veh/h)	90	85	25	710	555	35
Future Volume (Veh/h)	90	85	25	710	555	35
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	92	27	772	603	38
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				99	83	
pX, platoon unblocked	0.96	0.95	0.95			
vC, conflicting volume	1066	324	645			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	737	171	510			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	89	97			
cM capacity (veh/h)	334	801	1005			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	190	284	515	402	239	
Volume Left	98	27	0	0	0	
Volume Right	92	0	0	0	38	
cSH	466	1005	1700	1700	1700	
Volume to Capacity	0.41	0.03	0.30	0.24	0.14	
Queue Length 95th (m)	15.6	0.7	0.0	0.0	0.0	
Control Delay (s)	18.0	1.1	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	18.0	0.4		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			54.7%		ICU Level of Service	A
Analysis Period (min)			15			

Queues 7: Bradford St & John St

Future Total PM - Signal
2033 Horizon Year

Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations	↔		↔	↕		↕
Traffic Volume (vph)	0	20	5	965	5	990
Future Volume (vph)	0	20	5	965	5	990
Lane Group Flow (vph)	5	0	32	1082	0	1081
Turn Type	NA	Perm	NA	NA	Perm	NA
Protected Phases	4			2		6
Permitted Phases		8			6	
Detector Phase	4	8	8	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0		6.0	6.0		6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.02		0.13	0.37		0.38
Control Delay	0.0		21.5	4.4		2.7
Queue Delay	0.0		0.0	0.0		0.0
Total Delay	0.0		21.5	4.4		2.7
Queue Length 50th (m)	0.0		3.3	0.0		0.0
Queue Length 95th (m)	0.0		8.9	62.0		28.5
Internal Link Dist (m)	97.0		101.6	295.6		75.0
Turn Bay Length (m)						
Base Capacity (vph)	591		507	2960		2829
Starvation Cap Reductn	0		0	0		0
Spillback Cap Reductn	0		0	0		0
Storage Cap Reductn	0		0	0		0
Reduced v/c Ratio	0.01		0.06	0.37		0.38
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						
Natural Cycle: 65						
Control Type: Actuated-Coordinated						

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis

7: Bradford St & John St

Future Total PM - Signal

2033 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0		5	20	5	5	0	965	30	5	990
Future Volume (vph)	0	0		5	20	5	5	0	965	30	5	990
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.86			0.98			1.00			1.00	
Flt Protected		1.00			0.97			1.00			1.00	
Satd. Flow (prot)		1622			1797			3489			3505	
Flt Permitted		1.00			0.79			1.00			0.95	
Satd. Flow (perm)		1622			1472			3489			3333	
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)	0	0		5	22	5	5	0	1049	33	5	1076
RTOR Reduction (vph)	0	5	0	0	0	5	0	0	2	0	0	0
Lane Group Flow (vph)	0	0		0	0	27	0	0	1080	0	0	1081
Confl. Peds. (#/hr)			1	1			7		4	4		7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type		NA		Perm	NA		NA		Perm	NA		NA
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		134			121			2601			2485	
v/s Ratio Prot		0.00						0.31				
v/s Ratio Perm					c0.02						c0.32	
v/c Ratio		0.00			0.23			0.42			0.44	
Uniform Delay, d1		29.4			30.0			3.3			3.3	
Progression Factor		1.00			1.00			1.00			0.56	
Incremental Delay, d2		0.0			1.0			0.5			0.5	
Delay (s)		29.5			31.0			3.8			2.4	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			31.0			3.8			2.4	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		3.6			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		70.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		49.4%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Bradford St & Future Site Dwy

Future Total PM - Signal

2033 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	55	50	70	900	945	100
Future Volume (Veh/h)	55	50	70	900	945	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	54	76	978	1027	109
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				99	83	
pX, platoon unblocked	0.93	0.87	0.87			
vC, conflicting volume	1730	576	1144			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1083	216	868			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	66	92	89			
cM capacity (veh/h)	176	688	678			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	114	402	652	685	451	
Volume Left	60	76	0	0	0	
Volume Right	54	0	0	0	109	
cSH	272	678	1700	1700	1700	
Volume to Capacity	0.42	0.11	0.38	0.40	0.27	
Queue Length 95th (m)	15.8	3.0	0.0	0.0	0.0	
Control Delay (s)	27.5	3.3	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	27.5	1.3		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			72.4%		ICU Level of Service	C
Analysis Period (min)			15			

Queues
7: Bradford St & John St

Future Total AM - Signal
2038 Horizon Year

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	5	0	15	5	870	5	735
Future Volume (vph)	5	0	15	5	870	5	735
Lane Group Flow (vph)	0	10	0	26	932	0	790
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA
Protected Phases		4		8	2		6
Permitted Phases	4		8			6	
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0		6.0	6.0		6.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max
v/c Ratio		0.04		0.11	0.32		0.29
Control Delay		10.5		20.6	4.1		2.6
Queue Delay		0.0		0.0	0.0		0.0
Total Delay		10.5		20.6	4.1		2.6
Queue Length 50th (m)		0.0		2.6	0.0		0.0
Queue Length 95th (m)		0.0		7.6	51.1		21.5
Internal Link Dist (m)		97.0		101.6	295.6		75.0
Turn Bay Length (m)							
Base Capacity (vph)		529		489	2932		2756
Starvation Cap Reductn		0		0	0		0
Spillback Cap Reductn		0		0	0		0
Storage Cap Reductn		0		0	0		0
Reduced v/c Ratio		0.02		0.05	0.32		0.29

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis
7: Bradford St & John St

Future Total AM - Signal
2038 Horizon Year

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	5	15	5	5	0	870	15	5	735	10
Future Volume (vph)	5	0	5	15	5	5	0	870	15	5	735	10
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frft		0.93			0.97			1.00			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1715			1705			3456			3417	
Flt Permitted		0.83			0.81			1.00			0.95	
Satd. Flow (perm)		1457			1418			3456			3248	
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)	5	0	5	16	5	5	0	916	16	5	774	11
RTOR Reduction (vph)	0	9	0	0	5	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	1	0	0	21	0	0	931	0	0	789	0
Confl. Peds. (#/hr)	2		1	1		2	4		8	8		4
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	4%	12%	0%	5%	33%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		120			117			2577			2422	
v/s Ratio Prot								c0.27				
v/s Ratio Perm		0.00			c0.02						0.24	
v/c Ratio		0.01			0.18			0.36			0.33	
Uniform Delay, d1		29.5			29.9			3.1			3.0	
Progression Factor		1.00			1.00			1.00			0.63	
Incremental Delay, d2		0.0			0.8			0.4			0.4	
Delay (s)		29.5			30.7			3.5			2.2	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			30.7			3.5			2.2	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	3.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 11: Bradford St & Future Site Dwy

Future Total AM - Signal
2038 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Volume (veh/h)	90	85	25	855	665	35
Future Volume (Veh/h)	90	85	25	855	665	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)	98	92	27	929	723	38
Pedestrians	4					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				99	83	
pX, platoon unblocked	0.95	0.93	0.93			
vC, conflicting volume	1264	384	765			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	815	173	584			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	67	88	97			
cM capacity (veh/h)	293	781	922			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	190	337	619	482	279	
Volume Left	98	27	0	0	0	
Volume Right	92	0	0	0	38	
cSH	420	922	1700	1700	1700	
Volume to Capacity	0.45	0.03	0.36	0.28	0.16	
Queue Length 95th (m)	18.3	0.7	0.0	0.0	0.0	
Control Delay (s)	20.4	1.0	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	20.4	0.4		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			58.5%		ICU Level of Service	B
Analysis Period (min)			15			

Queues 7: Bradford St & John St

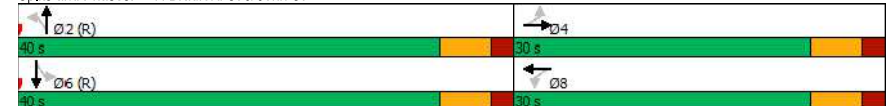
Future Total PM - Signal
2038 Horizon Year

Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations	↔		↔	↕		↕
Traffic Volume (vph)	0	20	5	1150	5	1180
Future Volume (vph)	0	20	5	1150	5	1180
Lane Group Flow (vph)	5	0	32	1283	0	1288
Turn Type	NA	Perm	NA	NA	Perm	NA
Protected Phases	4		8	2		6
Permitted Phases		8			6	
Detector Phase	4	8	8	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	25.0	25.0	25.0	40.0	40.0	40.0
Total Split (s)	30.0	30.0	30.0	40.0	40.0	40.0
Total Split (%)	42.9%	42.9%	42.9%	57.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0		6.0	6.0		6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.02		0.13	0.43		0.46
Control Delay	0.0		21.5	4.9		3.1
Queue Delay	0.0		0.0	0.0		0.0
Total Delay	0.0		21.5	4.9		3.1
Queue Length 50th (m)	0.0		3.3	0.0		0.0
Queue Length 95th (m)	0.0		8.9	80.0		35.2
Internal Link Dist (m)	97.0		101.6	295.6		75.0
Turn Bay Length (m)						
Base Capacity (vph)	587		507	2963		2826
Starvation Cap Reductn	0		0	0		0
Spillback Cap Reductn	0		0	0		0
Storage Cap Reductn	0		0	0		0
Reduced v/c Ratio	0.01		0.06	0.43		0.46

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 7: Bradford St & John St



HCM Signalized Intersection Capacity Analysis

7: Bradford St & John St

Future Total PM - Signal

2038 Horizon Year

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	5	20	5	5	0	1150	30	5	1180	0
Future Volume (vph)	0	0	5	20	5	5	0	1150	30	5	1180	0
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.86			0.98			1.00			1.00	
Flt Protected		1.00			0.97			1.00			1.00	
Satd. Flow (prot)		1622			1797			3492			3505	
Flt Permitted		1.00			0.79			1.00			0.95	
Satd. Flow (perm)		1622			1472			3492			3332	
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)	0	0	5	22	5	5	0	1250	33	5	1283	0
RTOR Reduction (vph)	0	5	0	0	5	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	27	0	0	1282	0	0	1288	0
Confl. Peds. (#/hr)			1	1			7		4	4		7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type		NA		Perm	NA		NA		Perm	NA		NA
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8			5.8			52.2			52.2	
Effective Green, g (s)		5.8			5.8			52.2			52.2	
Actuated g/C Ratio		0.08			0.08			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		134			121			2604			2484	
v/s Ratio Prot		0.00						0.37				
v/s Ratio Perm					c0.02						c0.39	
v/c Ratio		0.00			0.23			0.49			0.52	
Uniform Delay, d1		29.4			30.0			3.6			3.7	
Progression Factor		1.00			1.00			1.00			0.55	
Incremental Delay, d2		0.0			1.0			0.7			0.7	
Delay (s)		29.5			31.0			4.2			2.7	
Level of Service		C			C			A			A	
Approach Delay (s)		29.5			31.0			4.2			2.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		3.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.49										
Actuated Cycle Length (s)		70.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		54.7%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Bradford St & Future Site Dwy

Future Total PM - Signal

2038 Horizon Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	55	50	70	1085	1135	100
Future Volume (Veh/h)	55	50	70	1085	1135	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	54	76	1179	1234	109
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				99	83	
pX, platoon unblocked	0.90	0.83	0.83			
vC, conflicting volume	2038	680	1351			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1175	194	1006			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	59	92	87			
cM capacity (veh/h)	146	674	572			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	114	469	786	823	520	
Volume Left	60	76	0	0	0	
Volume Right	54	0	0	0	109	
cSH	232	572	1700	1700	1700	
Volume to Capacity	0.49	0.13	0.46	0.48	0.31	
Queue Length 95th (m)	19.8	3.6	0.0	0.0	0.0	
Control Delay (s)	34.6	3.8	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	34.6	1.4		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay		2.1				
Intersection Capacity Utilization		82.8%		ICU Level of Service		E
Analysis Period (min)		15				

Appendix H:

OTM Signal Warrant Worksheets



Input Data Sheet

[Analysis Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)
[GO TO Justification:](#)

What are the intersecting roadways?

Bradford Street / John Street

What is the direction of the Main Road street?

North-South

When was the data collected?

2023-09-13

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road?

2 or more

b.- Number of lanes on the Minor Road?

1

c.- How many approaches?

4

d.- What is the operating environment?

Urban

Population >= 10,000

AND

Speed < 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	5	565	5	5	0	5	0	590	0	15	0	10	0
8:00	0	865	15	5	5	0	5	740	5	15	0	5	0
9:00													
10:00													
15:00													
16:00													
17:00	5	1,040	35	5	5	5	10	1,235	5	20	10	10	0
18:00	5	1,130	35	5	5	5	10	1,055	5	20	5	10	0
Total	15	3,600	90	20	15	15	25	3,620	15	70	15	35	0

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptible to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Bradford Street / John Street

Count Date: 2023-09-13

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00				
	☐	☐	☐	☒												
1A	480	720	600	900	1,200	1,660	0	0	0	0	2,385	2,290	40050			
	COMPLIANCE %				100	100	0	0	0	0	100	100				
1B	120	170	120	170	35	30	0	0	0	0	55	50				
	COMPLIANCE %				21	18	0	0	0	0	32	29			10013	
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒	Yes ☐	No ☒

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☒	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00	400	50		
2A	480	720	600	900	1,165	1,630	0	0	0	0	2,330	2,240			147	18
COMPLIANCE %				100	100	0	0	0	0	100	100					
2B	50	75	50	75	20	25	0	0	0	0	35	30	147	18		
	COMPLIANCE %				27	33	0	0	0	0	47	40				
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒	Yes ☐	No ☒

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☒	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒	NOT JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	7:00	1,165	25	145	17 %	25 %
	8:00	1,630	20	115	17 %	
	17:00	2,330	40	115	35 %	
	18:00	2,240	35	115	30 %	

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Bradford Street / John Street

Count Date: 2023-09-13

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use						
Source: ITE Trip Generation Manual, 11th Edition						
Land Use Code	222			222		
Land Use	Multifamily Housing (High-Rise)			Multifamily Housing (High-Rise)		
Subcategory	Close to Rail Transit			Close to Rail Transit		
Setting	General Urban/Suburban			Dense Multi-Use Urban		
Time Period	Weekday			Weekday		
# Data Sites	2			8		
	% of 24-Hour Vehicle Trips			% of 24-Hour Vehicle Trips		
Time	Total	Entering	Exiting	Total	Entering	Exiting
12:00 - 1:00 AM	1.1%	1.4%	0.9%	0.8%	1.4%	0.3%
1:00 - 2:00 AM	0.9%	1.1%	0.6%	0.5%	0.7%	0.4%
2:00 - 3:00 AM	0.7%	0.9%	0.6%	0.6%	0.6%	0.7%
3:00 - 4:00 AM	0.4%	0.5%	0.3%	1.1%	0.4%	1.8%
4:00 - 5:00 AM	0.6%	0.4%	0.8%	1.2%	0.6%	1.9%
5:00 - 6:00 AM	1.1%	0.3%	2.0%	1.3%	0.4%	2.2%
6:00 - 7:00 AM	3.2%	1.1%	5.4%	3.8%	1.0%	6.4%
7:00 - 8:00 AM	6.7%	2.2%	11.3%	8.6%	2.0%	15.0%
8:00 - 9:00 AM	7.7%	2.1%	13.4%	8.8%	2.4%	14.9%
9:00 - 10:00 AM	4.2%	1.9%	6.6%	5.2%	2.2%	8.1%
10:00 - 11:00 AM	2.9%	2.0%	3.8%	3.2%	2.2%	4.3%
11:00 - 12:00 PM	2.8%	2.6%	3.0%	3.0%	2.4%	3.5%
12:00 - 1:00 PM	2.9%	2.7%	3.0%	3.6%	3.5%	3.7%
1:00 - 2:00 PM	4.2%	4.2%	4.3%	4.2%	4.5%	4.0%
2:00 - 3:00 PM	4.0%	4.5%	3.5%	4.2%	4.3%	4.0%
3:00 - 4:00 PM	5.6%	6.1%	5.1%	4.7%	6.0%	3.5%
4:00 - 5:00 PM	7.0%	9.1%	4.9%	6.4%	9.3%	3.5%
5:00 - 6:00 PM	8.6%	11.4%	5.9%	8.5%	12.5%	4.6%
6:00 - 7:00 PM	9.3%	12.2%	6.5%	9.0%	11.9%	6.2%
7:00 - 8:00 PM	8.1%	10.3%	5.9%	7.1%	9.4%	4.8%
8:00 - 9:00 PM	6.1%	7.7%	4.6%	5.2%	7.7%	2.6%
9:00 - 10:00 PM	5.0%	6.5%	3.5%	4.3%	6.9%	1.6%
10:00 - 11:00 PM	4.0%	5.4%	2.6%	3.0%	4.8%	1.2%
11:00 - 12:00 AM	2.6%	3.4%	1.8%	1.8%	2.9%	0.7%

9.3%

Time (Hour starting)	Num	Percent of Daily Traffic Two-way	Percentage Two-way
0:00	1	1.1%	12%
1:00	1	0.9%	9%
2:00	1	0.7%	8%
3:00	1	0.4%	4%
4:00	1	0.6%	6%
5:00	1	1.1%	12%
6:00	1	3.2%	34%
7:00	1	6.7%	72%
8:00	1	7.7%	83%
9:00	1	4.2%	45%
10:00	1	2.9%	31%
11:00	1	2.8%	30%
12:00	1	2.9%	31%
13:00	1	4.2%	45%
14:00	1	4.0%	43%
15:00	1	5.6%	60%
16:00	1	7.0%	75%
17:00	1	8.6%	93%
18:00	1	9.3%	100%
19:00	1	8.1%	87%
20:00	1	6.1%	66%
21:00	1	5.0%	54%
22:00	1	4.0%	43%
23:00	1	2.6%	28%
MAX		9.3%	

Existing (Raw Counts from Spectrum)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
7:15	0	53	1	1	43	0	1	0	2	5	0	2
7:30	1	55	0	0	67	0	0	0	1	2	0	3
7:45	1	75	1	1	84	0	1	0	2	4	0	2
8:00	1	107	1	0	106	1	1	0	1	2	0	1
8:15	1	115	5	1	93	2	0	0	1	1	0	0
8:30	0	129	2	0	90	1	3	0	1	6	0	3
8:45	0	118	5	3	98	0	0	0	1	2	0	0
9:00	1	121	5	0	108	0	0	0	0	4	0	3
16:15	0	118	7	0	168	0	1	0	4	5	1	2
16:30	0	141	6	2	160	0	0	1	0	4	0	1
16:45	0	125	9	0	180	0	0	0	1	4	2	0
17:00	2	177	7	1	179	0	0	0	2	4	0	0
17:15	0	161	8	1	175	0	1	0	1	4	0	1
17:30	0	160	6	0	143	0	1	0	2	6	1	2
17:45	0	138	9	3	126	0	0	0	4	4	0	1
18:00	1	128	6	2	108	0	0	0	1	1	0	1

Existing												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00	5	290	5	0	300	0	5	0	5	15	0	10
9:00	0	485	15	5	390	5	5	0	5	15	0	5
17:00	5	565	35	10	690	5	5	5	10	20	10	10
18:00	5	590	35	10	555	5	5	5	15	20	5	10

Corridor Growth (2028)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00		5			5							
9:00		10			5							
17:00		30			55							
18:00		30			45							

Corridor Growth (2033)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00		80			75							
9:00		130			100							
17:00		185			250							
18:00		185			200							

Corridor Growth (2038)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00		130			80							
9:00		215			105							
17:00		245			400							
18:00		255			320							

Background Traffic (2028)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00		80			60							
9:00		90			70							
17:00		75			65							
18:00		95			80							

Temporal Variation

72% *Values calculated from AM ratio of Temporal Variation

83% Peak Hour Data

75% *Values calculated from PM ratio of Temporal Variation

93% Peak Hour Data

Background Traffic (2033)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00		80			60							
9:00		90			70							
17:00		75			65							
18:00		95			80							

Temporal Variation

72% *Values calculated from AM ratio of Temporal Variation

83% Peak Hour Data

75% *Values calculated from PM ratio of Temporal Variation

93% Peak Hour Data

Background Traffic (2038)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00		130			150							
9:00		150			175							
17:00		170			120							
18:00		210			150							

Temporal Variation

72% *Values calculated from AM ratio of Temporal Variation

83% Peak Hour Data

75% *Values calculated from PM ratio of Temporal Variation

93% Peak Hour Data

Site Traffic												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00		15			60							
9:00		15			70							
17:00		60			25							
18:00		75			30							

Temporal Variation

72% *Values calculated from AM ratio of Temporal Variation

83% Peak Hour Data

75% *Values calculated from PM ratio of Temporal Variation

93% Peak Hour Data

Future Total Traffic (2028)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00	5	390	5	0	425	0	5	0	5	15	0	10
9:00	0	600	15	5	535	5	5	0	5	15	0	5
17:00	5	730	35	10	835	5	5	5	10	20	10	10
18:00	5	790	35	10	710	5	5	5	15	20	5	10

Future Total Traffic (2033)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00	5	465	5	0	495	0	5	0	5	15	0	10
9:00	0	720	15	5	630	5	5	0	5	15	0	5
17:00	5	885	35	10	1030	5	5	5	10	20	10	10
18:00	5	945	35	10	865	5	5	5	15	20	5	10

Future Total Traffic (2038)												
Time Ending	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
8:00	5	565	5	0	590	0	5	0	5	15	0	10
9:00	0	865	15	5	740	5	5	0	5	15	0	5
17:00	5	1040	35	10	1235	5	5	5	10	20	10	10
18:00	5	1130	35	10	1055	5	5	5	15	20	5	10

4-Hour Volume

Future Total Traffic (2028)			
Time Ending		Major	Minor
8:00		825	35
9:00		1160	30
17:00		1620	60
18:00		1555	60
Total		5160	185

Future Total Traffic (2033)			
Time Ending		Major	Minor
8:00		970	35
9:00		1375	30
17:00		1970	60
18:00		1865	60
Total		6180	185

Future Total Traffic (2038)			
Time Ending		Major	Minor
8:00		1165	35
9:00		1630	30
17:00		2330	60
18:00		2240	60
Total		7365	185