1120 Cooke Boulevard (Phase 2)
Proposed Mixed-Use Development
Traffic Impact Study

City of Burlington

Official Plan Amendment (OPA) / Zoning By-law Amendment (ZBA)

Prepared For: Adi Developments (Masonry) Inc.

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1.0 INTRODUCTION

BA Group has been retained by Adi Developments (Masonry) Inc. (referred to herein as the "client") to provide transportation consulting services in relation to an Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) applications for the lands located at 1120 Cooke Boulevard (herein referred to as the "site") in the City of Burlington, formerly identified as Phase 2 of 101 Masonry Court lands. Phase 1 consists of 425 units (140 stacked townhouses, 58 back-to-back townhouses, 35 regular townhouses, 172 apartment units and 20 rear lane townhouses) is registered and closed.

The site is located on the north-east corner of the Waterdown Road and Masonry Court intersection. The site is approximately 9,477 m^2 / 14,889.58 ft^2 in size and is bounded by Waterdown Road to the west, Masonry Court to the south, Cooke Boulevard to the east and a rail corridor for GO Trains operated by Metrolinx to the north.

The site location and context are illustrated in **Figure 1** and **Figure 2**, respectively.

The site is currently vacant with vehicle access located on Masonry Court. Pedestrian sidewalks are available along the southern boundary of the site. The City of Burlington Zoning By-law 2020 designates the site as a Mixed-Use Corridor Zone-commercial oriented (MXC-26), bordered by general employment (GE1 and GE2) zones immediately to the north, east and west and Mixed-Use Corridor Zone-employment oriented (MXE) to the south.

1.1 THIS STUDY

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

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

- A description of the existing transportation context of the site including vehicular, transit, cycling and pedestrian accessibility;
- A review of vehicle parking, bicycle parking and loading requirements specified by the applicable Zoning By-law;
- A review of the functionality and appropriateness of the proposed new driveway in regard to the accommodation of service vehicles, and refuse collection vehicles;
- A Transportation Demand Management (TDM) framework plan that is focused on reducing single occupancy travel and promoting more sustainable modes of travel;
- An assessment of existing traffic volumes on the area road system surrounding the proposed development;
- A comprehensive review of traffic changes that may occur due to corridor traffic growth along Waterdown Road;
- An assessment of the trip generation characteristics of the proposed development;
- A review of weekday peak hour traffic operations under existing and future conditions under the following analysis horizon years:
    - Existing traffic conditions (2021);
    - Traffic projections have been prepared for a 5-year build-out (2026), anticipated site build-out and fully occupied; and

    - In accordance with MTO requirements, traffic volumes have forecast for future background and future total conditions for 5-year beyond build-out (2031) and 10-year beyond build-out (2036); and
- An assessment of the operational impacts of the proposed development at the study area intersections.

1.2 BACKGROUND

1.2.1 Area Background Studies

1.2.1.1 Draft Aldershot GO Mobility Hub

The City of Burlington initiated the Burlington GO Mobility Hub Study in 2017. In early 2019, the Mobility Hubs Study was paused in order to advance other initiatives that would impact its outcome including updates to the Burlington Official Plan and the Halton Regional Municipal Comprehensive Review ("MCR"). As an outcome of the Region of Halton's MCR, formally delineated boundaries for Major Transit Station Areas and minimum density targets for all Halton Region MTSAs including Aldershot GO have been prepared in the draft ROPA 48.The subject site is part of the Draft Aldershot GO Mobility Hub study area, which sets forth the vision for future development in this area of Burlington.

On May 17, 2021, a council workshop was held to obtain feedback on the scope and the timing. On June 8, 2021, a draft workplan was delivered by City Staff and passed authorizing the advancement of the study. It is estimated by June 2022, Burlington City Council will vote to adopt the amendments as suggested in the Draft Aldershot GO Mobility Hub report. A road network and associated policies are provided within the study, which identifies the future area road network system.

When the Mobility Hub Study was paused, the City of Burlington had prepared a Draft Precinct Plan for the Aldershot GO Mobility Hub. In the draft plans, the site is located within the area that is identified as the Aldershot GO Central Precinct and will accommodate the most significant concentration of residential, retail and commercial uses which will contribute towards the creation of complete transit-oriented community and achieve high degree of compatibility with adjacent lands uses and transportation infrastructure. The Draft Aldershot GO Mobility Hub report is attached in **Appendix A**.

The context of the Draft Aldershot GO Mobility Hub study area is shown in **Figure 3** and **Figure 4**.

1.2.1.2 QEW and Highway 403 Freeman Interchange Preliminary Design Study and Class Environmental Assessment

The MTO undertook a Preliminary Design and Class Environmental Assessment (EA) Study for the Queen Elizabeth Way (QEW). The site is located within the study limit for the Highway 403 improvement area. The context of that study area is shown in **Figure 5**. The five (5) arterial road interchanges studied are Guelph line, Brant Street, Plains Road / Fairview Street, North Shore Boulevard East and Waterdown Road. It is noted in the EA study that the scope of this EA study looked at increasing the number of lanes on Highway 403. However, it did not review the interchange design specific to Waterdown Road.

1.2.1.3 Burlington Investment Profile: 403 West Corridor and QEW Prosperity Corridor Study

In the Burlington Investment Profile document, 403 West Corridor and QEW Prosperity Corridor are two (2) of the investment districts listed. The site is located within the study boundary of the Highway 403 West Corridor Investment district as shown in **Figure 6**.

The City of Burlington, Region of Halton and the Ministry of Transportation are jointly undertaking the QEW Prosperity Corridor Block Planning and Implementation Study that will identify infrastructure needs within development corridors to facilitate and expedite the development review process.

1.2.1.4 2020 Operating and Capital Budget

The Burlington 2020 Operating and Capital Budget identifies widening of the Waterdown Road bridge over Highway 403 to accommodate a 5-lane cross-section with on-road bike lanes and improved pedestrian facilities. The City identifies this widening to address existing capacity limitation along the bridge section and increases expected to vehicle, bus, cyclist and pedestrian activity around the Aldershot Mobility Hub.

1.2.2 Site Background Studies

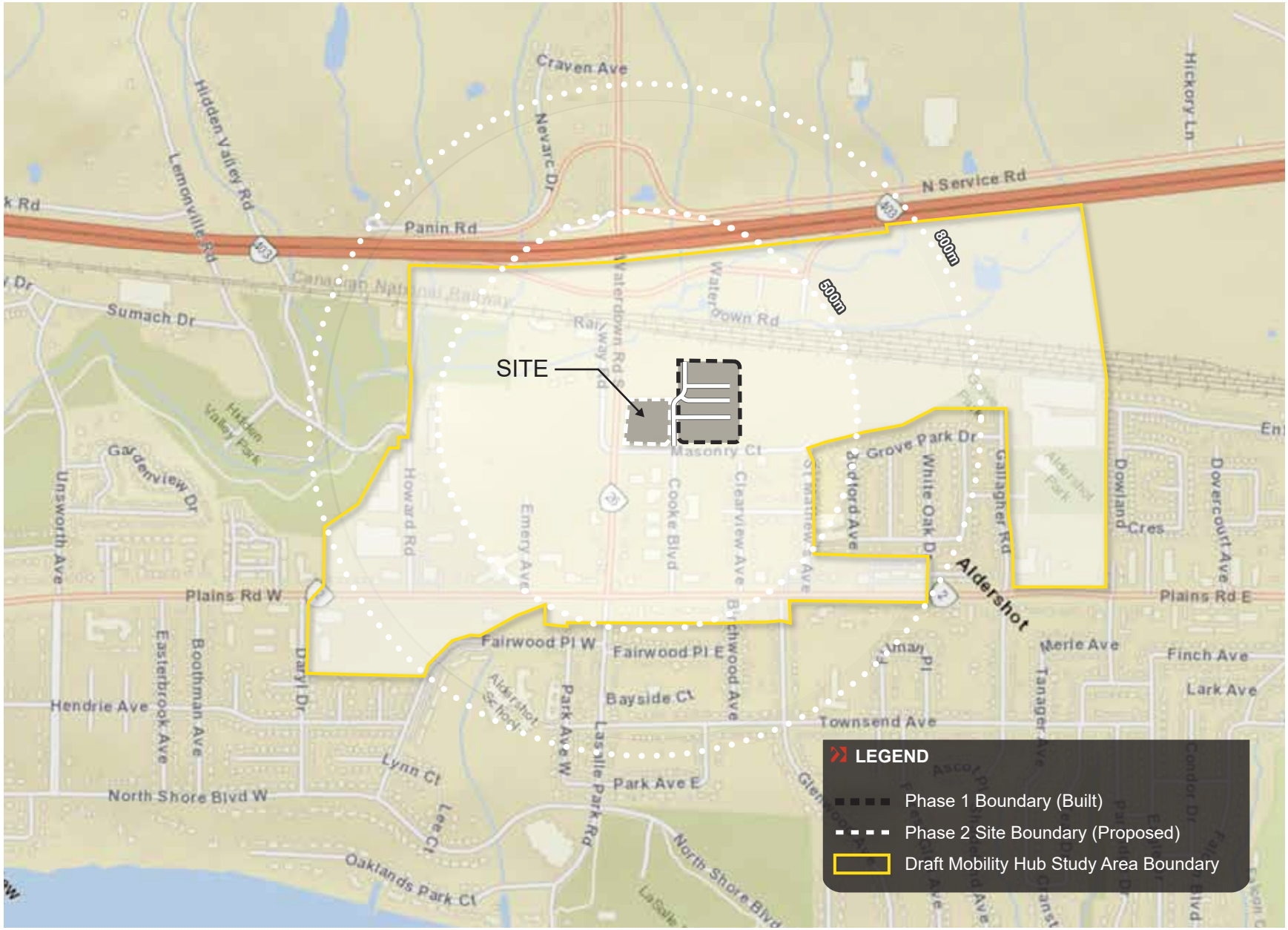
The proposed development is planned to be developed in two (2) phases. Phase 1 known as “101 Masonry Court – Phase 1” consists of 425 units that are registered and closed. From the total of 425 units, 140 are stacked townhouses, 58 back-to-back townhouses, 35 regular townhouses, 172 apartment units and 20 rear lane townhouses. Phase 2 of the proposed development will consist of 1,139 units within three (3) buildings. Phase 2 is to be constructed adjacent to the Phase 1 lands. The following sections gives a brief outline of the past studies submitted in relation to the site:

1.2.2.1 101 Masonry Court - Phase 1 TIS Report

Paradigm Transportation Solutions Limited was retained by Adi Developments (Masonry) Inc. to prepare a transportation impact study (TIS) on the residential development located at 101 Masonry Court in the City of Burlington (herein referred to as “Phase 1”). The TIS report titled “101 Masonry Court – Phase 1: Traffic Impact Study, Parking Study and TDM Options, City of Burlington” dated April 2016 discussed the development and its impacts on the existing road network. The development of Phase 1 is adjacent to the site, and is now fully built and occupied by residents.

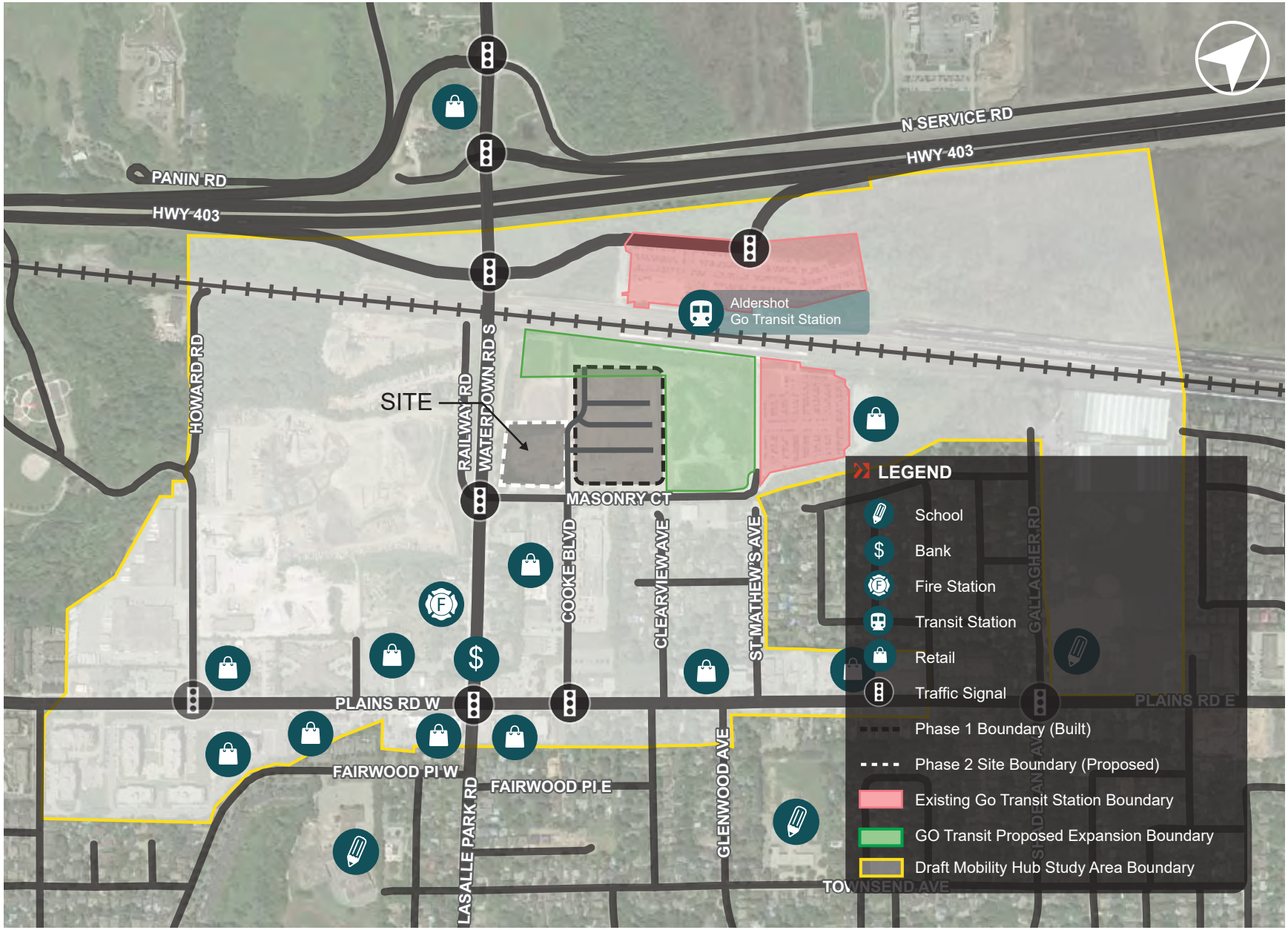
1.2.2.2 1120 Cooke Boulevard - Phase 2 Terms of Reference

BA Group has previously submitted a Terms of Reference (TOR) letter to the City of Burlington titled “Traffic Impact Study Scope for OPA/ZBA -1120 Cooke Boulevard” dated October 14, 2020. The letter described the proposed scope for this report. Following this submission, comments from the City of Burlington and Ministry of Transportation (MTO) were received and taken into account for this report. The terms of reference and comments from each agency are provided in **Appendix B.**



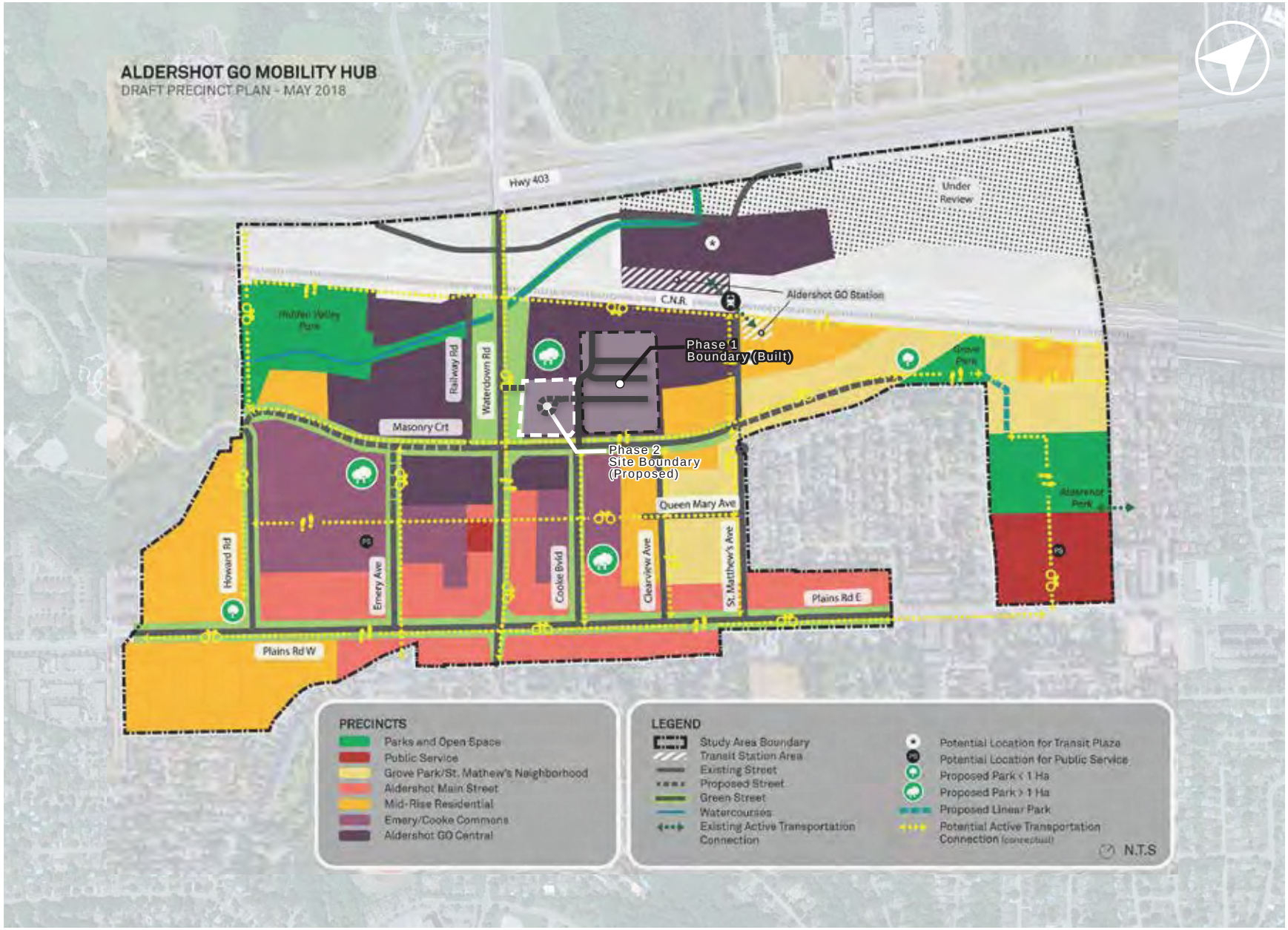
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FIGURE 1 SITE LOCATION



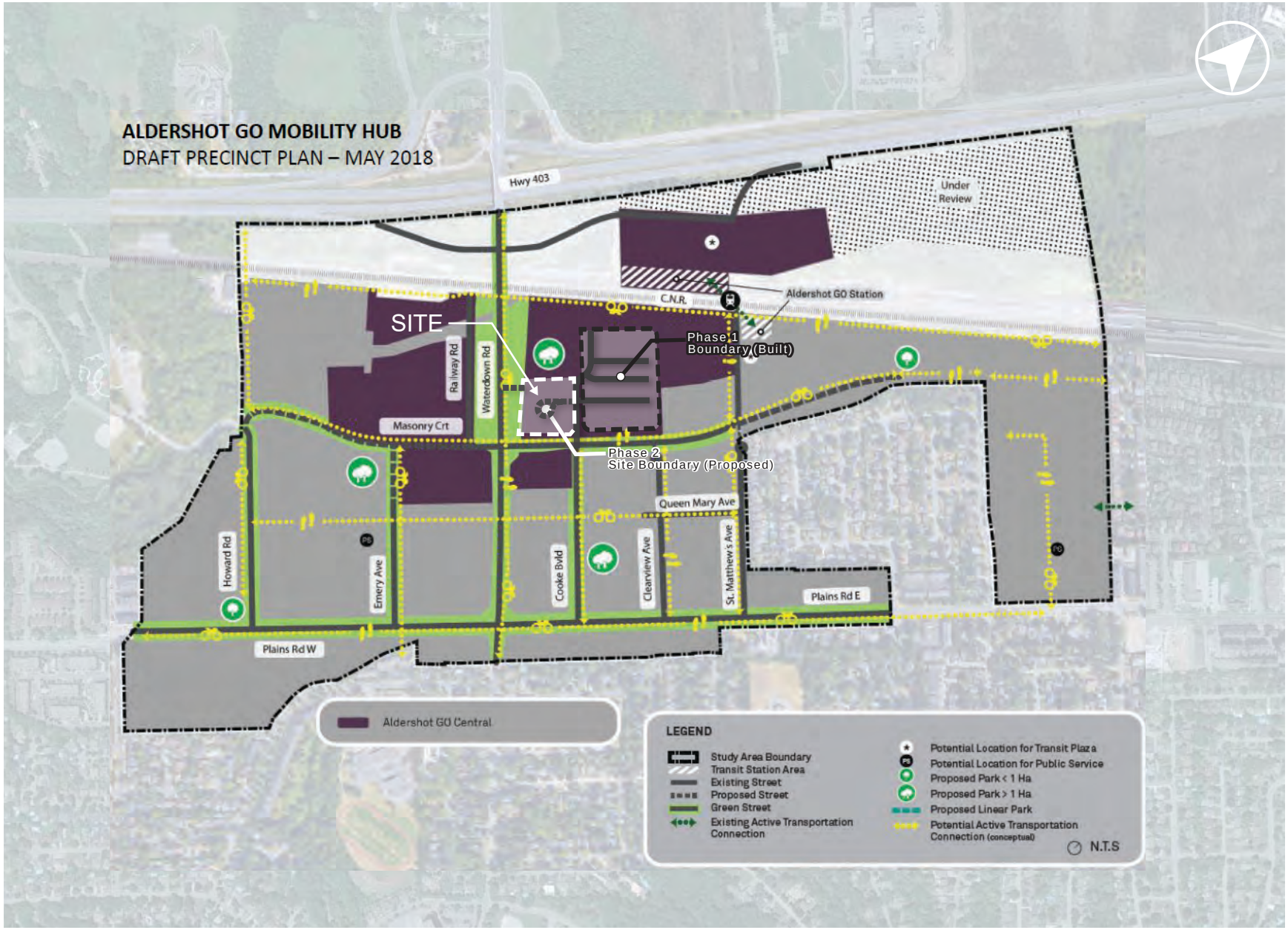
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FIGURE 2 SITE CONTEXT



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FIGURE 3 DRAFT ALDERSHOT GO MOBILITY HUB STUDY



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FIGURE 4 DRAFT ALDERSHOT GO CENTRAL PRECINCT

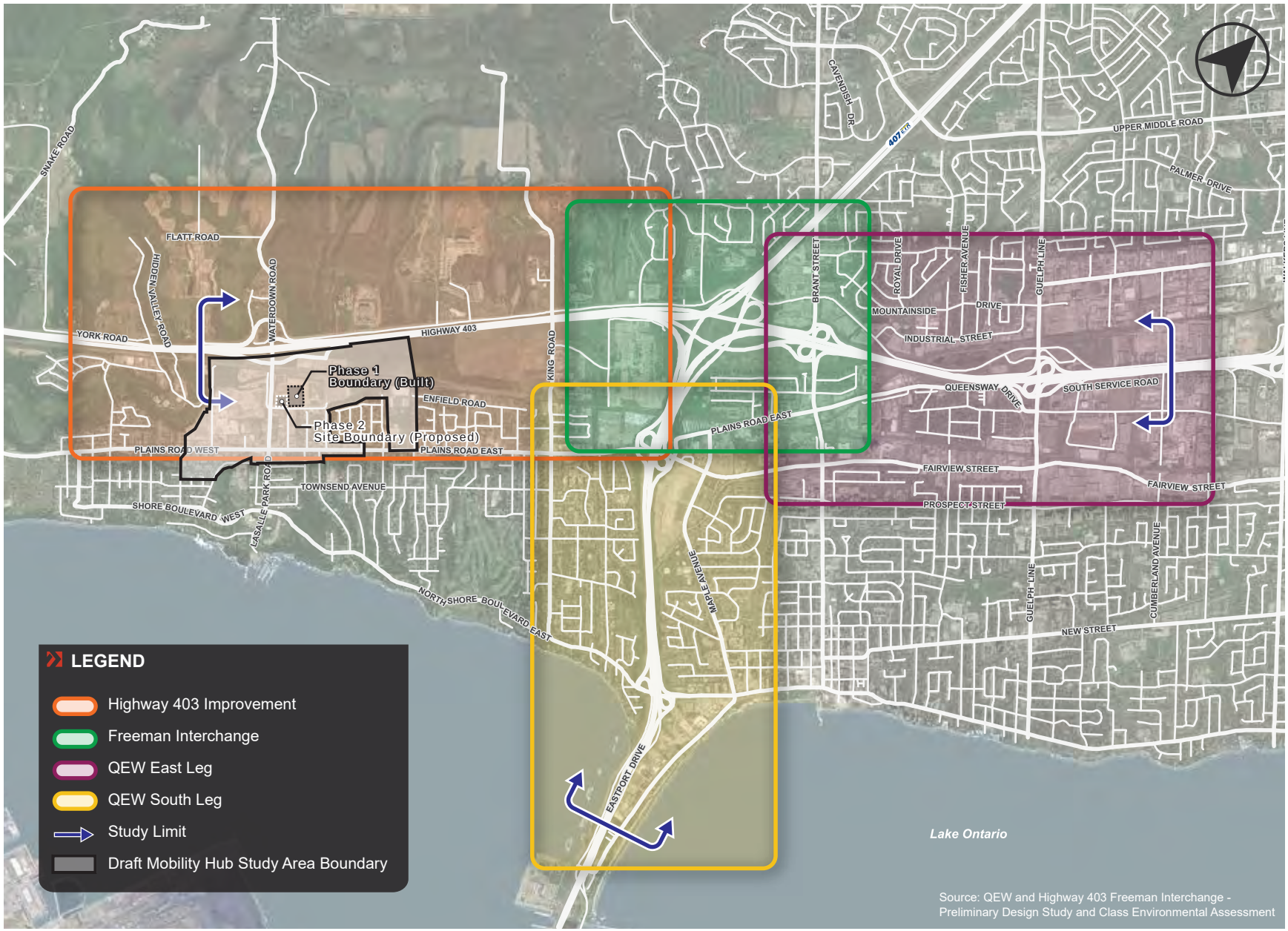


FIGURE 5 ENVIRONMENTAL ASSESSMENT STUDY LIMITS



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FIGURE 6 HIGHWAY 403 WEST CORRIDOR STUDY AREA

2.0 PROPOSED DEVELOPMENT

Phase 1 - Built

Phase 1 is an existing residential development adjacent to the subject lands for Phase 2. Phase 1 consists of 425 units. The units are a mix of: 140 stacked townhouses, 58 back-to-back townhouses, 35 regular townhouses, 172 apartment units and 20 rear lane townhouses. As part of Phase 1, a new street known as the Cooke Boulevard extension, was implemented extending north from Masonry Court / Cooke Boulevard to provide vehicular access to Phase 1 and Phase 2.

Phase 2 - Proposed

The development consists of three (3) residential high-rise buildings (Buildings A, B, and C) to accommodate 1,139 residential units including 424 one-bedroom units, 424 one-bedroom plus den units, 290 two-bedroom units and one (1) three-bedroom unit. A total of 1,031 vehicle parking spaces and 574 bicycle parking spaces are proposed to serve the development. 1,026 resident and resident visitor parking spaces will be provided in 5 levels of underground parking. Five (5) parking spaces will be provided on the ground floor for commercial-retail. Commercial-retail will be provided in Building B and will have a gross floor area (GFA) of 231.22 m^2.

The primary vehicular access to the development is proposed via a two-way, all-moves driveway connection from the Cooke Boulevard extension, which will operate as an unsignalized intersection with the driveway under STOP control. The driveway will provide access to the proposed parking garage, loading area and a pick-up and drop-off loop that serves all three buildings. A second right-turns only vehicular access is proposed on Waterdown Road.

Access for pedestrians is provided via sidewalks, walkways and direct lobby connections to the municipal sidewalks on Cooke Boulevard and Masonry Court.

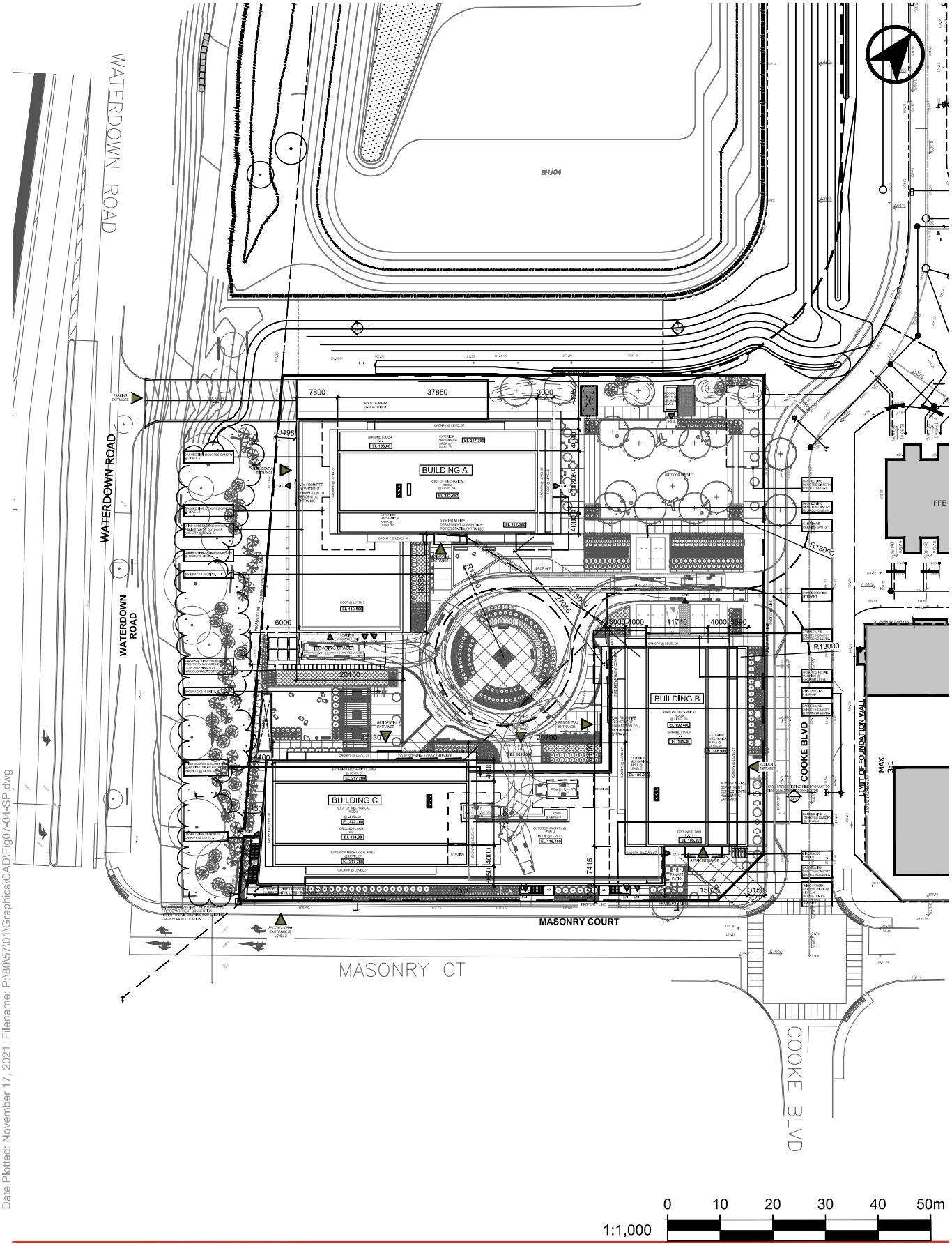
The proposed site plan is illustrated in **Figure 7** and the proposed road network is illustrated in **Figure 8**. The proposed development's statistics are summarized in **Table 1**.

A reduced set of architectural plans (not to scale) illustrating the ground floor and the parking level plans are provided in **Appendix C**.

TABLE 1 DEVELOPMENT PROPOSAL SUMMARY

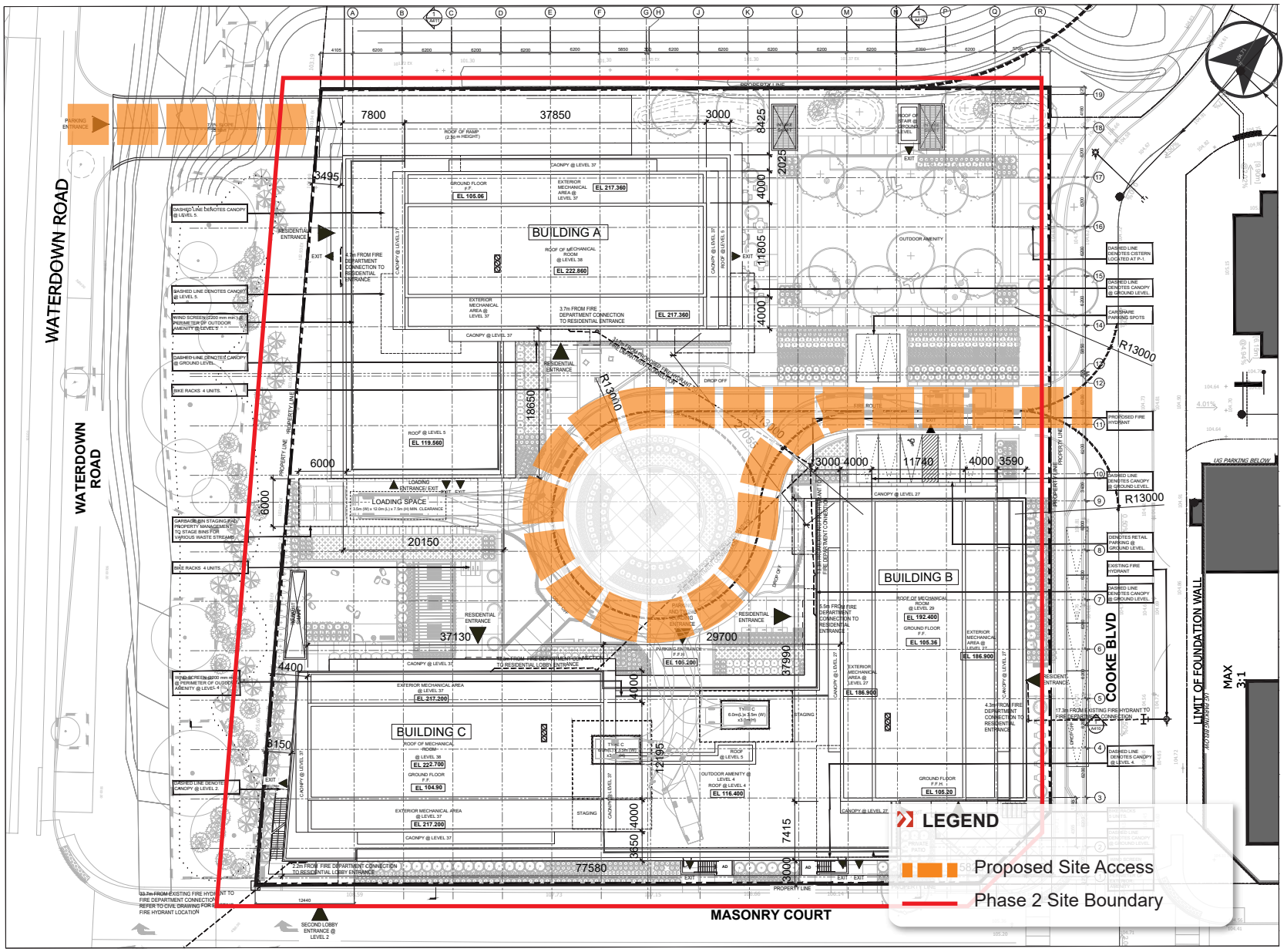
Use		Development Proposal[1]				
		Building A	Building B	Building C	Podium	Total
	Residential Units	442 units	242 units	384 units	71 units	1,139 units
	Commercial-Retail GFA	--	231.22 m^2	--	--	231.22 m^2
	Private Park	Accessible from both the new east-west private internal driveway from Waterdown Road and the new east-west private internal driveway from the Cooke Boulevard Extension.				
	Vehicular Parking	401 spaces	630 spaces		--	1,031 spaces
	Bicycle Parking	409 long term bicycle parking spaces on the ground level in 3 bicycle storage rooms 61 short term bicycle parking spaces on the ground level (34 spaces in one bicycle storage room, and 27 spaces in racks) 104 long term bicycle parking spaces located in 7 bicycle storage rooms through out P1-P4.				574 spaces
	Loading	1 space 3.5m (W) x 12m (L) x 7.5m,(H)	1 space 3.5m (W) x 6m (L) x 3m (H)	1 space 3.5m (W) x 6m (L) x 3m (H)	--	3 loading spaces
	Access	New east-west private internal driveway from Waterdown Road. New east-west internal driveway from Cooke Boulevard Extension.				

Notes:
1. Based upon site statistics provided by Core Architects Inc. dated October 7, 2021.



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FIGURE 7 SITE PLAN



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FIGURE 8 PROPOSED STREET NETWORK

3.0 TRANSPORTATION CONTEXT

3.1 ROAD NETWORK

3.1.1 Existing Area Road Network

A brief description of the existing roads within the vicinity of the site is provided in **Table 2**. Located in close proximity to a provincial highway and three arterial roads, the site is well-connected from a vehicular accessibility perspective.

Existing lane configurations in the vicinity of the site are shown in **Figure 9**.

TABLE 2 EXISTING AREA ROAD NETWORK

Street Name	Road Cross Section (Proximate to Site)	Parking/Traffic Regulations	Posted Speed	Description
Provincial Highway				
Highway 403	Three traffic lanes in each direction separated by a grass median strip.	--	100 km/h	Highway 403 is a provincial Highway aligned in an east-west direction. HWY 403 extends from the HWY 401/410/403 interchange in Mississauga in the east to HWY 401/403 interchange in Woodstock in the west. A full interchange is provide at Waterdown Road with all on-ramp and off-ramp intersections signalized.
Multi-Purpose Arterial				
Plains Road	Two traffic lanes in each direction with a centre two-way left-turn lane.	Parking prohibited at all times, except in designated lay-by areas.	60 km/h	Plains Road is a multi-purpose arterial generally aligned in an east-west direction. Plains Road East extends from Waterdown Road in the west to Queen Elizabeth Way in the east and Plains Road West extends from Waterdown Road in the east to York Road in the West.
Minor Arterial Roads				
Waterdown Road	Two traffic lanes in each direction with localized widening provided at intersections for turn lanes. On-street bicycle lanes provided in each direction.	Parking prohibited at all times.	50 km/h	Waterdown Road is a minor arterial road aligned in a north-south. Waterdown Road extends with Plains Road in the south to Mountain Brow Road in the north. South of Plains Road, Waterdown Road continues as Lasalle Park Road and north of Mountain Brow Road, Waterdown Road continues as Mill Street S.
North Service Rd	One traffic lane in each direction with localized widening provided at intersections for turn lanes. Paved shoulder provided in each direction.	--	60 km/h	North Service Road is a minor arterial road aligned in an east-west direction. North Service Road extends from Waterdown Road in the west to Burloak Drive in the east.
Collector Road				
South Service Road	Two traffic lanes in each direction	Parking prohibited at all times.	50 km/h	South Service Road is a collector road aligned in an east-west direction. South Service Road extends from Waterdown Road in the west to the Highway 403 EB on-ramp in the east.

Street Name	Road Cross Section (Proximate to Site)	Parking/Traffic Regulations	Posted Speed	Description
Local Roads				
Masonry Court	Single traffic lane in each direction with curbside parking lane on south side. Bicycle shared lane ('sharrow') markings on north side of road.	Parking permitted on south side of the road.	50 km/hr (unposted assumed)	Masonry Court is a local road aligned in an east-west direction. Masonry Court extends from Waterdown Road in the west to the Aldershot Station South Parking Lot in the east. West of Waterdown Road, Masonry Court continues as Railway Road.
Cooke Boulevard	Single traffic lane in each direction	Parking prohibited at all times, south of Masonry Court. Lay-by parking north of Masonry Court.-	50 km/hr (unposted assumed)	Cooke Boulevard is a local road aligned in a north-south direction. Cooke Boulevard extends from Plains Road East in the south to north of Masonry Court.
Emery Avenue	Single traffic lane in each direction	--	50 km/hr (unposted assumed)	Emery Avenue is a local road aligned in a north-south direction. Emery Avenue extends from Plains Road West in the south and terminates 100 m to the north.

3.1.2 Future Road Network

Numerous planning studies (completed and ongoing) set the framework for future road improvements within the area surrounding the site to address future roadway capacity constraints when considering the area growth in Burlington and to improve facilities for transit and active transportation. Important to note that the proposed development is that not the source to any of the planned road improvements within the area road network.

A description of the planned future road network within the vicinity of the site is provided in **Table 3**.

The planned improvements on Highway 403 are shown in **Figure 10**.

The planned improvements on Masonry Court and Emery Avenue within the Aldershot GO Mobility hub can be seen in **Figure 3** and **Figure 4**.

TABLE 3 FUTURE AREA ROAD NETWORK

Street Name	Proposed Improvements [1]	Source
Provincial Highway		
Highway 403	1 additional general purpose lane to be added in each direction by widening into the existing grass median. In addition, as there are presently capacity limitations along the bridge section over Highway 403, improvements are being considered by ongoing Prosperity Study. The improvements include providing a five-lane cross section with on-road bike lanes and improved pedestrian facilities.	Highway 403 Freeman Interchange Preliminary Design Study
Multi-Purpose Arterial		
Plains Road	Widen road cross-section to have a bicycle lane in each direction, create a raised median planter and add a curb-side parking lane on one side while maintaining the two travel lanes in each direction.	Plains Road Corridor Urban Design Guidelines – June 2006; and Aldershot GO Mobility Hub Draft Precinct Plan – May 2018 (attached in **Appendix A**)
Waterdown Road	The Burlington 2020 Operating and Capital Budget identifies widening of the Waterdown bridge over Highway 403 to accommodate a 5-lane cross-section with on-road bike lanes and improved pedestrian faciltities. The City identifies this widening to occur in 2028 to address existing capacity limitation along the bridge section and significant increases expected to vehicle, bus, cyclist and pedestrian activity around the Aldershot Mobility Hub. Specific improvements for this corridor are also under review as part of the ongoing Prosperity Corridor Study and Draft Aldershot Mobility Hub Secondary Plan.	Waterdown / Aldershot Transportation Master Plan
Collector Road		
South Service Road	South Service Road extension eastward from the Aldershot GO Station to Kind Road.	City of Burlington Roadway Capital Projects (2017-2026)
Local Roads		
Masonry Court	Proposed to be extended east past the Aldershot Station South Parking Lot to Grove park and extended west past Waterdown Road to connect to the Emery Avenue extension and connect to existing Howard Road with a potential active transportation connection.	Aldershot GO Mobility Hub Draft Precinct Plan – May 2018 (attached in **Appendix A**)
Emery Avenue	Proposed to be extended north up to the Masonry Court extension with a potential active transportation connection.	Aldershot GO Mobility Hub Draft Precinct Plan – May 2018 (attached in **Appendix A**)

Notes:
1. The planned road improvements are not a result due to the proposed development.

3.2 TRANSIT NETWORK

3.2.1 Existing Transit Network

The existing transit facilities provide reliable connections to the Downtown Burlington area, across the city, and connections to other cities as outlined in **Table 4**. As such, the level of transit accessibility provides a viable, non-automobile dependent travel mode choice for the tenants and visitors of the proposed building. This will serve to reduce private automobile usage for day to day travel and reduce parking demands. **Table 4** lists the transportation options available near the site.

The existing transit network in the vicinity of the site is shown in **Figure 11**.

TABLE 4 EXISTING AREA TRANSIT NETWORK

Route	Closest Stop	Headways[1]	Route Description
BUS			
1 – Plains	Waterdown Road / Plains Road intersection (~ 400 m)	10 minute intervals during the AM and PM peak hours	The 1 Plains bus route operates between the Central Hamilton area to Appleby GO Station, generally in an east – west direction by Burlington Transit. The route also connects to Burlington GO station.
4 – Central	Masonry Court / Waterdown Road intersection (~ 150 m)	60 minute intervals during the AM and PM peak hours.	The 4 Central bus route operates between Aldershot GO Station to Appleby GO Station, generally in an east-west direction by Burlington Transit. The route also connects to the Downtown Burlington Terminal providing numerous subsequent connections.
87 North Service - Aldershot	Aldershot GO station North Parking Lot North Lot (~ 900 m)	45 minute intervals during the AM and PM peak hours.	The 87 North Service – Aldershot route operates between Aldershot GO Station to Burlington GO Station generally in an east-west direction by Burlington Transit.
101 – Plains Express[2]	Waterdown Road / Plains Road intersection (~ 400 m)	---	The 101 Plains Express bus route operates between the Central Hamilton area to Burlington GO Station, generally in an east – west direction by Burlington Transit. The express route has 10 stops.
18 – Waterdown	Masonry Court / Railway Road / Waterdown Road intersection (~ 150 m)	30 minute intervals during the AM and PM peak hours.	The 18 Waterdown route operates between Aldershot GO Station and the Waterdown area, by Hamilton Street Railway. The route runs generally in a north-south direction along Waterdown Rd and then a in a loop around the Waterdown area.
TRAIN			
Lakeshore West	Aldershot GO Station South Parking Lot (~450 m)	15 - 30 minute intervals for EB direction during AM and WB direction for PM peak hours.	The Lakeshore West GO Train line operates from either West Harbour GO or Hamilton GO Centre to Union Station in Downtown Toronto. The Lakeshore West line provides connections to Hamilton, Oakville, Mississauga, and Toronto.
VIA Rail	Aldershot GO station North Parking Lot North Lot (1.0 km)	2 Eastbound and 2 Westbound trains daily	The VIA Rail line operates from Windsor to Union Station in Downtown Toronto. This train provides connections to Oakville, Brantford, Woodstock, London, and Chatham.
STATION			
Aldershot GO Station	South Lot (~ 450 m) North Lot (~ 1.0 km)	--	Further to the above mentioned transit services Aldershot GO Station, provides service to GO Bus 15 to Brantford Bus Terminal, 15A to McMaster University, GO Bus routes 18, 18B, 18C, 18E, 18F, and 18G providing connections between Hamilton GO Centre or West Harbour GO to union Station in Toronto.

Notes:
1. Based on most recent schedules available on transit websites during COVID-19 schedule modifications
2. Bus not in service due to COVID-19 schedule modifications

3.2.2 Future Transit Network

The Halton Region Transportation Master Plan (TMP) establishes plans for its future transit system in order to support population and employment forecasts to increase by 7% and 10% respectively from 2011 to 2031 in the City of Burlington, meet future transit mode share targets of 20% transit trips by 2031, and enhance the conventional transit system.

The focus of the improvements are both on external transit demand, making up transit trips going outside of the City as well as internal transit demand making up trips remaining within the City. Further to the enhancement of transit services, the Region acknowledges that a commitment to transit-supportive developments, policies and implementation of a transit supportive road network will help both accommodate and facilitate the forecasted future transit demands.

3.2.2.1 External Transit Network Improvements

Metrolinx is proposing to improve GO Transit train services along the Lakeshore West line with 15 minute service throughout the day between Toronto and Aldershot GO Station, and with hourly service between Hamilton and Toronto seven days a week.

Aldershot GO Station south parking lot expansion is expected to take place in two phases. Phase 1 will add 569 spaces by 2023 and Phase 2 will add 369 spaces by 2033 if needed.

3.2.2.2 Internal Transit Network Improvements

According to the City of Burlington Official Plan, Plains Road at Waterdown Road up to the CN rail bridge is identified as a frequent transit corridor and primarily mobility hub connector. As a result, there will be enhanced levels of transit service and complete streets to help provide a seamless integration between all mode of transportation.

Furthermore, the site is located within the primary growth area making the roads in the vicinity of the site priority on providing the most convenient and reliable transit service in the City. Municipal transit services and facilities growth will be focused on these areas.

3.3 ACTIVE TRANPROTATION NETWORK

3.3.1 Existing Active Transportation Network

The existing active transportation network and sidewalks support travelling to and from the site by walking or cycling. All bus stops within the vicinity of the site previously mentioned in **Table 4** are accessible via walking or cycling with the exception of the North Aldershot Lot which is currently only accessible via walking. The cycling accessibility to the Aldershot GO station is proposed to be resolved in the future with the extension of bike lanes along Waterdown Road.

In the vicinity of the site, sidewalks are provided along most of the road corridors. Sidewalks are provided on both sides of Plains Road and Waterdown Road up to Masonry Court. Sidewalks are provided on one side of Masonry Court, Cooke Boulevard, Emery Avenue, South Service Road, and one side of Waterdown Road north of Masonry Court.

The existing cycling network in the City is illustrated in **Figure 12**.

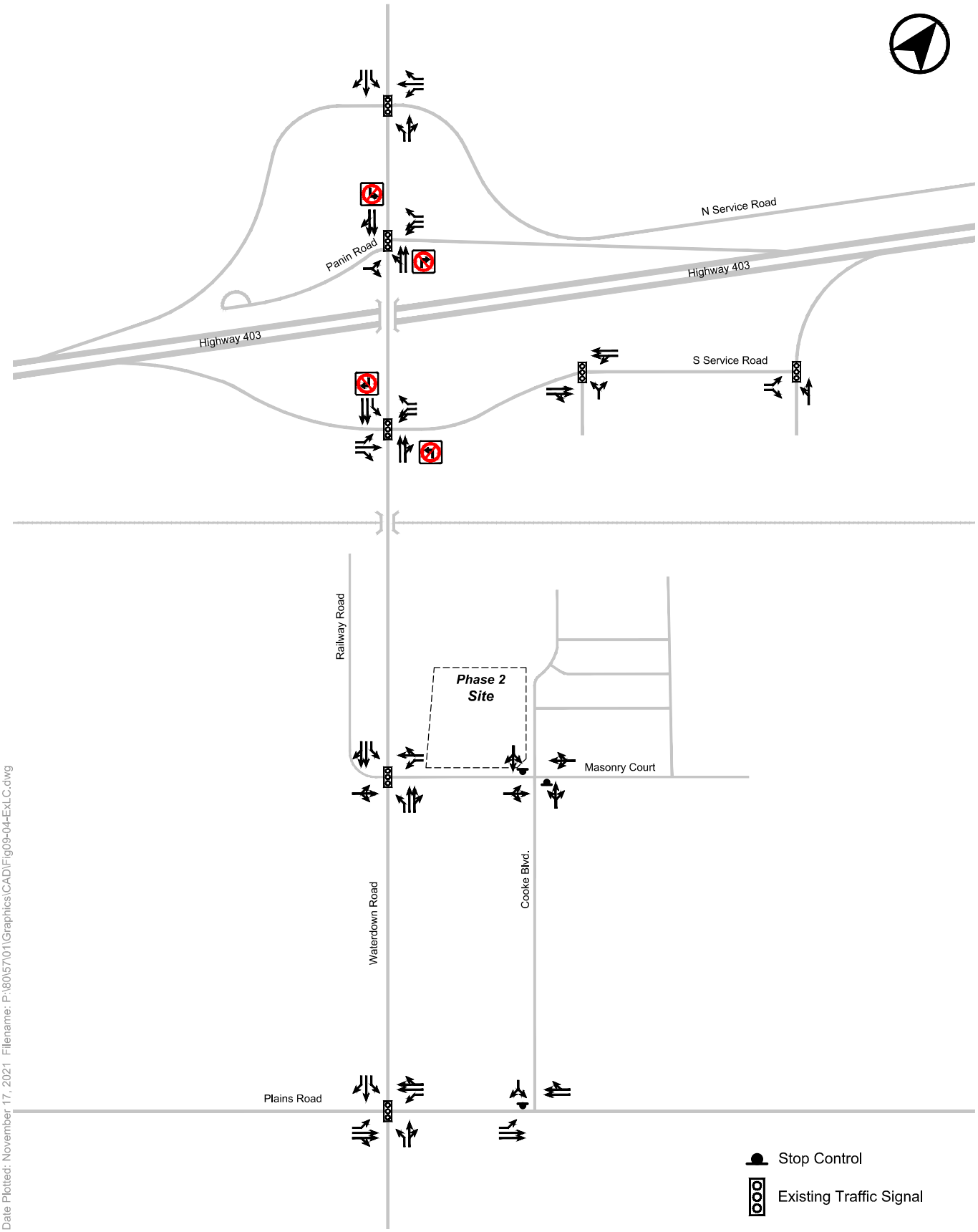
3.3.2 Future Active Transportation Network

The City of Burlington Cycling Plan proposes the expansion of the existing cycling network to provide options to encourage residents and visitors to use active transportation for a range of trip types and purposes. The proposed cycling network is illustrated in **Figure 13**.

The proposed improvements outlined in the cycling plan in close proximity to the site include:

- Protected bikeways along Plains Road, South Service Road and Waterdown Road up to the CN rail bridge;
- Multi-use trail along CN rail from Gallagher Rd to Howard Road;
- Highway interchange crossing along Waterdown from the CN rail bridge to North Service Rd;
- Local street 'bikeway' facility along Masonry Court, Cooke Boulevard (yet to be identified);
- Multi-use path along Waterdown Road north of North Service Road; and
- Painted bike lane along North Service Road.

The Draft Aldershot GO Mobility Hub study shows there will be numerous recreational, retail, commercial, and employment uses within walking or cycling distance from the site. The high level of proposed active transportation route integration surrounding the site, will offer an attractive and viable travel alternative for tenants and visitors of the proposed building. As such, reducing their need to use a private vehicle on a day-to-day basis.

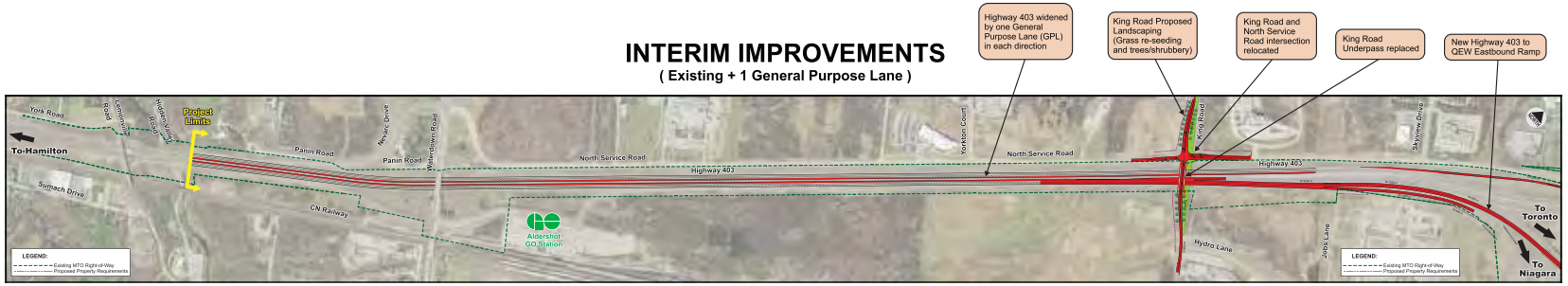


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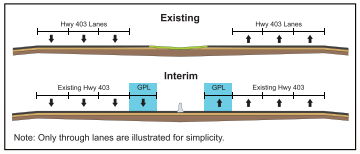
FIGURE 9 EXISTING LANE CONFIGURATION & TRAFFIC CONTROL

RECOMMENDED PLAN: HIGHWAY 403

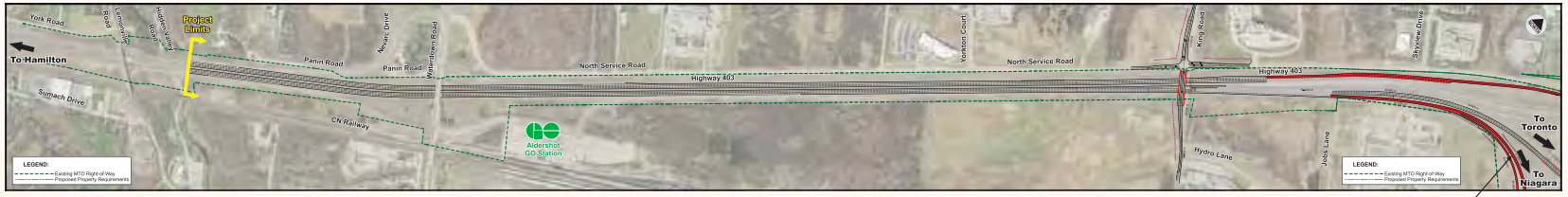
INTERIM IMPROVEMENTS
(Existing + 1 General Purpose Lane)



- Provide additional general purpose lane (GPL) in each direction on Highway 403 to Study Limits by widening into the median.
- Provide new ramp for Highway 403 to QEW eastbound movement to accommodate three lanes.
- Replace King Road Underpass to accommodate wider Highway 403. The existing bridge does not have adequate space for the widening.
- Existing partial illumination at Waterdown Road Interchange will be improved to full illumination (using typical light poles).



ULTIMATE IMPROVEMENTS
(Interim + Ramp Widening at Freeman Interchange)



- Highway 403 does not need to be widened again in the ultimate condition. The additional general purpose lane in each direction is anticipated to accommodate traffic capacity needs until project horizon.
- Widen the Highway 403 to QEW Southbound ramp to two lanes.

Source: QEW and Highway 403 Freeman Interchange: Preliminary Design Study and Class Environmental Assessment PIC #2, WSP
Date: September 10, 2019

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FIGURE 10 HIGHWAY 403 RECOMMENDED IMPROVEMENTS

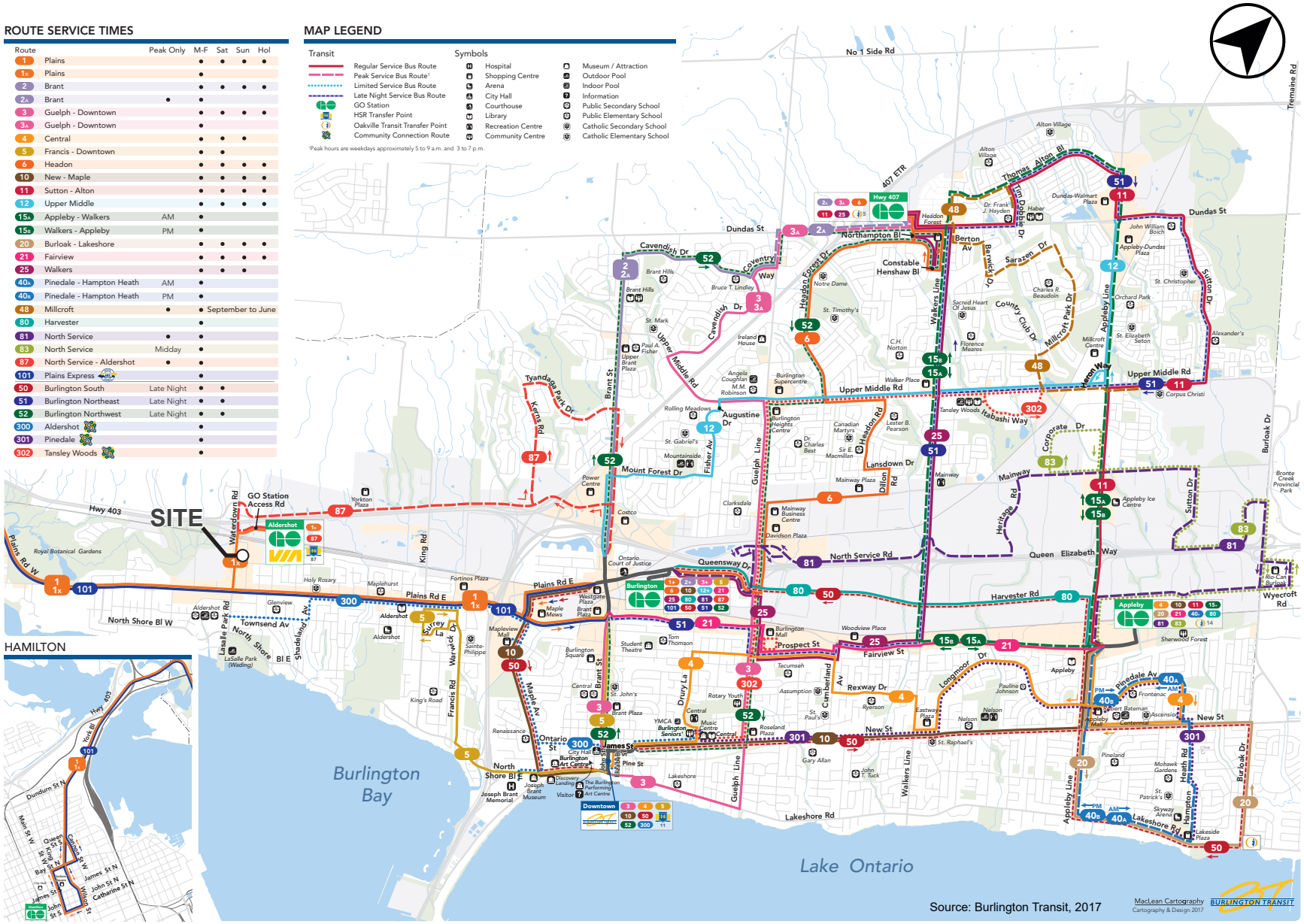


FIGURE 11 EXISTING AREA TRANSIT NETWORK



FIGURE 12 EXISTING CYCLING NETWORK



The development of trails (outside of the road right-of-way) are typically the responsibility of the Parks and Open Space, Capital Works department. The Cycling Plan identified these corridors as beneficial for connectivity and improved mobility for people cycling in Burlington. The feasibility, facility recommendations, including the surface type and implementation for these projects will be determined in consultation with the Transportation department to help advance cycling initiatives

Final rec... Street ar... Rural Burlington Active Transportation Strategy

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FIGURE 13 PROPOSED CYCLING NETWORK

4.0 VEHICLE PARKING CONSIDERATIONS

4.1 ZONING BY-LAW 2020 REQUIREMENTS

BA Group has undertaken a review of the prevailing Zoning By-law vehicle parking requirements as applicable to the site's location and proposed development. The site is subject to City of Burlington Zoning By-law 2020 for Mixed-Use Corridor Zone (MXG) designation.

Table 5 lists the minimum off-street vehicle parking requirements applicable to the site as set out in Zoning By-law 2020.

TABLE 5 ZONING BY-LAW 2020 MINIMUM VEHICLE PARKING REQUIREMENTS

Land Use / Unit Type	# of Units / GFA[1]	Minimum Parking Rate	Minimum Number of Parking Spaces
Residential			
1-Bedroom	848 units	1.25 spaces / unit	1,060 spaces
2-Bedroom	290 units	1.50 spaces / unit	435 spaces
3-Bedroom or more	1 unit	1.75 spaces / unit	2 spaces
Resident Sub-Total	**1,139 units**		**1,494 spaces (an effective parking rate of 1.31 spaces / unit)**
Non-Resident			
Residential Visitors	1,139 units	0.35 spaces / unit	399 spaces
Commercial-Retail[2]	231.22 m^2 GFA	3.5 spaces / 100 m^2 GFA	8 spaces
Non-Resident Sub-Total			**399 spaces**
Non-Resident Sub-Total with Sharing[2]			**399 spaces (an effective parking rate of 0.35 spaces / unit)**
SITE TOTAL			**1,893 spaces**

Notes:
1. Parking calculations are based upon site statistics provided by Core Architects Inc. dated October 7, 2021.
2. Zoning By-law 2020, Part 5, Section 4.6 – states that where a development is comprised of a mix of residential and non-residential uses, non-residential parking located on the same property as the residential uses may be counted toward required visitor parking for the residential use.

Based on the foregoing, the applicable Zoning By-law 2020 requires the provision of 1,541 resident parking spaces, 399 visitor parking spaces and eight (8) commercial-retail parking spaces for the site. Non-residential parking can be counted towards the required visitor parking for the residential use, therefore a total of 1940 spaces are required. The effective residential parking rate is 1.31 spaces / unit.

4.2 PROPOSED PARKING SUPPLY

The proposed parking supply is less than is required by Zoning By-law 2020 in accordance with the following parking supply standards:

- 924 parking spaces for the use of residents (0.8 resident parking rate)
- 107 parking spaces for residential visitors (0.10 resident visitor parking rate)

The appropriateness of the proposed parking supply is discussed in **Section 4.3**.

A total of 1,031 parking spaces are provided within a five (5) level underground parking garage. Out of the total, 107 of those parking spaces will be reserved for residential and commercial-retail visitors. Out of the 107 non-resident parking supply, five (5) parking spaces will be located on the ground floor.

The project incorporates a total of 35 accessible parking spaces distributed between the underground parking garage and the ground floor. One (1) accessible parking space is to be provided on the ground floor to serve the commercial-retail users/ residential visitors, the remainder will be distributed within the five (5) levels of the underground parking garage.

4.3 APPROPRIATENESS OF PROPOSED RESIDENT PARKING SUPPLY

The proposed parking supply with an effective residential parking rate of 0.8 spaces / unit is less than the required parking requirement of 1.31 spaces / unit.

A discussion and rationale is provided within the following sections regarding the appropriateness of the reduced parking supply for each use.

4.3.1 Resident Parking

The parking supply standards of Zoning By-law 2020 are considered to overstate the parking requirements of the proposed development, given the site's close proximity to higher-order transit service at Aldershot GO Station.

Adoption of a reduced series of parking standards are considered appropriate based upon the following considerations:

- the locational context of the proposed development, which is highly supportive of non-automobile modes of travel;
- the existing area travel characteristics being supportive of low automobile use;
- transportation planning principles supporting a reduced parking supply to change travel behaviour;
- recent resident parking reduction approvals obtained for residential buildings located within close proximity to an existing transit hub;
- a comparison of municipalities' parking standards for both resident and resident visitor parking; and
- a series of Transportation Demand Management (TDM) measures incorporated in the development, designed to support the use of non-automobile travel modes.

The following is an overview of the contextual factors that influence residential parking demand in the vicinity of the site and that provide a rationale for a reduced resident parking supply requirement for the development.

4.3.1.1 Existing and Evolving Transportation Context

The site enjoys a high level of transit accessibility given its proximity to the Aldershot GO Station transit hub, which is serviced by GO Transit, VIA rail and local transit services. This connects the site with areas across the City and the wider region. The complete transportation context is provided in **Section 3.0**.

The site is approximately 1.0 kilometres (13 minutes walking distance) from the Aldershot GO Station north lot and 450 metres (6 minutes walking distance) from the Aldershot GO Station south lot, known as a Mobility Hub. The Aldershot GO station serves the Lakeshore West line connecting the Site to Hamilton, Oakville, Mississauga and Toronto. The VIA Rail is also located within the Aldershot GO Station providing connections to Oakville, Brantford, Woodstock, London and Chatham. Also important to note that with the planned expansion of Aldershot GO Station, the site will be in greater proximity to the expansion resulting a shorter walk time.

The site is also well-situated relative to surface transit routes. The site is located approximately 400 metres from the 1 Plains bus route and the 101 Plains Express bus route, 150 metres from the 4 Central bus route and the 18 Waterdown bus route, and 900 metres from the 87 North Service Aldershot bus route, all operated by Burlington Transit.

The site is adjacent to bicycle lanes along Waterdown Road. With proposed improvements outlined in the City of Burlington Cycling Plan, there will be protected bikeways along Plains Road, South Service Road, and Waterdown Road up to the CN rail bridge. In addition, there will be local street bikeways along Masonry Court and Cooke Boulevard. As per pedestrian infrastructure improvements, there will be a multi-use path along Waterdown Road, north of North Service Road. With these improvements, cycling and walking will be more desirable to reach transit stops and the Aldershot GO station.

4.3.1.2 Area Travel Characteristics

The Transportation Tomorrow Survey (TTS) is a comprehensive travel survey that is conducted in the Greater Toronto and Hamilton Area (GTHA) once every five years. The survey collects information on how members of a household use the transportation system and categorizes data by geographical zone.

A review of the 2016 TTS for the area surrounding the site revealed that while the majority of travel is conducted using an automobile, a considerable amount of home-based travel is conducted using transit and active transportation during the morning and afternoon peak periods. TTS Zones 4050, 4051, 4052, 4054, and 4055 were analyzed in order to determine peak period travel modes for residents in the area. The data is summarized in **Table 6**.

TABLE 6 AREA PEAK PERIOD TRAVEL MODE DISTRIBUTION

Weekday Peak Period	Auto Driver	Auto Passenger	Transit	Walk	Cycle	Total
AM	80%	11%	4%	1%	4%	100%
PM	76%	13%	5%	1%	4%	100%

Notes:
1. Travel mode split calculated for home-based trips within TTS 2001 Zones 4050, 4051, 4052, 4054, and 4055.
2. Based on 2016 TTS results for morning (6:00am – 8:59am) and evening (3:00pm – 5:59pm) peak periods.
3. "Home based trip" purposes considered.
4. Auto passenger trips include auto passenger, taxi passenger, and paid rideshare trips.

Based on the most recent 2016 Transportation Tomorrow Survey data, approximately 76-80% of all home-based trips taken during the weekday peak periods in the site's vicinity were undertaken by auto drivers. The provision of a parking space for 80% of the site's residents (i.e. 0.8 spaces per unit) is higher than the range of the percent of area residents that currently drive a vehicle to and from their home during the peak times, based on 2016 data.

The 21-24% of area residents that carpool, and use active transportation modes are supportive of a reduced parking standard, as it indicates that not all residents in the areas surrounding the site depend on the use of a personal automobile for their daily travel needs.

4.3.1.3 Transportation Planning Principles

Providing excessive vehicular parking encourages automobile ownership, which encourages single-occupant automobile commuting. Taking a holistic perspective of the overall transportation network, the simplest and most effective way to effect change in travel behaviour at the site level is to reduce the amount of available vehicular parking. While the consideration and implementation of various TDM initiatives are advised, these are always more effectively implemented in tandem with a limited vehicle parking supply. Providing a limited amount of vehicular parking is a direct incentive for residents to use sustainable transportation.

Moreover, Halton Region is currently undergoing an update to the Official Plan to account for Downtown Burlington Urban Growth Centre and Major Transit Station Area recognizing the importance of reducing our reliance on single-occupancy vehicles. To address this, Halton Region has worked with the City of Burlington to develop a joint Supplemental Discussion Paper dated October, 2020. Aldershot GO Station is a Major Transit Station Area as it serves the Lakeshore West line. In addition, Metrolinx completed the GO Rail

Station Access Plan in 2016 and aims to reduce the dependency on single-occupant vehicles, and direct transit supportive growth to existing GO Stations on the Lakeshore West GO rail corridor, including Aldershot GO Station.

4.3.1.4 Residential Parking Supply Reduction Approvals

There is a range of parking supplies and demands associated with residential buildings across Burlington, and the Greater Toronto and Hamilton Area. These parking demands have been changing (reducing) over recent years in response to the changing demographics, economic factors, city policies and planning, and the mobility choices of residents, in particular, within newer buildings.

Parking supply and subsequent demands have, more recently, become governed by a number of factors and influences not limited to:

- the location of a building;
- building characteristics and market positioning;
- geography;
- area demographics
- alternative area mobility options (i.e. transit, car-share, bike share); and
- proximity to services, employment centres, amenities and retail facilities.

These factors contribute towards the choices that residents make with respect to vehicular and non-vehicular use and their choice of building to rent within.

Given the preceding, parking provisions at a substantial proportion of new residential (notably condominiums) buildings in transit accessible areas of the City have been approved at levels that are less than the applicable Zoning By-laws (often by some margin). Such approvals have been secured through City Council, the former Ontario Municipal Board, the Local Planning Appeal Tribunal (LPAT) and the Committee of Adjustment (CoA).

A selection of examples of condominiums for which reduced overall resident parking supplies have been approved within the Greater Toronto Area and Burlington range from as low as 0.58 to 1.0 spaces / unit. These examples are listed in **Table 7**.

TABLE 7 APPROVED RESIDENTIAL PARKING REDUCTIONS IN CLOSE PROXIMITY TO GO STATIONS

Municipality	Address	Approved Residential Rate	Permission Granted Through	Closest Transit Station
City of Hamilton	98 James Street South	**0.47 spaces / unit**	City of Hamilton Zoning By-law 15-024	West Harbour GO Station (1.5 m from site)
	600 James Street North	**0.58 spaces / unit**	LPAT Case No. PL190517 Site Specific Zoning By-law 21-053-LPAT	West Harbour GO Station (900 m from site)
	175 Catharine Street South and 117 Forest Avenue	**0.65 spaces / unit**	City of Hamilton Zoning By-law 20-216	West Harbour GO Station (2.2 km from site)
	292 Macnab Street North	**0.74 spaces / unit**	City of Hamilton Zoning By-law No. 20-213	West Harbour GO Station (300 m from site)
City of Pickering	Universal City 6 (Bayly St / Liverpool Rd)	**0.71 spaces / unit**	City of Pickering Zoning By-law No. 7810/21	Pickering GO Station (540 m from site)
	Universal City 2 & 3 (Bayly St / Liverpool Rd)	**0.74 spaces / unit**	CofA Decision – P/CA 60/19	Pickering GO Station (540 m from site)
City of Burlington	2082, 2086, and 2090 James Street	**1.0 spaces / units**	LPAT Case No. PL200183 Site Specific By-Law 2020	Burlington GO Station (2.6 km from site)
	421 Brant Street	**1.0 spaces / units**	City Council May 22, 2018	Burlington GO Station (2.2 km from site)
	101 Masonry Court	**1.0 spaces / units**	Decision 540-02-A-127/15	Aldershot GO Station (1.1 km from site)
	4853 Thomas Alton Blvd.	**1.05 spaces / units**	LPAT Amendment 2020.371	Appleby GO Station (6 km from site)
City of Toronto	5365 Dundas Street West (Bloor St W / Kipling Ave)	**Bachelor: 0.6 spaces / unit 1-bd: 0.7 spaces / unit 2-bd: 0.9 spaces / unit 3-bd: 1.0 spaces / unit**	Site Specific By-Law 1268-2018	TTC Kipling Subway Station (Line 2) + Kipling GO Station (300 m from site)

4.3.1.5 Comparison of other Municipalities' Zoning By-law Parking Standards

In order to demonstrate that the Zoning By-Law 2020's parking standards are too high, BA Group has conducted a review of other municipalities' parking standards. **Table 8** provides a comparison of the minimum residential and residential visitor parking standards for a selection of Cities and Towns in the Greater Toronto and Hamilton Area.

Based upon the information below, the residential parking standards range from 0.7-1.5 spaces / unit. The proposed residential parking rate of 0.8 spaces / unit is therefore appropriate as it's in this range.

TABLE 8 COMPARISON OF ZONING BY-LAW PARKING STANDARDS

	City of Burlington	City of Hamilton	City of Pickering	City of Markham	City of Vaughan	Town of Oakville	Town of Milton	Town of Ajaxy	City of Mississauga[1]
Zoning By-law	City of Burlington Zoning By-law 2020	City of Hamilton Zoning By-Law 05-200 (Transit Oriented Corridor Zone)	Town of Pickering Zoning By-law 7553-17	City of Markham Parking Standards By-law 28-97	City of Vaughan Zoning By-law 1-88 (Vaughan Metropolitan Centre Zones)	Town of Oakville Zoning By-Law 2014-014 (Mixed Use Zones)	Town of Milton Zoning By-Law 016-2014 (Urban Zones)	Town of Ajax Zoning By-law 95-2003	Mississauga Zoning By-law 0225-2007
Minimum Resident Parking Standard (spaces/unit)	1B – 1.25 2B-1.50 3B-1.75 1.29 (Blended)	**Units < 50 m²** 1-12 - 0.00 13+ - 0.30 **Units > 50 m²** 1-12 - 0.00 13-50 - 0.50 51+ - 0.70 0.70 (Assume)	0.80	1.25	Studio - 1.00 1B - 0.70 2B - 0.90 3B - 1.00 0.90 (Blended)	1.25	1.50	1.50	A suggested minimum of 0.80
Minimum Visitor Parking Standard (spaces/unit)	0.35	No stated minimum	0.15	0.25	0.15	0.20	0.25	0.25	A suggested minimum of 0.15

Notes

1. The City of Mississauga is currently undergoing a Zoning By-law review to allow for a lower parking requirement. The draft Parking Regulations study titled "Parking Regulations: Draft Policy Directions for Consultation" dated May 14, 2021, states the suggested minimum parking rates for both residential and visitor.

4.3.1.6 Transportation Demand Management Plan

As outlined in **Section 7.0**, a Mobility Choice Travel Plan is proposed as part of the development as a method to reduce vehicular traffic and to reduce parking demand for the site.

Highlights of the Plan, in addition to the proposed parking supply reductions, are provided below:

- Implement a sales program providing unit purchasers the option of buying a parking space as not all units will have a parking space;
- A transit information screen will be provided in the buildings' lobbies to display real-time information on transit schedules, to promote transit use and convenience;
- Explore opportunities to offer car-share services on site providing at least two car-share vehicle parking spaces for residents;
- Providing bicycle parking spaces;
- A bicycle repair station will be provided on-site to facilitate convenient bicycle maintenance for residential visitors;
- Dedicated carpool parking spaces on site for commercial-retail uses and residential visitors will be explored; and
- Encourage a community marketing outreach event focused on disseminating information about sustainable travel options.

4.3.2 Non-Resident Parking

The site is proposed to be supplied with 102 non-resident parking spaces within the underground parking garage and five (5) non-resident parking spaces on the ground level to meet the combined commercial-retail users/employees and residential visitors' demands related to the proposed development. The Zoning By-law requirement of a visitor parking rate of 0.35 spaces/unit is excessive for a site located in a Mobility Hub in close proximity to a GO Station. The proposed visitor parking rate of 0.10 spaces/unit is considered appropriate based upon the following considerations:

- the existing and evolving transit context surrounding the site being highly supportive of non-automobile modes;
- transportation planning principles supporting a reduced parking supply to change travel behaviour;
- a comparison of municipalities' parking standards for both resident and resident visitor parking; and
- a series of Transportation Demand Management (TDM) measures incorporated in the development, designed to support the use of non-automobile travel modes.

A discussion surrounding the appropriateness of the proposed non-resident parking supply is provided in the following sections.

4.3.2.1 Existing and Evolving Transportation Context

As noted above in **Section 4.3.1.1**, the site is well situated in relation to higher order and surface transit routes, cycling routes and multi-use trails, which provide an environment that is highly supportive of the adoption of parking standards that are lower than the prevailing Zoning By-law requirements.

4.3.2.2 Comparison of other Municipalities' Zoning By-law Parking Standards

As previously mentioned in **Section 4.3.1.5**, BA Group has conducted a review of other municipalities' parking standards to demonstrate that the Zoning By-Law 2020's parking standards are too high. A review has resulted in a range of 0-0.25 resident visitor spaces / unit. The proposed resident visitor parking rate of 0.1 spaces / unit is appropriate as it falls within this range.

4.3.2.3 Available Public Parking within the Site Vicinity

Aldershot GO station South Parking lot currently contains 706 parking spaces. The parking lot is located 450 metres (5 minutes walking distance) from the site. There is also a planned expansion that is expected to occur in two (2) phases. Phase 1 will add 569 parking spaces by 2023 and Phase 2 will add 369 parking spaces by 2033, approximately 600 metres from the site. With the planned expansion, there will be numerous public parking opportunities for future residential visitors to utilize the parking lot for a limited period during evenings and weekends. On-street parking is also provided along Cooke Boulevard and Masonry Court.

4.3.2.4 Mobility Choice Travel Plan TDM Measure

As outlined above in **Section 4.3.1.6**, and detailed in **Section 7.0**, a Mobility Choice Travel Plan is proposed as part of the development, both as a method to reduce vehicular traffic but also to reduce parking demand. Included among the measures are "hard" infrastructure elements, integrated with the site plan, and "soft" strategies intended to promote sustainable transportation behaviour.

Highlights of the Plan, in addition to the proposed parking supply reductions, are provided below:

- A transit information screen will be provided in the buildings' lobbies to display real-time information on transit schedules, to promote transit use and convenience;
- Occasional visitor parking demands that exceed the proposed supply can be accommodated on the new public street system adjacent the project and within the existing GO Station parking lots. These lots will be underutilized on weekends and weekday evenings when residential visitor parking peaks; and
- Dedicated carpool parking spaces on site for commercial-retail uses and residential visitors will be explored.

5.0 LOADING CONSIDERATIONS

5.1 ZONING BY-LAW 2020 LOADING REQUIREMENTS

BA Group has assessed the service vehicle loading requirements for the proposed development. Application of the prevailing City of Burlington Zoning By-law 2020 to the proposed development results in a requirement of three (3) loading spaces. Loading space dimensions outlined in Halton Region's *Development Design Guidelines for Source Separation of Solid Waste* indicate the required dimensions of the loading space are 13m (L) x 4M(W) x 9m(H).

5.2 PROPOSED LOADING SUPPLY & FACILITIES

Three (3) loading spaces are proposed to meet the servicing the needs of the proposed development.

The proposed loading supply meets the requirements of the City of Burlington Zoning By-law 2020 and is considered appropriate on that basis.

One (1) loading space is proposed to serve each of the three (3) buildings. Two loading spaces with the dimensions of 6.0 m (L) x 3.5 m (W) x 3.0 (H) are serving Building B and C can be accessed directly from the new site driveway from the Cooke Boulevard Extension. These two (2) spaces will require to back directly into or out of the loading area to / from the site driveway. The third loading space with the dimensions of 12 m (L) x 3.5 m (W) x 7.5 m (L) is proposed to serve Building A and can be accessed from the new east-west site driveway off Waterdown Road. This loading space will require the servicing and waste vehicles to back directly into or out of the loading area to / from the site driveway.

A series of vehicle manoeuvring diagrams are provided in **Appendix D** illustrating the manoeuvring requirements of a recycling, front end garbage collection, and single unit truck.

5.2.1 Residential Waste Facilities

Residential waste collection for the proposed development will occur within the three (3) loading spaces.

A residential waste storage room is provided in Building A and Building C. Important to note that Building B has commercial-retail at-grade and thus the waste storage room will be shared between residents and commercial-retail.

5.2.2 Non-Residential Waste Facilities

Building C has a commercial-retail component to the building and therefore the loading space proposed on site will be shared between residents and commercial-retail to service waste collection.

6.0 BICYCLE PARKING CONSIDERATIONS

The City of Burlington Zoning By-law 2020 does not include requirements for the provision of bicycle parking spaces for residential buildings. However, planning documents, including the *Halton Region Active Transportation Master Plan* (May 2015) recognizes the benefits to including bicycle parking in order to provide residents with greater transportation options and reduce auto dependency.

The *Halton Region's Active Transportation Master Plan Design Toolbox* outlines planning and design guidelines for bicycle parking. Additionally, the *Burlington City-Wide Parking Standards Review*, a report prepared by IBI Group in July 2017 recommends the provision of bicycle parking for residential buildings and retail stores.

The City of Burlington Zoning By-law 2020 requires a total of two (2) spaces for the retail component.

As part of the proposed TDM measures for this site, the proposed development plans have identified 570 spaces long-term and 22 spaces short-term, which is equivalent to 0.50 spaces per unit long-term and 0.02 spaces per unit short-term, above and beyond the minimum requirements.

6.1 PROPOSED BICYCLE PARKING FACILITIES & SUPPLY

As part of the TDM plan, a bicycle parking supply of approximately 50% of the residential units is proposed, including 45% for the long-term residential bicycle parking spaces and 5% for the short-term residential parking spaces. The proposed development provides a total of 574 bicycle spaces, including 513 long term, 56 short term and five (5) outdoor commercial bicycle parking spaces.

Bicycle parking spaces will be provided on the ground floor and on the P1 level of the underground parking garage. A total of 104 residential long-term bicycle parking spaces are proposed to be located on the P1-P4 levels of the underground parking garage.

A total of 409 residential long-term bicycle parking spaces are proposed to be located on the ground floor, and can be accessed through the buildings' lobbies. A total of 56 residential short-term bicycle parking spaces and five (5) retail bicycle parking spaces are proposed for the site. From the total, six (6) exterior residential short-term bicycle parking spaces, five (5) retail short-term exterior bicycle parking spaces and 34 interior residential short-term bicycle parking spaces are proposed for Building B, eight (8) exterior residential short-term bicycle parking spaces are proposed for Building C and eight (8) exterior residential short-term bicycle parking spaces are proposed for Building A.

7.0 TRANSPORTATION DEMAND MANAGEMENT

Consistent with the objectives of the Halton Region Official Plan, a Transportation Demand Management (TDM) plan for the proposed mixed-use development is provided herein. The following outlines the proposed physical and operational strategies that complement the site design with the goal of encouraging a shift in the travel pattern of future residents to sustainable modes of transportation.

7.1 TDM PLAN OBJECTIVES

The Plan strives to reduce automobile use as a part of the design and construction of the development, as well as after construction as an on-going strategy by supporting and promoting the use of non-auto travel modes.

The key objective of the TDM Plan is to reduce peak hour single occupant automobile traffic by focusing on four specific policy areas:

1. encourage the use of non-automobile travel modes (transit, cycling, walking);
2. increase vehicle occupancy;
3. shift travel to off-peak periods; and
4. reduce vehicle kilometres travelled.

7.2 SITE TRANSPORTATION CONTEXT AND USE CHARACTERISTICS

The site is currently situated in walking distance to a Mobility Hub that includes Aldershot GO station. Aldershot GO Station provides service to GO Bus 15 to Brantford Bus Terminal, 15A to McMaster University, GO Bus routes 18, 18B, 18C, 18E, 18F, and 18G providing connections between Hamilton GO Centre or West Harbour GO, and the Lakeshore West GO train service to Union Station. In addition to the GO services provided at Aldershot GO Station, VIA rail services are also provided there, connecting the site to Oakville, Brantford, Woodstock, London, Chatham and Toronto.

The site is a 13 minute walk to the VIA Rail station and GO bus services, 5 minute walk to reach Aldershot GO station to travel along the Lakeshore Line and a 4-6 minute walk to surface transit operated by Burlington Transit. The surface transit routes provide connections to surrounding areas in Burlington and Hamilton.

In addition to the several transportation services available within walking distance to the site, there are dedicated cycling lanes provided along Waterdown Road, Plains Road and a portion of North Service Road. Sidewalks are provided along the surrounding road network creating a pedestrian friendly environment promoting residents to walk to their destinations.

7.2.1 Existing Travel Mode Characteristics

The existing travel mode split for home-based trips in the area based on 2016 Transportation Tomorrow Survey (TTS) data is summarized in **Table 9**.

TABLE 9 EXISTING AREA TRAVEL MODE SPLIT

Travel Mode	% of Trips	
	Morning Peak Hour[1]	Afternoon Peak Hour[2]
Auto Driver	80%	76%
Auto Passenger	11%	13%
Transit	4%	5%
Cycle	1%	1%
Walk	4%	4%

Notes:
1. Based on 2016 TTS data for home-based trips originating in 2006 TTS Zones 4050,4051,4052,4054,4055 between hours of 6:00 and 9:00 a.m. on a weekday.
2. Based on 2016 TTS data for home-based trips originating in 2006 TTS Zones 4050,4051,4052,4054,4055 between hours of 3:00 and 6:00 p.m. on a weekday.

Based on the most 2016 TTS data, in the order of 76%-80% of residents living around the area regularly drive during peak travel periods, which is fairly typical for a suburban area of Halton Region. However, the remaining of the residents use car-share options, transit, walk and cycle as their mode of travel.

7.3 TDM PLAN STRATEGIES

The future site context will be served by a strong network of public transit services as well as pedestrian and cycling connections. Additional TDM strategies have been developed to further support the use of non-auto modes of travel.

The recommended TDM strategies have been selected based upon the site context and proposed land uses. These measures are summarized in **Table 10**. The table outlines which of the three general TDM plan objectives the strategy is targeting and whether the strategy is a ‘hard’ or ‘soft’ measure. A ‘hard’ TDM measure is a physical infrastructure component, where the applicant or land developer is responsible for implementations. On the contrary, a ‘soft’ TDM measure is where the applicant or land developer is responsible for notifying a third party for implementations (i.e. City Staff or Transit Agency). The following sections provide additional details regarding each proposed TDM strategy.

TABLE 10 RECOMMENDED SITE TDM MEASURES

Measure	Description	TDM Plan Objective	Hard or Soft Measure
Reduced Vehicular Parking Supply	Reduced automobile parking ratios are proposed for the site given the close proximity to the Mobility Hub of Aldershot GO Station and existing surface transit routes.	• Reduce car dependence and the need for everyday travel. • Promote non-automobile travel modes.	Hard Measure
"Unbundle Parking"	This measure is also inherent to the reduced parking supply; since not all units will have a parking space, a sales program should be commenced which gives unit purchasers the option of buying a parking space.	• Reduce car dependence and the need for everyday travel.	Hard Measure
Transit Information Centre	Provide an information centre within the proposed buildings that ensure current transit information sources (arrival times, route information, advisory notices) is conveniently available to all residents and visitors of the site. The information will be delivered via transit information screen located in a central location of the building (i.e. a front lobby) or electronic applications for smart phones or tablets.	• Promote non-automobile travel modes such as transit and car-sharing.	Hard Measure
Car-Share Program	Explore opportunities to offer car-share service on the site, ideally with car-share stations (i.e. ZipCar, Car2GO, etc) providing 2 car-share vehicles to be located within the parking area of the site or on surface parking lots.	• Reduce car dependence and the need for everyday travel. • Car-share vehicles offer an on-site vehicle for a resident to use if they forego car ownership.	Hard Measure
Bicycle Parking	Provide a bicycle parking supply of at least 50% to serve the Project.	• Make it easy and attractive for residents to walk and cycle.	Hard Measure
Bike Repair Stations	Consider a bicycle repair / maintenance station within the residential bike parking storage area or near commercial-retail bicycle parking locations within the site	• Make it easy and attractive for pedestrians to walk and cycle.	Hard Measure
Ride-Sharing (Carpool) Program	Explore opportunities to offer ride-sharing programs originating within the building to reduce car dependence for commercial-retail employees and promote car-sharing and transit.	• Reduce car dependence and the need for everyday travel. • Promote car-sharing and transit.	Soft Measure
Travel Mode Information Brochures	Each new resident receives a brochure and/or receives an email informing them of the different available travel options aside from driving a personal vehicle, including an overview of transportation (sidewalk connections, cycling routes, and transit) in the area.	• Reduce car dependence and the need for everyday travel. • Make it easy and attractive for people to walk and cycle. • Promote car-sharing and transit.	Soft Measure

Measure	Description	TDM Plan Objective	Hard or Soft Measure
Community Marketing Outreach	It is recommended that an event should be held around the time of building launch focused on disseminating information about sustainable travel options (i.e. the Travel Mode Information Packages), to explore ride-sharing programs for residents.	• Reduce car dependence and the need for everyday travel. • Promote car-sharing.	Soft Measure

7.4 IMPLEMENTATION

The physical infrastructure components (referred to as 'hard') TDM measures outlined in this plan (i.e. bicycle parking, bicycle repair station, etc.) will be incorporated into the development designs and are illustrated on the site plan included in **Appendix C**.

The 'soft' measures of the TDM plan (i.e. ride-sharing program, travel mode information packages, and community marketing outreach) will be implemented by the developer as part of the marketing process for the site.

8.0 TRAFFIC VOLUME FORECAST

8.1 TRAFFIC ANALYSIS SCENARIOS AND DESIGN PERIODS

Traffic operations analyses have been undertaken during the weekday morning and afternoon street peak hours under the following conditions:

- Existing traffic – traffic activity level under current conditions;
- Future background traffic – traffic activity level 5, 10 and 15 years into the future, which include allowances for corridor growth and background developments; and
- Future total traffic – traffic activity levels 5, 10 and 15 years into the future with the site developed and projected site generated traffic added to the road network.

Traffic projections for future scenarios have been prepared for a 2026, 2031 and 2036 horizon years consistent with MTO report requirements.

To provide a comprehensive traffic analysis review, additional traffic conditions were analyzed to improve operations under Future conditions. The conditions are as follows:

- **Traffic Condition A**: Background development excluding the Metrolinx expansion project, and site traffic
- **Traffic Condition B**: A sensitivity analysis was conducted to review local impacts related to the expansion of Merolinx GO and traffic operations along Masonry Court.

8.2 EXISTING TRAFFIC VOLUMES

Existing baseline traffic volumes were established at intersections within the study area for the weekday morning and afternoon peak periods using traffic count information obtained from the City of Burlington and Ministry of Transportation Ontario (MTO). Traffic count surveys were also undertaken by Spectrum Traffic Data Inc. on behalf of BA Group in 2021. A listing of the count data and courses are provided in **Table 11**.

TABLE 11 EXISTING TRAFFIC DATA SOURCES

Intersection	Count Date	Source	Time Periods
S Service Road / Highway 403 EB On-Ramp & GO Station Lot Entrance	Thursday, October 13, 2016	MTO	7:30 to 9:30 am 4:00 to 6:00 pm
S Service Road / GO Station Bus Loop Access	Tuesday, March 2, 2021	Spectrum Traffic Data Inc.	
Cooke Boulevard / Masonry Court	Tuesday, March 2, 2021		
Waterdown Road & N Service Road / Highway 403 WB On-Ramp	Thursday, October 11, 2018	City of Burlington	
Waterdown Road & Highway 403 WB Off-Ramp / Panin Rd	Thursday, September 27, 2018		
Waterdown Road & Highway 403 EB Off-Ramp / S Service Road	Wednesday, September 26, 2018		
Waterdown Road & Masonry Court / Railway Road	Thursday, June 21, 2018		
Waterdown Road & Lasalle Park Road / Plains Road	Tuesday, September 18, 2018		
Plains Road East & Cooke Boulevard	Thursday, October 5, 2017		7:00 to 9:00 am 4:00 to 6:00 pm

Recognizing the existing 2021 counts were surveyed under COVID-19 pandemic circumstances, the traffic volumes along some of the corridors (i.e. S Service Road and Masonry Court) were anticipated to be less than normal circumstances. Therefore, in order to create a representative traffic volumes base, the counts completed in 2021 were factored up proportionally based on the 2018 City of Burlington counts along the corridors.

The existing turning movement counts were reviewed in detail to ensure a general consistency in the traffic volumes on roadways between intersections. Understanding the existing traffic counts provided are based on the 2018 City of Burlington counts, BA Group has factored up the movements along the major corridors (i.e. Highway 403, Waterdown Road and Plains Road) based on a 2% per annum growth rate for 3 years in order to create a representative 2021 traffic volumes base. These adjusted traffic volumes represent the existing baseline traffic volumes (non-COVID) and were used for the purpose of the traffic operations analyses undertaken as part of this study.

The existing turning movement counts are provided in **Appendix E**.

Existing, balanced baseline area traffic volumes for the weekday morning and afternoon peak traffic hours are summarized in **Figure 14**.

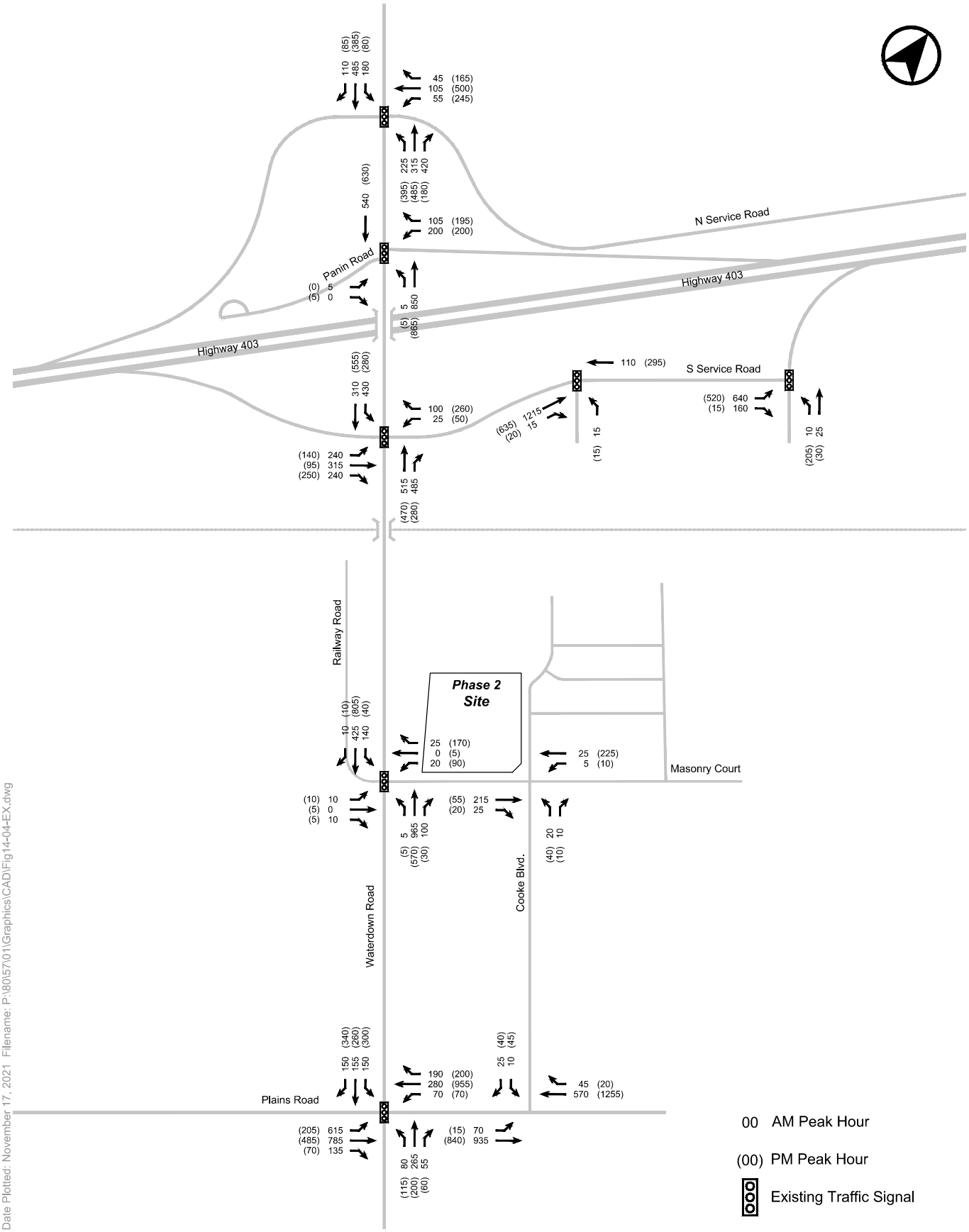


FIGURE 14 EXISTING TRAFFIC VOLUMES

8.3 FUTURE BACKGROUND TRAFFIC VOLUMES

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

- general corridor growth on the area arterial roads (i.e. Waterdown Road and Plains Road) and Highway corridors (i.e. Highway 403); and
- specific area development traffic (i.e. background development traffic).

8.3.1 Corridor Growth

Traffic allowance have been made for general corridor growth on major corridors (i.e. Highway 403, Waterdown Road and Plains Road). Given the lack of historical information available within the vicinity of the site, a growth rate of 2% per annum (compounded) was adopted for all major movements along the major corridors based on the terms of reference confirmed with municipal agencies.

For the purposes of this analysis, it is anticipated that the site will be built-out within a 5-year time horizon for the 2026 site build-out year. BA Group considered a comprehensive series of allowances for area background developments as outlined below. The combined background development traffic allowance can be represented as an average per annum growth rate over the next five years (i.e. assumed 5-year horizon year) by taking the ratio of the total traffic allowance over the existing traffic divided over five years. The resultant per annum growth rate along the major corridors due to background development traffic allowance is in the order of 2 to 18% during the weekday morning and afternoon peak hours. Therefore, no allowances have been made to account for general traffic growth along these corridors over and above the site specific traffic allowances made for other area developments. It is reasonable to consider the general traffic growth along these corridors have been accommodated within the site specific area development traffic growth.

In addition to the 2026 horizon year, a 10-year and 15-year study horizons were also reviewed as per MTO TIS guidelines. As such, a 2% per annum (compounded) was applied to all major movements along the major corridors during the weekday morning and afternoon peak hours for the 5 to 10 and 10 to 15 years time horizon for the 2031 and 2036 post site build-out years, respectively.

The applied corridor growth of 2% per year (compounded 2026-2036) is illustrated in **Figure 15**.

8.3.2 Background Development Growth

Traffic allowances were made for other proposed or approved developments in the area, based on a review of the Metrolinx Aldershot GO Station South parking lot expansion report and City of Burlington's list of current development projects as of March 2021. These sites represent in the order of 2,083 residential units, 1,644 m^2 of non-residential uses, and 938 parking spaces.

Area background developments are summarized in **Table 12** together with a description of the key development statistics for each. Traffic allowances made for each development were based upon traffic impact studies submitted to the City of Burlington as part of the development application process, unless otherwise noted.

TABLE 12 AREA BACKGROUND DEVELOPMENTS

Location	Development Description	Source / Trip Generation Notes
Aldershot GO Station South Parking lot	Phase 1 - 569 parking spaces Phase 2 - 369 parking spaces	AECOM (dated August, 2020)
35 Plains Road East	72 residential units 279 m^2 retail	Paradigm Transporation Solutions Limited (dated April, 2016)
92 Plains Road East[1]	49 residential units 157 m^2 office	WSP (dated October, 2017)
53 and 71 Plains Rd East	450 residential units 1,208 m^2 retail	Paradigm Transporation Solutions Limited (dated December, 2017)
1085 Clearview Avenue	160 residential units	Paradigm Transporation Solutions Limited (dated December, 2018)
1640, 1673, and 1751 Flatt Road and 1664 Waterdown Road	924 residential units	Read, Voorhees & Associates (dated December, 2012)
1350 Waterdown Road	1,126 m^2 Church 100 parking spaces	As per discussion with City Staff, Traffic was not considered as part of this analysis due to the negligible amount of trips being generated during peak hours.
Total	**1,655 residential units 1,6487 m^2 retail 157m^2 office 1,126 m^2 Church 1,038 parking spaces**	

Notes:
1. Traffic allowances made based on 1120 Cooke Boulevard forecasted residential site traffic distribution

8.3.3 Future Background Traffic Volumes

The future background traffic volumes for the weekday morning and afternoon peak hours were developed by adding the abovementioned allowances for corridor traffic growth and the specific background development to base existing traffic volumes. The future background traffic volumes for the site build-out (2026), post 5-year (2031) and post 10-year (2036) horizons are illustrated in **Figure 16**, **Figure 17**, and **Figure 18** respectively.

Construction of the expansion of the south parking lot of Aldershot GO Station proposed by Metrolinx was anticipated to commence construction during the spring of 2021. However, given the uncertainty of the application process, it is unclear to include Metrolinx in the horizon years for the future background developments. Given this, BA Group conducted a sensitivity analysis and analyzed a traffic condition without Metrolinx's expansion in the future background developments. Refer to **Section 9.4** for the sensitivity analysis.

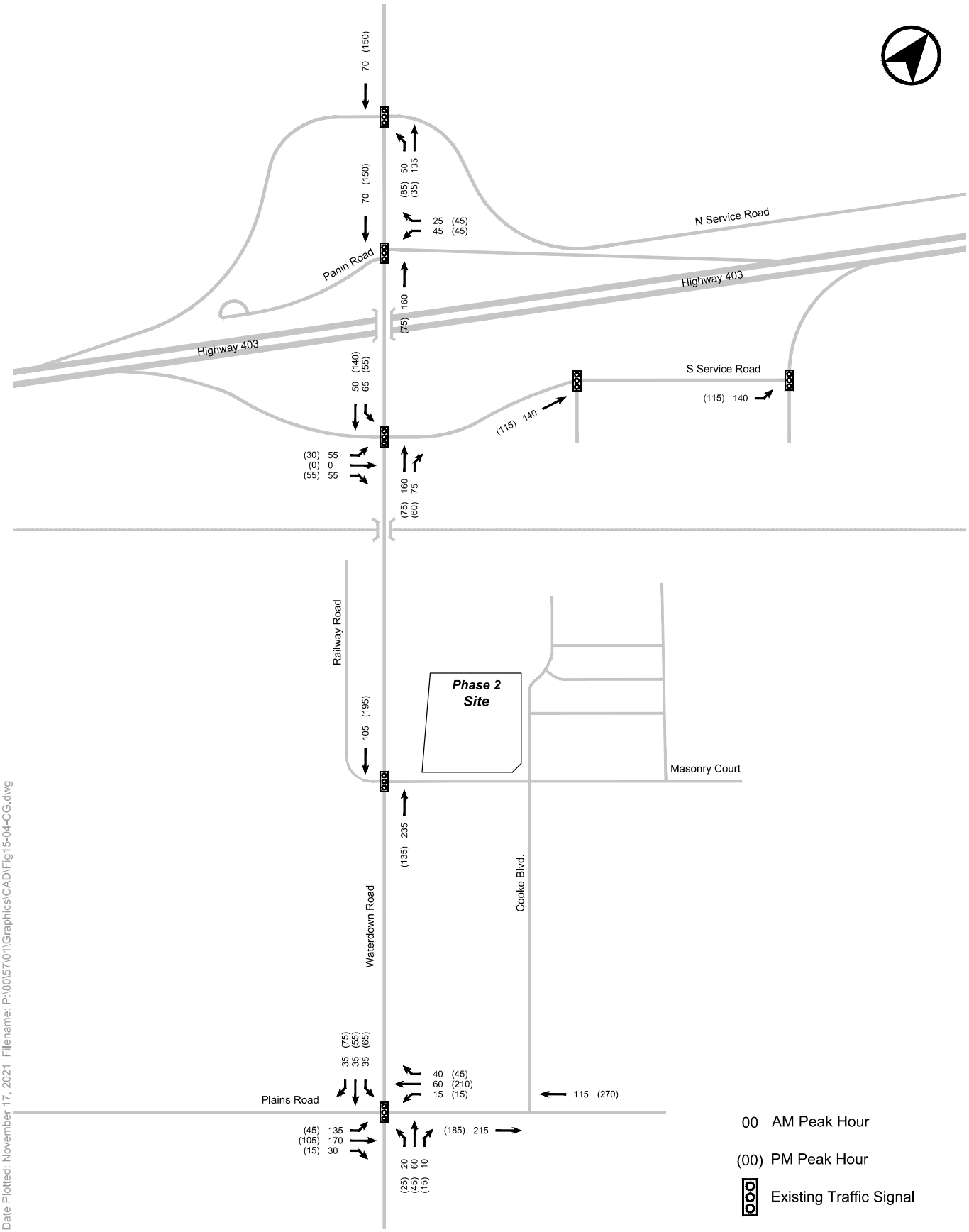


FIGURE 15 CORRIDOR GROWTH

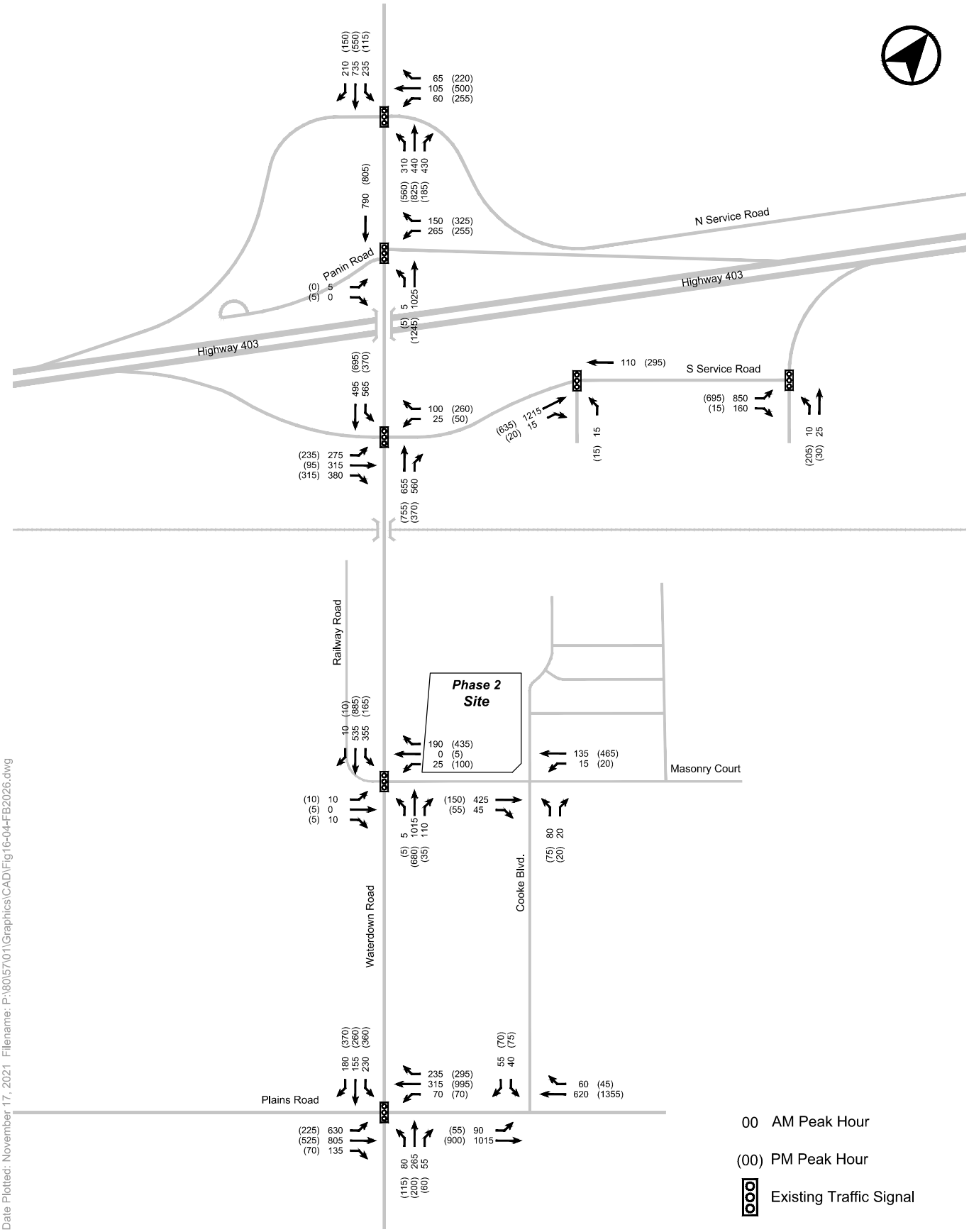


FIGURE 16 FUTURE BACKGROUND 2026 TRAFFIC VOLUMES

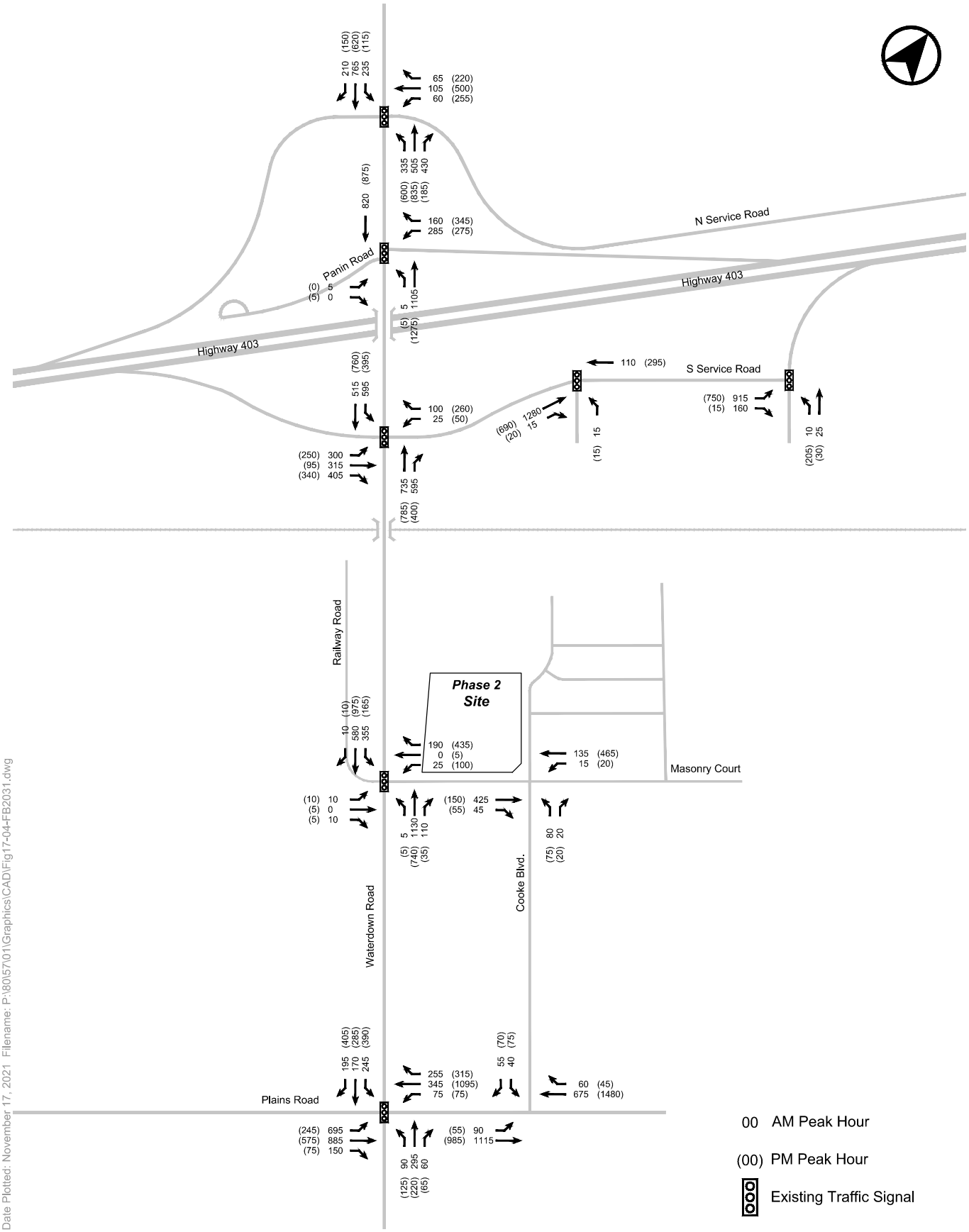


FIGURE 17 FUTURE BACKGROUND 2031 TRAFFIC VOLUMES

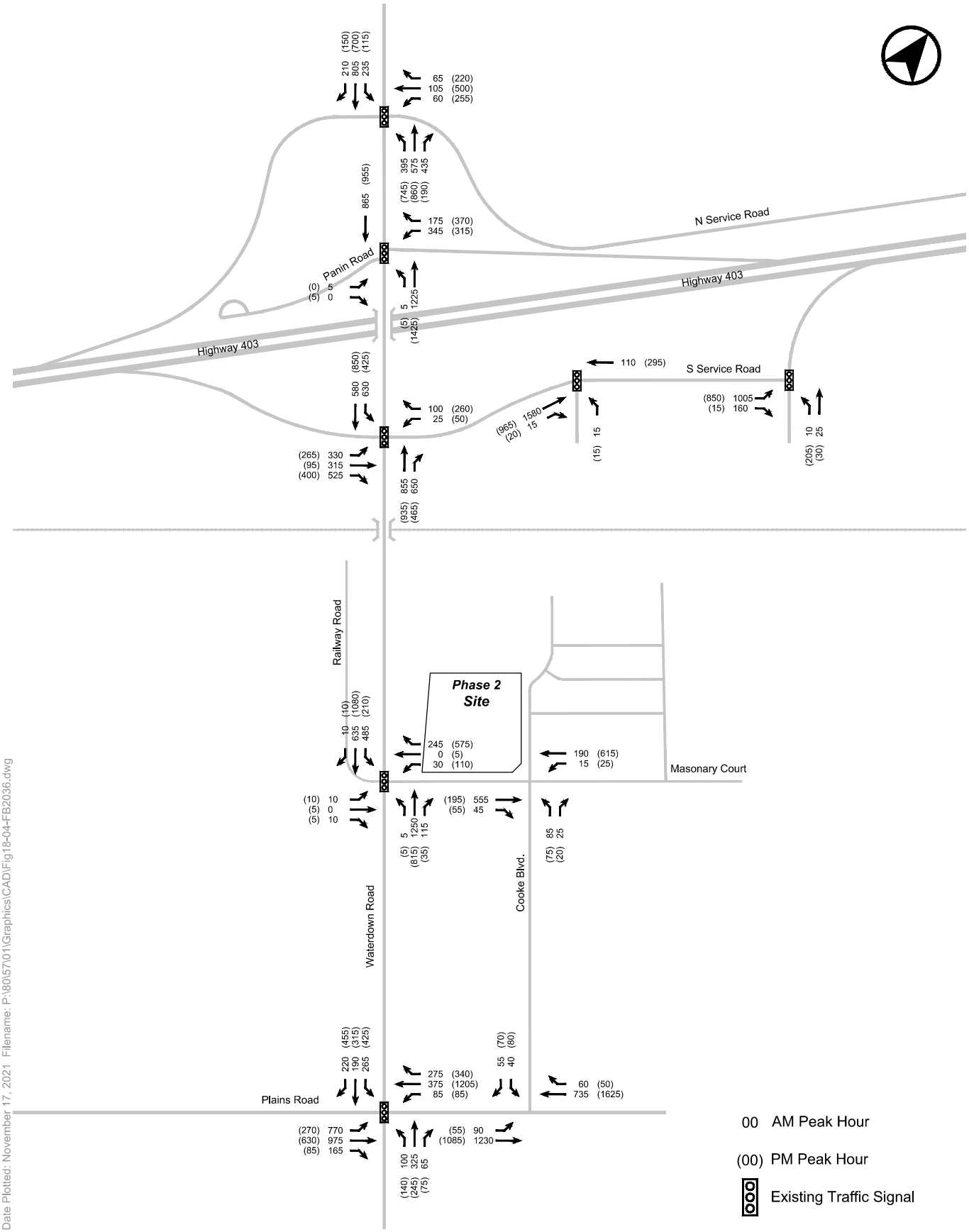


FIGURE 18 FUTURE BACKGROUND 2036 TRAFFIC VOLUMES

8.4 SITE TRAFFIC VOLUMES

8.4.1 Trip Generation

Phase 1

Phase 1 (101 Masonry Court) is completed, registered, occupied and no longer owned by our client, it is not part of the planning process of this development, and would typically be included as background traffic for this type of study. However, Phase 1 (101 Masonry Court) has been included in this study's site traffic consistent with the terms of reference, as requested by the MTO.

Paradigm conducted a Traffic Impact Study for Phase 1 as part of the 101 Masonry Court Project titled "101 Masonry Court - Phase 1, Traffic Impact Study, Parking Study and TDM Options, City of Burlington" dated April 2016. In this study, Paradigm anticipated Phase 1 of the development to generate in the order of 123 two-way trips and 130 two-way trips during the morning and afternoon peak hours, respectively.

Phase 1 site traffic is illustrated in **Figure 19**.

Phase 2

Vehicular travel demand forecasts have been developed based on Institute for Transportation Engineers (ITE) rates for the land use code 222: Multifamily Housing (High-Rise) and considered comparable with residential at existing mobility hub sites around Ontario. Based on the ITE adopted rates, the projected vehicle trip generation associated with Phase 2 is outlined in **Table 13**. Overall, the Phase 2 development is projected to generate 355 and 410 two-way residential vehicle trips during the AM and PM hours respectively.

TABLE 13 RESIDENTIAL TRIP GENERATION

	Number / Size	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Adopted Trip Rate	1,139 units	*0.07*	*0.24*	*0.31*	*0.22*	*0.14*	*0.36*
Number of New Trips (1,139 units)		80	273	353	250	160	410
Rounded[1]		**80**	**275**	**355**	**250**	**160**	**410**

Notes:
1. Rounded to the nearest 5 trips.

Due to the ancillary nature of the at-grade commercial-retail, it is assumed that the commercial-retail trips will be primarily pass by-trips related to other uses and will not generate a substantial amount of additional traffic.

Phase 2 site traffic is illustrated in **Figure 20**.

Combined, Phase 1 and Phase 2 site traffic will generate 478 and 540 two-way two-way residential vehicle trips during the AM and PM peak hours, respectively.

8.4.2 Trip Distribution and Assignment

Site traffic was assigned onto the area road network based on the results of the 2016 Transportation Tomorrow Survey (TTS), prevailing traffic patterns and local area turn restrictions. General direction of approach percentages for site traffic was based on the results from the TTS and is summarized in **Table 14**.

TABLE 14 SITE TRAFFIC DISTRIBUTION

Street	Direction	Inbound	Outbound
Waterdown Road	North	5%	5%
	South	0%	0%
North Service Road	East	10%	10%
Highway 403	East	35%	45%
	West	15%	20%
Plains Road	East	30%	15%
	West	5%	5%
Total		**100%**	**100%**

Notes:
1. Trip assignment is based on a review of TTS data related to home-based trips during the weekday morning and afternoon peak periods to/from 2006 TTS Zones 4050, 4051, 4052, 4054, and 4055.
2. Values rounded to nearest 5%

The projected site total including Phase 1 and Phase 2 site vehicle traffic volumes are shown in **Figure 21**.

8.5 FUTURE TOTAL TRAFFIC VOLUMES

The future total traffic volume forecasts comprising the future background traffic with the addition of the site generated traffic volumes are illustrated in **Figure 22**, **Figure 23**, and **Figure 24** respectively.

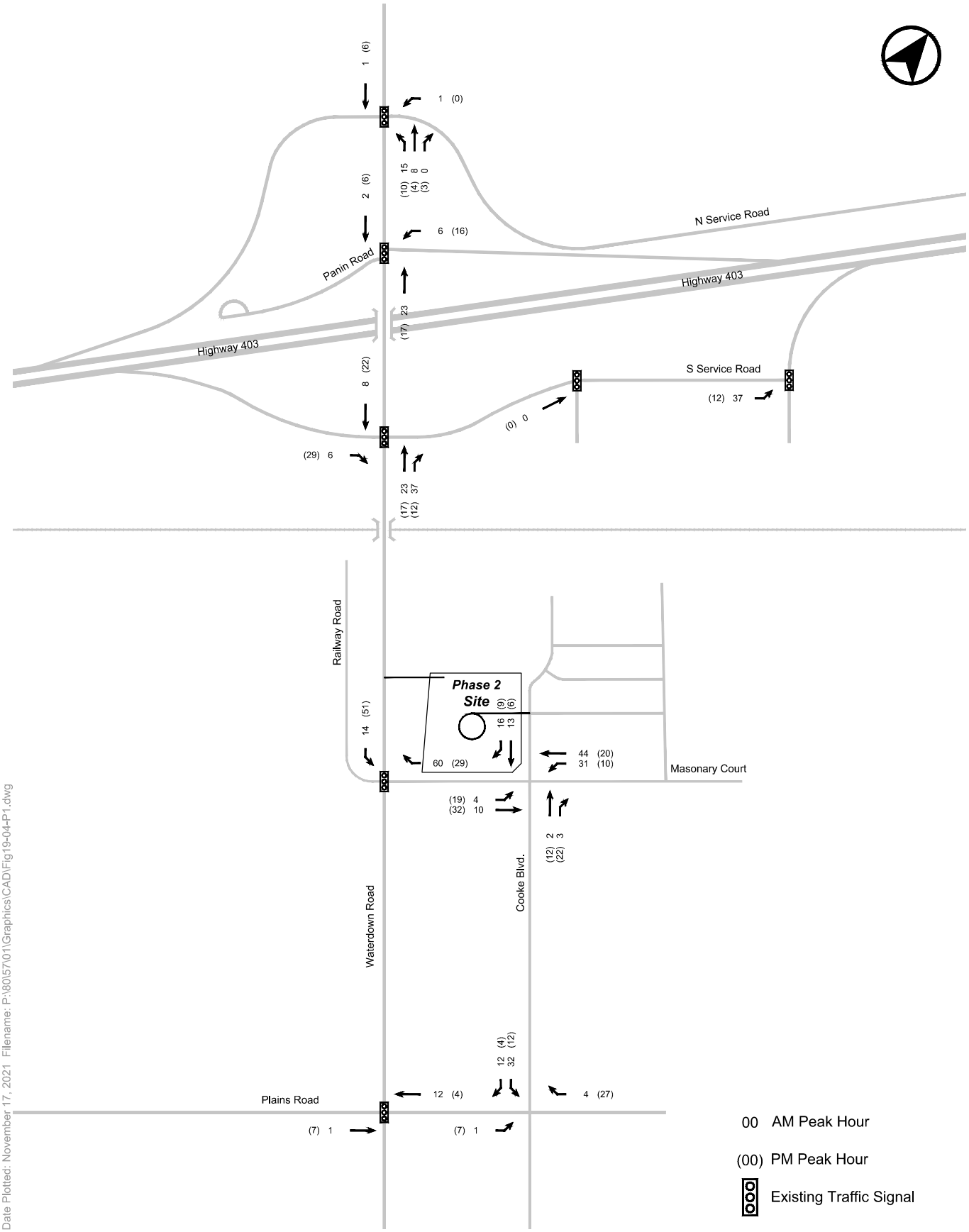


FIGURE 19 PHASE 1 SITE TRAFFIC VOLUMES

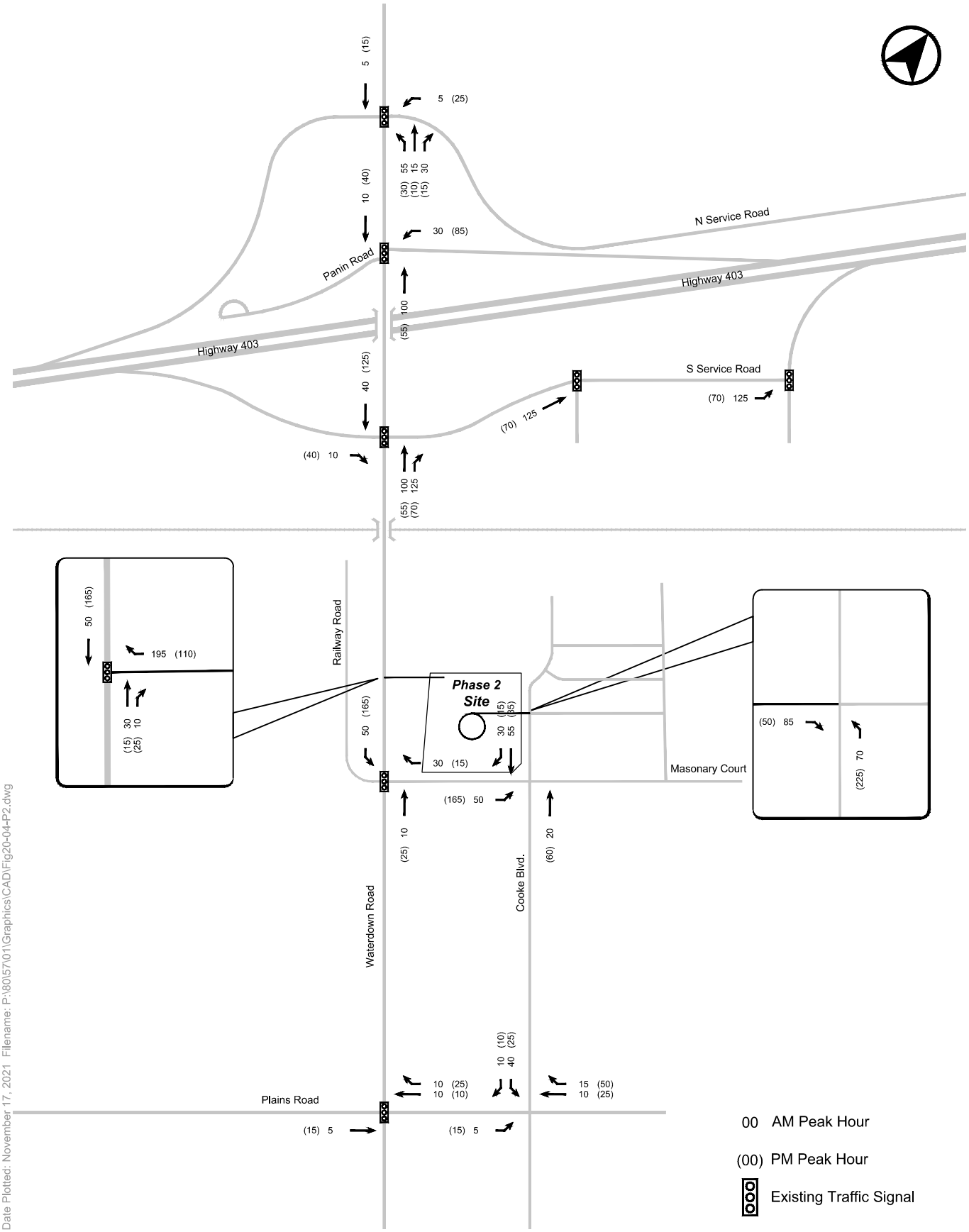


FIGURE 20 PHASE 2 SITE TRAFFIC VOLUMES

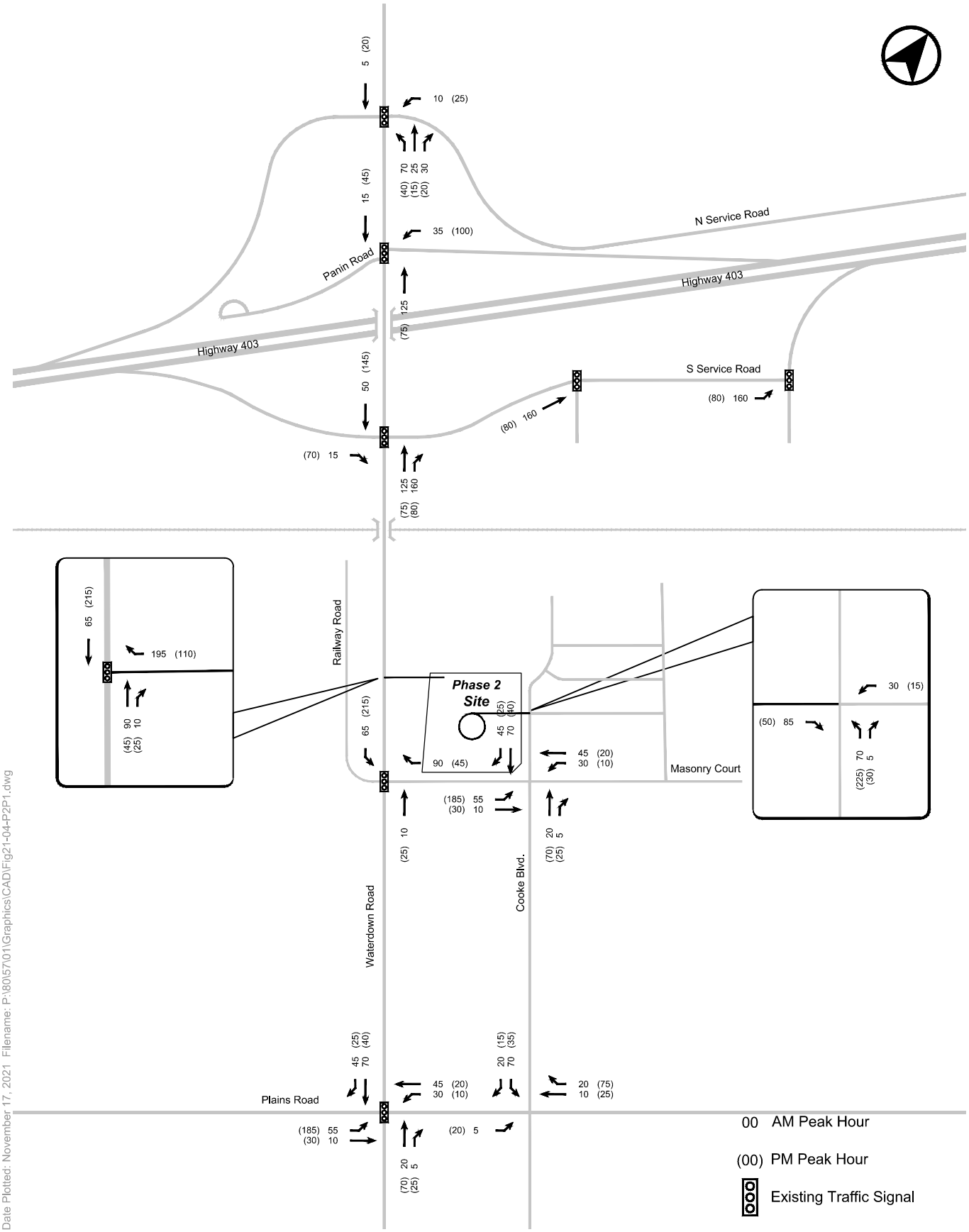


FIGURE 21 PHASE 2 SITE AND PHASE 1 TRAFFIC VOLUMES

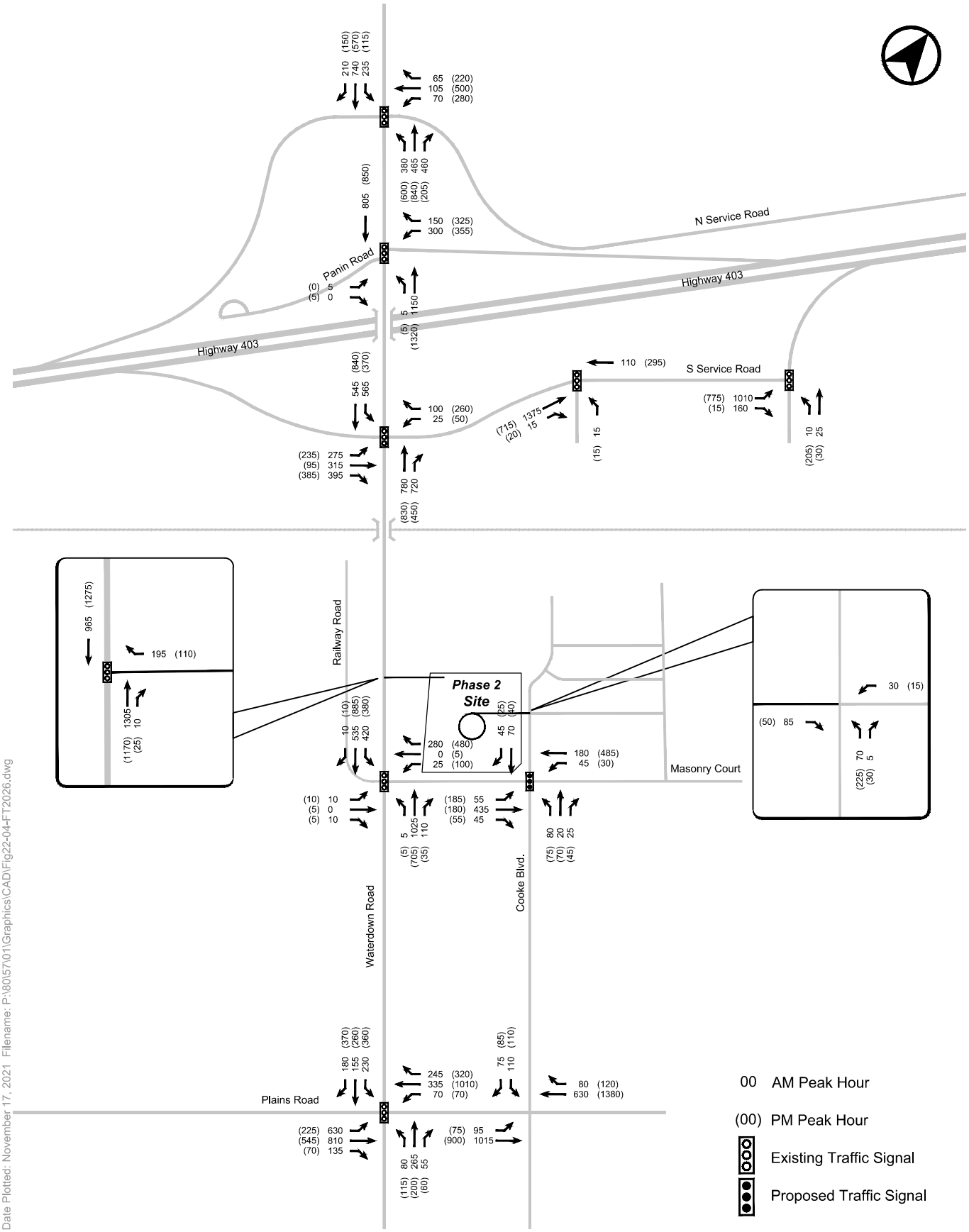


FIGURE 22 FUTURE TOTAL (2026) TRAFFIC VOLUMES

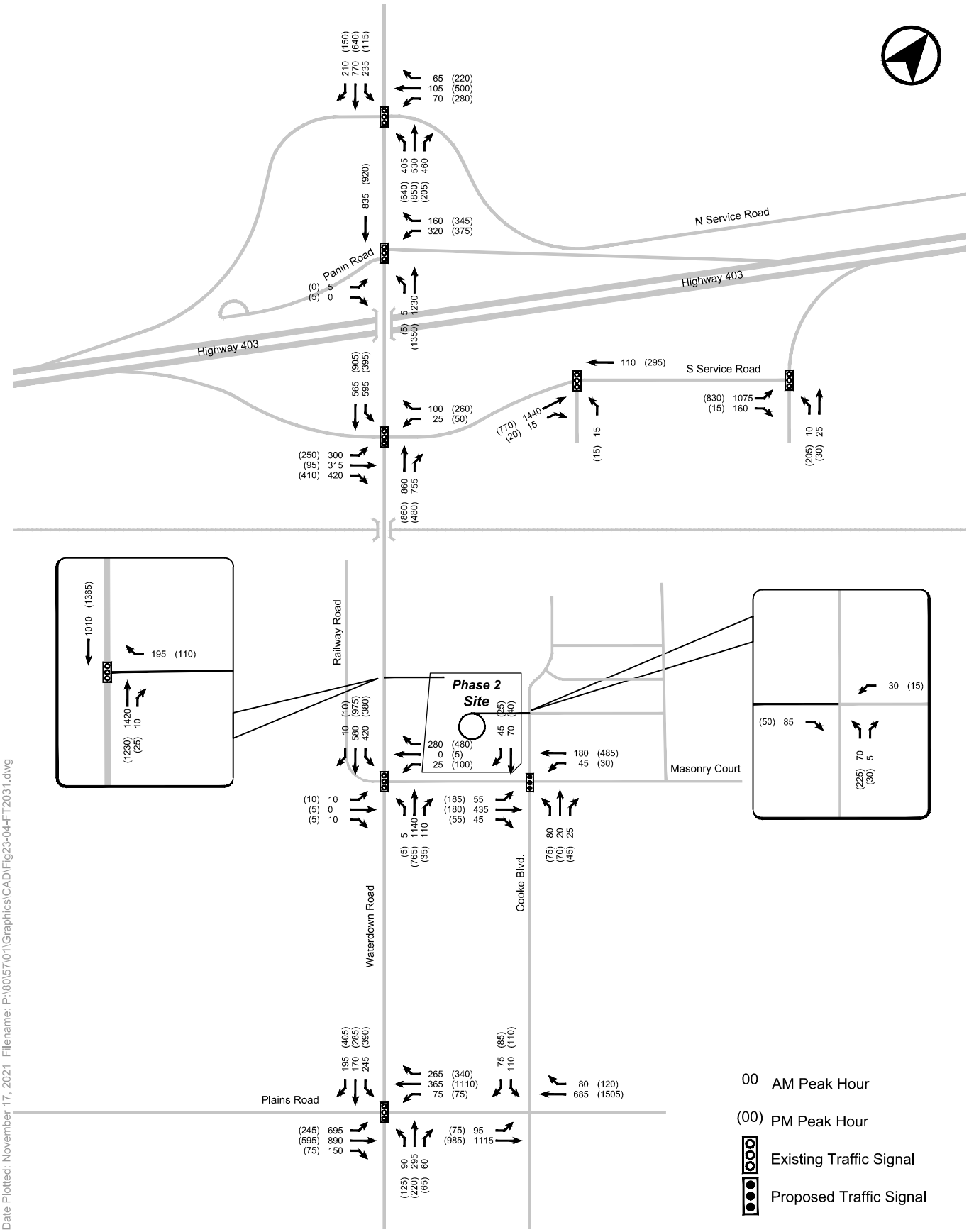


FIGURE 23 FUTURE TOTAL (2031) TRAFFIC VOLUMES

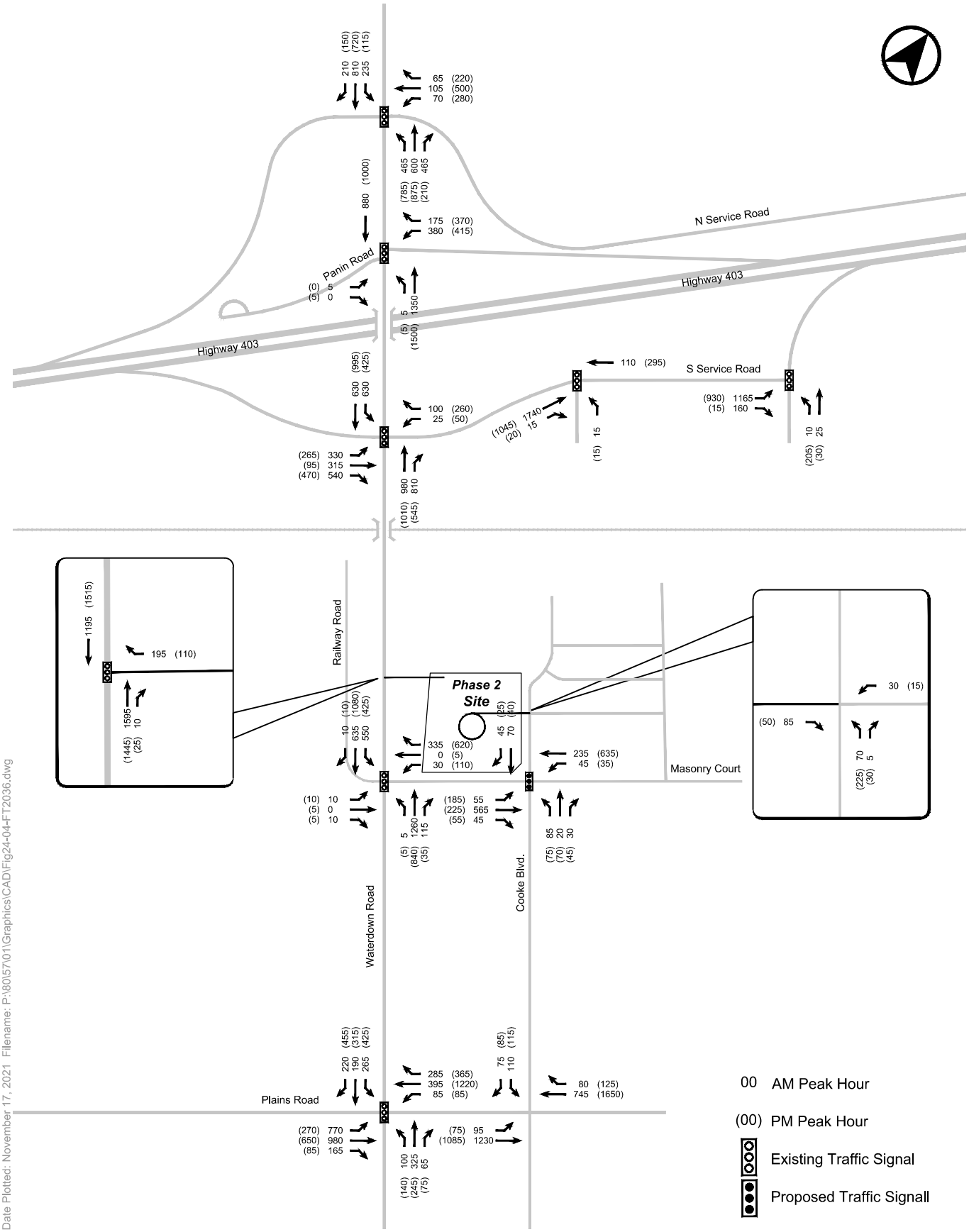


FIGURE 24 FUTURE TOTAL (2036) TRAFFIC VOLUMES

9.0 TRAFFIC OPERATIONS ANALYSIS

9.1 ANALYSIS METHODOLOGY AND ASSUMPTIONS

Traffic operations analyses have been completed using the Synchro (Version 11.0) capacity analysis software in accordance with the methodologies outlined in the *Highway Capacity Manual* (HCM) and Halton Region's *Transportation Impact Study Guidelines*, and *Ministry of Transportation (MTO) Traffic Impact Study Guidelines* (at interchange intersections).

The key performance indicator of the signalized intersection evaluation is an intersection performance index (volume to capacity ratio, or v/c), where a v/c index of 1.00 indicates 'at or near capacity' conditions.

The key performance indicator of the unsignalized intersection / driveway analyses is an average delay per vehicle (in seconds) and a level of service (LOS) designation, where the LOS A (little delay) to LOS F (extended delay) range provides an understanding of the relative time a motorist may have to wait to complete a turn at an intersection or driveway.

Signal Timings

Existing traffic signal timing plans for all signalized intersections within the study area were obtained from Halton Region. Analyses were undertaken using these signal timing plans for existing conditions and modified (where required) for future background and future total traffic conditions

The existing traffic signal timing plans are provided in **Appendix E**.

Road Network Assumptions

Base existing road network configurations are shown in **Figure 9**. Road network improvements, as described in **Section 10.0**, have been assumed in the analysis for future background and future total conditions.

Saturation Flow Rates

A base saturation flow rate of 1,900 passenger cars per hour of green time per lane (pcphgpl) was adopted as the base assumption within the Synchro analysis. This default rate was assumed in all analysis scenarios.

Heavy Vehicle Assumptions

Heavy and medium truck percentages incorporated into the analyses were based upon information obtained from observations made during existing intersection turning movement counts.

The relative proportion of heavy vehicles within in the general traffic stream was used as the basis for the heavy vehicle adjustment factor inputs adopted within the Synchro analysis for both existing and future scenarios. Where necessary, heavy percentage changes were made for certain intersections in the future scenarios.

Peak Hour Factors

The peak hour factors at the area intersection were calculated based on the existing traffic volume data extracted from the traffic count utilized in the study for the operations analysis. A peak hour factor of 0.92 was assumed for proposed driveway access.

9.2 STUDY AREA INTERSECTIONS

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

Signalized

- Waterdown Road / N Service Road & Highway 403 WB On-Ramp;
- Waterdown Road / Panin Rd & Highway 403 WB Off-Ramp;
- Waterdown Road / S Service Road & Highway 403 EB Off- Ramp
- Waterdown Road / Masonry Court & Railway Road;
- Waterdown Road & Lasalle Park Road / Plains Road;
- S Service Road / Highway 403 EB Off-Ramp & GO Station Lot Entrance
- S Service Road / GO Station Bus Loop Access;
- Plains Road / Cooke Boulevard; and
- Cooke Boulevard / Masonry Court (Proposed Signalization).

Unsignalized

- Masonry Court / Cooke Boulevard;
- Waterdown Road / Site Driveway (West); and
- Cooke Boulevard / Site Driveway (East).

9.3 TRAFFIC ANALYSIS SUMMARY

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**.

The study area intersections can be define by three distinct characteristics:

1. Highway 403/Waterdown Road Interchange & North Aldershot GO Entrance;
2. Waterdown Road / Masonry Court & South GO Entrance; and,
3. Plains Road Corridor.

9.3.1 Highway 403 / Waterdown Road Operations

The Highway 403 / Waterdown Road interchange has an unusual configuration that does not meet the typical Diamond I/C, Parclo B, or desirable Parclo A interchange configurations defined in the MTO's Highway Corridor Management Manual. The existing configuration requires three signals to facilitate on/off ramp manoeuvres:

1. The south signal is shared with the primary and only route to the north (and main) entrance for the Aldershot GO station;
2. The centre signal is shared with Panin Road; and,
3. The north signal is shared with the North Service Road.

None of the on or off-ramp manoeuvres permit free-flow movement on or off the freeway. The highway's eastbound on-ramp is served by an insufficient shared northbound-thru lane and insufficient southbound left turn lane, both constrained by bridge structures on either side of the intersection.

The bridge widening over Highway 403 has been identified by the City in its Capital Budget to permit a five-lane cross-section and active transportation along Waterdown Road. The bridge widening is not a requirement of the proposed development. This improvement has been identified in both the 2014 Development Charges Background Study (at the time, for construction in 2016) and again in the 2019 Development Charges Background Study / 2020 Capital Budget (for construction in 2028).

As identified in the City's Capital Budget:

> *With the completion of the Waterdown Road/403 interchange, and planned intensification around the Aldershot GO Mobility Hub, use of Waterdown Road by vehicles, buses, cyclists and pedestrians is expected to increase significantly. There are presently capacity limitations along the bridge section over the 403. This will be a joint project with the Ministry of Transportation to widen the structure to provide a five lane cross section with on-road bike lanes and improved pedestrian facilities.*

The existing Aldershot GO station and Highway 403 Eastbound On-Ramp currently share the same access via the South Service Road and existing GO Station traffic contributes to a large amount of traffic volumes on the critical movements of the intersection. Given that both the existing Aldershot GO station and Highway 403 EB On-Ramp are large vehicle traffic generators, the critical movements at this intersection are currently operating at or near theoretical capacity.

The South Service Road is planned to be extended to King Road. This was formerly planned for 2017 (2014 DC Background Study), 2019 (2018 Capital Projects) and currently planned for 2023 (2019 DC Background Study).

As identified in the City's Capital Budget:

> *This project involves the construction of the South Service Road extension across the Aldershot GO Station property and provides for the City's share of a new bridge at the future crossing of South Service Road and Falcon Creek. The remainder of the South Service extension to King Road will be constructed through development, as it relates to the prosperity corridor.*
>
> *The timing, scope and limits of these proposed works may be impacted by the findings of the forthcoming QEW Prosperity Corridor Block Plan and Implementation Study.*

It not clear at this time whether extension of the South Service Road will provide improvements to or increase capacity issues for the Highway 403 Eastbound on-ramp. There is insufficient information on the development and trip generation potential in the prosperity corridor land parcels along this corridor to understand relief or impacts of this improvement. We expect this road extension and growth related to the trip generation potential of the overall Mobility Study area are expected to be reviewed as part of the Prosperity Corridor Study and Secondary Plan Study processes that are currently underway.

The Waterdown Road bridges (over Highway 403 and CN Rail) and eastbound on-ramp interchange will require significant improvements regardless of development of the subject site. The MTO and City have identified the need to widen the bridge over Highway 403 in order to implement a five-lane section and add active transportation. Mitigating improvement measures have been identified in the following sections, should background development proceed at the high rate projected for 2026 (from 6 to 17% per year) based on the list of approved and appealed developments. It is important to note that this bridge widening is not required for the proposed development.

The impact related to site traffic is minor and can readily be accommodated within the interchange improvements that continue to be forthcoming in the City's Capital Budget and are already required to address existing and future background conditions.

Detailed analysis results for the Highway interchange are provided in **Section 9.3.4**.

9.3.2 Waterdown Road / Masonry Court - South GO Entrance

The intersection of Waterdown Road / Masonry Court serves as the primary entrance for the South Aldershot GO entrance, as well as the only public access via Waterdown Road to the east side of the draft Mobility Study lands, between Highway 403 and Plains Road.

The existing southbound left lane storage at this intersection is insufficient for peak morning peak hour queuing activity and is recommended to be extended. Metrolinx has also acknowledge this intersection will experience capacity and queuing issues with the introduction of new traffic. With regard to geometric improvements, the 2017 TIS for Aldershot GO states:

> *The two intersections providing ingress/egress for the station (Waterdown Road/Aldershot Access Road and Waterdown Road/Masonry Court) are shown to require geometric changes to accommodate the future traffic growth in the vicinity of the station and traffic growth at the station itself. Due to the constrained nature of the site and the municipal planning direction provided to Metrolinx, it is recommended that signal improvements be implemented immediately, and that geometric changes to the road network be deferred in the short-term to encourage GO Station users to access the station outside of the AM and PM peak hours, or to access the station via municipal transit services.*

New Metrolinx traffic related to the South Lot expansion contributes more than twice the existing volume on the southbound left movement at Waterdown Road / Masonry Court (see **Figure 25**). The contributing traffic on the westbound right is also illustrated below in **Figure 26**.

Given the direction that Metrolinx is expecting travel behaviour to spread outside of the peak periods, we have conducted a sensitivity analysis for the southbound left turn movement at this intersection (with and without new Metrolinx traffic) to evaluate the site traffic contribution to road network improvements.

Detailed analysis results for the Highway interchange are provided in **Section 9.3.4**.

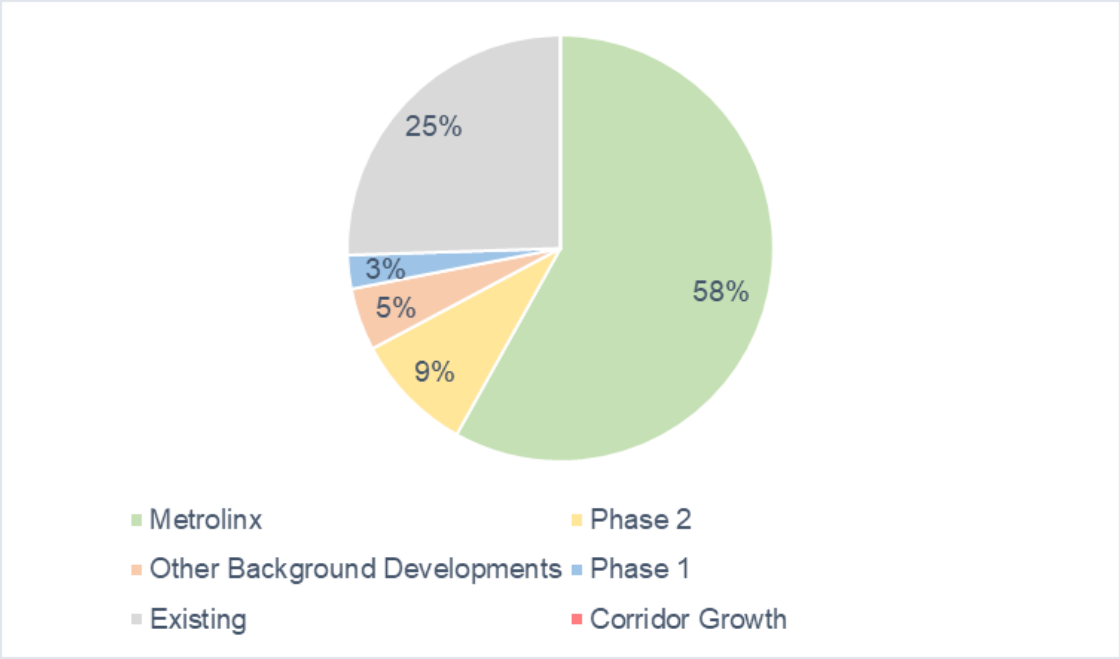


FIGURE 25: WATERDOWN ROAD & MASONRY COURT, FUTURE SOUTHBOUND LEFT TRAFFIC, CRITICAL MORNING PEAK HOUR

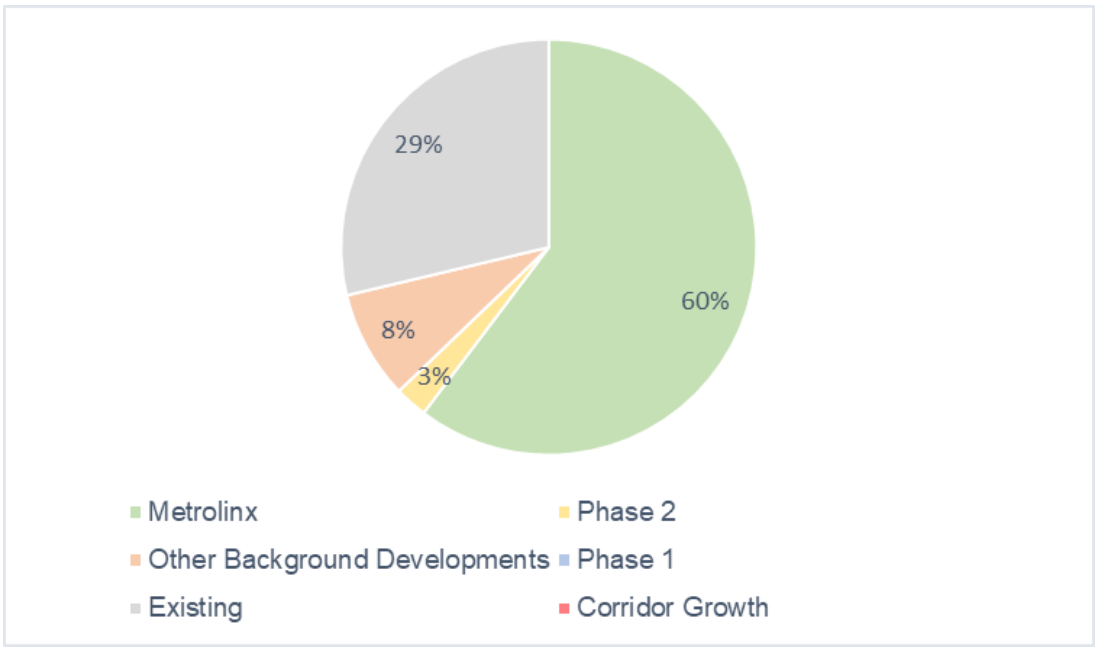


FIGURE 26: WATERDOWN ROAD & MASONRY COURT, FUTURE WESTBOUND RIGHT TRAFFIC, CRITICAL AFTERNOON PEAK HOUR

9.3.3 Plains Road Corridor

Future Site traffic can be acceptably accommodated on the left and right turn movements at the intersection of Plains Road / Cooke Boulevard. Site traffic travelling to/from the south and west is expected to have minimal impact on the turning movements at Plains Road / Waterdown Road and Plains Road / Emery Road.

Application of corridor growth (2% per annum) indicates that the left and right turns at Waterdown Road / Plains Road will worsen over time. The introduction of a grid network road system, as contemplated by the draft Mobility Study will reasonably improve routing options for this traffic growth, without the need to expand turning lanes at the major intersections.

9.3.4 Signalized Intersection Analysis

9.3.4.1 Waterdown Road / N Service Road & Highway 403 WB On-Ramp

The Waterdown Road / N Service Road & Highway 403 WB On-Ramp intersection is signalized with typical cycle lengths of 100 seconds and 110 seconds during the weekday morning and afternoon peak periods, respectively.

A summary of the existing and future traffic analysis results for 2026 (Opening Day) is shown in **Table 15** and 5 and 10 years post-buildout is shown in **Table 16**.

A summary of the 50th percentile and 95th percentile queues are summarized in **Table 17**.

Existing Conditions
Under existing traffic conditions, the Waterdown Road / N Service Road & Highway 403 WB On-Ramp intersection operates under acceptable conditions with overall v/c ratios of 0.42 and 0.73 during the weekday morning and afternoon peak hours, respectively. The northbound left movement is the critical movement with an individual v/c ratio of 0.91, approaching theoretical capacity during the weekday afternoon peak hour.

Under existing traffic conditions, the 95th percentile queue in the afternoon peak period exceeds the available northbound left storage of approximately 90 metres.

Future Background Conditions
Under future background traffic conditions, with the addition of traffic allowances associated with background developments and general background corridor traffic growth, the Waterdown Road / N Service Road & Highway 403 WB On-Ramp intersection begins to operate under very busy conditions, at theoretical capacity during the weekday afternoon peak hour with an overall v/c ratio of 1.00. The northbound left movement is the critical movement with an individual v/c ratio of 1.00, at theoretical capacity during the weekday afternoon peak hour.

The westbound through and southbound through-right movements are notable critical movements with individual v/c ratios of 1.04 and 0.98, above and approaching theoretical capacity during the weekday afternoon peak hour, respectively.

In order to minimize the traffic impacts at the Waterdown Road / N Service Road & Highway 403 WB On-Ramp intersection, a lane configuration improvement is recommended to convert the existing northbound left configuration into a dual northbound left turn lane in the future. A cycle length of 120 seconds was also

considered during the weekday morning and afternoon peak hours under future 2026, 2031 and 2036 traffic conditions with the recommended dual northbound left improvement.

The above-noted improvements are recommended to keep the existing and future conditions below capacity.

Future background traffic analysis was conducted for an additional 5-year and 10-year horizon years beyond the 5-year build-out horizon of the site. The recommended improvements for Future Background 2026 were carried into the 2031 and 2036 horizon periods.

Future background conditions remain below capacity in 2031 and 2036 with the improvements proposed for Future Background 2026.

Future Total Conditions

Future total conditions in 2026, 2031, and 2036 at the Waterdown Road / N Service Road & Highway 403 WB On-Ramp intersection have been assessed, considering improvements required to address growth and the addition of site traffic to individual intersection movements.

The site adds a minor amount of traffic to the critical northbound left during the afternoon peak hour **Figure 27**.

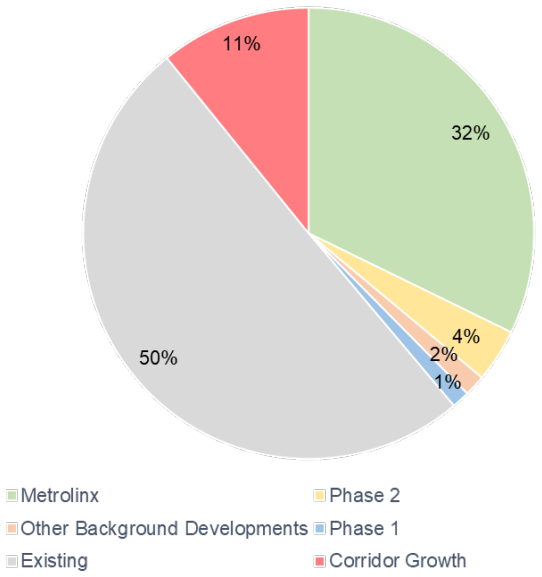


FIGURE 27: WATERDOWN ROAD / N SERVICE ROAD & HIGHWAY 403 WB ON-RAMP, FUTURE NORTHBOUND LEFT TRAFFIC, CRITICAL AFTERNOON PEAK HOUR

Future total conditions remain below capacity in 2026, 2031 and 2036 with the improvements proposed for existing and Future Background 2026.

Summary

Site-related impacts are anticipated to be minor relative to future background conditions and remain within the capacity limits of the intersection.

Dual northbound left lanes are recommended at this intersection with an increased cycle length of 120 seconds.

With modifications, the future total 95th percentile queues for 2026, 2031 and 2036 can be accommodated in the available storage under weekday morning and afternoon peak periods. Given this, the proposed development does not impact the queues for the northbound left turn lane.

Further improvements to bring this interchange and regional facility below typical critical thresholds of 0.75 and 0.85 are expected to be reviewed as part of the Prosperity Corridor Study and Secondary Plan Study processes that are currently underway.

Based on the foregoing, the traffic generated by the site can be acceptably accommodated at the intersection of Waterdown Road / N Service Road & Highway 403 WB On-Ramp.

TABLE 15 WATERDOWN ROAD / N SERVICE ROAD & HIGHWAY 403 WB ON-RAMP (BUILD OUT, 2026)

Key Movements	Existing		Future Background 2026 – Without Improvements		Future Background 2026 – With Improvements		Future Total 2026	
	v/c	LOS	v/c	v/c	v/c	LOS	v/c	LOS
WBL	0.30 (0.40)	D (C)	0.35 (0.59)	D (D)	0.32 (0.51)	D (C)	0.37 (0.56)	D (C)
WBT	0.51 (0.73)	D (C)	0.56 (1.04)	D (F)	0.50 (0.90)	D (D)	0.50 (0.90)	D (D)
WBR	0.03 (0.12)	D (C)	0.05 (0.16)	D (C)	0.05 (0.16)	D (C)	0.05 (0.16)	D (C)
NBL	0.41 (0.91)	A (D)	0.65 (1.00)	B (E)	0.63 (0.88)	D (D)	0.64 (0.91)	D (D)
NBTR	0.33 (0.56)	A (C)	0.42 (0.67)	A (C)	0.43 (0.74)	B (C)	0.47 (0.76)	B (C)
SBL	0.35 (0.30)	A (C)	0.49 (0.51)	A (C)	0.49 (0.47)	A (C)	0.51 (0.48)	A (C)
SBTR	0.33 (0.61)	B (D)	0.55 (0.98)	B (E)	0.61 (0.82)	B (D)	0.67 (0.87)	C (D)
Overall	**0.42 (0.73)**	**B (C)**	**0.57 (1.00)**	**B (D)**	**0.60 (0.87)**	**C (D)**	**0.63 (0.89)**	**C (D)**
Analysis Notes	• Existing Lane Configuration		• Existing Lane Configuration		• Introduce Dual Northbound Left		• Future Background 2026 Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 16 WATERDOWN ROAD / N SERVICE ROAD & HIGHWAY 403 WB ON-RAMP (2031, 2036)

Key Movements	Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2031	
	v/c	LOS	v/c	v/c	v/c	LOS	v/c	LOS
WBL	0.35 (0.50)	D (C)	0.41 (0.56)	D (C)	0.35 (0.55)	D (D)	0.41 (0.61)	D (D)
WBT	0.56 (0.88)	D (D)	0.56 (0.89)	D (D)	0.56 (0.98)	D (E)	0.56 (0.98)	D (E)
WBR	0.05 (0.16)	D (C)	0.05 (0.16)	D (C)	0.05 (0.16)	D (C)	0.05 (0.16)	D (C)
NBL	0.44 (0.86)	B (D)	0.53 (0.90)	B (D)	0.49 (0.91)	B (E)	0.56 (0.95)	C (E)
NBTR	0.49 (0.74)	B (C)	0.52 (0.76)	C (C)	0.51 (0.72)	B (C)	0.55 (0.75)	B (C)
SBL	0.48 (0.47)	A (C)	0.50 (0.48)	A (C)	0.54 (0.44)	A (C)	0.55 (0.45)	A (C)
SBTR	0.49 (0.77)	B (D)	0.50 (0.80)	B (D)	0.55 (0.98)	B (E)	0.57 (0.99)	B (E)
Overall	**0.51 (0.89)**	**B (D)**	**0.53 (0.92)**	**B (D)**	**0.55 (0.97)**	**B (D)**	**0.56 (0.99)**	**B (D)**
Analysis Notes	• Future Background 2026 Lane Configuration • Change Cycle Length from 100/110 seconds to 120 seconds		• Future Background 2026 Lane Configuration		• Future Background 2026 Lane Configuration		• Future Background 2026 Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 17 WATERDOWN ROAD / N SERVICE ROAD & HIGHWAY 403 WB ON-RAMP QUEUE LENGTHS

Key Movements	Existing		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
NBL	7.4 (69.9)	30.3 (#134.7)	22.8 (58.8)	49.8 (#93.7)	32.0 (61.9)	59.2 (#105.6)	10.1 (53.1)	18.7 (85.0)	15.5 (56.9)	28.2 (93.6)	9.2 (91.7)	28.6 (#118.5)	25.1 (98.6)	43.9 (m#131.7)

9.3.4.2 Waterdown Road / Panin Road & Highway 403 WB Off-Ramp

The Waterdown Road / Panin Road & Highway 403 WB Off-Ramp intersection is signalized with typical cycle lengths of 100 seconds and 110 seconds during the weekday morning and afternoon peak periods, respectively. A summary of the traffic analysis results for this intersection are shown in **Table 18**.

A summary of future traffic analysis results for this intersection for additional 5-year and 10-year beyond build-out is shown in
Table 19.

A summary of the 50th percentile and 95th percentile queues are summarized in **Table 20**.

Existing Conditions
Under existing traffic conditions, the Waterdown Road / Panin Road & Highway 403 WB Off-Ramp intersection operates under acceptable conditions with overall v/c ratios of 0.44 during the weekday morning and afternoon peak hours.

Future Background Conditions
Under future background traffic conditions with the addition of traffic allowances associated with background developments and general background corridor traffic growth, the Waterdown Road / Panin Road & Highway 403 WB Off-Ramp intersection operates under acceptable conditions with overall v/c ratios of 0.54 and 0.66 during the weekday morning and afternoon peak hours, respectively.

Note that a cycle length of 120 seconds was implemented during the weekday morning and afternoon peak hours under future 2026, 2031 and 2036 traffic conditions in order to maintain signal coordination with adjacent signalized intersections along Waterdown Road.

Future Total Conditions
With addition of site-related traffic under future total 2026 traffic conditions, the Waterdown Road / Panin Road & Highway 403 WB Off-Ramp intersection operates under acceptable conditions with overall v/c ratios of 0.60 and 0.70 during the weekday morning and afternoon peak hours, respectively.

As part of the Ministry of Transportation (MTO) Traffic Impact Study Guidelines, future traffic analysis was conducted for an additional 5-year and 10-year horizon years beyond the 5-year build-out horizon.

Under future total 2031 traffic conditions, the Waterdown Road / Panin Road & Highway 403 WB Off-Ramp intersection operates under capacity with overall v/c ratios of 0.62 and 0.76 during the weekday morning and afternoon peak hours, respectively. Under future total 2036 traffic conditions, the intersection operates under capacity with overall v/c ratios of 0.69 and 0.86 during the weekday morning and afternoon peak hours, respectively.

Summary
Site-related impacts are anticipated to be minor at this intersection during the weekday morning and afternoon peak hours.

The future total 95th percentile queues can be accommodated in the available storage under weekday morning and afternoon peak periods.

TABLE 18 WATERDOWN ROAD / PANIN ROAD & HIGHWAY 403 WB OFF-RAMP (BUILD OUT, 2026)

Key Movements	Existing		Future Background 2026		Future Total 2026	
	v/c	LOS	v/c	LOS	v/c	LOS
EBLTR	0.17 (0.00)	D (D)	0.17 (0.00)	D (D)	0.17 (0.00)	D (D)
WBL	0.52 (0.56)	D (D)	0.59 (0.54)	D (D)	0.62 (0.69)	D (D)
WBR	0.08 (0.14)	D (D)	0.11 (0.73)	D (D)	0.11 (0.71)	D (D)
NBLT	0.43 (0.44)	B (B)	0.54 (0.67)	B (C)	0.62 (0.73)	B (C)
SBTR	0.26 (0.30)	A (A)	0.39 (0.40)	A (B)	0.41 (0.43)	A (B)
Overall	**0.44 (0.44)**	**B (B)**	**0.54 (0.66)**	**B (C)**	**0.60 (0.70)**	**B (C)**
Analysis Notes	• Existing Lane Configuration		• Existing Lane Configuration		• Existing Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 19 WATERDOWN ROAD / PANIN ROAD & HIGHWAY 403 WB OFF-RAMP (2031, 2036)

Key Movements	Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBLTR	0.21 (0.00)	E (E)	0.21 (0.00)	E (E)	0.21 (0.00)	E (E)	0.21 (0.00)	E (E)
WBL	0.65 (0.45)	D (D)	0.68 (0.61)	D (D)	0.69 (0.41)	D (D)	0.70 (0.57)	D (D)
WBR	0.15 (0.82)	D (E)	0.21 (0.83)	D (E)	0.27 (0.77)	D (D)	0.28 (0.80)	D (D)
NBLT	0.55 (0.72)	B (B)	0.62 (0.77)	B (B)	0.63 (0.89)	B (B)	0.71 (0.92)	B (B)
SBTR	0.38 (0.46)	A (B)	0.40 (0.49)	A (B)	0.42 (0.55)	A (B)	0.43 (0.57)	A (B)
Overall	**0.56 (0.73)**	**B (C)**	**0.62 (0.76)**	**B (C)**	**0.63 (0.83)**	**B (C)**	**0.69 (0.86)**	**B (C)**
Analysis Notes	• Change Cycle Length from 100/110 seconds to 120 seconds		• Future Background 2031 Signal Timing Plan		• Future Background 2031 Signal Timing Plan		• Future Background 2031 Signal Timing Plan	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 20 WATERDOWN ROAD / PANIN ROAD & HIGHWAY 403 WB OFF-RAMP QUEUE LENGTHS

Key Movements	Existing		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
WBL	21.5 (25.1)	32.2 (35.7)	28.5 (30.6)	40.3 (43.5)	32.2 (44.0)	44.4 (60.0)	37.7 (34.4)	51.0 (44.8)	42.4 (48.1)	55.9 (61.0)	45.5 (34.8)	59.1 (56.2)	50.0 (49.5)	63.3 (74.4)
WBR	0.0 (0.0)	14.0 (19.8)	0.0 (34.4)	17.3 (#78.9)	0.0 (35.8)	17.0 (#81.3)	1.5 (60.4)	21.5 (92.9)	5.4 (60.7)	25.9 (94.1)	8.8 (63.2)	30.3 (#139.1)	9.7 (66.3)	30.7 (#140.8)

9.3.4.3 Waterdown Road / S Service Road & Highway 403 EB Off-Ramp

The Waterdown Road / S Service Road & Highway 403 EB Off-Ramp intersection is signalized with typical cycle lengths of 100 seconds and 110 seconds during the weekday morning and afternoon peak periods, respectively. A summary of the existing and future background traffic analysis results for this intersection are shown in **Table 21**.

A summary of the traffic analysis results for this intersection are shown in **Table 21**.

A summary of future traffic analysis results for this intersection for additional 5-year and 10-year beyond build-out is shown in **Table 23** and **Table 24**.

A summary of the 50th percentile and 95th percentile queues are summarized in **Table 24**.

Existing Conditions
Under existing traffic conditions, the Waterdown Road / S Service Road & Highway 403 EB Off-Ramp intersection operates under capacity conditions with overall v/c ratios of 0.81 and 0.58 during the weekday morning and afternoon peak hours, respectively. However, the southbound left and northbound through-right movements are the critical and most physically constrained movements with individual v/c ratio of 0.99, approaching theoretical capacity during the weekday morning peak hour.

Future Background Conditions
Under 2026 future background traffic conditions with the addition of traffic allowances associated with background developments and general background corridor traffic growth, the Waterdown Road / S Service Road & Highway 403 EB Off-Ramp intersection begins to operate under very busy conditions during the weekday morning and afternoon peak hours with overall v/c ratios of 0.85 and 0.91, respectively. The southbound left movement is the critical movements with an individual v/c ratio above theoretical capacity during the weekday morning and afternoon peak hours.

In the short-term, in order to minimize the traffic impacts at the Waterdown Road / S Service Road & Highway 403 EB Off-Ramp intersection, the following mitigation improvement to the existing intersection could be considered in advance of the bridge widening already planned for 2028. These measures could improve the intersection on an interim basis, but extensive improvements are necessary to resolve the regional / interchange issues that will arise regardless of the proposed development:

- A reduction of the dual westbound left turn lane into a single westbound left turn lane
- An auxiliary channelized northbound right turn lane

As part of the Ministry of Transportation (MTO) Traffic Impact Study Guidelines, future traffic analysis was conducted for an additional 5-year and 10-year horizon years beyond the 5-year build-out horizon. The potential mitigation measures for Future Background 2026 were carried into the 2031 and 2036 horizon periods.

Further improvements are needed to address ongoing regional growth and insufficient queuing space along Waterdown Road at this intersection beyond buildout of the site. The MTO could consider a number of improvements, including introducing typical free-flow elements of a Diamond or Parclo interchange or considering additional auxiliary lanes when widening the Waterdown bridge structures where typical

interchange elements cannot be accommodated due to physical constraints. Future background traffic analysis results for this intersection for 2031 and 2036 reflect a potential dual southbound left and an additional receiving lane for the northbound right channelized and is shown in **Table 22**. This represents one possible improvement, among several expected to be reviewed as part of the Prosperity Corridor Study and Secondary Plan Study processes that are currently underway.

Note this improvement is primarily caused by the addition of non-site related traffic growth since the site related traffic volumes are consistent from 2026 to 2031 and 2036 traffic conditions.

Future Total Conditions

Future total conditions in 2026, 2031, and 2036 at the Waterdown Road / S Service Road & Highway 403 EB Off-Ramp intersection have been assessed, considering potential improvements required to address background growth and the addition of site traffic to individual intersection movements.

Under future total 2031 traffic conditions with the potential further improvements required to address corridor growth, the Waterdown Road / S Service Road & Highway 403 EB Off-Ramp intersection operate under busy conditions during the weekday morning and afternoon peak hours with overall v/c ratios of 0.85 and 0.82, respectively. Under future total 2036 traffic conditions with potential further improvements required to address corridor growth, the intersection operates under busy conditions during the weekday morning and afternoon peak hours with overall v/c ratios of 0.99 and 0.94, respectively. Note that a cycle length of 120 seconds was implemented during the weekday morning and afternoon peak hours under future 2026, 2031 and 2036 traffic conditions with the recommended improvement.

The future total 95th percentile queues can be accommodated in the available storage under weekday morning and afternoon peak periods. Southbound left queues do not meet existing storage under existing or future background conditions and site traffic does not specifically contribute to this constrained movement.

Summary

Based on the foregoing, the traffic generated by the site can be acceptably accommodated at the intersection of Waterdown Road / S Service Road & Highway 403 EB Off-Ramp. The traffic operations at this intersection are recommended to be monitored going forward in order to assess the necessity of both mitigating intersection improvements in advance of major improvements that are expected to be reviewed as part of the Prosperity Corridor Study, Secondary Plan Study, and Capital Budget processes that are currently underway.

Mitigating improvement measures are discussed under Future Background conditions above and have been identified in **Section 10.0**, should background development proceed at the high rate projected for 2026 (from 6 to 17% per year) based on the list of approved and appealed developments.

The impact related to site traffic is minor and can readily be accommodated within the interchange improvements that continue to be forthcoming in the City's Capital Budget and are already required to address existing and future background conditions.

TABLE 21 WATERDOWN ROAD / S SERVICE ROAD & HIGHWAY 403 EB OFF-RAMP (EXISTING AND FUTURE BACKGROUND 2026)

Key Movements	Existing		Future Background 2026		Future Background 2026 – With Improvements		Future Total 2026	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.63 (0.64)	D (D)	0.80 (0.85)	E (E)	0.81 (0.85)	D (E)	0.81 (0.85)	D (E)
EBT	0.76 (0.41)	D (D)	0.84 (0.33)	E (D)	0.52 (0.18)	C (C)	0.52 (0.18)	C (C)
EBR	0.17 (0.19)	C (D)	0.38 (0.70)	D (D)	0.42 (0.49)	C (C)	0.50 (0.73)	C (D)
WBL	0.11 (0.19)	D (D)	0.15 (0.28)	E (E)	0.45 (0.53)	D (D)	0.45 (0.53)	D (D)
WBR	0.08 (0.19)	D (D)	0.08 (0.19)	F (F)	0.08 (0.19)	D (D)	0.08 (0.19)	D (D)
NBTR / NBR	0.99 (0.59)	E (C)	0.85 (0.97)	C (D)	0.81 (0.75)	D (D)	0.95 (0.82)	E (C)
NBR	--	--	--	--	0.40 (0.27)	A (A)	0.51 (0.32)	A (A)
SBL	0.99 (0.74)	E (D)	1.37 (1.08)	F (F)	0.98 (0.89)	E (D)	0.99 (0.94)	E (E)
SBT	0.21 (0.31)	B (B)	0.29 (0.38)	B (C)	0.30 (0.39)	B (C)	0.33 (0.47)	B (C)
Overall	**0.81 (0.58)**	**D (C)**	**0.85 (0.91)**	**E (E)**	**0.85 (0.79)**	**C (C)**	**0.92 (0.86)**	**D (C)**
Analysis Notes	• Existing Lane Configuration		• Existing Lane Configuration		• **Mitigation Improvements:** a) A reduction of the dual westbound left turn lane into a single westbound left turn lane b) An auxiliary channelized northbound right turn lane		• Future Background 2026 Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 22 WATERDOWN ROAD / S SERVICE ROAD & HIGHWAY 403 EB OFF-RAMP (2031)

Key Movements	Future Background 2031		Future Background 2031 - with Improvements		Future Total 2031	
	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.98 (0.89)	F (E)	0.89 (0.83)	E (E)	0.92 (0.88)	E (E)
EBT	0.94 (0.32)	F (D)	0.54 (0.17)	C (C)	0.55 (0.17)	C (C)
EBR	0.56 (0.88)	D (E)	0.45 (0.57)	C (C)	0.54 (0.77)	C (D)
WBL	0.20 (0.36)	E (D)	0.45 (0.44)	E (E)	0.45 (0.40)	E (E)
WBR	0.08 (0.19)	F (F)	0.08 (0.38)	F (F)	0.08 (0.39)	E (F)
NBTR	0.99 (0.97)	D (D)	0.76 (0.77)	D (C)	0.82 (0.82)	D (D)
NBR	--	--	0.42 (0.29)	A (A)	0.53 (0.34)	A (A)
SBL[1]	1.20 (1.18)	F (F)	0.88 (0.68)	E (D)	0.82 (0.71)	D (D)
SBT	0.28 (0.40)	B (B)	0.29 (0.45)	B (C)	0.32 (0.53)	B (C)
Overall	**0.97 (0.96)**	**E (F)**	**0.82 (0.75)**	**D (D)**	**0.85 (0.82)**	**C (D)**
Analysis Notes	• Future Background 2026 Lane Configuration • Change Cycle Length from 100/110 seconds to 120 seconds		• Interchange Improvements, Such as: 1. Parclo or typical Diamond configuration 2. Separation of highway on/off ramp and primary GO traffic; **or**, 3. Introduction of Dual or Free Flow Left/Right Turns at interchange intersections; in combination with, 4. Widening of Waterdown Road over Highway 403 (already planned for 2028) • ***Dual SBL / Northbound Right receiving lane Implemented in Synchro***		• Future Background 2031 Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)
2. Includes a dual southbound left with an additional receiving lane for the northbound right channelized as a potential improvement to be explored by MTO as part of the Prosperity Corridor Study and Secondary Plan Study.

TABLE 23 WATERDOWN ROAD / S SERVICE ROAD & HIGHWAY 403 EB OFF-RAMP (2036)

Key Movements	Future Background 2036		Future Background 2036 - with Improvements		Future Total 2036	
	v/c	LOS	v/c	LOS	v/c	LOS
EBL	1.10 (0.81)	F (E)	0.95 (0.91)	E (E)	0.99 (0.94)	F (F)
EBT	0.97 (0.27)	F (D)	0.53 (0.17)	C (C)	0.55 (0.16)	C (C)
EBR	1.14 (1.04)	F (F)	0.77 (0.74)	D (D)	0.86 (0.86)	D (D)
WBL	0.20 (0.36)	E (D)	0.45 (0.41)	D (C)	0.45 (0.35)	E (C)
WBR	0.08 (0.19)	E (F)	0.08 (0.47)	F (D)	0.08 (0.43)	F (D)
NBTR	1.06 (1.19)	E (F)	0.89 (0.79)	E (C)	0.98 (0.95)	E (D)
NBR	--	--	0.46 (0.33)	A (A)	0.57 (0.39)	A (A)
SBL[1]	1.32 (1.41)	F (F)	0.96 (0.76)	E (D)	0.97 (0.85)	E (E)
SBT	0.31 (0.48)	B (C)	0.33 (0.50)	B (C)	0.36 (0.60)	B (C)
Overall	**1.06 (1.13)**	**F (F)**	**0.93 (0.82)**	**D (C)**	**0.99 (0.94)**	**D (D)**
Analysis Notes	• Future Background 2026 Lane Configuration		• Future Background 2031 Lane Configuration		• Future Background 2031 Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)
2. Includes a dual southbound left with an additional receiving lane for the northbound right channelized as a potential improvement to be explored by MTO as part of the Prosperity Corridor Study and Secondary Plan Study.

TABLE 24 WATERDOWN ROAD / S SERVICE ROAD & HIGHWAY 403 EB OFF-RAMP QUEUE LENGTHS

Key Movements	Existing		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
EBL	46.4 (33.7)	71.4 (53.4)	56.4 (57.6)	#94.0 (#97.9)	56.4 (57.6)	#94.0 (#97.9)	77.3 (66.5)	#136.3 (#124.5)	79.4 (68.9)	#136.3 (#124.5)	88.4 (73.7)	#151.1 (#127.5)	88.4 (73.7)	#151.1 (#127.5)
EBT	63.2 (22.2)	93.0 (37.8)	53.3 (16.7)	80.5 (29.7)	53.3 (16.7)	80.5 (29.7)	66.7 (17.9)	100.1 (29.5)	69.0 (18.7)	100.1 (28.6)	68.0 (18.7)	98.7 (27.9)	68.0 (17.3)	98.7 (27.7)
EBR	0.0 (0.0)	18.9 (22.7)	16.8 (33.9)	46.4 (63.1)	26.6 (64.7)	59.6 (102.8)	22.1 (56.0)	59.6 (84.4)	36.7 (91.8)	76.5 (119.1)	74.9 (86.3)	#141.3 (110.9)	89.4 (107.0)	#161.3 (143.4)

9.3.4.4 Waterdown Road / Masonry Court & Railway Road

The Waterdown Road / Masonry Court & Railway Road intersection is signalized with a typical cycle length of 100 seconds and 110 seconds during the weekday morning and afternoon peak periods, respectively.

A summary of the traffic analysis results for this intersection are shown in **Table 25**.

A summary of future traffic analysis results for this intersection for additional 5-year and 10-year beyond build-out is shown in **Table 26**.

A summary of the 50th percentile and 95th percentile queues are summarized in **Table 27**.

Existing Conditions
Under existing traffic conditions, the intersection operates under acceptable volume-to-capacity conditions with overall v/c ratios of 0.47 and 0.43 during the weekday morning and afternoon peak hours, respectively. The existing queuing exceeds the available storage length of 45 metres on the southbound left turn lane.

Future Background Conditions
The addition of the South GO expansion lot will add queuing to the southbound left and westbound right movement of this intersection.

In addition, given the increase in outbound GO transit activity, the westbound approach is proposed to be reconfigured to have an exclusive right turn lane and shared left-through lane in order to accommodate the traffic demand on the right turn movement.

Under future background traffic conditions in 2026 with the addition of traffic allowances associated with background developments and general background corridor traffic growth, the intersection operates under acceptable conditions with overall v/c ratios of 0.64 and 0.47 during the weekday morning and afternoon peak hours, respectively.

In 2036, with the addition of Phase 2 South GO expansion expected to be completed by 2033, Metrolinx will add significant queuing to the southbound left and westbound right movement of this intersection.

The 2017 TIS prepared by AECOM addressed these improvements, by noting that “geometric changes to the road network be deferred in the short-term to encourage GO Station users to access the station outside of the AM and PM peak hours, or to access the station via municipal transit services”.

BA Group has conducted further sensitivity analysis without the consideration of the proposed parking lot expansion in **Section 9.4**, recognizing that Metrolinx is anticipating traffic is expected to disperse outside of peak AM and PM peak hours.

Note that a cycle length of 120 seconds was implemented during the weekday morning and afternoon peak hours under future 2026, 2031 and 2036 traffic conditions in order to maintain signal coordination with adjacent signalized intersections along Waterdown Road.

Future Total Conditions

With addition of site-related traffic under future total 2026 traffic conditions, the intersection operates under busy yet acceptable volume-to-capacity conditions with overall v/c ratios of 0.74 and 0.69 during the weekday morning and afternoon peak hours, respectively.

Under future total 2031 traffic conditions, the intersection operates under acceptable volume-to-capacity conditions with overall v/c ratios of 0.77 and 0.71 during the weekday morning and afternoon peak hours, respectively. Under future total 2036 traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.91 and 0.97 during the weekday morning and afternoon peak hours, respectively. Southbound left queuing for future total conditions has been assessed as part of the Metrolinx sensitivity described in **Section 9.4**.

Site-related impacts are anticipated to have moderate impact at this intersection during the weekday morning and afternoon peak hours when compared to other development (notably GO transit activity) routing through this intersection.

Summary

An extension of the southbound left turn lane to 135 metres is proposed to accommodate Phase 1 of the South GO expansion and site traffic volumes. Phase 2 South GO expansion and regional growth will add to the queuing on the southbound left in 2031 and 2036. The TIS prepared for Metrolinx anticipates dispersal of traffic outside of the peak hour that may lessen the traffic impact on this movement currently estimated for Future Background 2031 and 2036.

The impact related to site traffic is minor and can readily be accommodated within improvements proposed for 2026.

TABLE 25 WATERDOWN ROAD / MASONRY COURT & RAILWAY ROAD (BUILD-OUT, 2026)

Key Movements	Existing		Future Background 2026		Future Background 2026 – With Improvements		Future Total 2026	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBLTR	0.02 (0.19)	D (D)	0.06 (0.42)	D (D)	0.02 (0.12)	D (D)	0.02 (0.12)	D (D)
WBL/WBLT	0.29 (0.60)	D (D)	0.27 (0.60)	D (D)	0.21 (0.62)	D (D)	0.20 (0.60)	D (D)
WBTR/WBR	0.02 (0.16)	D (D)	0.15 (0.37)	D (D)	0.14 (0.45)	D (D)	0.21 (0.66)	D (D)
NBL	0.01 (0.02)	A (A)	0.02 (0.03)	A (A)	0.02 (0.03)	B (A)	0.02 (0.04)	B (B)
NBTR	0.51 (0.33)	A (A)	0.66 (0.42)	B (B)	0.71 (0.44)	C (B)	0.82 (0.62)	C (C)
SBL	0.37 (0.10)	A (A)	0.74 (0.43)	C (A)	0.76 (0.44)	D (B)	0.82 (0.80)	D (C)
SBTR	0.18 (0.39)	A (A)	0.22 (0.43)	A (A)	0.23 (0.45)	A (B)	0.24 (0.45)	A (B)
Overall	**0.47 (0.43)**	**A (B)**	**0.64 (0.47)**	**B (B)**	**0.66 (0.49)**	**C (B)**	**0.74 (0.68)**	**C (C)**
Analysis Notes:	• Existing Lane Configuration		• Existing Lane Configuration		• Convert WBL/WBTR to WBTL/WBR • Extend second lane to Cooke Blvd • Extend Southbound left from 45 metres to 90 metres		• Future Background 2026 Lane Configuration • Extend Southbound left from 90 metres to 130 metres	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 26 WATERDOWN ROAD / MASONRY COURT & RAILWAY ROAD (2031, 2036)

Key Movements	Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBLTR	0.02 (0.12)	D (D)	0.02 (0.11)	D (D)	0.02 (0.08)	D (D)	0.02 (0.07)	D (C)
WBLT	0.25 (0.62)	D (D)	0.23 (0.57)	D (D)	0.28 (0.47)	D (D)	0.26 (0.41)	D (D)
WBR	0.14 (0.46)	D (D)	0.21 (0.65)	D (D)	0.19 (0.90)	D (E)	0.26 (0.96)	D (E)
NBL	0.02 (0.03)	B (A)	0.02 (0.04)	B (C)	0.02 (0.04)	B (A)	0.02 (0.07)	B (B)
NBTR	0.74 (0.47)	C (B)	0.86 (0.68)	C (C)	1.00 (0.63)	D (B)	1.00 (0.98)	D (D)
SBL	0.77 (0.45)	D (A)	0.80 (0.82)	D (D)	0.85 (0.65)	D (C)	0.99 (0.98)	E (E)
SBTR	0.24 (0.48)	A (A)	0.24 (0.49)	A (A)	0.27 (0.59)	A (A)	0.27 (0.62)	A (B)
Overall	**0.70 (0.52)**	**C (B)**	**0.77 (0.71)**	**C (C)**	**0.86 (0.70)**	**D (C)**	**0.91 (0.97)**	**D (D)**
Analysis Notes:	• Future Background 2026 Lane Configuration • Change Cycle Length from 100/110 seconds to 120 seconds		• Future Background 2026 Lane Configuration		• Future Background 2026 Lane Configuration		• Future Background 2026 Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 27 WATERDOWN ROAD / MASONRY COURT & RAILWAY ROAD QUEUE LENGTHS

Key Movements	Existing		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
SBL	16.0 (4.7)	17.8 (m10.8)	55.8 (21.8)	86.1 (35.2)	78.1 (71.8)	#126.5 (91.3)	71.4 (5.4)	96.0 (24.8)	99.3 (71.2)	#151.1 (110.0)	115.4 (28.3)	m#189.1 (47.4)	141.9 (~127.1)	m#232.1 (#153.0)
WBR	0.0 (1.2)	0.0 (13.4)	0.0 (6.4)	19.2 (16.7)	0.0 (18.8)	22.0 (32.0)	0.0 (7.5)	21.1 (17.0)	0.0 (20.7)	24.7 (29.9)	0.0 (60.4)	23.4 (75.1)	0.0 (83.5)	26.0 (99.3)

9.3.4.5 Waterdown Road & Lasalle Park Road / Plains Road

The Waterdown Road / Masonry Court & Railway Road intersection is signalized with a typical cycle length of 110 seconds during the weekday morning and afternoon peak periods.

A summary of the traffic analysis results for this intersection are shown in **Table 28.**

A summary of future traffic analysis results for this intersection for additional 5-year and 10-year beyond build-out is shown in **Table 29** and **Table 30**.

Existing Conditions
Under existing traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.83 during the weekday morning and afternoon peak hours. The eastbound left movement is the critical movement with an individual v/c ratio of 1.00, at theoretical capacity during the weekday morning peak hour.

Future Background Conditions
The intersection is impacted by the addition of corridor traffic growth, notably on the local turning movements.

Under future background traffic conditions with the addition of traffic allowances associated with background developments and general background corridor traffic growth, the intersection operates under busy yet acceptable conditions with overall v/c ratios of 0.91 during the weekday morning and afternoon peak hours.

Traffic growth along the major corridors and the changing area travel mode characteristics in the area, it is fully anticipated that traffic volumes analyzed under future background scenario for 2031 and 2036 horizon years will either be dispersed, realized in other modes of travel or accommodated at new north-south road connections within the draft Mobility Study Area. Should the 2% annual corridor growth be realized to 2036, the following road improvements would also accommodate additional activity at this intersection (if space permits) in addition to new north-south connections within the draft Mobility Study Area:

- An additional eastbound left turn lane
- An auxiliary westbound right turn lane
- An additional southbound left turn lane (2036 only)

Future Total Conditions
With addition of site-related traffic under future total 2026 traffic conditions, the intersection operates under busy yet acceptable conditions with overall v/c ratios of 0.92 during the weekday morning and afternoon peak hours.

Under future total 2031 traffic conditions with the potential improvements described above, the intersection operate under busy conditions during the weekday morning and afternoon peak hours with overall v/c ratios of 0.87 and 0.88, respectively. Under future total 2036 traffic conditions with the potential improvements described above, the intersection operates under busy conditions during the weekday morning and afternoon peak hours with overall v/c ratios of 0.90 and 0.89, respectively. Note that a cycle length of 120 seconds was implemented during the weekday morning and afternoon peak hours under future 2031 and 2036 traffic conditions.

Summary

Site-related impacts are anticipated to be a minor impact at this intersection during the weekday morning and afternoon peak hours when compared to other developments and corridor traffic routing through this intersection.

The analysis provides a conservative projection of future corridor traffic volumes in the area. It is anticipated that some of the corridor traffic volumes analyzed under future conditions may never be fully realized – and instead corridor growth may be dispersed, realized in other modes of travel or accommodated at new north-south road connections within the draft Mobility Study Area. It is recommended that the City monitor this intersection for estimated vs realized growth on turning movements to assess the necessity of intersection improvements, such as a dual eastbound left turn lane and auxiliary westbound right turn lane. Additional north-south routes, that would establish a grid-network, are recommended to alleviate regional growth, improve capacity, and provide alternative routes and better local access conditions to the local area north of Plains Road.

TABLE 28 WATERDOWN ROAD & LASALLE PARK ROAD / PLAINS ROAD (BUILD OUT, 2026)

Key Movements	Existing		Future Background 2026		Future Total 2026	
	v/c	LOS	v/c	LOS	v/c	LOS
EBL	1.00 (0.80)	E (D)	0.99 (0.88)	E (E)	1.00 (0.88)	E (E)
EBTR	0.63 (0.35)	C (B)	0.52 (0.38)	B (C)	0.52 (0.39)	B (C)
WBL	0.37 (0.17)	C (B)	0.84 (0.19)	F (B)	0.83 (0.19)	F (B)
WBTR	0.71 (0.85)	D (D)	0.85 (0.96)	E (D)	0.89 (0.99)	E (E)
NBL	0.21 (0.39)	C (C)	0.33 (0.39)	D (D)	0.33 (0.39)	D (D)
NBTR	0.80 (0.84)	D (E)	0.86 (0.78)	E (E)	0.86 (0.78)	E (E)
SBL	0.57 (0.86)	C (D)	0.94 (1.00)	E (F)	0.94 (1.00)	E (F)
SBT	0.33 (0.54)	C (D)	0.26 (0.51)	C (D)	0.26 (0.51)	C (D)
SBR	0.11 (0.25)	C (F)	0.14 (0.38)	C (D)	0.14 (0.38)	C (D)
Overall	**0.83 (0.83)**	**D (D)**	**0.91 (0.91)**	**D (D)**	**0.92 (0.92)**	**D (D)**
Analysis Notes:	• Existing Lane Configuration		• Existing Lane Configuration • Change Cycle Length from 100/110 seconds to 120 seconds		• Existing Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 29 WATERDOWN ROAD & LASALLE PARK ROAD / PLAINS ROAD (2031)

Key Movements	Future Background 2031		Future Background 2031 – With Improvements		Future Total 2031	
	v/c	LOS	v/c	LOS	v/c	LOS
EBL	1.13 (0.89)	F (E)	0.94 (0.70)	E (D)	0.94 (0.70)	E (D)
EBTR	0.57 (0.41)	B (C)	0.62 (0.38)	C (B)	0.62 (0.39)	C (B)
WBL	0.95 (0.22)	F (C)	0.81 (0.34)	F (C)	0.81 (0.35)	F (D)
WBTR	0.89 (1.10)	E (F)	0.49 (0.97)	D (D)	0.52 (0.98)	D (E)
WBR	--	--	0.18 (0.26)	D (C)	0.20 (0.29)	D (F)
NBL	0.37 (0.62)	D (D)	0.35 (0.60)	D (D)	0.35 (0.60)	D (D)
NBTR	0.91 (0.79)	E (E)	0.87 (0.76)	E (D)	0.87 (0.76)	E (D)
SBL	1.12 (1.13)	F (F)	0.90 (0.99)	E (E)	0.90 (0.99)	E (E)
SBT	0.29 (0.42)	C (C)	0.26 (0.39)	C (C)	0.26 (0.39)	C (C)
SBR	0.15 (0.53)	D (D)	0.15 (0.49)	C (C)	0.15 (0.49)	C (C)
Overall	**1.02 (0.99)**	**E (E)**	**0.87 (0.88)**	**D (D)**	**0.87 (0.88)**	**D (D)**
Analysis Notes:	• Existing Lane Configuration		• Monitor for Estimated vs. Realized Corridor Growth ***Dual eastbound left and westbound right implemented in Synchro***		• Future Background 2031 Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 30 WATERDOWN ROAD & LASALLE PARK ROAD / PLAINS ROAD (2036)

Key Movements	Future Background 2036		Future Background 2036 - with Improvements		Future Total 2036	
	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.95 (0.97)	E (F)	0.95 (0.84)	E (E)	0.95 (0.84)	E (E)
EBTR	0.89 (0.42)	D (B)	0.86 (0.39)	D (B)	0.86 (0.40)	D (B)
WBL	0.62 (0.39)	D (C)	0.62 (0.36)	D (C)	0.62 (0.37)	D (D)
WBTR	0.63 (0.98)	D (E)	0.59 (0.92)	D (D)	0.62 (0.93)	D (D)
WBR	0.20 (0.32)	D (C)	0.20 (0.30)	D (C)	0.20 (0.33)	D (E)
NBL	0.39 (0.78)	D (E)	0.38 (0.67)	D (D)	0.38 (0.67)	D (D)
NBTR	0.95 (0.98)	E (F)	0.92 (0.84)	E (E)	0.92 (0.84)	E (E)
SBL	0.94 (1.05)	E (F)	0.68 (0.94)	D (E)	0.68 (0.94)	D (E)
SBT	0.27 (0.42)	C (C)	0.28 (0.46)	C (D)	0.28 (0.46)	C (D)
SBR	0.16 (0.560	D (D)	0.16 (0.61)	D (D)	0.16 (0.61)	D (D)
Overall	**0.95 (0.99)**	**D (E)**	**0.90 (0.89)**	**D (D)**	**0.90 (0.89)**	**D (D)**
Analysis Notes	• Future Background 2031 Lane Configuration		• Monitor for Estimated vs. Realized Corridor Growth • ***Dual eastbound left, westbound right and dual southbound implemented in Synchro***		• Future Background 2036 Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

9.3.4.6 S Service Road / Highway 403 EB On-Ramp & GO Station Lot Entrance

The S Service Road / Highway 403 EB On-Ramp & GO Station Lot Entrance intersection is signalized with an actuated-uncoordinated free cycle length plan during the weekday morning and afternoon peak periods, respectively.

A summary of the traffic analysis results for this intersection is shown in **Table 31**.

A summary of future traffic analysis results for this intersection for additional 5-year and 10-year beyond build-out is shown in **Table 32**.

A summary of the 50th percentile and 95th percentile queues are summarized in **Table 33**.

Existing Conditions
Under existing traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.64 and 0.69 during the weekday morning and afternoon peak hours, respectively.

Future Background Conditions
Under future background traffic conditions with the addition of traffic allowances associated with background developments and general background corridor traffic growth, the intersection operates under capacity conditions with overall v/c ratios of 0.80 and 0.83 during the weekday morning and afternoon peak hours, respectively.

Under future background 2031 traffic conditions, the intersection operates under capacity with overall v/c ratios of 0.81 during the weekday morning and afternoon peak hours. Under future total 2036 background conditions, the intersection operates under capacity with overall v/c ratios of 0.89 during the weekday morning and afternoon peak hours.

In order to meet the MTO operational results criteria and accommodate the anticipated traffic growth accessing the Highway 403 corridor, the intersection will require an additional eastbound left turn lane or a reconfiguration of the on-ramp to allow free-flowing traffic onto the Highway 403 corridor, similar to other MTO Highway On-Ramp terminals located throughout the GTA. Recognizing S Service Road currently functions as a shared access for both the Highway 403 corridor and the Aldershot GO Station, which represents the two highest vehicle generators throughout the day, it is considered beneficial for the City and MTO to explore the potential option of providing two separate access for each of these generators. Traffic operations at this junction should be monitored by the MTO and City and improvements beyond buildout (2026) should be implemented in concert with the interchange improvements that will be required at Waterdown Road beyond 2026.

Future Total Conditions
With addition of site-related traffic under future total 2026 traffic conditions, the intersection operates under capacity with overall v/c ratios of 0.93 and 0.89 during the weekday morning and afternoon peak hours, respectively.

A queuing analysis was also conducted at the S Service Road / Highway 403 EB On-Ramp & GO Station Lot Entrance intersection to confirm that future total queues do not extend beyond the available storage capacity and obstruct traffic volumes related to the Highway 403 off-ramp terminals.

The future total 95th percentile queues can be accommodated in the available storage under weekday morning and afternoon peak periods.

TABLE 31 S SERVICE ROAD / HIGHWAY 403 EB ON-RAMP & GO STATION LOT ENTRANCE (BUILD OUT, 2026)

Key Movements	Existing		Future Background 2026		Future Total 2026	
	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.66 (0.74)	A (B)	0.84 (0.88)	B (C)	0.97 (0.93)	C (C)
EBR	0.11 (0.01)	A (A)	0.11 (0.01)	A (A)	0.11 (0.01)	A (A)
NBLT	0.32 (0.61)	C (C)	0.32 (0.71)	D (C)	0.33 (0.76)	D (C)
Overall	**0.64 (0.69)**	**A (B)**	**0.80 (0.83)**	**B (C)**	**0.93 (0.89)**	**C (C)**
Analysis Notes	• Existing Lane Configuration		• Existing Lane Configuration		• Existing Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 32 S SERVICE ROAD / HIGHWAY 403 EB ON-RAMP & GO STATION LOT ENTRANCE (2031 & 2036)

Key Movements	Future Background 2031		Future Total 2031		Future Background 2036		Future Background 2036 – With Improvements		Future Total 2036	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL/EBLR	0.83 (0.80)	B (B)	0.98 (0.88)	D (C)	0.92 (0.89)	B (B)	0.54 (0.49)	A (A)	0.61 (0.54)	A (A)
EBR	0.11 (0.01)	A (A)	0.11 (0.01)	A (A)	0.11 (0.01)	A (A)	-- (--)	-- (--)	-- (--)	-- (--)
NBLT	0.42 (0.83)	E (E)	0.42 (0.85)	E (E)	0.42 (0.89)	E (E)	0.38 (0.73)	E (D)	0.38 (0.73)	E (D)
Overall	**0.81 (0.81)**	**B (C)**	**0.95 (0.87)**	**C (C)**	**0.89 (0.89)**	**B (C)**	**0.53 (0.55)**	**A (B)**	**0.60 (0.59)**	**A (B)**
Analysis Notes	• Existing Lane Configuration • Change Cycle Length to 120 seconds • Interchange Improvements as shown in **Table 22** may be considered and implemented		• Existing Lane Configuration		• Existing Lane Configuration		• ***Dual EBL Implemented in Synchro***		• Future Background 2036	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 33 S SERVICE ROAD / HIGHWAY 403 EB ON-RAMP & GO STATION LOT ENTRANCE QUEUE LENGTHS

Key Movements	Existing		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
EBL	0.0 (50.2)	86.5 (83.1)	84.0 (92.2)	#215.2 (107.4)	~167.0 (117.9)	#282.8 (135.2)	199.6 (100.7)	#225.6 (167.6)	~207.9 (189.1)	#373.6 (203.4)	0.5 (64.3)	26.8 (73.5)	2.6 (28.8)	0.0 (69.4)
EBR	0.0 (0.0)	4.5 (2.3)	0.0 (0.0)	3.5 (1.7)	0.0 (0.0)	3.5 (1.7)	3.7 (0.2)	6.2 (0.4)	0.1 (0.0)	5.2 (0.6)	--	--	--	--

9.3.4.7 S Service Road / GO Station Bus Loop Access

The S Service Road / GO Station Bus Loop Access intersection is signalized with as an actuated-uncoordinated free cycle length plan during the weekday morning and afternoon peak periods, respectively.

A summary of the traffic analysis results for this intersection is shown in **Table 34**.

A summary of future traffic analysis results for this intersection for additional 5-year and 10-year beyond build-out is shown in **Table 35**.

A summary of the 50th percentile and 95th percentile queues are summarized in **Table 36**.

Existing Conditions
Under existing traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.53 and 0.32 during the weekday morning and afternoon peak hours, respectively.

Future Background Conditions
Under future background traffic conditions with the addition of traffic allowances associated with background developments and general background corridor traffic growth, the intersection operates under acceptable conditions with overall v/c ratios of 0.61 and 0.32 during the weekday morning and afternoon peak hours, respectively.

Future Total Conditions
With addition of site-related traffic under future total 2026 traffic conditions, the intersection operates under busy yet acceptable conditions with overall v/c ratios of 0.66 and 0.35 during the weekday morning and afternoon peak hours, respectively.

Under future total 2031 traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.67 and 0.33 during the weekday morning and afternoon peak hours, respectively. Under future total 2036 traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.71 and 0.44 during the weekday morning and afternoon peak hours, respectively. Note that a cycle length of 60 seconds was implemented during the weekday morning and afternoon peak hours under future 2031 and 2036 traffic conditions in order to maintain signal coordination with adjacent signalized intersections along S Service Road.

Summary
Site-related impacts are anticipated to have minor impact at this intersection during the weekday morning and afternoon peak hours when compared to other developments routing through this intersection. It can reasonably be expected that this intersection will also be modified beyond build-out (beyond 2026) to address interchange improvements given it's location between Waterdown Road and the eastbound highway on-ramp.

A queuing analysis was also conducted at the S Service Road / GO Station Bus Loop Access intersection to confirm that future total queues do not extend beyond the available storage capacity and obstruct traffic volumes related the Highway 403 off-ramp terminals if the intersection remains in the existing configuration.

The future total 95th percentile queues can be accommodated in the available storage under weekday morning and afternoon peak periods. Based on the foregoing, the traffic generated by the site can be acceptably accommodated at the intersection of S Service Road / GO Station Bus Loop Access.

TABLE 34 S SERVICE ROAD / GO STATION BUS LOOP ACCESS (BUILD OUT, 2026)

Key Movements	Existing		Future Background 2026		Future Total 2026	
	v/c	LOS	v/c	LOS	v/c	LOS
EBTR	0.54 (0.31)	A (A)	0.62 (0.31)	A (A)	0.67 (0.35)	A (A)
WBT	0.05 (0.13)	A (A)	0.05 (0.13)	A (A)	0.04 (0.13)	A (A)
NBLR	0.40 (0.36)	C (C)	0.41 (0.36)	C (C)	0.43 (0.36)	C (C)
Overall	**0.53 (0.32)**	**A (A)**	**0.61 (0.32)**	**A (A)**	**0.66 (0.35)**	**A (A)**
Analysis Notes:	• Existing Lane Configuration		• Existing Lane Configuration		• Existing Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 35 S SERVICE ROAD / GO STATION BUS LOOP ACCESS (2031, 2036)

Key Movements	Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBTR	0.62 (0.30)	A (A)	0.69 (0.33)	A (A)	0.66 (0.41)	A (A)	0.72 (0.44)	A (A)
WBT	0.04 (0.12)	A (A)	0.04 (0.12)	A (A)	0.04 (0.12)	A (A)	0.04 (0.12)	A (A)
NBLR	0.42 (0.38)	D (C)	0.42 (0.38)	D (C)	0.42 (0.38)	D (C)	0.42 (0.38)	D (C)
Overall	**0.61 (0.30)**	**A (A)**	**0.67 (0.33)**	**A (A)**	**0.65 (0.41)**	**A (A)**	**0.71 (0.44)**	**A (A)**
Analysis Notes:	• Existing Lane Configuration • Change Cycle Length to 60 seconds		• Existing Lane Configuration		• Existing Lane Configuration		• Existing Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 36 S SERVICE ROAD / GO STATION BUS LOOP ACCESS QUEUE LENGTHS

Key Movements	Existing		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
EBTR	0.0 (0.0)	56.9 (23.8)	0.0 (0.0)	75.0 (23.8)	0.0 (0.0)	92.3 (27.6)	1.6 (0.0)	113.0 (12.2)	3.9 (0.0)	133.6 (10.3)	2.0 (0.0)	m124.7 (23.5)	5.3 (0.0)	m145.7 (15.6)

9.3.4.8 Plains Road / Cooke Boulevard

The Plains Road / Cooke Boulevard intersection is signalized with a 100 seconds and 110 seconds cycle length plan during the weekday morning and afternoon peak periods, respectively.

A summary of the traffic analysis results for this intersection is shown in **Table 37**.

A summary of future traffic analysis results for this intersection for additional 5-year and 10-year beyond build-out is shown in **Table 38**.

Existing Conditions
Under existing traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.38 and 0.50 during the weekday morning and afternoon peak hours, respectively.

Future Background Conditions
Under future background traffic conditions with the addition of traffic allowances associated with background developments and general background corridor traffic growth, the intersection operates under acceptable conditions with overall v/c ratios of 0.45 and 0.61 during the weekday morning and afternoon peak hours, respectively.

Future Total Conditions
Under future total 2031 traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.60 and 0.74 during the weekday morning and afternoon peak hours, respectively. Under future total 2036 traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.64 and 0.79 during the weekday morning and afternoon peak hours, respectively.

Site-related impacts are anticipated to have minor impact at this intersection during the weekday morning and afternoon peak hours when compared to other developments routing through this intersection.

Based on the foregoing, the traffic generated by the site can be acceptably accommodated at the intersection of Plains Road / Cooke Boulevard. No mitigation measures or improvements are recommended at this intersection.

TABLE 37 PLAINS ROAD / COOKE BOULEVARD (BUILD-OUT, 2026)

Key Movements	Existing		Future Background 2026		Future Total 2026	
	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.13 (0.05)	A (A)	0.19 (0.22)	A (A)	0.23 (0.35)	A (B)
EBT	0.39 (0.32)	A (A)	0.44 (0.36)	A (A)	0.50 (0.38)	A (A)
WBTR	0.28 (0.52)	A (A)	0.33 (0.64)	A (B)	0.41 (0.73)	B (B)
SBLR	0.15 (0.39)	D (D)	0.38 (0.55)	D (D)	0.68 (0.66)	D (D)
Overall	**0.38 (0.50)**	**A (A)**	**0.45 (0.61)**	**A (B)**	**0.56 (0.70)**	**B (B)**
Analysis Notes:	• Existing Lane Configuration		• Existing Lane Configuration		• Existing Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 38 PLAINS ROAD / COOKE BOULEVARD (2031, 2036)

Key Movements	Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.20 (0.25)	A (A)	0.25 (0.40)	A (B)	0.21 (0.29)	A (A)	0.26 (0.46)	A (C)
EBT	0.48 (0.39)	A (A)	0.55 (0.41)	A (A)	0.53 (0.44)	A (A)	0.60 (0.45)	A (A)
WBTR	0.36 (0.69)	A (B)	0.45 (0.79)	B (B)	0.39 (0.76)	A (B)	0.48 (0.84)	B (B)
SBLR	0.38 (0.55)	D (D)	0.68 (0.66)	D (D)	0.38 (0.57)	D (D)	0.68 (0.70)	D (E)
Overall	**0.49 (0.66)**	**A (B)**	**0.60 (0.74)**	**B (B)**	**0.53 (0.72)**	**A (B)**	**0.64 (0.79)**	**B (B)**
Analysis Notes:	• Existing Lane Configuration		• Existing Lane Configuration		• Existing Lane Configuration		• Existing Lane Configuration	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

9.3.4.9 Cooke Boulevard / Masonry Court

The Cooke Boulevard / Masonry Court intersection is currently an unsignalized intersection with a minor street STOP-controlled operation

A summary of the traffic analysis results for this intersection is shown in **Table 39**.

A summary of future traffic analysis results for this intersection for additional 5-year and 10-year beyond build-out is shown in **Table 40**.

Existing Conditions
As shown in **Table 41**, the Cooke Boulevard / Masonry Court intersection operates acceptably at a level of service LOS B or better during the weekday morning and afternoon peak hours under existing traffic conditions.

As described in the Metrolinx sensitivity discussion in **Section 9.4**, an All-Way STOP-control is required for this intersection with the exception of the expansion of the South GO Aldershot parking lot.

Future Background Conditions
Under future background traffic conditions with the addition of traffic allowances associated with background developments, it is recommended to signalize the Cooke Boulevard / Masonry Court intersection given that the minor approaches are experiencing extended delays due to the South GO Aldershot parking lot expansion by Metrolinx.

For the purposes of this analysis, it is recommended that the intersection operate with a cycle length of 120 seconds during the weekday morning and afternoon peak hours to maintain coordination with the adjacent intersection at Waterdown Road / Cooke Boulevard & Railway Road.

The Cooke Boulevard / Masonry Court intersection operates under acceptable conditions with overall v/c ratio of 0.65 and 0.49 during the weekday morning and afternoon peak hours, respectively.

Future Total Conditions
Under future total 2031 traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.65 and 0.76 during the weekday morning and afternoon peak hours, respectively. Under future total 2036 traffic conditions, the intersection operates under acceptable conditions with overall v/c ratios of 0.74 and 0.85 during the weekday morning and afternoon peak hours, respectively.

Summary
Based on the foregoing, the traffic generated by the site can be acceptably accommodated at the intersection of Cooke Boulevard / Masonry Court, with the implementation of a signal for the South GO Aldershot parking lot expansion. As further discussed in **Section 9.4**, the site can be acceptably accommodated with an all-way stop control without South GO Aldershot parking lot expansion. The site plan reflects space for the implementation of a future signal, if needed.

TABLE 39 COOKE BOULEVARD / MASONRY COURT (BUILD-OUT, 2026)

Key Movements	Existing	Future Background	Future Background 2026		Future Total 2026	
			v/c	LOS	v/c	LOS
EBLTR	Unsignalized – see **9.3.5**	Unsignalized – see **9.3.5**	0.56 (0.23)	A (A)	0.72 (0.23)	B (A)
WBLTR			0.18 (0.52)	A (A)	0.33 (0.52)	A (A)
NBLTR			0.42 (0.38)	B (B)	0.48 (0.38)	B (B)
SBLTR[2]			-- (--)	-- (--)	0.29 (0.00)	B (A)
Overall			**0.53 (0.49)**	**A (A)**	**0.65 (0.49)**	**B (A)**
Analysis Notes:	• Existing Lane Configuration	• Existing Lane Configuration	• Signalize		• Future Background 2026	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)
2. Future background shows no capacity since Phase 1 is included as part of the site traffic for the purposes of this study.

TABLE 40 COOKE BOULEVARD / MASONRY COURT (2031, 2036)

Key Movements	Future Background 2031		Future Total 2031		Future Background 2036		Future Total 2036	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBLTR	0.56 (0.23)	A (A)	0.72 (0.81)	B (B)	0.66 (0.26)	A (A)	0.81 (0.89)	B (C)
WBLTR	0.18 (0.52)	A (A)	0.33 (0.57)	A (A)	0.23 (0.63)	A (A)	0.38 (0.68)	A (A)
NBLTR	0.42 (0.38)	B (B)	0.48 (0.62)	B (C)	0.50 (0.42)	C (C)	0.55 (0.72)	C (D)
SBLTR	-- (--)	-- (--)	0.29 (0.13)	B (B)	-- (--)	-- (--)	0.31 (0.15)	C (C)
Overall	**0.53 (0.49)**	**A (A)**	**0.65 (0.76)**	**B (B)**	**0.63 (0.59)**	**A (A)**	**0.74 (0.85)**	**B (B)**
Analysis Notes:	• Future Background 2026		• Future Background 2026		• Future Background 2026		• Future Background 2026	

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

9.3.5 Unsignalized Intersections

Unsignalized intersection capacity results are summarized in **Table 41** and **Table 42**. All unsignalized intersections within the study area operate acceptably at LOS B or better under all scenarios.

Vehicular access to the site will be provided via two driveways located on Cooke Boulevard and Waterdown Road. The proposed driveways will provide two-way access to the proposed loading and underground parking facilities. The driveways will operate under minor street STOP-controlled with full manoeuvres permitted at Cooke Boulevard and only right-in / right-out manoeuvres permitted at Waterdown Road. These driveways are anticipated to operate at a good level of service (LOS B or better) with very minimal delay in the future.

TABLE 41 UNSIGNALIZED INTERSECTION ANALYSIS SUMMARY (BUILD OUT)

Key Movements	Existing		Future Background 2026		Future Total 2026	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Cooke Boulevard / Masonry Court						
WBLT	1.3 (0.4)	A (A)	-- (--)	-- (--)	-- (--)	-- (--)
NBLR	10.6 (0.0)	B (A)	-- (--)	-- (--)	-- (--)	-- (--)
Waterdown Road / Site Driveway (West)						
WBR	-- (--)	-- (--)	-- (--)	-- (--)	11.8 (10.5)	B (B)
Cooke Boulevard / Site Driveway (East)						
WBL	-- (--)	-- (--)	-- (--)	-- (--)	7.4 (7.3)	A (A)
NBLR	-- (--)	-- (--)	-- (--)	-- (--)	9.2 (10.1)	A (B)

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 42 UNSIGNALIZED INTERSECTION ANALYSIS SUMMARY (FUTURE TOTAL, 2031 & 2036)

Key Movements	Future Total 2031		Future Total 2036	
	Delay (s)	LOS	Delay (s)	LOS
Waterdown Road / Site Driveway (West)				
WBR	12.4 (10.1)	B (B)	14.1 (10.6)	B (B)
Cooke Boulevard / Site Driveway (East)				
WBL	7.4 (7.3)	A (A)	7.4 (7.3)	A (A)
NBLR	9.2 (10.1)	A (B)	9.2 (10.1)	A (B)

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

9.4 SENSITIVITY ANALYSIS – METROLINX EXPANSION

AECOM conducted a TIS on behalf of Metrolinx in relation to a proposed south parking lot expansion for the existing Aldershot GO station. The proposed expansion consisted of two (2) phases with a total of 938 additional parking spaces provided. Phase 1 considered the construction of 569 additional parking spaces with an anticipated opening year of 2023. Phase 2 considered the construction of 369 additional parking spaces and was anticipated to be only constructed if the demand of the Aldershot GO station warranted additional parking spaces in the future. As part of the AECOM's study, it was assumed all 938 additional parking spaces would be constructed by the year 2033. The study concluded that "*the proposed station's south parking lot expansion would not create any new traffic operational issues at the movement and / or overall intersection at the Highway 403 ramp terminals along Waterdown Road*."

Metrolinx site traffic contributes significant peak hour volumes on the southbound left and westbound right movements of the intersection of Waterdown Road / Masonry Court as illustrated in **Figure 25** and **Figure 26**. The 2017 TIS prepared by AECOM addressed these site-related improvements, by noting that "geometric changes to the road network be deferred in the short-term to encourage GO Station users to access the station outside of the AM and PM peak hours, or to access the station via municipal transit services"

Due to the uncertainty regarding the application process and completion of the proposed south parking lot expansion at this time, and as the TIS prepared for Metrolinx anticipates dispersal of traffic outside of the peak hour that may lessen the traffic impact, a sensitivity analysis was encouraged. Therefore, BA Group has conducted a sensitivity analysis without the consideration of the proposed parking lot expansion.

For the purposes of this sensitivity analysis, the study area included the following intersections:

- Waterdown Road / Masonry Court & Railway Road; and
- Cooke Boulevard / Masonry Court.

In addition, the analysis was undertaken for the 2026, 2031 and 2036 horizon years consistent with MTO reporting requirements.

The operations assessment results of the sensitivity analysis without the proposed parking lot expansion implemented are summarized in **Table 43**. Synchro analysis worksheets are provided in **Appendix F**.

Traffic operations of the sensitivity analysis without the proposed parking lot expansion implemented are summarized in the following:

- The **Waterdown Road / Masonry Court & Railway Road** intersection operates at acceptable conditions with overall v/c ratio of 0.64 and 0.65 or better in the weekday morning and afternoon peak hours, respectively. A southbound left turn of 75 metres is required to suitably accommodate future site traffic.
- The **Cooke Boulevard / Masonry Court** intersection operates at acceptable conditions with an All Stop Way Control LOS of D or better, respectively. An All-Way Stop Control intersection is recommended at this intersection, However, a signal is not required at this intersection, unless Metrolinx expands its South parking lot.

TABLE 43 SIGNALIZED INTERSECTIONS CAPACITY ANALYSIS RESULTS (SENSITIVITY ANALYSIS WITHOUT METROLINX EXPANSION)

Key Movements	Future Total 2026		Future Total 2031		Future Total 2036	
	v/c	LOS	v/c	LOS	v/c	LOS
Waterdown Road / Masonry Court & Railway Road						
EBLTR	0.06 (0.58)	D (E)	0.06 (0.58)	D (E)	0.06 (0.58)	D (E)
WBL	0.21 (0.60)	D (D)	0.20 (0.60)	D (D)	0.23 (0.60)	D (D)
WBTR	0.15 (0.24)	D (D)	0.15 (0.24)	D (D)	0.15 (0.24)	D (D)
NBL	0.01 (0.03)	A (B)	0.02 (0.04)	A (B)	0.02 (0.04)	A (B)
NBTR	0.59 (0.52)	B (B)	0.67 (0.58)	B (C)	0.69 (0.63)	B (C)
SBL	0.57 (0.67)	A (B)	0.65 (0.69)	B (B)	0.67 (0.74)	D (C)
SBTR	0.22 (0.43)	A (B)	0.25 (0.47)	A (A)	0.26 (0.52)	A (B)
Overall	**0.55 (0.57)**	**B (C)**	**0.61 (0.61)**	**B (B)**	**0.64 (0.65)**	**B (C)**

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

Based on the foregoing, the signalized intersection within the study area along Waterdown Road operate in an acceptable manner.

The local improvements along Masonry Court related to the site include a southbound left turn extension of 75 metres and all-way stop control at Masonry Court / Cooke Boulevard, with provision in the site design for a future signal if needed.

10.0 RECOMMENDED INTERSECTION IMPROVEMENTS

As discussed in **Section 9.3**, there are several infrastructure improvements recommended for the area street network over the next 5 to 15 years.

The future lane configuration for the full build out is identified on **Figure 28**. Local development-led improvements are identified in **Figure 29**. Regional improvements are identified in **Figure 30** and briefly described below:

Local Road Improvements

Local road improvements (from north to south) required to support near term growth and buildout of the site (2026) include:

- Convert the single northbound left to a dual northbound left at Waterdown Road / N Service Road & Highway 403 WB On-Ramp;
- Extend the southbound left lane to 135 metres of storage at Waterdown Road / Masonry Court;
- Convert the westbound left / through-right to a westbound through-left / right at Waterdown Road / Masonry Court and extend the westbound curb lane to Cooke Boulevard;
- Protect for signalization of Masonry Court / Cooke Boulevard that is required by expansion of Metrolinx lands (otherwise provide All-Way Stop Control); and,
- Provide New Site Driveways.

The above-noted improvements accommodate local traffic needs for buildout of the site and near term requirements of Metrolinx Phase 1 expansion.

Regional Road Improvements

Regional road improvements recommended to mitigate ongoing constraints and address regional growth include:

- Monitor the Waterdown Road / S Service Road & Highway 403 EB Off-Ramp for estimated vs. realized growth. Background developments (approved and appealed) account for 6% to 17% of annual growth by 2026. In the event that this growth is realized in advance of the bridge widening already planned for 2026, the following temporary mitigating improvements could be considered by the municipality and MTO:
    - Convert the existing westbound dual left to a single westbound left, introduce a channelized northbound right, and optimize signal timing.

- By 2031/2036, with the consideration of background development and corridor growth, the Highway 403 / Waterdown Road interchange will require one of the following improvements:
    1. Parclo or typical Diamond configuration
    2. Separation of highway on/off ramp and primary GO traffic; or,
    3. Introduction of Dual or Free Flow Left/Right Turns at Waterdown and the EB On-Ramp; in combination with,
    4. Widening of Waterdown Road over Highway 403 (already planned for 2028).

    Dual turning lanes have been considered for improvements in this study's Synchro analysis to confirm the ability to provide capacity for future traffic demands, recognizing they represent one possible

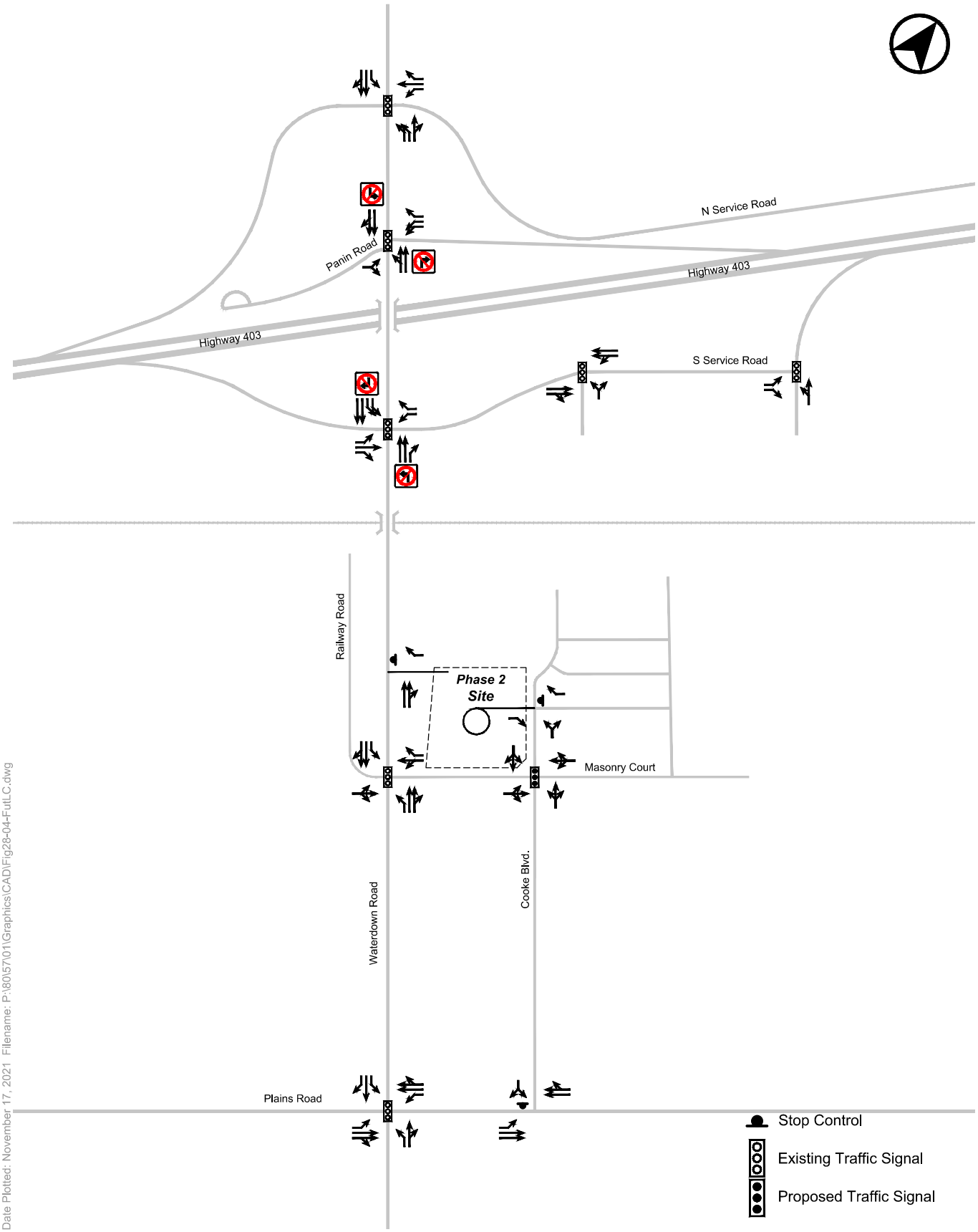
solution and are not necessarily the desired interchange configuration in an unconstrained environment.

The proposed site driveways are located in compliance with the Highway Corridor Management Manual and local improvements will not preclude the consideration of multiple interchange alternatives to improve Highway 403 / Waterdown Road.

- Monitor the Waterdown Road / Plains Road intersection for estimated vs. realized growth. Corridor growth (2% annual) contributes directly to the 2031/2036 traffic operations at this intersection and could be addressed with new road connections within the draft Mobility Study Area, or dual eastbound left, dual southbound left, and an auxiliary westbound right turn movement at Waterdown Road / Plains Road.

10.1 SIGNAL TIMING MODIFICATION

In addition to the functional design plans discussed and presented herein, under future background and total traffic conditions, traffic signal timings and changes in cycle lengths were adjusted as necessary at selected intersections to best accommodate future traffic demands and patterns.



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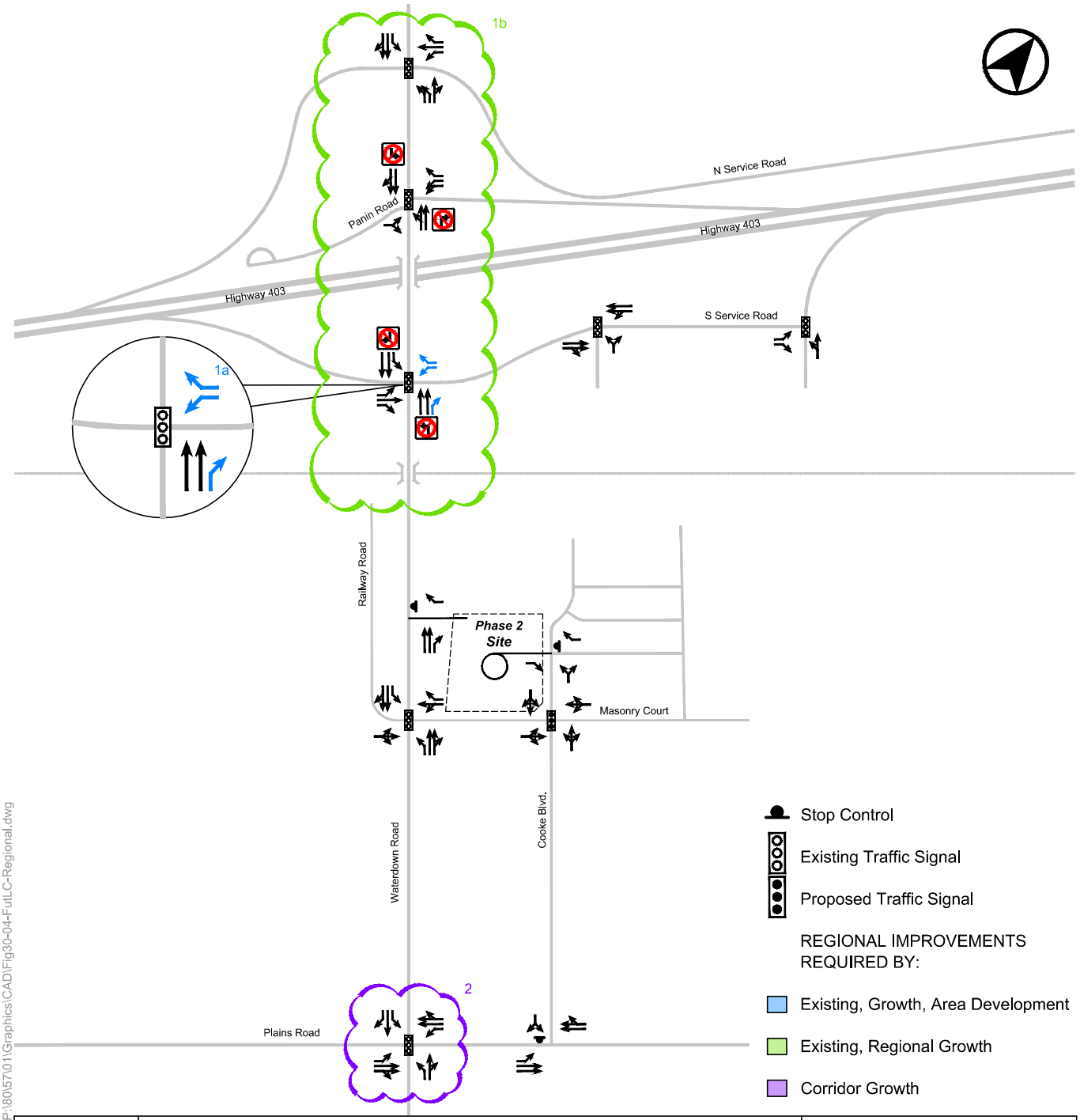
FIGURE 28 FUTURE LANE CONFIGURATION & TRAFFIC CONTROL



Improvement	Description	Required by
1	- Convert Single NBL to Dual NBL	Regional Growth, Metrolinx, and Site
2	- Extend SBL Storage	- ~45m existing - 45m to 90m required by Metrolinx (2026) - 90m to 135m required by Site (2026) - 135m to 240m required by Metrolinx and Regional Growth (2031 and 2036)
3	- Convert WBL/WBTR to WBTL/WBR - Extend Second Lane to Cooke Blvd	Metrolinx, and Site
4	- Signalize Intersection	Metrolinx
5	- New Site Driveways	Site

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FIGURE 29 LOCAL ROAD IMPROVEMENTS



Improvement	Description	Required by
1a	Monitor and Mitigate (if required)	Existing, Growth, and Area Development
1b	- Interchange Improvements, such as: Parclo or typical Diamond configuration (may be limited by physical constraints) Separation of highway on/off ramp or primary GO traffic; or, Introduction of Dual or Free Flow Left/Right Turn at interchange; in combination with, Widening of Waterdown Road over Highway 403 (already planned for 2028)	- Existing Constraint/ Non-conforming Interchange Serving multiple functions; and, - Regional Growth
2	- Provide dual EBL and auxiliary WBR; **OR**, - Monitor and introduce new road connections within the draft Mobility Study area	Corridor Growth Only

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FIGURE 30 REGIONAL ROAD IMPROVEMENTS

10.2 FUNCTIONAL DESIGN CONSIDERATIONS

The three intersections recommended to be modified to support the proposed development as planned are identified in **Figure 28** and discussed in greater detail below.

10.2.1 Waterdown Road / N Service Road & Highway 403 WB On-Ramp

Based upon the results summarized in **Section 9.4**, it is recommended the provision of an additional northbound left turn lane is recommended within the existing pavement limits (i.e. restriping of the intersection). The restriping of the intersection is shown in a draft functional road plan provided in **Appendix G**.

The turning lane storage and taper lengths to accommodate the intersection modification is summarized in **Table 44**, along with the maximum 95th percentile queue lengths reported in **Section 9.3**.

TABLE 44 WATERDOWN ROAD / N SERVICE ROAD & HIGHWAY 403 WB ON-RAMP RECOMMENDED TURNING LANE CONFIGURATION

Movement	Storage (m)	Taper (m)	Max. 95th Percentile Queue (m)
NBL	100	xx	91

Notes:
1. Rounded to the nearest 5 metres.

10.2.2 Waterdown Road / Highway 403 EB Off-Ramp & S Service Road

Based upon the results summarized in **Section 9.4**, it is recommended that traffic operations at this junction be monitored going forward. If it is determined that improvements are required to address traffic operations at the intersection, the provision of a channelized northbound right turn lane and conversion of the dual westbound left to a single westbound left is a potential mitigating measure until further measures are implemented at this intersection.

10.2.3 Waterdown Road / Masonry Court & Railway Road

Based upon the results summarized in **Section 9.4**, the southbound left turn lane to accommodate a storage length of approximately 75 metres. Note that for the southbound left turn lane is approximately 25 metres longer than the existing storage length of 50 metres. The westbound approach is proposed to be converted to a through-left lane right lane operates as an exclusive lane with a storage length extension.

The recommended improvements at this intersection are shown in a draft functional road plan (FD-01A) provided in **Appendix G**. The provision of the functional design plan is to ensure that the nature of the recommended improvement is understood going forward.

11.0 SUMMARY AND CONCLUSIONS

BA Group has been retained by Adi Developments (Masonry) Inc. to provide transportation consulting services in relation to an Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) applications for a proposed mixed-use development located at the municipal address 1120 Cooke Boulevard in the City of Burlington.

The development consists of three (3) residential high-rise buildings (Buildings A, B, and C) to accommodate 1,139 residential units including 424 one-bedroom units, 424 one-bedroom plus den units, 290 two-bedroom units and one (1) three-bedroom unit.

A total of 1,031 vehicle parking spaces and 574 bicycle parking spaces are proposed to serve the development. 1,026 resident and resident visitor parking spaces will be provided throughout an underground parking garage of five levels. Five (5) parking spaces will be provided on the ground floor for commercial-retail. Commercial retail will be provided in Building B and will have a gross floor area (GFA) of 231.22 m^2.

The primary vehicular access and main entrance to the development is proposed via a two-way, all-moves driveway on Cooke Boulevard, which will operate as an unsignalized intersection with the driveway under STOP control. The driveway will provide access to the proposed parking garage, loading area and a pick-up and drop-off loop. A second right-turns only vehicular access to the development is proposed from Waterdown Road.

Key findings are summarized as follows:

Transportation Context

1. The site is located in great proximity to transit routes, including Aldershot GO Station, that connect the site to a wider transit network within and outside Burlington. The site is located less than 500 metres from Aldershot GO Station's South parking lot, the 1 Plains bus route, the101 Plain express bus route, the 4 Central bus route, and the 18 Waterdown bus route. This site is also less than a kilometre from the 87 North Service- Aldershot bus route.

2. The site is well served by cycling and pedestrian facilities. Sidewalks are provided along most of the road corridors. In addition, there are planned cycling facilities in close proximity to the site that will introduce protected bikeways along Plains Road, South Service Road and Waterdown Road up to the CN rail bridge, and local street bikeways identified for Masonry Court and Cooke Boulevard.

Vehicular Parking

3. Application of the City of Burlington Zoning By-law 2020 results in a requirement of 1,893 vehicular spaces, including 1,494 residential and 399 non-residential parking spaces. The effective residential parking rate is 1.31 spaces / unit and the effective non-residential parking rate is 0.35 spaces / unit.

4. The proposed parking supply will provide a total of 1,031 spaces including 924 residential parking and 102 residential visitor parking spaces. The effective residential parking rate is approximately 0.8 spaces / unit and 0.1 spaces / unit non-residential parking rate. The parking spaces are to be supplied in a five (5) level underground parking garage. Five (5) parking spaces will be provided for commercial-retail parking on the ground floor.

5. A comprehensive parking justification was undertaken to demonstrate the appropriateness of a residential parking ratio of 0.8 spaces per unit based upon consideration of:
    - the local context of the proposed development, which is highly supportive of non-automobile modes of travel;
    - the existing area travel characteristics;
    - transportation planning principles supporting a reduced parking supply to change travel behaviour;
    - recent resident parking reduction approvals obtained for residential buildings located within close proximity to an existing transit hub;
    - a comparison of municipalities' parking standards for both resident and resident visitor parking; and,
    - a series of Transportation Demand Management (TDM) measures incorporated in the development, designed to support the use of non-automobile travel modes.

6. The proposed non-residential parking supply of 102 parking spaces results in an effective rate of 0.1 spaces / unit and is less than what is required for residential visitor and commercial-retail uses under the prevailing Zoning By-law standards.

7. The adoption of a reduced non-resident parking supply for the proposed development is considered to be appropriate recognizing the site context and its support for non-automobile transportation options, transportation planning principles supporting a reduced parking supply to change travel behaviour, a comparison of municipalities' parking standards for both resident and resident visitor parking, the TDM plan proposed for the site, and the availability of local area public parking to support highest and best use of parking supply while taking into account temporal parking characteristics within the area.

8. The proposed resident and non-resident parking supply of 1,031 parking spaces is considered to be appropriate based upon the above assessment and will meet the parking needs of the proposed development in this context.

Loading

9. Application of the Zoning By-law 2020 results in a requirement of three (3) loading spaces.

10. The proposed development includes three (3) loading spaces which will accommodate the refuse collection, moving and deliveries of the proposed development.

11. The proposed loading meets the Zoning By-law 2020 loading requirements.

Bicycle Considerations

12. The City of Burlington Zoning By-law 2020 does not include bicycle parking requirements for residential buildings. However, the Zoning By-law requires two (2) spaces for the commercial-retail component of the site.

13. A bicycle parking supply of 50% of the residential units is proposed to support the TDM plan. The proposed development provides a total of 574 bicycle spaces, including 513 long term, 56 short term

and five (5) outdoor commercial bicycle parking spaces. Bicycle parking spaces will be provided on the ground floor and throughout P1-P4 of the underground garage in bicycle storage rooms.

Transportation Demand Management (TDM)

14. A Transportation Demand Management (TDM) framework has been developed to support the use of non-auto modes of travel, and to encourage a change in travel behaviour that reduces automobile travel. The strategies include a proposed reduced vehicular parking supply than the prevailing Zoning By-law, unbundle parking, implementation of a transit information centre, a car-share program, a bike repair station, bicycle parking spaces, distribution of travel information brochures, carpool program, and a community marketing outreach event.

Traffic Volumes Forecast

15. There are seven (7) area background development sites, including the Aldershot South GO expansion that account for 2 to 18% growth along Waterdown Road per year in the next 5 years.

16. An additional 2% annual corridor growth is considered within the study area from 2026 to 2036.

17. Site traffic includes Phase 1 (already built) and Phase 2 (the site). Phase 1 is built and occupied and no longer owned by Adi Developments (Masonry) Inc. However, Phase 1 has been included in accordance with the terms of reference for this study for the purpose of traffic assessment.

18. The proposed development (Phases 1 and 2) are forecast to generate in the order of 478 and 540 two-way net-new vehicle trips during the weekday morning and afternoon peak hour periods, respectively.

Traffic Operations

19. The study area intersections can be define by three distinct characteristics:
    1. Highway 403/Waterdown Road Interchange & North Aldershot GO Entrance;
    2. Waterdown Road / Masonry Court & South GO Entrance; and,
    3. Plains Road Corridor.

Highway 403 / Waterdown Road Interchange

20. The Highway 403 / Waterdown Road interchange has an unusual configuration that does not meet the typical Diamond I/C, Parclo B, or desirable Parclo A interchange configurations defined in the MTO's Highway Corridor Management Manual. This interchange has been identified by the MTO and City to have existing constraints and expected increases in activity related to the Aldershot GO Mobility Hub. The City has already planned for part of this work, a bridge widening to 5-lanes plus active transportation for 2028 and is identifying potential infrastructure solutions as part of an ongoing Prosperity Corridor Study. The bridge widening is not a requirement of the proposed development. Operations at these interchange intersection will continue to be constrained under future conditions, irrespective of development of the subject site.

Waterdown Road / Masonry Court & South GO Entrance

21. The intersection of Waterdown Road / Masonry Court serves as the primary entrance for the South Aldershot GO entrance, as well as the only public access via Waterdown Road to the east side of the draft Mobility Study lands, between Highway 403 and Plains Road.

    The existing southbound left lane storage at this intersection is insufficient for morning peak hour queuing activity (i.e. inbound commuters). Both Metrolinx and site traffic will contribute to this

movement. Traffic activity will also increase at the intersection of Masonry Court / Cooke Boulevard with the buildout of Phase 1 and 2 of the Aldershot South Go expansion lot.

Plains Road Corridor

22. Site traffic can be acceptably be accommodated at the Plains Road / Cooke Boulevard intersection that leads directly to the main entrance to the development and will have minimal impact on the Plains Road / Waterdown Road and Plains Road / Emery Road intersections.

    Application of corridor growth (2% per annum) indicates that the left and right turns at Waterdown Road / Plains Road will worsen over time without the introduction of additional turning lanes or additional routing options through a grid network system such as those contemplated in the draft Mobility Hub.

Road Network Improvements

23. Infrastructure improvements have been identified in two categories:
    1. Local development-led measures; and
    2. measures required to address regional growth.

    The following mitigating improvement measures have been identified near-term should background development proceed at the high rate projected for 2026 (from 2 to 18% per year) based on the list of approved and appealed developments:

    - the provision of a channelized northbound right turn lane and conversion of the dual westbound left to a single westbound left at the Waterdown Road / S Service Road & Highway 403 EB Off-Ramp intersection

    Further improvements are needed by 2031 to address ongoing regional growth and insufficient queuing space along Waterdown Road beyond buildout of the site. The MTO could consider a number of improvements, including:

    1) Introducing typical free-flow elements of a Diamond or Parclo interchange;
    2) Separation of highway on/off ramp and primary GO traffic;
    3) Introduction of Dual or Free Flow Left/Right Turns at interchange intersections; in combination with,
    4) Widening of Waterdown Road over Highway 403 (already planned for 2028)

    The proposed right-turns site driveway on Waterdown Road is located approximately 200 metres south of the existing rail line (~255 metres to S Service Road) and exceeds the desirable offset spacing of 125 metres for Commercial / Private Road access to a Diamond I/C or Parclo interchange along a 50 km/hr posted roadway. The proposed site driveways and proposed local improvements do not preclude consideration of any of the above noted improvements that would address long term regional growth.

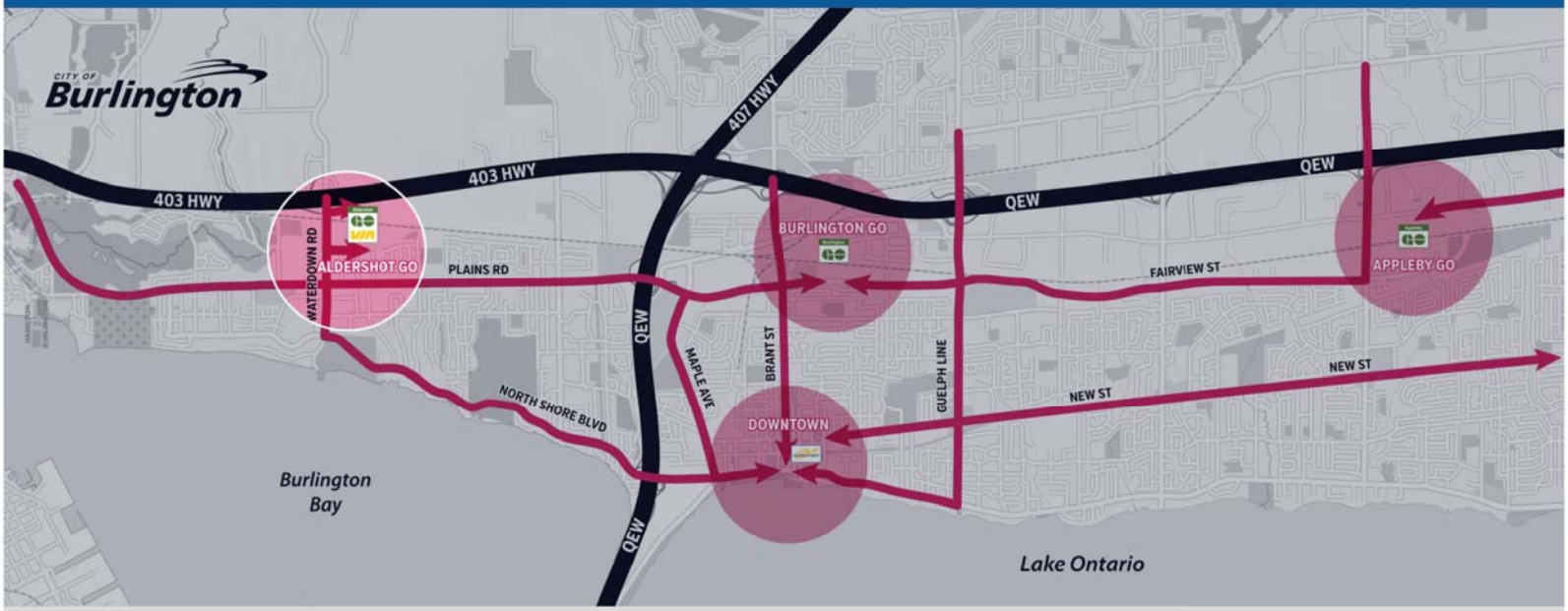
Overall

24. The traffic demands of the site can be acceptably accommodated with the proposed local road network improvements and development of the site does not preclude the ability for the municipalities to provide long term improvements at the Highway 403 interchange to address regional growth.

25. The site is well positioned relative to the significant transit and active transit improvements planned in the immediate vicinity and proposes extensive Transportation Demand Management (TDM) measures that aim to reduce the dependency on single-occupant vehicles, and direct transit supportive growth next to existing GO Stations on the Lakeshore West GO rail corridor.

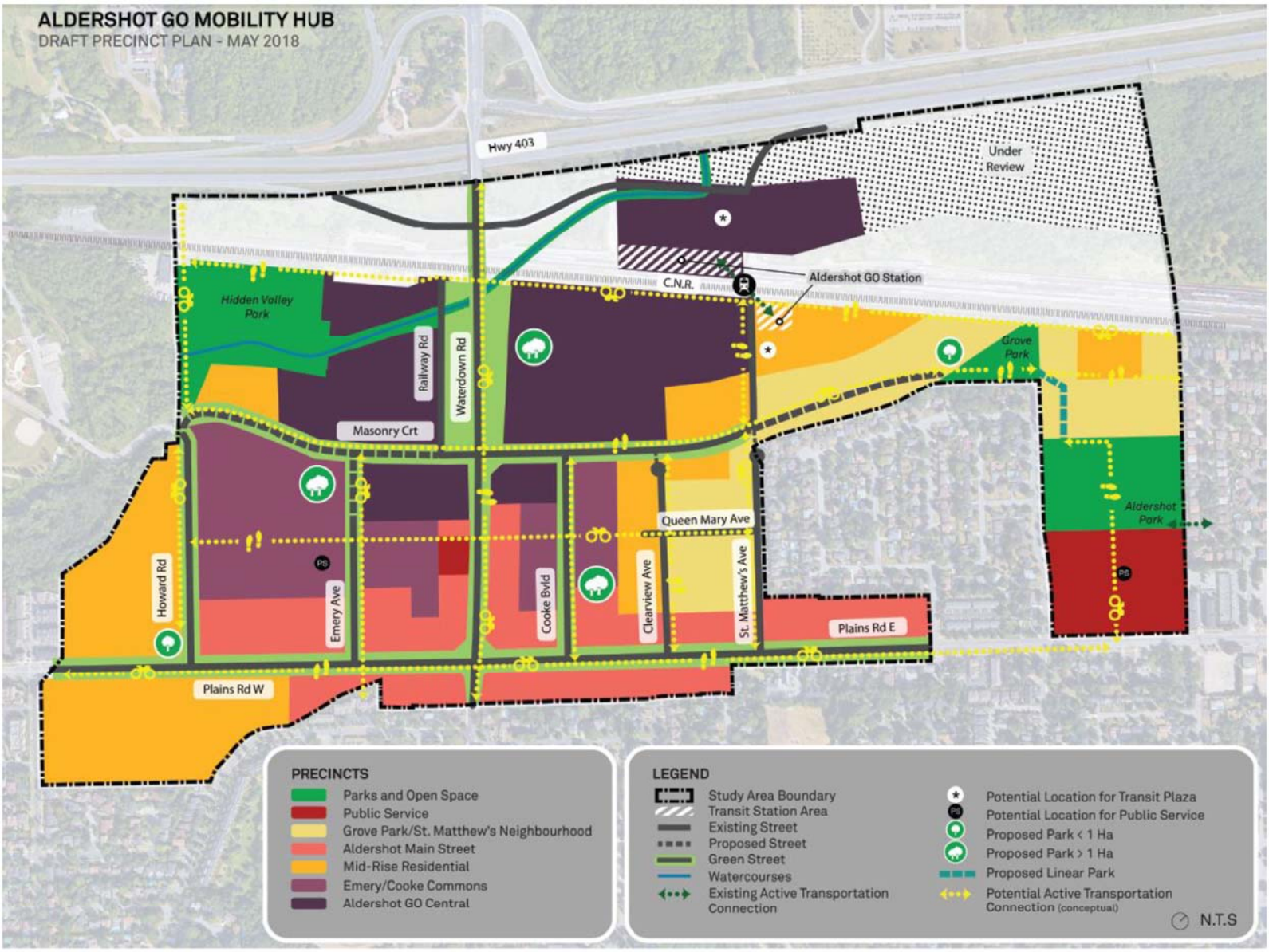
APPENDIX A:
Aldershot GO Mobility Hub Draft Precinct Plan – May 2018

ALDERSHOT GO MOBILITY HUB



APPENDIX A PACKAGE

DRAFT ALDERSHOT GO PRECINCTS



PROPOSED FUTURE BUILDING TYPES WITHIN THIS HUB

The draft precinct plan for the Aldershot GO Mobility Hub includes the following building types:



Please note that the draft precinct plan, precinct boundaries, associated intention statements and key directions are preliminary and subject to change as a result of on-going technical studies and community and stakeholder feedback.

CITY OF Burlington

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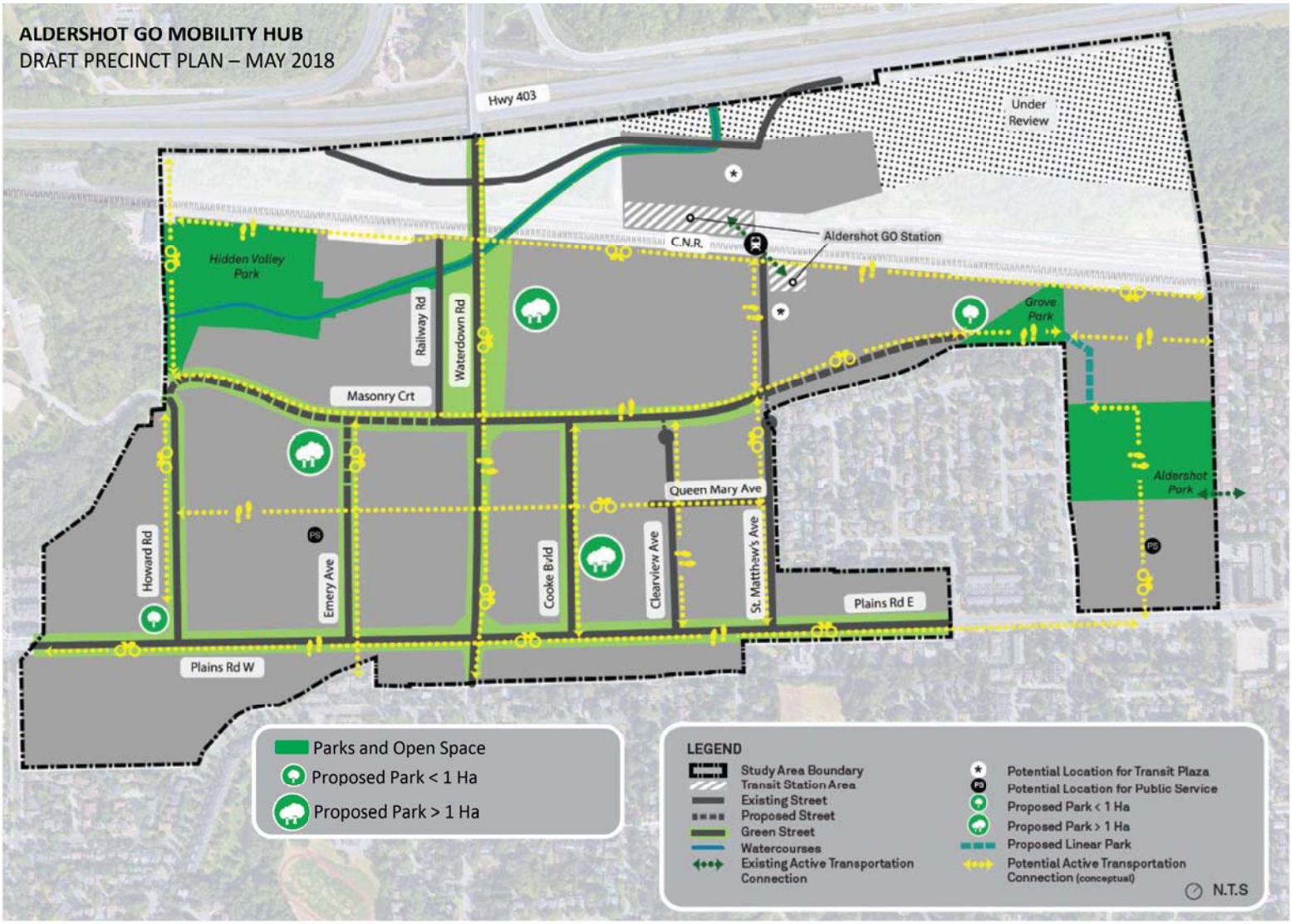
PARKS AND OPEN SPACE PRECINCT

INTENTION STATEMENT

The Mobility Hub **Parks and Open Space Precinct** will create a parks and open space network consisting of current and future parks, open spaces and key linkages within the mobility hub to serve the residents and employees of the mobility hub and the surrounding area. In addition, the precinct will recognize the need to maintain and enhance public access to parks and open spaces and identify key linkages to ensure pedestrian and cycling access within, to and from the Mobility Hub and the adjacent areas.

KEY DIRECTIONS

- Recognize and preserve the Hidden Valley, Aldershot and Grove Parks.
- Identify new public parks and gathering spaces throughout the hub to serve current and future residents and employees of the hub and the surrounding neighbourhoods.
- Provide a range and variety of parks and open spaces, which may include privately-owned publicly accessible spaces, to serve the amenity needs of the hubs including:
  - Expanding Grove Park and providing a linear connection to Aldershot Park;
  - Establishing two new major urban parks on the east and west side of Waterdown Road to serve as central community gathering spaces.



Please note that the draft precinct plan, precinct boundaries, associated intention statements and key directions are preliminary and subject to change as a result of on-going technical studies and community and stakeholder feedback.

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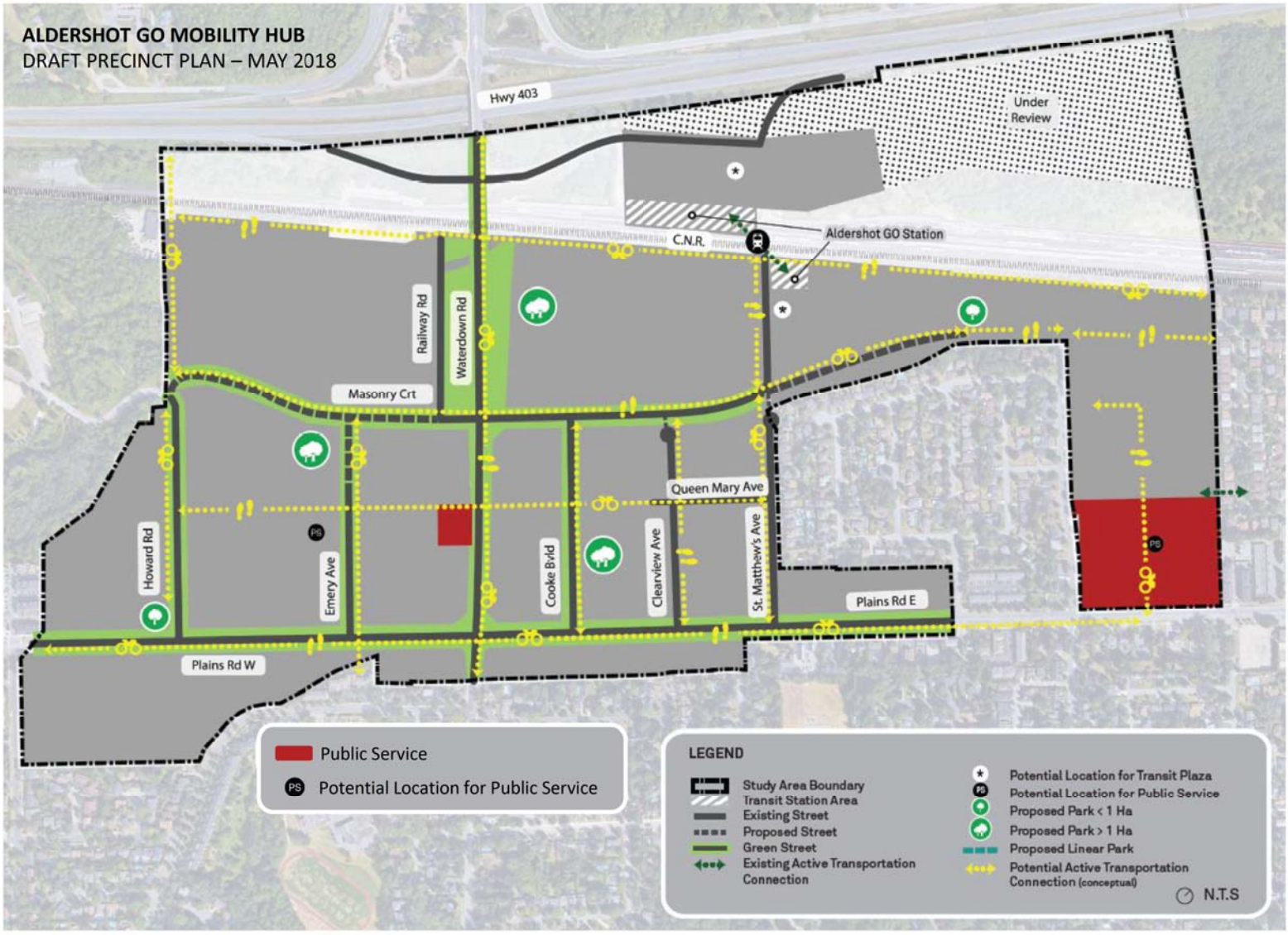
PUBLIC SERVICE PRECINCT

INTENTION STATEMENT

The Mobility Hub **Public Service Precinct** will accommodate current and future public services within the Mobility Hub including healthcare, education, emergency and protective services, cultural activities and civic administration, among others. Lands identified as public service may accommodate such uses either wholly or in part as part of a public-private partnership.

KEY DIRECTIONS

- Include within the precinct existing public services located in the Aldershot GO Mobility Hub including:
  - Holy Rosary Catholic Elementary School; and
  - Fire Station #3.
- Identify additional lands within the Aldershot GO Mobility Hub which may be required to accommodate future public services in anticipation of future population and employment growth.
- Permit the opportunity for public services to be located within private developments through joint Public-Private Partnerships.
- Require the provision of Transportation Demand Management (TDM) and traffic mitigation measures within developments, such as car-share, transit passes, shared parking facilities, etc.



Please note that the draft precinct plan, precinct boundaries, associated intention statements and key directions are preliminary and subject to change as a result of on-going technical studies and community and stakeholder feedback.

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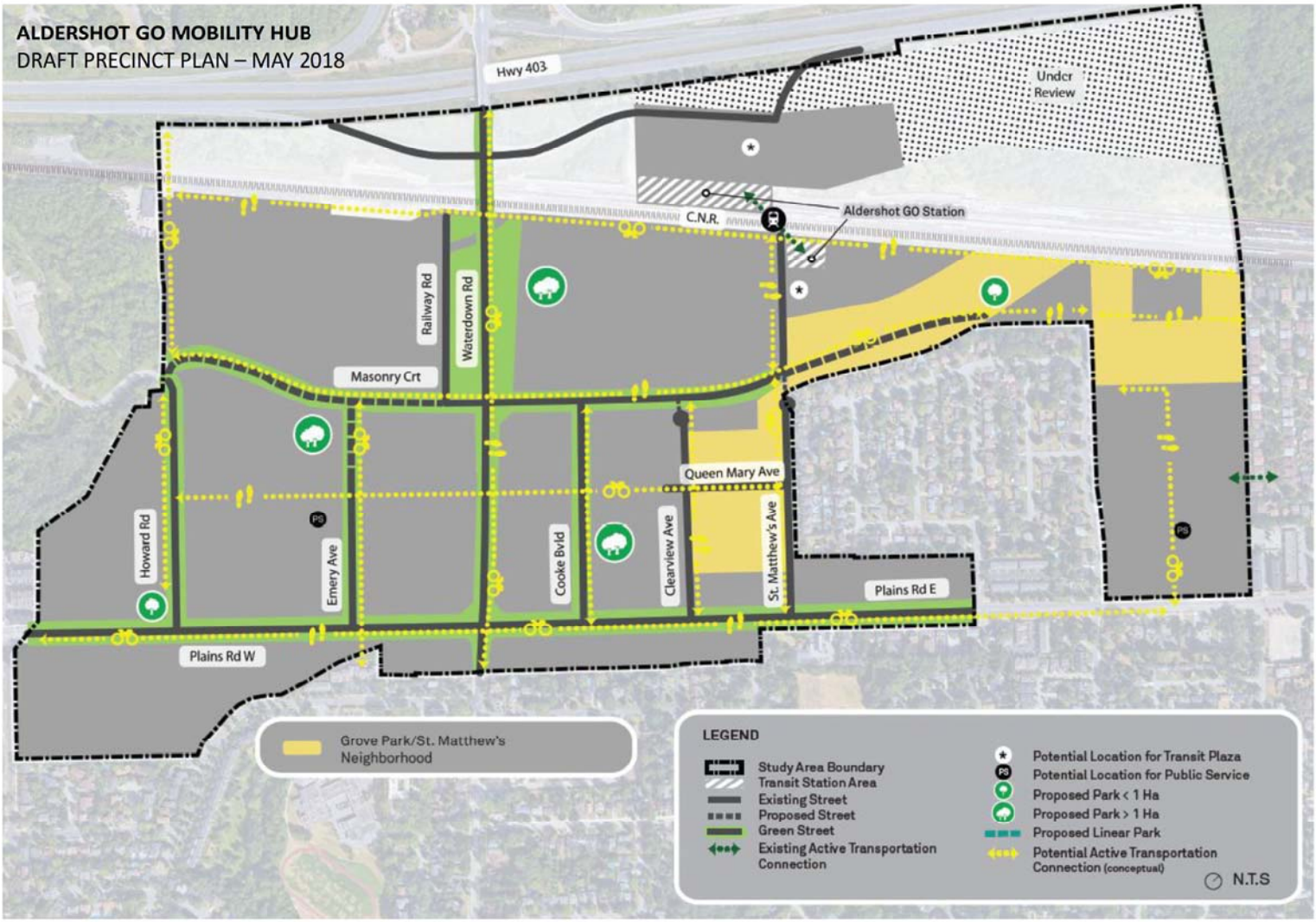
GROVE PARK / ST. MATTHEW'S NEIGHBOURHOOD PRECINCT

INTENTION STATEMENT

The **Grove Park / St. Matthew's Neighbourhood Precinct** will maintain the low-rise residential and neighbourhood character of the area and provide an effective and compatible transition to established neighbourhoods outside of the mobility hub. Limited development opportunities may exist within the precinct given the neighbourhood's close proximity and existing linear public access to the Aldershot GO station. Development will be in the form of low-rise residential, including **single and semi-detached houses as well as street-oriented townhouses** which will be compatible with the existing neighbourhood. New and/or enhanced multi-modal connections to the Aldershot GO station will be established using existing streets.

KEY DIRECTIONS

- Provide for **street-oriented townhouses** with the exception of stacked and back-to-back forms of townhouses.
- Enhance existing streets to provide a high degree of permeability to the Aldershot GO station and accommodate active transportation and transit.
- Prohibit closures of existing public streets.
- Achievement of complete streets.
- Require built form and design measures to achieve effective transitions and a high degree of compatibility with adjacent neighbourhoods/ areas.



PROPOSED BUILDING TYPES



Please note that the draft precinct plan, precinct boundaries, associated intention statements and key directions are preliminary and subject to change as a result of on-going technical studies and community and stakeholder feedback.

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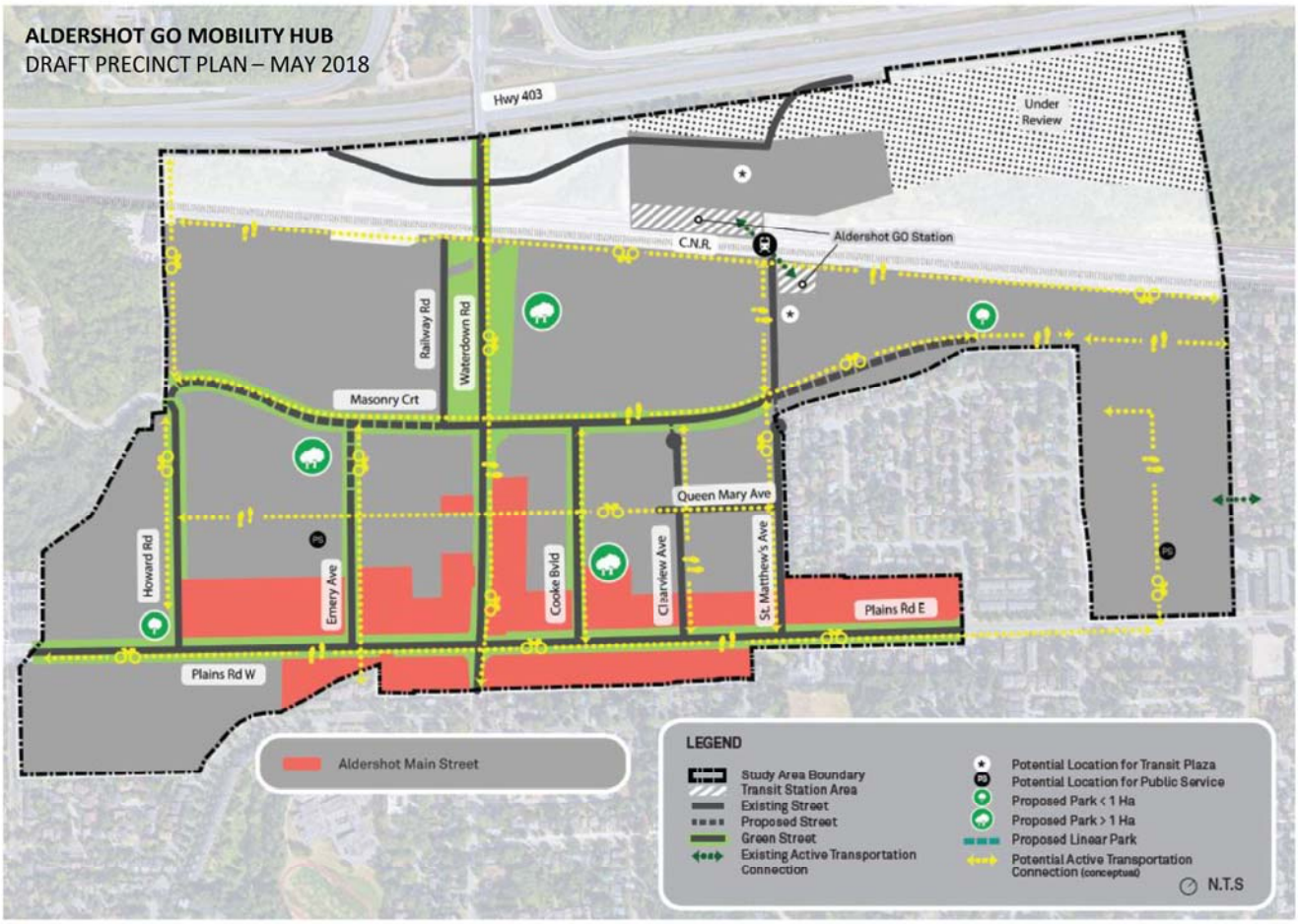
ALDERSHOT MAIN STREET PRECINCT

INTENTION STATEMENT

The **Aldershot Main Street Precinct** advances the Plains Road Village Vision and will establish a unique community destination within the Aldershot GO Mobility Hub focused on creating a continuous retail frontage with a main-street pedestrian experience along a planned frequent transit corridor.

KEY DIRECTIONS

- Developments will be in a **mid-rise form** and continue to establish a traditional main-street character along Plains Road generally between Howard Street and White Oak Drive. Development will incorporate a low-rise podium with building heights that respond to adjacent neighbourhoods.
- Establish a **maximum building height of 6 storeys on the north side of Plains Road** adjacent to low-density residential areas and **up to a maximum of 11 storeys in a mid-rise form** where properties are not adjacent to low-rise residential uses. On **the south side of Plains Road, establish a maximum building height of 6 storeys** with compatibility criteria to adjacent low-density residential uses.
- Establish a continuous building frontage along Plains Road to provide a predicable rhythm along Plains Road.
- High degree of public realm and building design that support a main-street character.
- Preferred location for public art.
- Achievement of complete streets.
- Requirement for retail and/or service commercial uses to be located at street level on Plains Road.
- Establish a minimum floor height for the ground floor of buildings containing retail / commercial uses.
- Investigate minimum retail unit sizes.
- Introduce a requirement for buildings to incorporate a podium element to create a pedestrian scaled environment at street level along Plains Road.
- Require developments to achieve a minimum of two uses within a building.
- Require the provision of Transportation Demand Management (TDM) and traffic mitigation measures within developments, such as car-share, transit passes, shared parking facilities, etc.



PROPOSED BUILDING TYPES



Please note that the draft precinct plan, precinct boundaries, associated intention statements and key directions are preliminary and subject to change as a result of on-going technical studies and community and stakeholder feedback.

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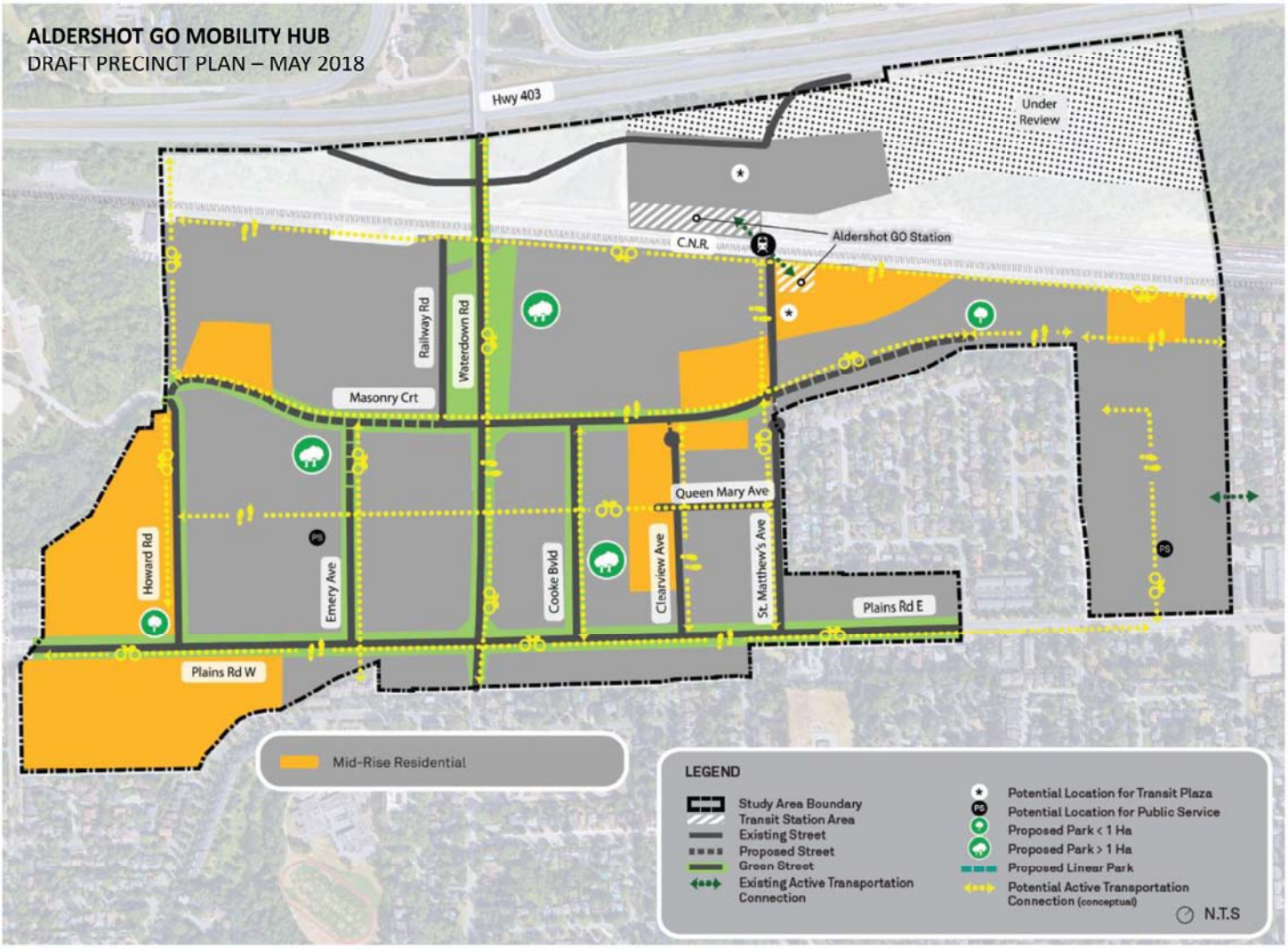
MID-RISE RESIDENTIAL PRECINCT

INTENTION STATEMENT

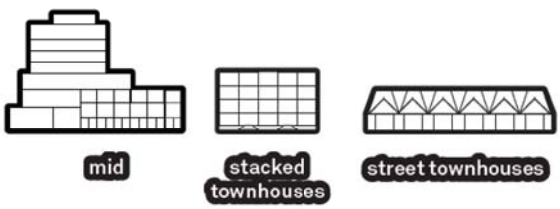
The Mobility Hub **Mid-Rise Residential Precinct** will support the development of compact urban residential communities within the mobility hub. This precinct will provide a variety of housing forms at a lower scale and intensity not otherwise provided for in the mobility hub and which will accommodate a wide range of demographics through the development of family-oriented housing, ground-oriented housing, associated supporting amenities and other community features. Development will be in the form of **low and/or mid-rise building forms** consisting of 11 storeys or less and may serve as a transition to adjacent precincts and/or areas.

KEY DIRECTIONS

- Establish a **maximum building height of 11 storeys in a mid-rise or low-rise form.**
- Provide opportunities for a range of low-rise and mid-rise building types including new ground-oriented housing formats (such as townhomes).
- Permit opportunities for commercial activities at street level on strategic streets.
- Require the provision of Transportation Demand Management (TDM) and traffic mitigation measures within developments, such as car-share, transit passes, shared parking facilities, etc.
- Provide for a range of units types and sizes (i.e. "Missing Middle").



PROPOSED BUILDING TYPES



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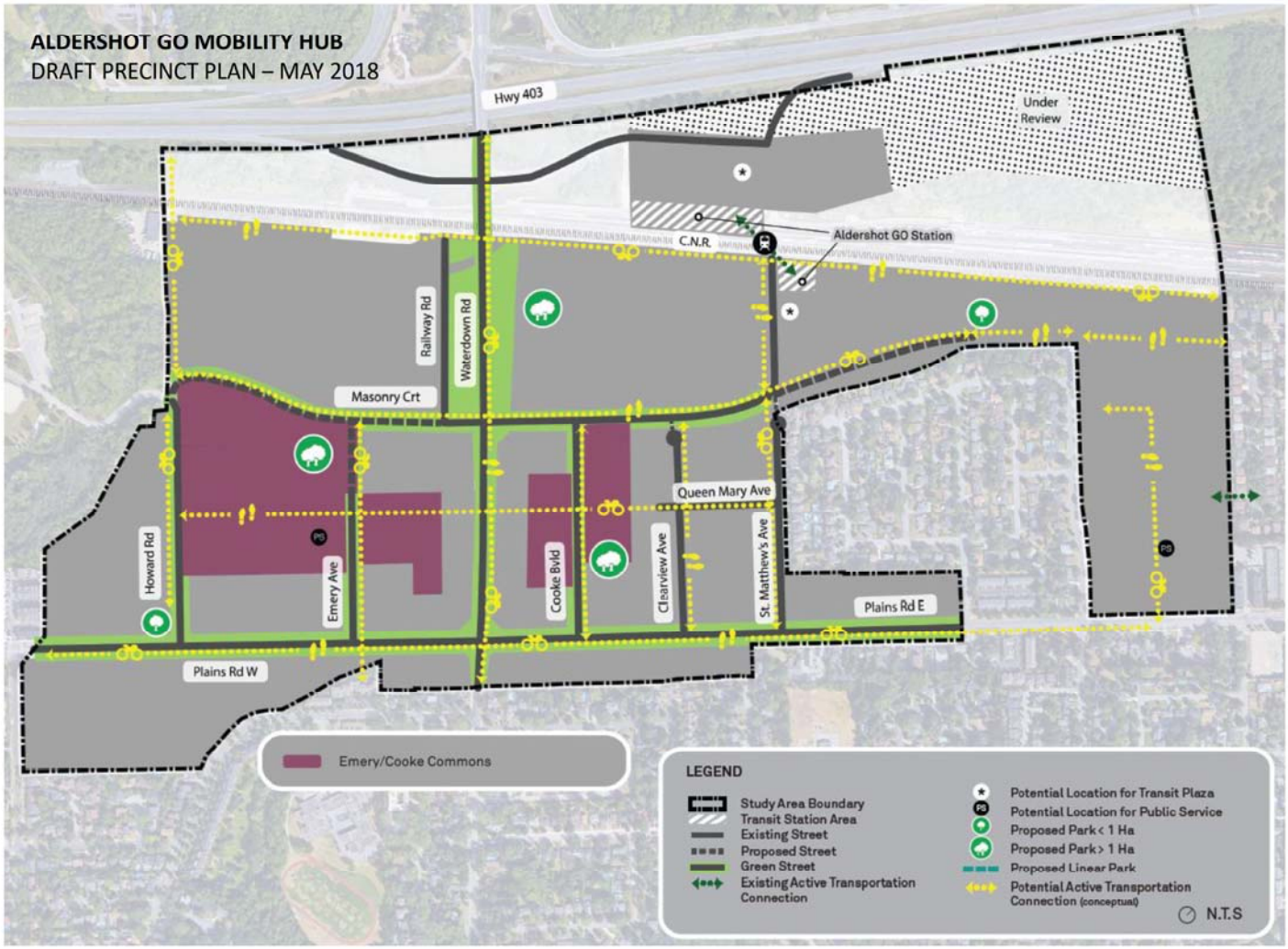
EMERY/COOKE COMMONS PRECINCT

INTENTION STATEMENT

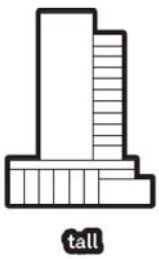
The **Emery/Cooke Commons Precinct** will accommodate a significant concentration of residential, retail and commercial uses which are located in close proximity to, and oriented around, planned major public parks. Developments will also support the frequent transit corridor within the hub along Plains Road. Development will be in the form of **tall mixed-use buildings** and contribute towards the creation of a lively, vibrant and people-oriented place.

KEY DIRECTIONS

- Establish a maximum building height of 19 storeys.
- Introduce a requirement for buildings to incorporate a podium element to create a pedestrian scaled environment at street level and provide an appropriate interface to public parks, where applicable.
- Ensure new development is permeable to provide active transportation linkages to and from the frequent transit corridor.
- Introduce new building setback requirements from the sidewalk at street level to allow for potential patio spaces, greenery and/or other elements that will enhance the public realm and pedestrian experience and enjoyment.
- Require developments to achieve a minimum of two uses within a building.
- Require the provision of Transportation Demand Management (TDM) and traffic mitigation measures within developments, such as car-share, transit passes, shared parking facilities, etc.



PROPOSED BUILDING TYPES



May be in combination with:



Stacked townhouses



Mid-rise

Please note that the draft precinct plan, precinct boundaries, associated intention statements and key directions are preliminary and subject to change as a result of on-going technical studies and community and stakeholder feedback.

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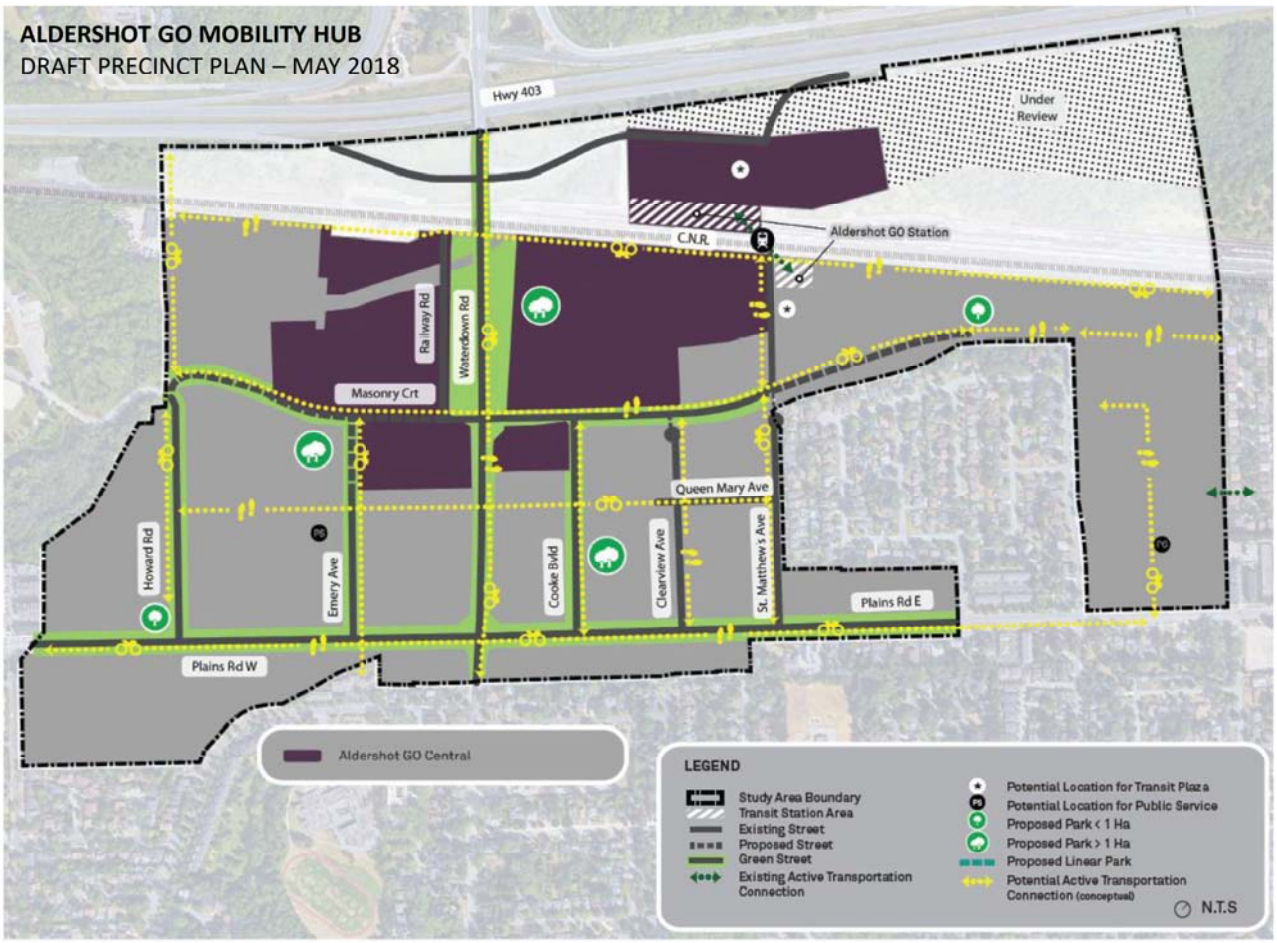
ALDERSHOT GO CENTRAL PRECINCT

INTENTION STATEMENT

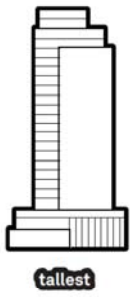
The **Aldershot GO Central Precinct** will establish a height peak within the Mobility Hub in close proximity to the rail corridor and GO station. The precinct will accommodate the most significant concentration of residential, retail and commercial uses and be the preeminent destination for office, affordable housing and urban format retail. Development will significantly contribute towards the creation of a complete transit-oriented community and achieve a high degree of compatibility with adjacent land uses and transportation infrastructure.

KEY DIRECTIONS

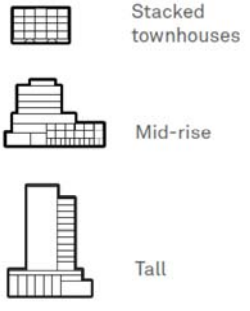
- Establish a **maximum building height of 30 storeys**, where appropriate and compatible.
- Require developments to achieve a high standard of architectural and urban design excellence to create a distinct and identifiable landmark area within each hub.
- Introduce a requirement for buildings to incorporate a podium element to create a pedestrian scaled environment at street level.
- Provide residential developments that achieve a level of affordability and mix of unit sizes and bedrooms to attract people from a range of income and demographics to the areas in close proximity to the GO station.
- Require retail, office and/or other service commercial uses at street level within buildings.
- Introduce new building setback requirements from the sidewalk at street level to allow for potential patio spaces, greenery and/or other elements that will enhance the public realm and pedestrian experience and enjoyment.
- Incorporate a significant employment function within mixed use developments.
- Require developments to achieve a minimum of two uses within a building.
- Require the provision of Transportation Demand Management (TDM) and traffic mitigation measures within developments, such as car-share, transit passes, shared parking facilities, etc.



PROPOSED BUILDING TYPES



May be in combination with:



Please note that the draft precinct plan, precinct boundaries, associated intention statements and key directions are preliminary and subject to change as a result of on-going technical studies and community and stakeholder feedback.

CITY OF Burlington

GROW BOLD

APPENDIX B:
Terms of Reference Letter

Memorandum

TO:
Kaylan Edgcumbe, C.E.T.
Manager, Integrated Mobility
Transportation Services Department
City of Burlington

FROM:
Emily J. Ecker

PROJECT:
8057-01
1120 Cooke Boulevard

DATE:
October 14, 2020

SUBJECT: TRAFFIC IMPACT STUDY SCOPE FOR OPA/ZBA – 1120 COOKE BOULEVARD

BA Group has been retained by Adi Development Group to provide transportation consulting services for the proposed residential development located at 1120 Cooke Boulevard, located in the northeast quadrant of the Waterdown Road / Masonry Court intersection, in the City of Burlington. The subject site is currently vacant.

The development proposal is for Phase 2 of the previously name "101 Masonry Court" site. The development proposal consists of three (3) to four (4) new residential buildings with below-grade parking. The current draft development concept contains in the order of 1,300 condominium units. The development statistics and concept plan are draft only, and continue to be refined.

Phase 1 (located east of the subject site) is partially occupied and consists of a mix of condominium apartment units and back-to-back, regular, rear lane, and stacked townhouses.

We understand, in accordance with discussions to this point, that the MTO would continue to require an iHAMP study or completion of the Prosperity Study in advance of building permit approvals for this site.

The proposed scope for a Traffic Impact Study for the Official Plan Amendment and Zoning By-Law Amendment for 1120 Cooke Boulevard is outlined below for your comment and consideration.

1.0 SCOPE OF WORK

Intersections to be analyzed:

Signalized Intersections:

- Waterdown Rd & N Service Rd / HWY 403 WB on-ramp
- Waterdown Rd & HWY 403 WB off-ramp / Panin Rd
- Waterdown Rd & HWY 403 EB off-ramp / S Service Rd
- S Service Rd & HWY 403 EB on-ramp / Go Station Lot Entrance
- Waterdown Rd & Masonry Ct / Railway Rd
- Waterdown Rd / Lasalle Park Rd & Plains Rd E / Plains Rd W

Unsignalized Intersections:

- Masonry Ct & Cooke Blvd
- Cooke Blvd & East Site Driveway(s)

Analysis Time Periods:

Weekday morning and weekday afternoon peak hours for:

- existing
- future background (5 and 10-years); and,
- future total (5 and 10-years).

Study Guidelines:

- Halton Region TIS Guidelines (2015)
- MTO TIS Guidelines (2014)
- MTO Geometric Design Standards for Ontario Highways
- MTO Highway Corridor Management Manual (2018)
- Ontario Traffic Manual
- Transportation Association of Canada Geometric Design Guide for Canadian Roads

Analysis inputs (sat flow for example) at City intersections will be prepared in accordance with Halton Region TIS Guidelines.

Analysis inputs at Highway terminals will be prepared in accordance with MTO TIS Guidelines.

Analysis Methodology:

Highway Capacity Manual methodology using Synchro 9 software.

Existing TMC:

A review of the latest counts available pre-COVID from BA Group, City of Burlington and MTO. Counts that are more recent than February 2020 will not be considered representative of typical conditions.

Background Traffic:
For highway intersections: a 2% annual growth rate will be applied.
For City intersections: an annual growth rate that will either be adopted from the City's Transportation Master Plan (TMP) or through discussion with City staff and review of historical count data for the local area (if available).

Traffic allowances based on specific developments will also be considered for proposed, approved, or under construction developments in the site vicinity. The area developments we are aware of from the Metrolinx Aldershot GO Station Traffic Brief report and City of Burlington development application website include:

- 101 Masonry Rd Phase 1
- Aldershot GO Station south parking lot expansion
- 35 Plains Rd East
- 92 Plains Rd East
- 53 & 71 Plains Rd East
- 1085 Clearview Avenue
- 1640, 1673, and 1751 Flatt Road and 1664 Waterdown Road Eagle Heights and Taylor Subdivisions

Please advise of other specific development proposals to consider.

Site Traffic
Traffic generation for the residential development will be based upon a review of Institute for Transportation Engineers (ITE) Trip Generation Manual and studies conducted by BA Group at comparable developments that are in a similar transportation context to the proposed site.

Mode Split
Mode split for the residential development will be determined based on a review of the City's TMP targets and existing comparable Major Transit Stations Areas (MTSAs).

Trip Distribution
Trip distribution will be based upon 2016 Transportation Tomorrow Survey (TTS) data. Trip distribution and assignment assumptions will reflect TTS data and local area turning restrictions and network constraints.

Parking and Loading Review
We will review the suitability of the proposed loading and parking supplies based on our experience at similar facilities and taking into consideration relevant standards and by-law requirements.

Emily J. Ecker

From: Lucas, Steve <Steve.Lucas@burlington.ca>
Sent: October 23, 2020 3:04 PM
To: Emily J. Ecker
Cc: Edgcumbe, Kaylan; Routledge, Graham (MTO); Ann.Larkin@halton.ca; 'Huycke, Adam'; Scattolon, Walter
Subject: 1120 Cooke Boulevard: TIS Scope Consolidated Comments
Attachments: BA_1120 Cooke Boulevard Terms of Reference Letter 20-10-14.pdf; BA_1120 Cooke Boulevard TOR MTO Traffic Comments Oct 2020.docx

Hello Emily,

I hope you are doing well, bellow and attached you will find our collective comments (MTO, Region and COB), with regards to your proposed scope of work.

City of Burlington Comments

- Please include this development proposal in this analysis: Fellowship Can Reform Church - 1350 Waterdown Road https://www.burlington.ca/en/services-for-you/Fellowship-Canadian-Reformed-Church.asp, in addition to the developments identified by the MTO.
- Please refer to our Burlington Citywide Parking Standards Review for applicable parking rates for this proposal - see the following URL: https://www.burlington.ca/en/services-for-you/city-wide-parking-standards-review.asp
- Please provide appropriate truck turning templates to demonstrate the functionality of the loading bays, structured parking, ramps, and accesses.
- We are in support of the comments and requirements detailed by the MTO.

Halton Region Comments

Regional Staff have now had an opportunity to consider the Scope of Work/Terms of Reference for the Traffic Impact Study that is required to support the development file for these lands. While we acknowledge that the subject lands are not located in close proximity to a Regional Road, it is the expectation to the Region that in order to consider the redevelopment of these lands in advance of the MTSA Secondary Plan being completed, that the developer comprehensively addresses, in this instance, the City's and MTO's traffic comments and requirements.

We further note that the growth targets and boundary for the MTSA cannot be provided at this time. We continue to note that the onus will be on the developers team to demonstrate how the proposed development has addressed current planning direction for the area (e.g. Policy 48, 77(5) and 81 (3) of the ROP), and does not negatively impact future growth planning for this area that the Region and the City are or will be engaged in.

Specifically in this regard, we have considered the MTO's comments (see attached) and offer nothing further from a scope of work perspective at this time. We further support the MTO comments and the City efforts to scope the TIS for the Provincial and Municipal interests, which align with ours.

Adam Huycke, MCIP, RPP, CPT
Senior Planner
Planning Services
Legislative & Planning Services
Halton Region

Ministry of Transportation Comments

Attached to this email you will find comments with regards to the scope of work. Also below are additional comments made by Graham Routledge (MTO):

With regard to the ToR, Background Traffic, we have listed developments below that we are aware of.

- 101 Masonry Rd Phase 1 – Please note that our files indicate that the proponent is to include Phase 1 (ie. not as background traffic) in their TIS for Phase 2
- Aldershot GO Station south parking lot expansion
- 35 Plains Rd East
- 92 Plains Rd East
- 53 & 71 Plains Rd East
- 1085 Clearview Avenue
- 1640, 1673, and 1751 Flatt Road and 1664 Waterdown Road Eagle Heights and Taylor Subdivisions

If you have any additional questions or concerns, please feel free to reach out to us.

Have a great weekend,

Steve Lucas
Transportation Planning Technologist
Transportation
(905) 335-7600 ext.7691
steve.lucas@burlington.ca
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APPENDIX C:
Reduced Architectural Plans (Not to Scale)

101 Masonry Court - GCA Chart

	BUILDING A		BUILDING B		BUILDING C		RETAIL		TOTAL	
	BUILDING OUTLINE (GCA) sq.ft.	BUILDING OUTLINE (GCA) sq.m.	BUILDING OUTLINE (GCA) sq.ft.	BUILDING OUTLINE (GCA) sq.m.	BUILDING OUTLINE (GCA) sq.ft.	BUILDING OUTLINE (GCA) sq.m.	BUILDING OUTLINE (GCA) sq.ft.	BUILDING OUTLINE (GCA) sq.m.	sq.ft.	sq.m.
GROUND	15,477	1,437.83	25,475	2,366.68			2,489	231.22	43,440	4,035.73
LEVEL 2	15,477	1,437.83	26,044	2,419.59					41,521	3,857.42
LEVEL 3	15,477	1,437.83	26,044	2,419.59					41,521	3,857.42
LEVEL 4	15,477	1,437.83	8,072	749.92	8,483	788.05			32,031	2,975.80
LEVEL 5	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 6	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 7	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 8	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 9	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 10	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 11	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 12	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 13	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 14	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 15	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 16	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 17	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 18	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 19	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 20	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 21	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 22	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 23	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 24	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 25	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 26	8,073	750.00	8,072	749.92	8,070	749.69			24,215	2,249.60
LEVEL 27	8,073	750.00			8,070	749.69			16,142	1,499.68
LEVEL 28	8,073	750.00			8,070	749.69			16,142	1,499.68
LEVEL 29	8,073	750.00			8,070	749.69			16,142	1,499.68
LEVEL 30	8,073	750.00			8,070	749.69			16,142	1,499.68
LEVEL 31	8,073	750.00			8,070	749.69			16,142	1,499.68
LEVEL 32	8,073	750.00			8,070	749.69			16,142	1,499.68
LEVEL 33	8,073	750.00			8,070	749.69			16,142	1,499.68
LEVEL 34	8,073	750.00			8,070	749.69			16,142	1,499.68
LEVEL 35	8,073	750.00			8,070	749.69			16,142	1,499.68
LEVEL 36	8,073	750.00			8,070	749.69			16,142	1,499.68
MPH	4,810	446.82	4,801	446.00	4,875	452.86			14,485	1,345.68
TOTAL GCA	320,239.38	30,198.03	263,221.56	24,900.09	266,707.95	25,230.84	2,488.83	231.22	867,143	80,560.18

	sq.ft.	sq.m.
TOTAL RESIDENTIAL GCA (ABOVE GRADE)	867,143	80,560.18
TOTAL RESIDENTIAL GFA (ABOVE GRADE)	794,979	73,855.94
TOTAL COMMERCIAL GFA (ABOVE GRADE)	2,489	231.22
TOTAL DEDUCTABLE (ABOVE GRADE)	69,675	6,473.01
TOTAL SITE AREA (m2)	9,534.66	
TOTAL SITE COVERAGE	7.8	

7 A100 GCA CHART
REF

ABBREVIATION LEGEND

ACC	ARCHITECTURAL CONCRETE TYPE	EL	ELEVATION	H	HOT	O/C	ON CENTRE	S	SINK	U/S	UNDERSIDE
ACT	ACOUSTIC TILE	ELEC	ELECTRICAL	HD	HUB DRAIN	OD	OUTSIDE DIAMETER	S/A	SUPPLY AIR		
AD	AREA DRAIN	EOS	EDGE OF SLAB	HM	HOLLOW METAL	OH	OVERHEAD	SC	SEALED CONCRETE	V	VOLT
AES	ARCHITECTURAL EXPOSED STEEL	EP	ELECTRICAL PANEL	HOR	HORIZONTAL			SD	SCUPPER DRAIN	VB	VAPOUR BARRIER
ALUM	ALUMINUM	EQ	EQUAL	HSS	HOLLOW STEEL SECTION	PC	PRECAST CONCRETE	SPEC	SPECIFICATION	VCT	VINYL COMPOSITE TILE TYPE
AFF	ABOVE FINISHED FLOOR	EIF	EXTERIOR INSULATION FINISHTYPE	HT	HEIGHT	PLM	PLASTIC LAMINATE	SQ	SQUARE	VERT	VERTICAL
		EXP	EXPOSED	HW	HARDWOOD STRIP	PLYWD	PLYWOOD	SQ FT	SQUARE FEET	VEST	VESTIBULE
C	COLD	EXJ	EXPANSION JOINT			PRE-FAB	PRE-FABRICATED	SSTL	STAINLESS STEEL	VP	VAPOUR BARRIER
C/H	COLD & HOT	EXT	EXTERIOR	IM	INSULATED METAL	PS	PRESSED STEEL	STL	STEEL		
CAR	CARPET			INS	INSULATION	PT	PAINT	SIM	SIMILAR	W	WASHER, WIDE
CB	CONCRETE BLOCK	FD	FLOOR DRAIN	INT	INTERIOR	P/T	PRESSURE TREATED	ST	STONE TYPE	WD	WOOD TYPE
℄	CENTRE LINE	FDN	FOUNDATION					STOR	STORAGE	WF	WOOD FINISH TYPE
CF	CERAMIC TILE	FIN	FINISH(ED)	JT	JOINT	QM	QUIRK MITRE	STRUCT	STRUCTURE, STRUCTURAL	WP	WORKING POINT
CJ	CONCRETE FINISH TYPE	FL	FLOOR					SW	SWITCH	W.P.	WATERPROOF (MEMBRANE)
CL	CONCRETE JOINT	FT	FOOT	LAM	LAMINATED	R	RISER, RADIUS			W.R.T.	WITH RESPECT TO
COL	CLOSET	FTG	FOOTING	LIN	LINEN	R.O.	ROUGH OPENING	T	TREAD	W/	WITH
CONC	CONCRETE BLOCK	FRG	FIBRE REINFORCED GYPSUM			R/A	RETURN AIR	TBB	TILE BACKER BOARD		
CONT	CONTINUOUS			MA	MARBLE TYPE	RAD	RADIATOR	TEL	TELEPHONE	XGWB	EXTERIOR GYPSUM BOARD
CT	CONCRETE COLUMN	GALV	GALVANIZED	MAX	MAXIMUM	RB	RUBBER BASE	THK	THICK, THICKNESS		
C/W	COVERED WITH	GBL	GLASS BLOCK	MECH	MECHANICAL	RC	REINFORCED CONCRETE	T&G	TONGUE & GROOVE		
		GR	GRANITE	MIN	MINIMUM	RD	ROOF DRAIN	TV	TELEVISION		
D	DIAMETER, DRYER	GL	GLASS	ML	MELAMINE	REF	REFERENCE DIMENSIONS	TYP	TYPICAL		
DFJ	DEFLECTION JOINT	GWB	GYPSUM WALLBOARD	MOD	MODULE	REINF	REINFORCED, REINFORCING	T/O	TOP OF SLAB		
DN	DOWN			MT	METAL TYPE	REQ'D	REQUIRED	T.O.B.	TOP OF BEAM		
DWG	DRAWING					RV	REVEAL	T.O.W.	TOP OF WALL		
				NFWH	NO FREEZE WATER HOSE	REV	REVERSE				
				N/C	NOT IN CONTRACT	R INSUL	RIGID INSULATION				
				N°	NUMBER	RM	ROOM				
				NTS	NOT TO SCALE						

3 A100 ABBREVIATION LEGEND
1:300

GROSS FLOOR AREA BREAKDOWN

FLOOR		RESIDENTIAL UNIT	RETAIL		RESIDENTIAL BUILDING B (PHASE 1) SALABLE		NON-SALABLE		BUILDING C (PHASE 2) SALABLE		NON-SALABLE		BUILDING A (PHASE 3) SALABLE		NON-SALABLE		TOTAL RESIDENTIAL GFA		TOTAL INDOOR AMENITY		TOTAL DEDUCTABLE	
			ft2	m2	ft2	m2	ft2	m2	ft2	m2	ft2	m2	ft2	m2	ft2	m2	ft2	m2	ft2	m2	ft2	m2
PARKING LEVEL P-5	PARKING				0	0.00	0	0.00					0	0.00	178	16.57	178	16.57	0	0.00	98,635	9,163.52
PARKING LEVEL P-4					0	0.00	0	0.00					0	0.00	178	16.57	178	16.57	0	0.00	98,635	9,163.52
PARKING LEVEL P-3					0	0.00	0	0.00					0	0.00	178	16.57	178	16.57	0	0.00	98,635	9,163.52
PARKING LEVEL P-2					0	0.00	2,081	193.35					0	0.00	178	16.57	2,260	209.92	0	0.00	96,554	8,970.18
PARKING LEVEL P-1					0	0.00	10,317	958.44					0	0.00	2,893	268.79	13,210	1,227.22	0	0.00	85,604	7,952.87
GROUND	PODIUM	0	2,558	231.22	0	0.00	9,333	867.07	0	0.00	7,720	717.22	0	0.00	13,053	1,212.63	30,106	2,796.92	19,127	1,777.00	10,846	1,007.58
LEVEL 2		51			12,313	1,143.89	1,228	114.08	8,309	771.91	1,968	182.87	12,893	1,197.78	1,228	114.11	37,939	3,524.62	0	0.00	3,582	332.81
LEVEL 3		52			12,313	1,143.89	1,228	114.08	5,586	850.46	829	77.03	12,893	1,197.78	1,228	114.11	38,076	3,537.35	0	0.00	3,445	320.08
LEVEL 4		28			2,491	231.41	4,891	454.41	2,587	240.37	5,335	495.60	12,893	1,197.78	1,228	114.11	29,425	2,733.68	8,254	766.83	2,606	242.11
LEVEL 5	TOWER	33			6,855	636.87	657	61.01	6,897	640.72	612	56.89	5,727	532.07	1,786	165.88	22,534	2,093.44	1,064	98.81	1,681	156.17
LEVEL 6		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 7		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 8		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 9		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 10		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 11		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 12		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 13		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 14		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 15		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 16		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 17		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 18		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 19		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 20		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 21		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 22		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 23		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 24		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 25		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 26		35			6,855	636.87	657	61.01	6,897	640.72	612	56.89	6,849	636.29	664	61.66	22,534	2,093.44	0	0.00	1,681	156.17
LEVEL 27		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
LEVEL 28		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
LEVEL 29		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
LEVEL 30		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
LEVEL 31		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
LEVEL 32		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
LEVEL 33		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
LEVEL 34		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
LEVEL 35		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
LEVEL 36		24							6,897	640.72	612	56.89	6,849	636.29	664	61.66	15,022	1,395.56	0	0.00	1,121	104.12
MECHANICAL PH		0			0	0.00	4,655	432.43	0	0.00	4,444	412.84	0	0.00	4,370	406.82	13,477	1,252.09	0	0.00	1,007	93.59
TOTAL		1,139	2,558.00	231.22	177,930.21	16,530.26	48,179.30	4,476.01	241,174.86	22,405.88	39,891.95	3,706.08	256,723.06	23,850.35	47,084.14	4,374.26	810,983.55	75,342.84	28,445.14	2,642.64	547,739.18	50,886.64

TOTAL ABOVE GRADE DEDUCTABLE	6,473.01
TOTAL BELOW GRADE DEDUCTABLE	44,413.62

2 A100 GFA CHART
REF

BUILDING A(36 STORIES)

UNIT BREAKDOWN	BACHELOR (400-450sf)	1BED (450-529sf)	1BED+D (530-625sf)		2BED (625-750sf)	2BED+D (751-825sf)	3BED (900-1100sf)		NO. OF LEVELS	TOTAL
GROUND	0	0	0		0	0	0		1	0
LEVELS 2 - 4	0	3	11		5	1	0		3	60
LEVEL 5	0	6	1		3	0	0		1	10
LEVELS 6 - 36	0	6	4		2	0	0		31	372
TOTAL	0	201	158		80	3	0		36	442
PROVIDED %	0%	45%	36%		18%	1%	0%			100%
NO OF BARRIER FREE UNITS REQUIRED	0	53.85			12.45		0			

PHASE 1 (BUILDING B)	UNIT NUMBER	PHASE 2 (BUILDING C)	UNIT NUMBER	PHASE 3 (BUILDING A)	UNIT NUMBER
GROUND	0	GROUND	0	GROUND	0
LEVELS 2 - 4	0	LEVELS 2 - 4	0	LEVELS 2 - 4	60
LEVEL 5	0	LEVEL 5	0	LEVEL 5	10
LEVELS 6 - 36	0	LEVELS 6 - 36	0	LEVELS 6 - 36	372
TOTAL	0	TOTAL	0	TOTAL	442

BUILDING B & C PODIUM(4 STORIES)

UNIT BREAKDOWN	BACHELOR (400-450sf)	1BED (450-529sf)	1BED+D (530-625sf)		2BED (650-750sf)	2BED+D (751-900sf)	3BED (900-1100sf)		NO. OF LEVELS	TOTAL
GROUND	0	0	0		0	0	0		1	0
LEVEL 2	0	4	22		0	5	0		1	31
LEVEL 3	0	4	22		0	5	1		1	32
LEVEL 4	0	1	4		3	0	0		1	8
TOTAL	0	9	48		3	10	1		4	71
PROVIDED %	0%	13%	68%		4%	14%	1%			100%
NO OF BARRIER FREE UNITS REQUIRED	0	6.55			1.95		0.15			

PHASE 1 (BUILDING B)	UNIT NUMBER	PHASE 2 (BUILDING C)	UNIT NUMBER	PHASE 3	UNIT NUMBER
GROUND	0	GROUND	0	GROUND	0
LEVEL 2	18	LEVEL 2	13	LEVEL 2	0
LEVEL 3	18	LEVEL 3	14	LEVEL 3	0
LEVEL 4	4	LEVEL 4	4	LEVEL 4	0
TOTAL	40	TOTAL	31	TOTAL	0

BUILDING B(26 STORIES)

UNIT BREAKDOWN	BACHELOR (400-450sf)	1BED (450-529sf)	1BED+D (530-625sf)		2BED (650-750sf)	2BED+D (751-900sf)	3BED (900-1100sf)		NO. OF LEVELS	TOTAL
LEVELS 5-26	0	1	7		3	0	0		22	242
TOTAL	0	22	154		66	0	0		22	242
PROVIDED %	0%	9%	64%		27%	0%	0%			100%
NO OF BARRIER FREE UNITS REQUIRED	0	26.4			9.9		0			

PHASE 1 (BUILDING B)	UNIT NUMBER	PHASE 2 (BUILDING C)	UNIT NUMBER	PHASE 3	UNIT NUMBER
LEVELS 5-26	242	LEVELS 5-26	0	LEVELS 5-26	0
TOTAL	242	TOTAL	0	TOTAL	0

BUILDING C(36 STORIES)

UNIT BREAKDOWN	BACHELOR (400-450sf)	1BED (450-529sf)	1BED+D (530-625sf)		2BED (650-750sf)	2BED+D (751-900sf)	3BED (900-1100sf)		NO. OF LEVELS	TOTAL
LEVEL 5	0	6	2		4	0	0		1	12
LEVELS 6-36	0	6	2		4	0	0		31	372
TOTAL	0	192	64		128	0	0		32	384
PROVIDED %	0%	50%	17%		33%	0%	0%			100%
NO OF BARRIER FREE UNITS REQUIRED	0	38.4			19.2		0			

PHASE 1 (BUILDING B)	UNIT NUMBER	PHASE 2 (BUILDING C)	UNIT NUMBER	PHASE 3	UNIT NUMBER
LEVEL 5	0	LEVEL 5	12	LEVEL 5	0
LEVELS 6-36	0	LEVELS 6-36	372	LEVELS 6-36	0
TOTAL	0	TOTAL	384	TOTAL	0

UNIT BREAKDOWN	1B	1B+D	2B	2B+D	3B	TOTAL
TOTAL	424	424	277	13	1	1,139
REQUIRE %	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100%
PROVIDE %	37.2%	37.2%	24.3%	1.1%	0.1%	100%

TOTAL UNITS
1,139

PHASE 1	TOTAL UNITS	PHASE 2	TOTAL UNITS	PHASE 3	TOTAL UNITS
TOTAL	282	TOTAL	415	TOTAL	442

6 A100 UNIT BREAKDOWN
REF

PARKING & BIKE PARKING

PARKING (RESIDENTIAL+VISITOR)	REGULAR PARKING		BARRIER FREE PARKING TYPE A	TYPE B	TOTAL
P-5 PARKING	201	11 (TENDEM)	3	4	219
P-3 TO P-4 PARKING	201		3	4	208
P-2 PARKING	198		3	4	205
P-1 PARKING	179		3	4	186
GROUND	0		0	0	0
TOTAL PARKING REQUIRED					1020
TOTAL PARKING PROVIDED	991		35		1026

PARKING (COMMERCIAL)	REGULAR PARKING	BARRIER FREE PARKING TYPE A	TYPE B	TOTAL
GROUND(OUTDOOR)	4	0	1	5
TOTAL PARKING PROVIDED	4	1		5

	PHASE 1 (BUILDING B & C)		PHASE 2 (BUILDING A)
P-5 PARKING	320	11 (TENDEM)	40
P-3 TO P-4 PARKING	[illegible]		[illegible]
P-2 PARKING	[illegible]		[illegible]
P-1 PARKING	[illegible]		[illegible]

BIKE PARKING PARKING		RESIDENTIAL LONG-TERM		RESIDENTIAL SHORT-TERM	COMMERCIAL
PHASE 1 (BUILDING B)	PROVIDED	[illegible]	[illegible]	[illegible]	[illegible]
	REQUIRED				
PHASE 2 (BUILDING C)	PROVIDED	[illegible]	[illegible]	[illegible]	
	REQUIRED				
PHASE 3 (BUILDING A)	PROVIDED	[illegible]	[illegible]	[illegible]	
	REQUIRED				
TOTAL	PROVIDED	[illegible]		[illegible]	
	REQUIRED				

5 A100 PARKING & BIKE PARKING STATISTICS
REF

AMENITY

AMENITY SPACE	AMENITY (15 sq.m./UNIT) INDOOR AMENITY	OUTDOOR AMENITY	BALCONY & TERRACE	PARK AREA	TOTAL
BUILDING A					
PROVIDED	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
REQUIRED					[illegible]
BUILDING B					
PROVIDED	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
REQUIRED					[illegible]
BUILDING C					
PROVIDED	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
REQUIRED					[illegible]
A+B+C	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PARK AREA					[illegible]
TOTAL REQUIRED					[illegible]
TOTAL PROVIDED					[illegible]

4 A100 AMENITY STATISTICS
REF

ARCHITECTURAL DRAWING LIST

DRAWING NO.	TITLE	CONSULTANT
SCHEDULES		
A001	TITLE	CORE
A100	STATISTICS & ZONING	CORE
A101	CONTEXT PLAN	CORE
A103	PHASING DIAGRAM	CORE
A104	SITE PLAN	CORE
A105	SURVEY PLAN	CORE
PLANS		
A200	PARKING LEVEL 5	CORE
A201	PARKING LEVELS 3 & 4	CORE
A202	PARKING LEVEL 2	CORE
A203	PARKING LEVEL 1	CORE
A204	GROUND LEVEL	CORE
A205	LEVEL 2	CORE
A206	LEVEL 3	CORE
A207	LEVEL 4	CORE
A208	LEVEL 5	CORE
A209	TYPICAL TOWER	CORE
A210	MECHANICAL PENTHOUSE	CORE
A211	ROOF PLAN	CORE
ELEVATIONS / SECTIONS		
A410	BUILDING SECTION 1	CORE
A411	BUILDING SECTION 2	CORE
A412	BUILDING SECTION 3	CORE
PERSPECTIVES		
A600	BUILDING PERSPECTIVE	CORE
A601	BUILDING PERSPECTIVE	CORE
A602	BUILDING PERSPECTIVE	CORE

NOTE: SHADOW STUDY AT SEPARATE PACKAGE

1 A100 DRAWING LIST
REF

No.	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCTOBER 2021

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1120 COOKE BLVD

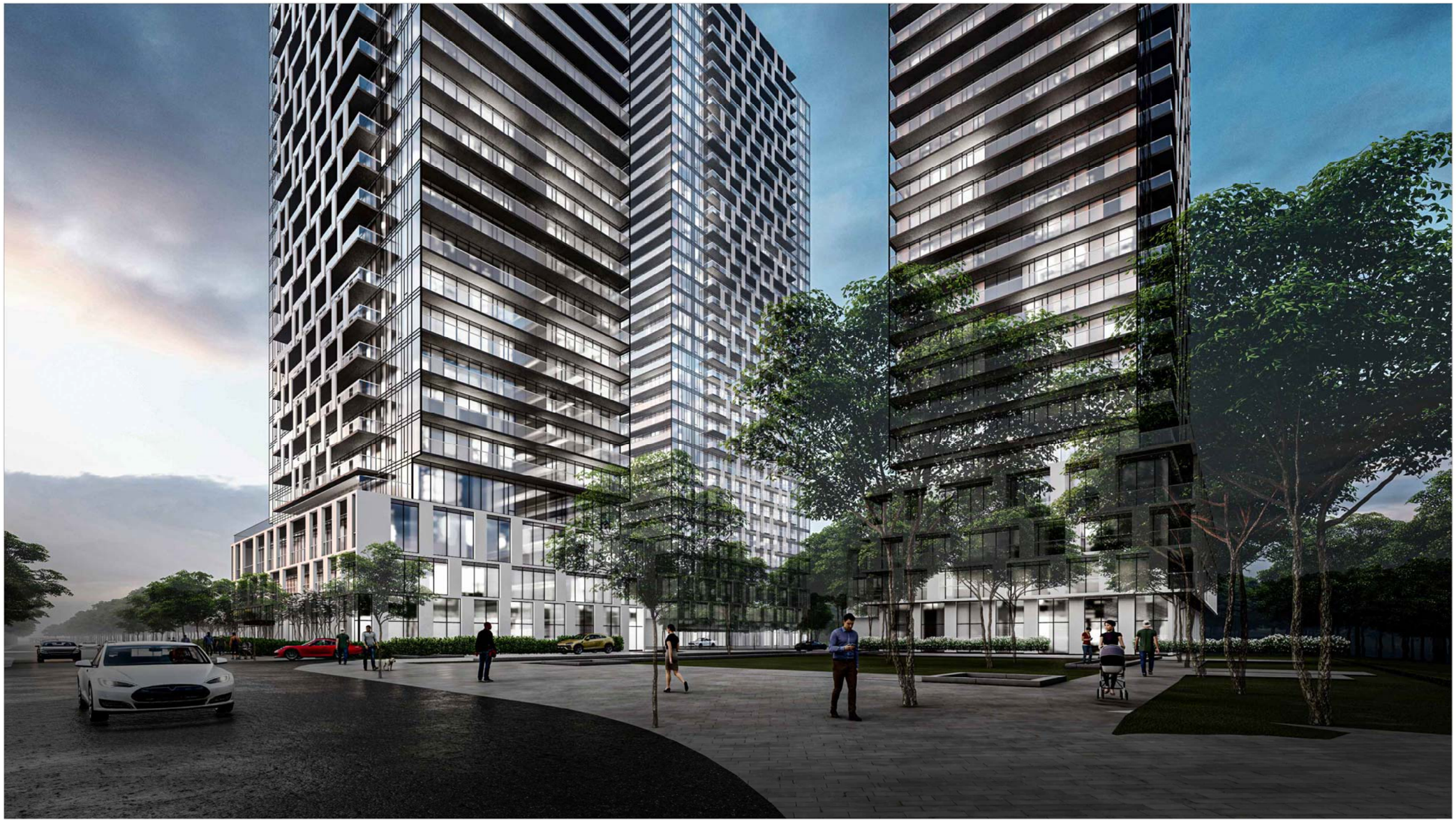
PHASE 2
BURLINGTON ONTARIO

ONTARIO ASSOCIATION OF ARCHITECTS
BABAK ESLAHJOU
LICENCE
5700

Drawn: CW	Scale: N.T.S.
Checked: DL	Date: 11 JUN 2021

Title
STATISTICS & ZONING

Project No.	Drawing No.
20-129	A100



1120 COOKE BOULEVARD - PHASE 2

ISSUED FOR OPA/ ZBA
07 OCTOBER 2021

No.	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCT 2021

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PHASE 2
MISSISSAUGA, ONTARIO

Drawn	Scale
	NTS
Checked	Date
	11 JUN 2021

Title
TITLE

Project No.	Drawing No.
20-129	A001



5 CONTEXT PLAN
A101 1:1000

LEGEND

HATCH DENOTES EXISTING PHASE 1

No.	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCTOBER 2021

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1120 COOKE BLVD

PHASE 2
BURLINGTON ONTARIO

N

ONTARIO ASSOCIATION OF ARCHITECTS

Drawn	Scale
CW	N.T.S.
Checked	Date
DL	11 JUN 2021

Title
CONTEXT PLAN

Project No.	Drawing No.
20-129	A101



2 A103 PHASING DIAGFAM BELOW GRADE



1 A103 PHASING DIAGRAM ABOVE GRADE

LEGEND

- HATCH DENOTES PHASE 1
- HATCH DENOTES PHASE 2
- HATCH DENOTES PHASE 3

No	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCTOBER 2021

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1120 COOKE BLVD

PHASE 2
BURLINGTON ONTARIO

N

Drawn	Scale
CW	1:350
Checked	Date
DL	11 JUN 2021

Title
PHASING DIAGRAM

Project No.	Drawing No.
20-129	A103

WATERDOWN ROAD

WATERDOWN ROAD

MASONRY COURT

COOKE BLVD

PARKING ENTRANCE

7.5% SLOPE
25.89m

ROOF OF RAMP
(2.30 m HEIGHT)

BUILDING A

GROUND FLOOR F.F.
EL 105.06

EXTERIOR MECHANICAL AREA @ LEVEL 37
EL 217.360

ROOF OF MECHANICAL ROOM @ LEVEL 38
EL 222.860

CAONPY @ LEVEL 37

DASHED LINE DENOTES CANOPY @ LEVEL 5.

RESIDENTIAL ENTRANCE

EXIT

4.7m FROM FIRE DEPARTMENT CONNECTION TO RESIDENTIAL ENTRANCE

WIND SCREEN (2200 mm min.) @ PERIMETER OF OUTDOOR AMENITY @ LEVEL 5

DASHED LINE DENOTES CANOPY @ GROUND LEVEL.

BIKE RACKS 4 UNITS.

PROPERTY LINE

ROOF @ LEVEL 5
EL 119.560

LOADING ENTRANCE/ EXIT

LOADING SPACE
3.5m (W) x 12.0m (L) x 7.5m (H) MIN. CLEARANCE

GARBAGE BIN STAGING PAD. PROPERTY MANAGEMENT TO STAGE BINS FOR VARIOUS WASTE STREAMS

INTAKE SHAFT

3.7m FROM FIRE DEPARTMENT CONNECTION TO RESIDENTIAL ENTRANCE

EL 217.360

31.7m FROM PROPOSED FIRE HYDRANT TO FIRE DEPARTMENT CONNECTION

DROP OFF

FIRE ROUTE

R13000

27055

18650

3495

7800

37850

3000

8425

2025

4000

11805

4000

6000

20150

3000 4000

11740

4000 3590

OUTDOOR AMENITY

ROOF OF STAIR @ GROUND LEVEL

EXIT

DASHED LINE DENOTES CISTERN LOCATED AT P-1.

DASHED LINE DENOTES CANOPY @ GROUND LEVEL.

CAR SHARE PARKING SPOTS

PROPOSED FIRE HYDRANT

DASHED LINE DENOTES CANOPY @ GROUND LEVEL.

R13000

DENOTES RETAIL PARKING @ GROUND LEVEL.

EXISTING FIRE HYDRANT

DASHED LINE DENOTES CANOPY @ GROUND LEVEL.

DASHED LINE DENOTES CANOPY @ LEVEL 4.

BIKE RACKS 5 UNITS.

DASHED LINE DENOTES CANOPY @ GROUND LEVEL.

WIND SCREEN (2000mm HIGH) @ LEVEL 4/ PERIMETER OF EXTERIOR AMENITY

BUILDING B

ROOF OF MECHANICAL ROOM @ LEVEL 29
EL 192.400

GROUND FLOOR F.F.
EL 105.36

EXTERIOR MECHANICAL AREA @ LEVEL 27
EL 186.900

5.5m FROM FIRE DEPARTMENT CONNECTION TO RESIDENTIAL ENTRANCE

RESIDENT. ENTRANCE

4.3m FROM FIRE DEPARTMENT CONNECTION TO RESIDENTIAL ENTRANCE

17.3m FROM EXISTING FIRE HYDRANT TO FIRE DEPARTMENT CONNECTION

GROUND FLOOR F.F.H.
EL 105.20

RETAIL ENTRANCE

PRIVATE PATIO

BUILDING C

ROOF OF MECHANICAL ROOM @ LEVEL 38
EL 222.700

GROUND FLOOR F.F.
EL 104.90

EXTERIOR MECHANICAL AREA @ LEVEL 37
EL 217.200

EXTERIOR MECHANICAL AREA @ LEVEL 37
EL 217.200

WIND SCREEN (2200 mm min.) @ PERIMETER OF OUTDOOR AMENITY @ LEVEL 4

DASHED LINE DENOTES CANOPY @ LEVEL 2.

3150

12195

4000

3650

7415

TYPE C
6.0m(L) x 3.5m (W)
x3.0m(H)

STAGING

ROOF @ LEVEL 5

OUTDOOR AMENITY @ LEVEL 4
ROOF @ LEVEL 4
EL 116.400

PARKING AND TYPE C LOADING ENTRANCE

PARKING ENTRANCE
EL 105.200

29700

37990

37130

4400

13.3m FROM FIRE DEPARTMENT CONNECTION TO RESIDENTIAL LOBBY ENTRANCE

2.2m FROM FIRE DEPARTMENT CONNECTION TO RESIDENTIAL LOBBY ENTRANCE

77580

15825

3150

12440

33.7m FROM EXISTING FIRE HYDRANT TO FIRE DEPARTMENT CONNECTION REFER TO CIVIL DRAWING FOR EXISTING FIRE HYDRANT LOCATION

SECOND LOBBY ENTRANCE @ LEVEL 2

UG PARKING BELOW

LIMIT OF FOUNDATION WALL

MAX 3:1

LEGEND

- REGULATION PARKING
- BARRIER FREE PARKING
- HORIZONTAL BICYCLE PARKING
- VERTICAL BICYCLE PARKING
- TYPICAL CONVEX MIRROR
- EV ELECTRICAL CHARGING STATION

No.	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCTOBER 2020

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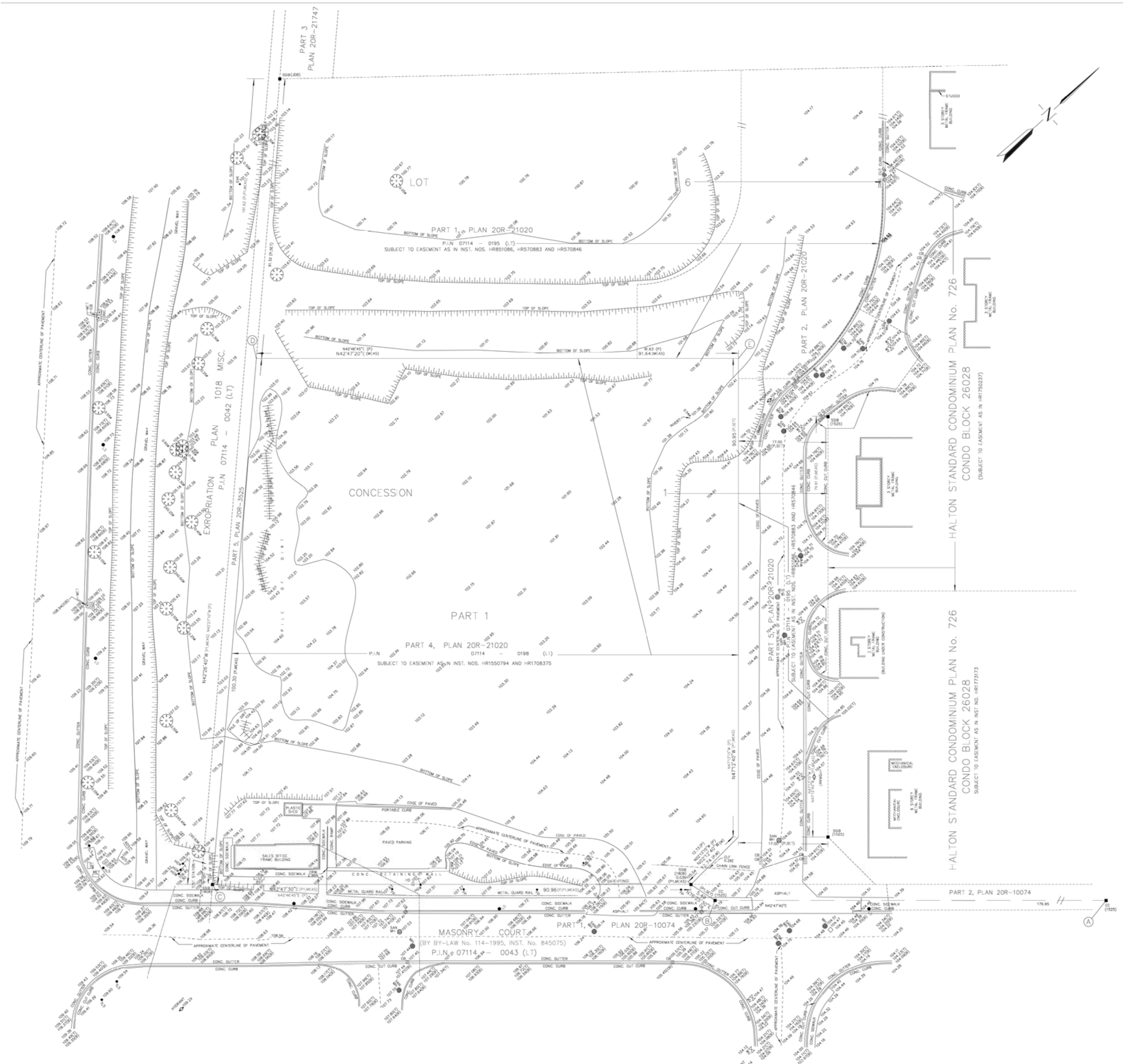
PHASE 2
BURLINGTON ONTARIO

Drawn: CW	Scale: 1:200
Checked: DL	Date: 11 JUN 2021

Title: SITE PLAN

Project No.: 20-129

Drawing No.: A104



TOPOGRAPHICAL SURVEY OF

PART OF LOT 6
CONCESSION 1

(GEOGRAPHIC TOWNSHIP OF EAST FLAMBOROUGH)

CITY OF BURLINGTON

REGIONAL MUNICIPALITY OF HALTON

SCALE 1 : 300

5m 4 3 2 1 0 5 10 15 20m

R. AVIS SURVEYING INC.

METRIC : DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

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NOTES AND LEGEND

BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE OBSERVED REFERENCE POINTS A AND B HAVING A BEARING OF N42°47'40"E BY REAL TIME NETWORK (RTK) OBSERVATION, UTM ZONE 17, CENTRAL MERIDIAN 81° 00' WEST LONGITUDE.
(6° UNIVERSAL TRANSVERSE MERCATOR PROJECTION, NAD 83 (CSRS-2010)

6° UTM ZONE 17 COORDINATES NAD83(CSRS-2010) (CENTRAL MERIDIAN 81°00' WEST LONGITUDE)		
DERIVED OBSERVED REFERENCE POINTS A AND B		
	NORTHING	EASTING
A	4795993.73	593012.39
B	4795863.89	592892.17
C	4795795.85	592825.04
D	4795869.86	592757.35
E	4795937.11	592819.60

(1) THE UTM COORDINATES LISTED ABOVE ARE TO AN URBAN ACCURACY, PER SUBSECTION 14(2) OF ONTARIO REGULATION 216/10 FILED UNDER THE SURVEYORS ACT
(2) THE UTM COORDINATES LISTED ABOVE ARE TO BE USED FOR GEOGRAPHIC INFORMATION SYSTEM INTEGRATION ONLY AND CANNOT BE USED TO RE-ESTABLISH THE PROPERTY CORNERS OR BOUNDARIES SHOWN HEREON

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO THE CITY OF BIRLINGTON BENCHMARK No. 0011922U2445, HAVING AN ELEVATION = 100.718 metres.

DISTANCES SHOWN HEREON ARE ADJUSTED GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.99971063.

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT PLANTED
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
CC	DENOTES	CUT CROSS
CP	DENOTES	CONCRETE PIN
NI	DENOTES	NOT IDENTIFIABLE
WIT	DENOTES	WITNESS
MEAS/M	DENOTES	MEASURED
N,S,E,W	DENOTES	NORTH, SOUTH, EAST, WEST
P	DENOTES	PLAN 20R-21020
P1	DENOTES	PLAN 20R-21714
1808	DENOTES	J.H. GELBLOOM SURVEYING LIMITED, O.L.S.
JDB	DENOTES	J.D. BARNES LIMITED, O.L.S.
1525	DENOTES	R. AVIS SURVEYING INC. O.L.S.
ORP	DENOTES	OBSERVED REFERENCE POINTS
ADS	DENOTES	ADVERTISEMENT SIGN
B	DENOTES	BOTTOM OF CONCRETE CURB
BTS	DENOTES	BOTTOM OF STEP
CB	DENOTES	CATCH BASIN
CD	DENOTES	COMMUNICATION DUCT
CLF	DENOTES	CHAIN LINK FENCE
CONC/C	DENOTES	CONCRETE
CRW	DENOTES	CONCRETE RETAINING WALL
FH	DENOTES	FIRE HYDRANT
FP	DENOTES	FLAG POLE
GI	DENOTES	GAS LINE INDICATOR
HD	DENOTES	HYDRO DUCT
HGW	DENOTES	HYDRO GUY WIRE
GVK	DENOTES	GAS VALVE KEY
ICB	DENOTES	INLET CATCH BASIN
LS	DENOTES	LIGHT STANDARD
MET	DENOTES	METAL
OH	DENOTES	OVERHEAD WIRE
SMH	DENOTES	SANITARY MANHOLE
STMH	DENOTES	STORM MANHOLE
T	DENOTES	TOP OF CONCRETE CURB
TLS	DENOTES	TRAFFIC LIGHT STANDARD
TS	DENOTES	TRAFFIC SIGN
WV	DENOTES	WATER VALVE

0.10ø DENOTES CONIFEROUS TREE WITH TRUNK DIAMETER 0.10 metres

0.10ø DENOTES DECIDUOUS TREE WITH TRUNK DIAMETER 0.10 metres

000.00 DENOTES SPOT ELEVATION

AREA : 9535.9 sq. m.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 27th DAY OF MARCH, 2021.

APRIL 23, 2021
DATE

PIRATHEEPAN RAMACHANDRAN
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CHECKED BY : P.R., O.L.S.	
CALCULATED BY : HT/SR	PROJECT No. : 3211-8
DRAWN BY : GN/S.S./SR/F.M.	DRAWING No. : 3211-8T.DWG

No.	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCT 2021

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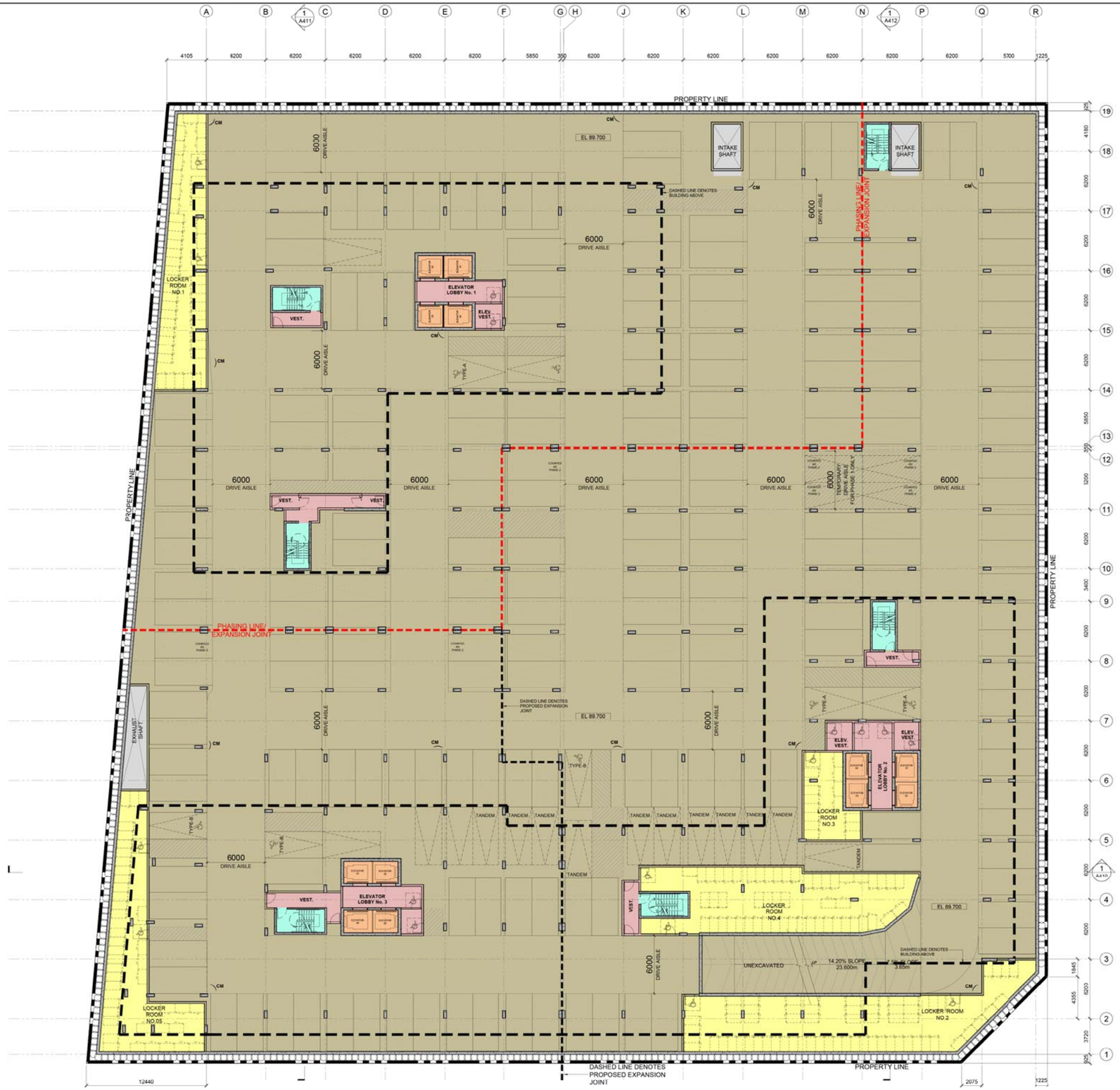
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1120 COOKE BLVD

PHASE 2
BURLINGTON, ONTARIO

Drawn	Scale N.T.S.
Checked	Date 11 JUN 2021
Title SURVEY PLAN	
Project No. 20-129	Drawing No. A0.5



LEGEND

- REGULATION PARKING
- BARRIER FREE PARKING
- HORIZONTAL BICYCLE PARKING
- VERTICAL BICYCLE PARKING
- TYPICAL CONVEX MIRROR
- EV — ELECTRICAL CHARGING STATION
- NON-SALABLE GFA
- SALABLE GFA
- DEDUCTABLE - STORAGE
- DEDUCTABLE - STAIRWAY
- DEDUCTABLE - AIR HANDLING
- DEDUCTABLE - ELEVATOR SHAFT
- DEDUCTABLE - FOYER AND LOBBY
- DEDUCTABLE - PARKING

No.	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCTOBER 2021

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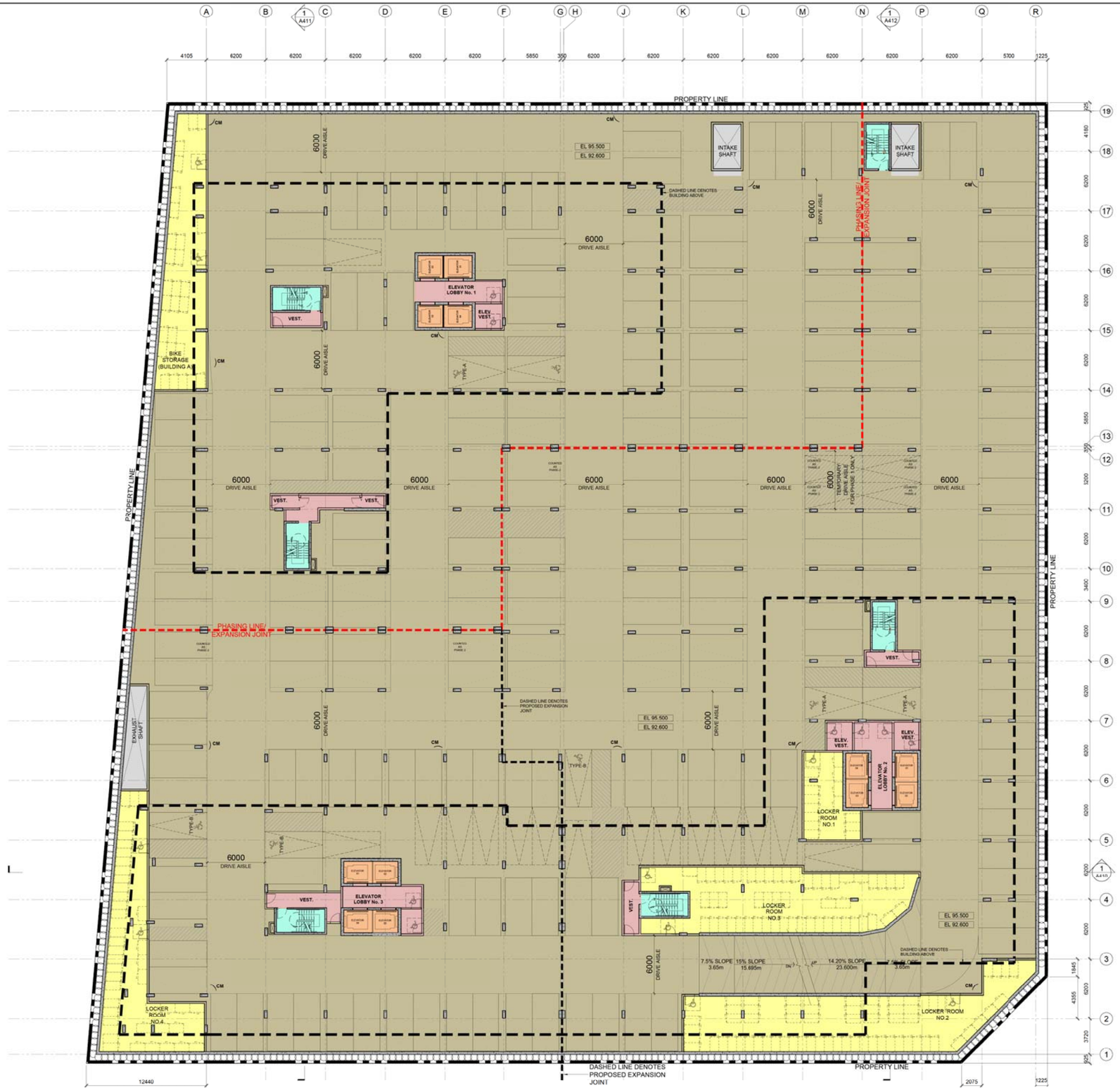
1120 COOKE BLVD

PHASE 2
BURLINGTON ONTARIO

Drawn: AZ	Scale: 1:200
Checked: DL	Date: 11 JUN 2021

Title: PARKING LEVEL 5

Project No.: 20-129	Drawing No.: A200



LEGEND

- REGULATION PARKING
- BARRIER FREE PARKING
- HORIZONTAL BICYCLE PARKING
- VERTICAL BICYCLE PARKING
- CM — TYPICAL CONVEX MIRROR
- EV — ELECTRICAL CHARGING STATION
- NON-SALABLE GFA
- SALABLE GFA
- DEDUCTABLE - STORAGE
- DEDUCTABLE - STAIRWAY
- DEDUCTABLE - AIR HANDLING
- DEDUCTABLE - ELEVATOR SHAFT
- DEDUCTABLE - FOYER AND LOBBY
- DEDUCTABLE - PARKING

No.	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCTOBER 2020

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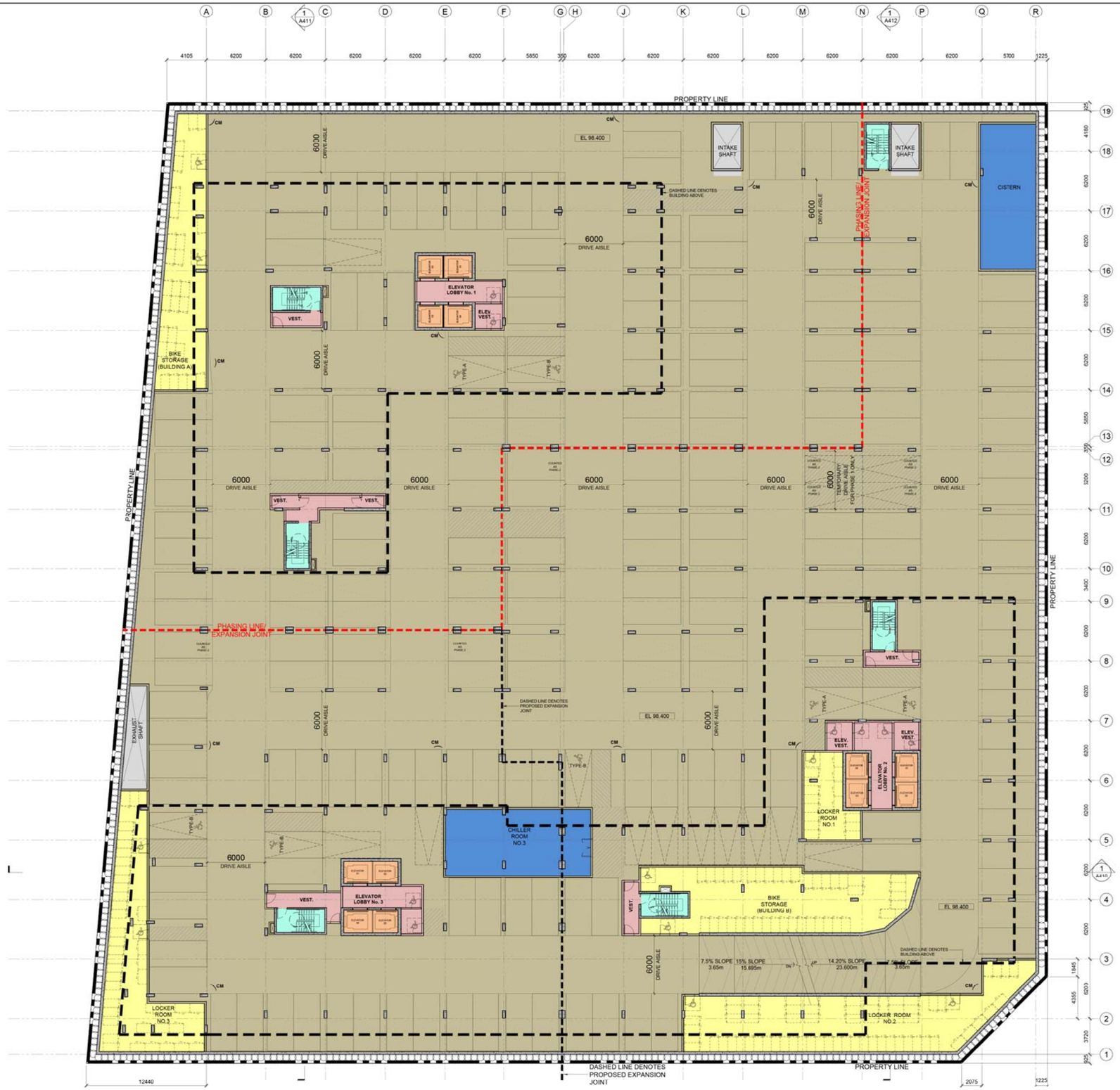
1120 COOKE BLVD

PHASE 2
BURLINGTON ONTARIO

Drawn: AZ	Scale: 1:200
Checked: DL	Date: 11 JUN 2021

Title: PARKING LEVELS 3 & 4

Project No.	Drawing No.
20-129	A201



LEGEND

- REGULATION PARKING
- BARRIER FREE PARKING
- HORIZONTAL BICYCLE PARKING
- VERTICAL BICYCLE PARKING
- TYPICAL CONVEX MIRROR
- EV — ELECTRICAL CHARGING STATION
- NON-SALABLE GFA
- SALABLE GFA
- DEDUCTABLE - STORAGE
- DEDUCTABLE - STAIRWAY
- DEDUCTABLE - AIR HANDLING
- DEDUCTABLE - ELEVATOR SHAFT
- DEDUCTABLE - FOYER AND LOBBY
- DEDUCTABLE - PARKING

No.	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCTOBER 2020

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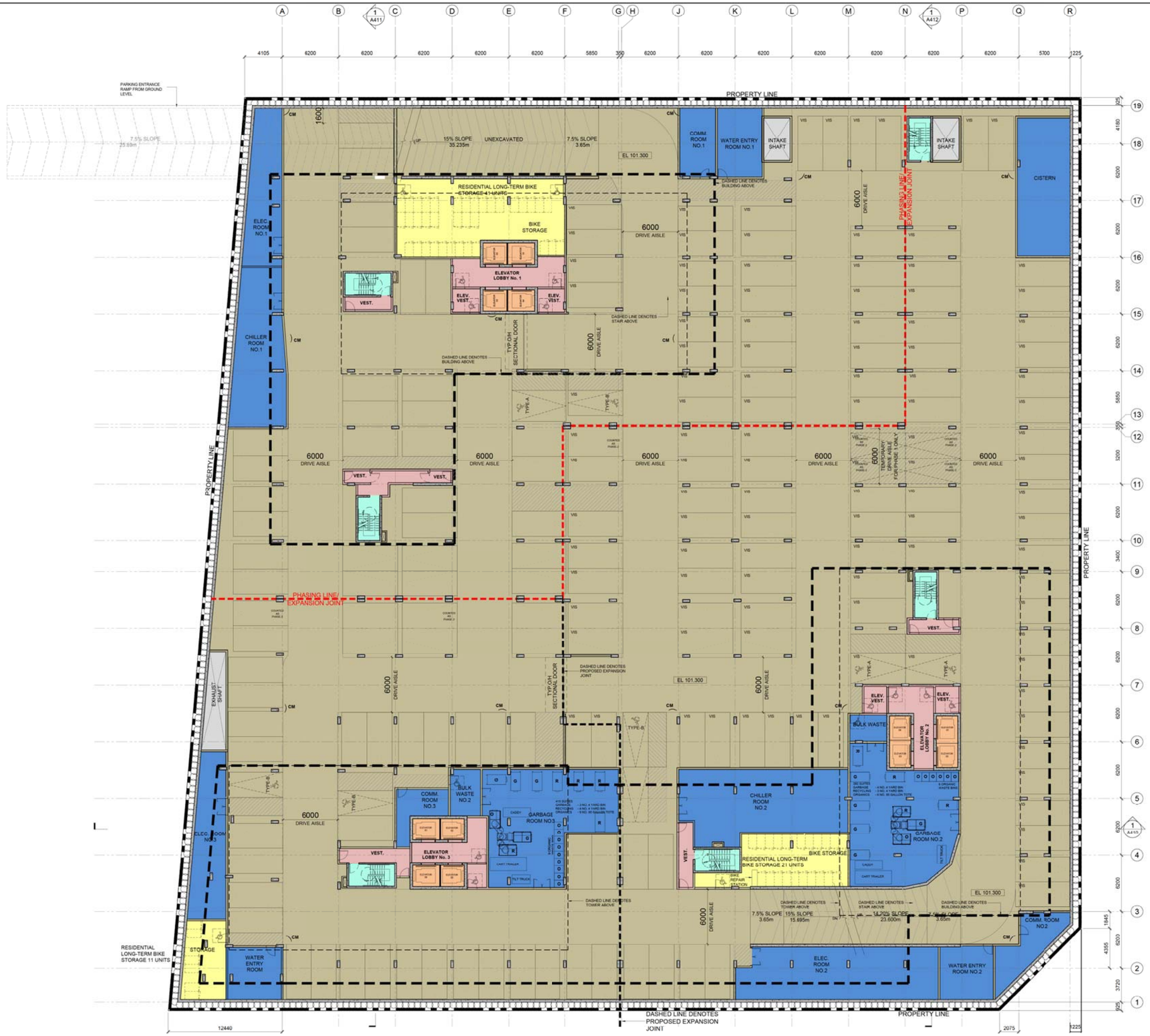
1120 COOKE BLVD

PHASE 2
BURLINGTON ONTARIO

Drawn: AZ	Scale: 1:200
Checked: DL	Date: 11 JUN 2021

Title: PARKING LEVEL 2

Project No.	Drawing No.
20-129	A202



LEGEND

- REGULATION PARKING
- BARRIER FREE PARKING
- HORIZONTAL BICYCLE PARKING
- VERTICAL BICYCLE PARKING
- TYPICAL CONVEX MIRROR
- EV — ELECTRICAL CHARGING STATION
- NON-SALABLE GFA
- SALABLE GFA
- DEDUCTABLE - STORAGE
- DEDUCTABLE - STAIRWAY
- DEDUCTABLE - AIR HANDLING
- DEDUCTABLE - FOYER AND LOBBY
- DEDUCTABLE - PARKING

No.	Revisions	Date
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1120 COOKE BLVD

PHASE 2
BURLINGTON ONTARIO

Drawn	Scale
AZ	1:200
Checked	Date
DL	11 JUN 2021

Title: PARKING LEVEL 1

Project No.	Drawing No.
20-129	A203

PHASE 3

PROPERTY LINE

WATERDOWN ROAD

COOKE BLVD.

PROPERTY LINE

PHASING LINE

PHASING LINE

PHASING LINE

PHASE 2

PHASE 1

MASONRY COURT

BUILDING A

BUILDING B

BUILDING C

48650

3000

4105 6200 6200 6200 6200 6200 5850 350 6200 6200 6200 6200 6200 6200 6200 5700 225

48650

3495

40480

3015

9000

20150

LOADING SPACE
3.5m (W) x 12.0m (L) x 7.5m (H) MIN. CLEARANCE

18650

8425

21830

26330

23655

26700

19200
24 ORGANIC 360L CART(0.6m/W) PER CART

3150

38385

77580

6000
DRIVE AISLE

3000

7415

15825

3150

12440

2075

1225

7.5% SLOPE
25.89m

15% SLOPE
35.235m

7.5% SLOPE
3.65m

DASHED LINE DENOTES ROOF ABOVE

TYP OH SECTIONAL DOOR

INTAKE SHAFT

INTAKE SHAFT

EXIT

LOBBY & AMENITY

EL. 105.06

VES.

RESIDENTIAL ENTRANCE

EXIT

BIKE REPAIR STATION

RESIDENTIAL LONG-TERM BIKE STORAGE
(135 UNITS (90 STACKED) 3 VERTICAL)

BIKE STORAGE

ELEVATOR LOBBY No. 1

EXIT

LOBBY & AMENITY

MOVING CORRIDOR

VESTIBULE

GARBAGE ROOM

SERVICE CORRIDOR

JANITOR

BULK STORAGE

EXIT EXIT

RESIDENTIAL ENTRANCE

DASHED LINE DENOTES CANOPY @ GROUND LEVEL

CAR SHARE

CAR SHARE

CS1

CS2

DROP OFF AREA

RESIDENTIAL SHORT-TERM BIKE RACK 8 UNITS (4 RACKS)

EXIT

DASHED LINE DENOTES CANOPY @ GROUND LEVEL

RETAIL

RETAIL

RETAIL

RETAIL

RETAIL

C01 C02 C03 C04 C05

EL 105.36

DASHED LINE DENOTES LEVELS 4-26

FIRE DEPARTMENT CONNECTION @ GROUND FLOOR

DROP OFF AREA

LOBBY & AMENITY

VESTIBULE

EL 105.360

ELEVATOR LOBBY No. 2

MOVING ROOM

VESTIBULE

RESIDENTIAL ENTRANCE

EXHAUST SHAFT

RESIDENTIAL SHORT-TERM BIKE RACK 8 UNITS (4 RACKS)

DROP OFF AREA

DASHED LINE DENOTES CANOPY @ GROUND LEVEL

DASHED LINE DENOTES LEVELS 5-36

EL 104.90

RESIDENTIAL ENTRANCE

PARKING ENTRANCE

RESIDENTIAL SHORT-TERM BIKE RACK 6 UNITS (3 RACKS)

RESIDENTIAL ENTRANCE

VESTIBULE

LOBBY & AMENITY

ELEVATOR LOBBY No. 3

TYPE C
6m (L) x 3.5m (W) x 3m (H)

MOVING ROOM

STAGING

RETAIL LOADING/ GARBAGE

C. PARKING/ G-

EL 105.200

SERVICE CORRIDOR

RETAIL

EL 105.210

DROP OFF AREA

FIRE DEPARTMENT CONNECTION @ GROUND FLOOR

EL 104.90

RESIDENTIAL LONG-TERM BIKE STORAGE
208 UNITS (100 STACKED, 8 VERTICLE)

BIKE REPAIR STATION

SERVICE CORRIDOR

STAGING

BIKE STORAGE

UNDERGROUND PARKING ENTRANCE

7.5% SLOPE
3.65m

14.20% SLOPE
23.600m

RESIDENTIAL LONG-TERM BIKE STORAGE
96 UNITS(39 STACKED 8 VERTICLE)

BIKE STORAGE

EXIT

RETAIL ENTRANCE

DASHED LINE DENOTES CANOPY @ GROUND LEVEL PRIVATE PATIO

RETAIL LONG/SHORT-TERM BIKE STORAGE 5 RACKS

EXIT EXIT

AD AD

LEGEND

- REGULATION PARKING
- BARRIER FREE PARKING
- HORIZONTAL BICYCLE PARKING
- VERTICAL BICYCLE PARKING
- TYPICAL CONVEX MIRROR
- EV — ELECTRICAL CHARGING STATION
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- DEDUCTABLE - AIR HANDLING
- DEDUCTABLE - ELEVATOR SHAFT
- DEDUCTABLE - FOYER AND LOBBY
- DEDUCTABLE - PARKING
- MASONRY COURT PHASE 1

No.	Revisions	Date
01	ISSUED FOR OPA/ZBA	07 OCTOBER 2021

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1120 COOKE BLVD

PHASE 2
BURLINGTON ONTARIO

Drawn: CW	Scale: 1:200
Checked: DL	Date: 11 JUN 2021

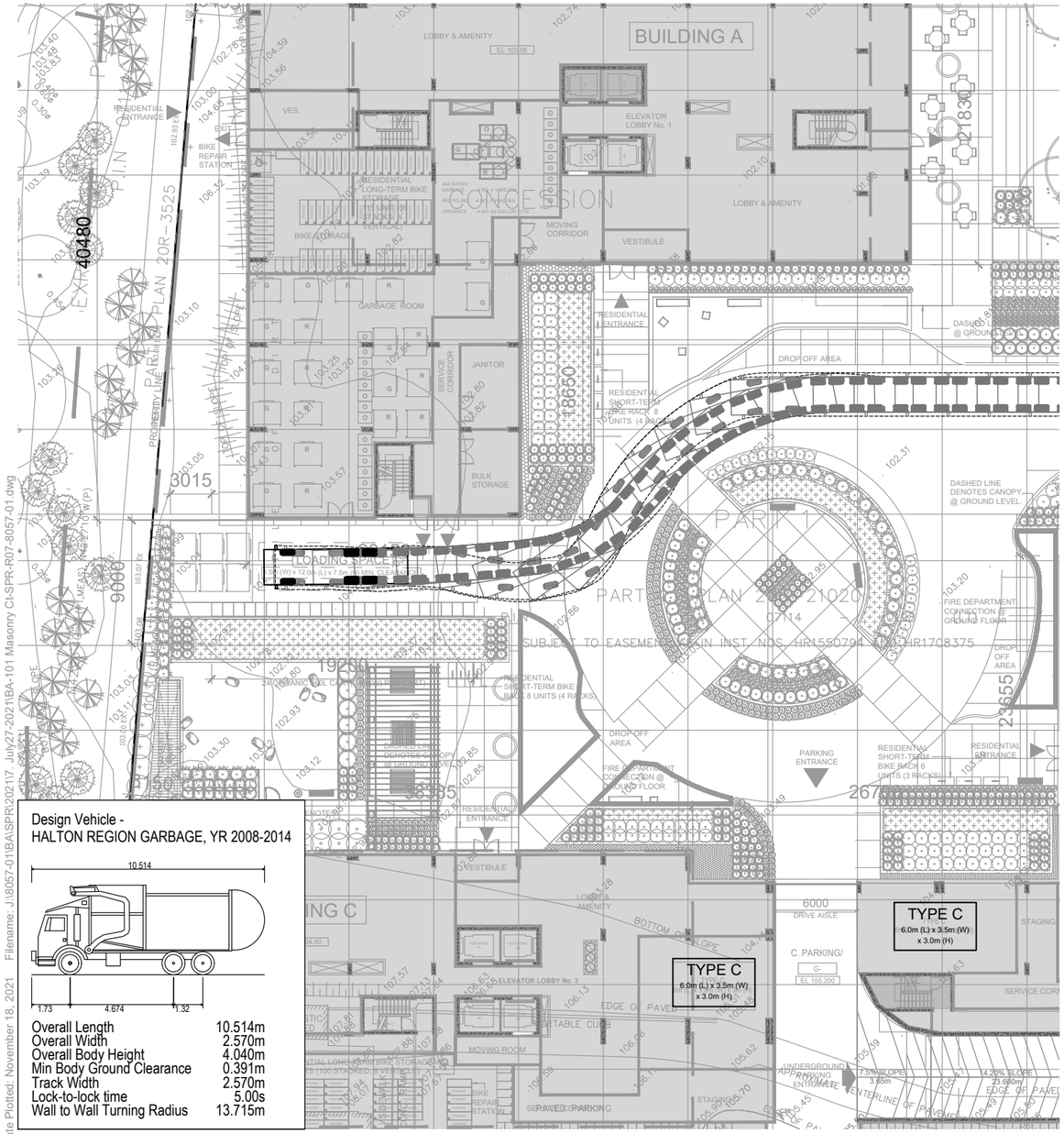
Title: GROUND LEVEL

Project No.: 20-129

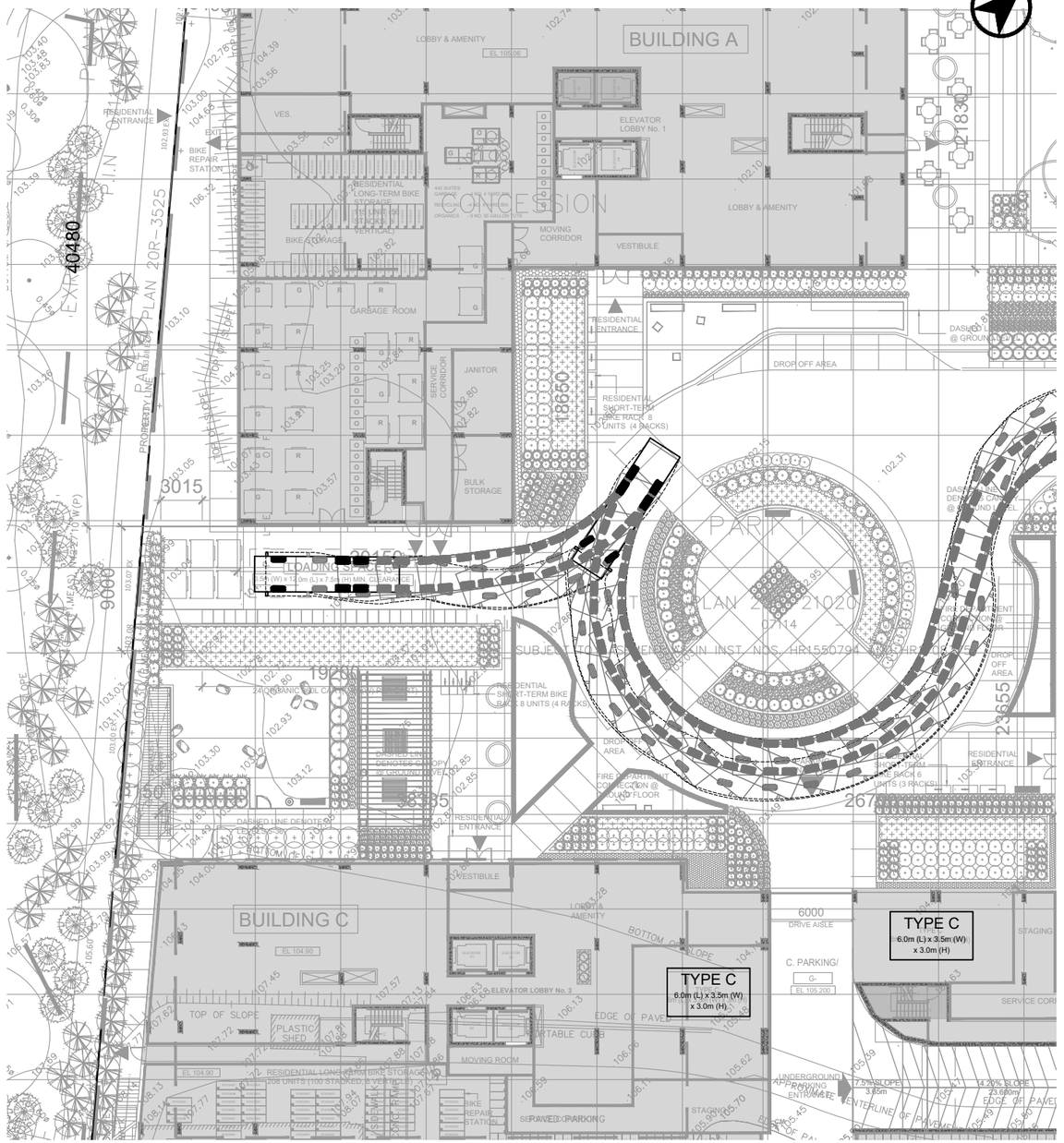
Drawing No.: A204

APPENDIX D:
Vehicle Manoeuvring Diagrams (VMDs)

INBOUND



OUTBOUND



Design Vehicle -
HALTON REGION GARBAGE, YR 2008-2014

Overall Length	10.514m
Overall Width	2.570m
Overall Body Height	4.040m
Min Body Ground Clearance	0.391m
Track Width	2.570m
Lock-to-lock time	5.00s
Wall to Wall Turning Radius	13.715m

Date Plotted: November 18, 2021 Filename: J:\8057-01\BA\SPR\20211?_July\27-2021\BA-101 Masonry Ct-SPR-R07-8057-01.dwg

BA Group

101 MASONRY CT

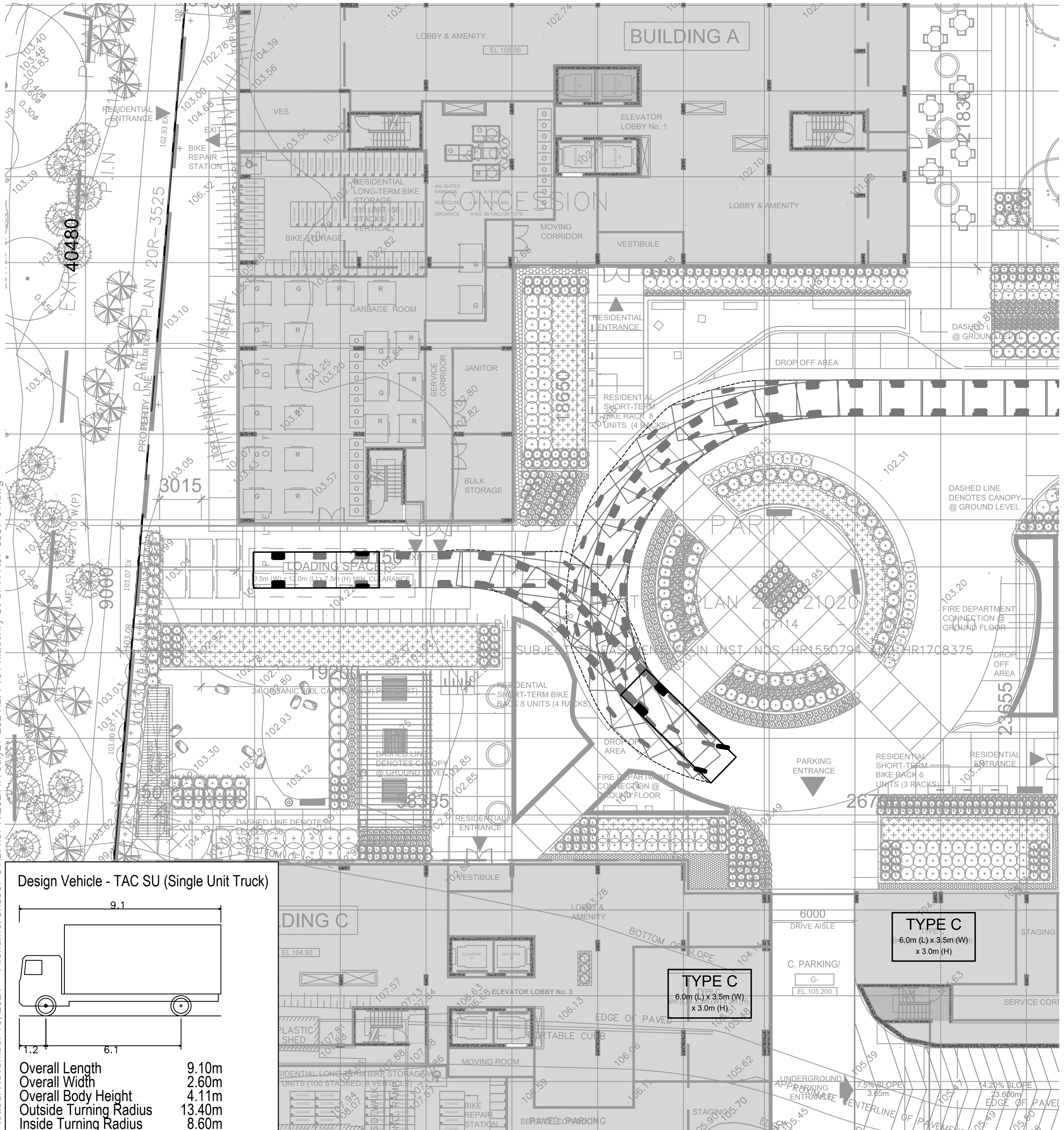
VEHICLE MANOEUVRING DIAGRAM
HALTON REGION GARBAGE TRUCK

Project:	101 Masonry Ct
Project No.	8057-01
Date:	NOVEMBER 2021
Revised:	--

Scale 1:400 — 0 2 4 6 8 10 20m

Drawing No. VMD-01

INBOUND



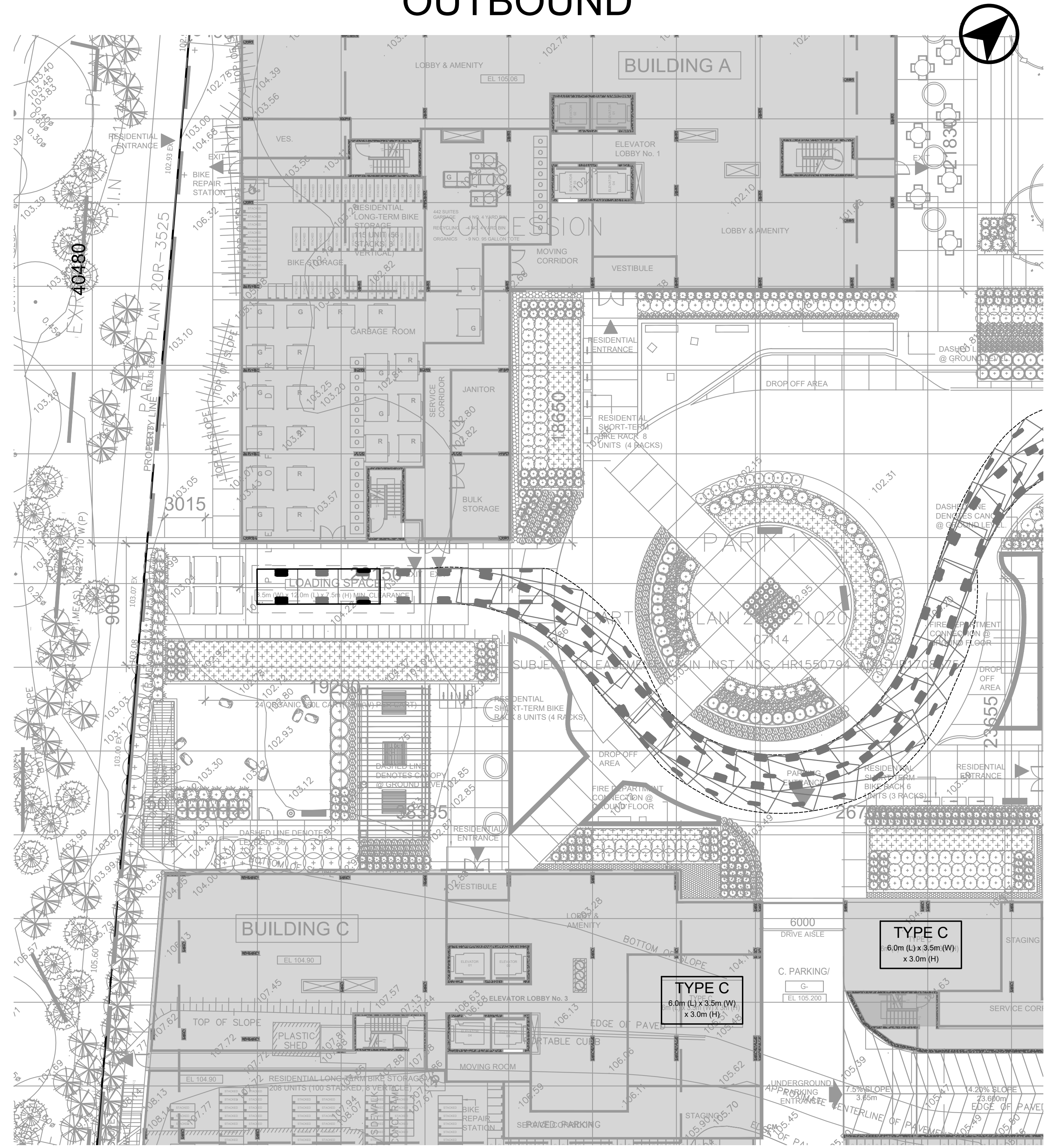
Design Vehicle - TAC SU (Single Unit Truck)

9.1

1.2 6.1

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m

OUTBOUND



Date Plotted: November 18, 2021 Filename: J:\8057-01\BA\SPR\2021\7. July27-2021\BA-101 Masonry Ct-SPR-R07-8057-01.dwg

BA Group

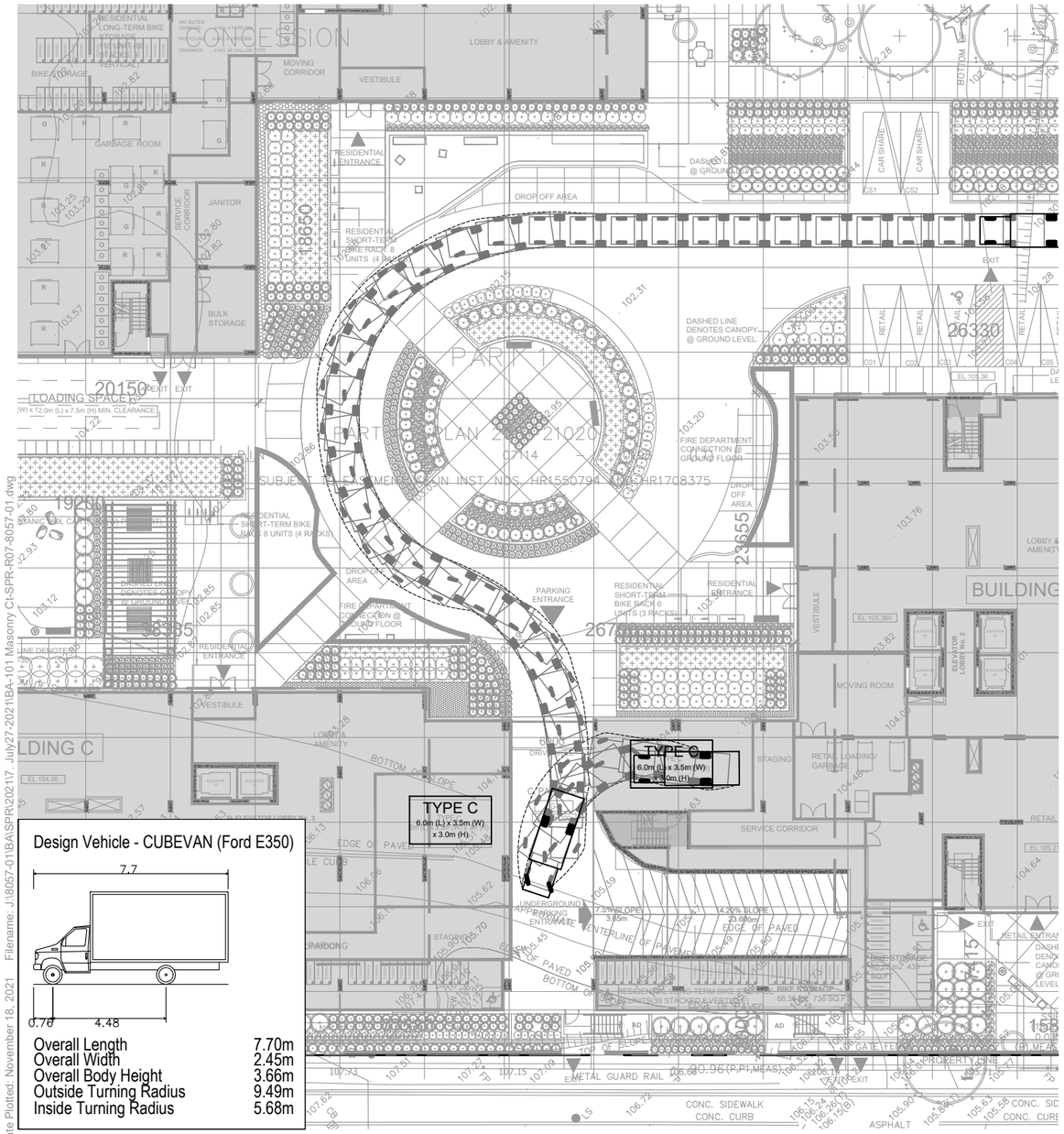
101 MASONRY CT
VEHICLE MANOEUVRING DIAGRAM
SINGLE UNIT TRUCK

Project:	101 Masonry Ct
Project No.	8057-01
Date:	NOVEMBER 2021
Revised:	--

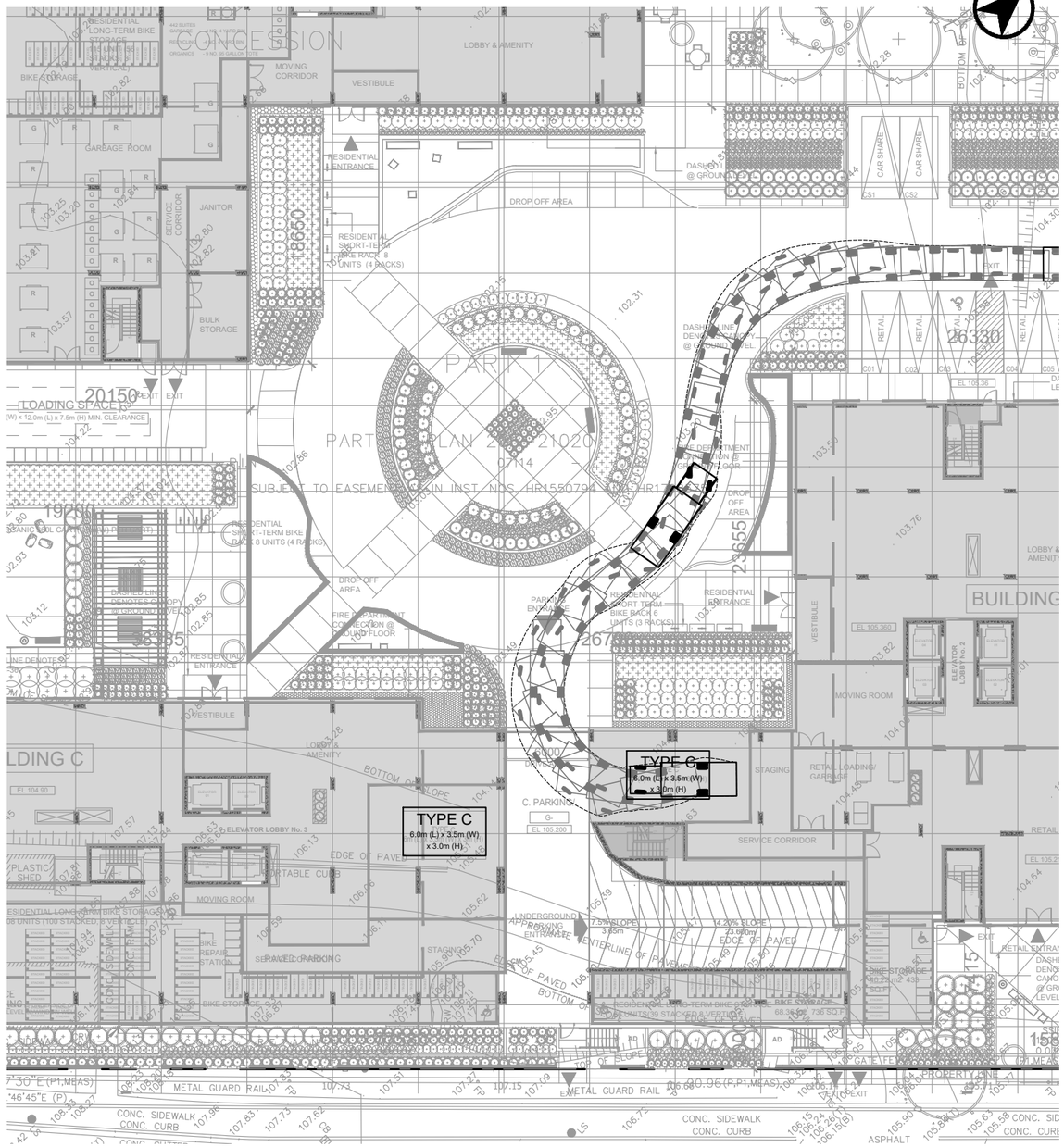
Scale 1:400 (0 2 4 6 8 10 20m)

Drawing No. VMD-02

INBOUND



OUTBOUND



Date Plotted: November 18, 2021 Filename: J:\8057-01\BA\SPR\20211?. July27-2021\BA-101 Masonry Ct-SPR-R07-8057-01.dwg

BA Group

101 MASONRY CT

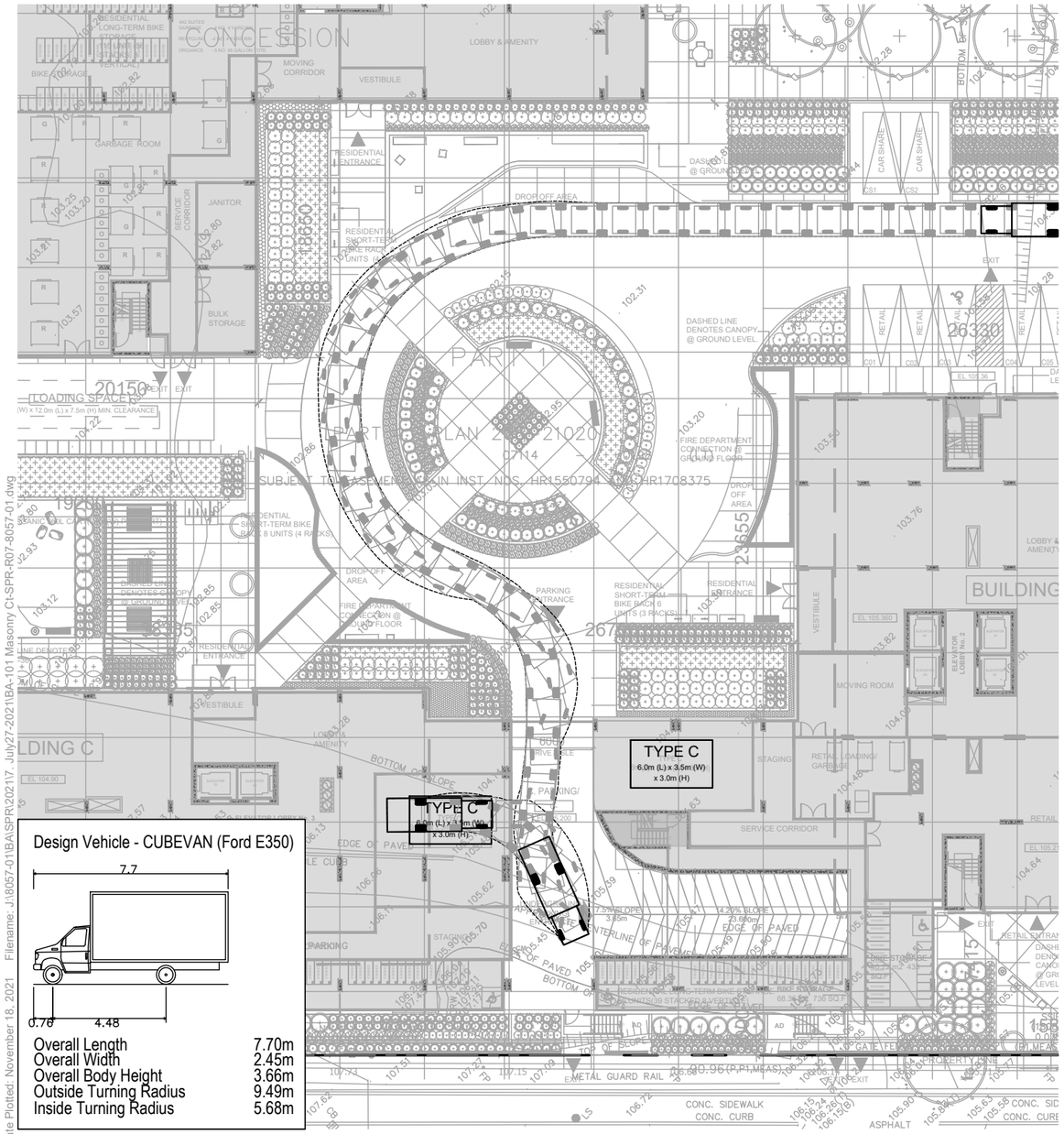
VEHICLE MANOEUVRING DIAGRAM
FORD 350 CUBE VAN

Project:	101 Masonry Ct
Project No.	8057-01
Date:	NOVEMBER 2021
Revised:	--

Scale 1:400 (0 2 4 6 8 10 20m)

Drawing No. VMD-03

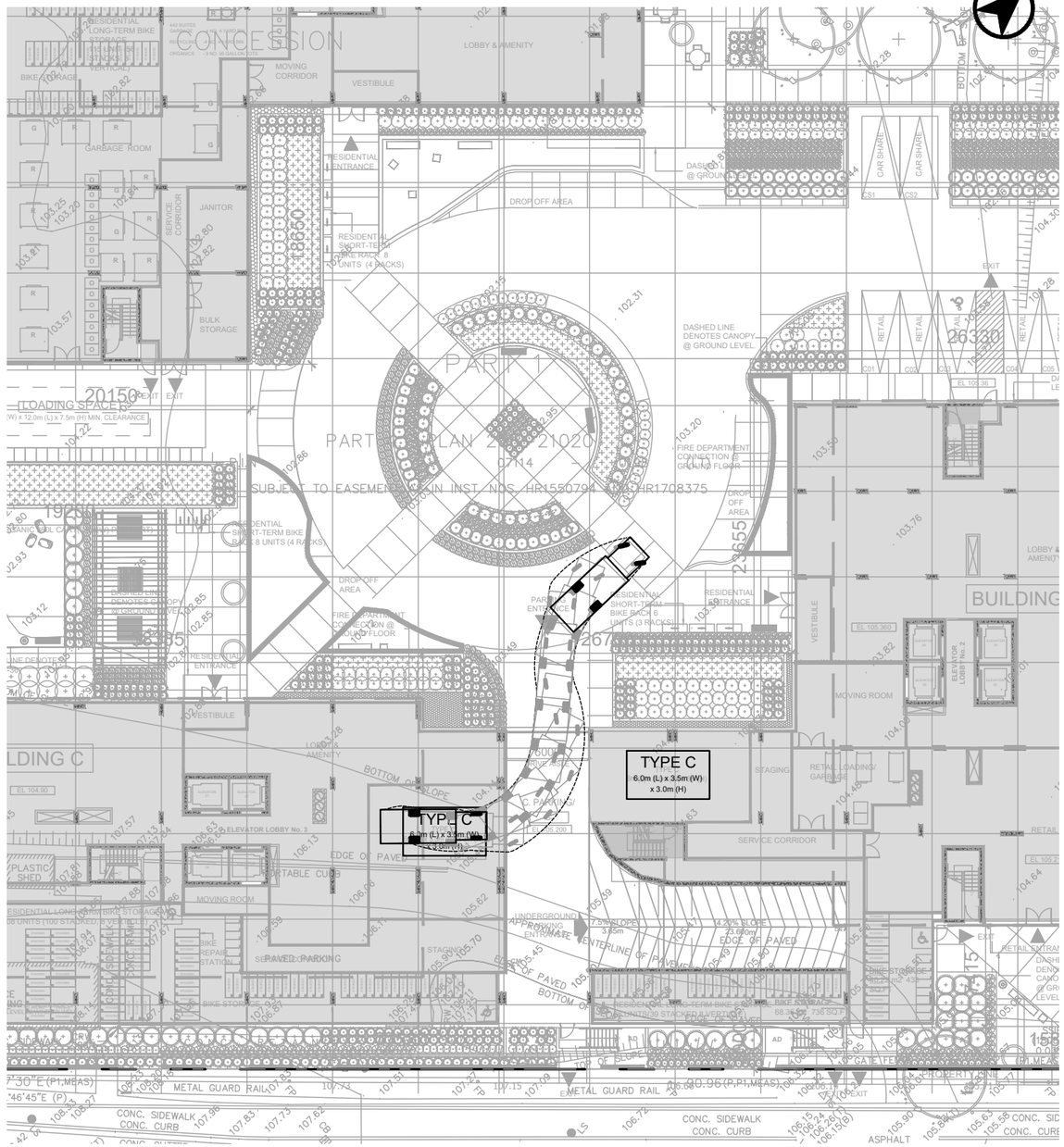
INBOUND



Design Vehicle - CUBEVAN (Ford E350)

Overall Length	7.70m
Overall Width	2.45m
Overall Body Height	3.66m
Outside Turning Radius	9.49m
Inside Turning Radius	5.68m

OUTBOUND



Date Plotted: November 18, 2021 Filename: J:\8057-01\BA\SPR\20211?. July27-2021\BA-101 Masonry Ct-SPR-R07-8057-01.dwg

BA Group

101 MASONRY CT

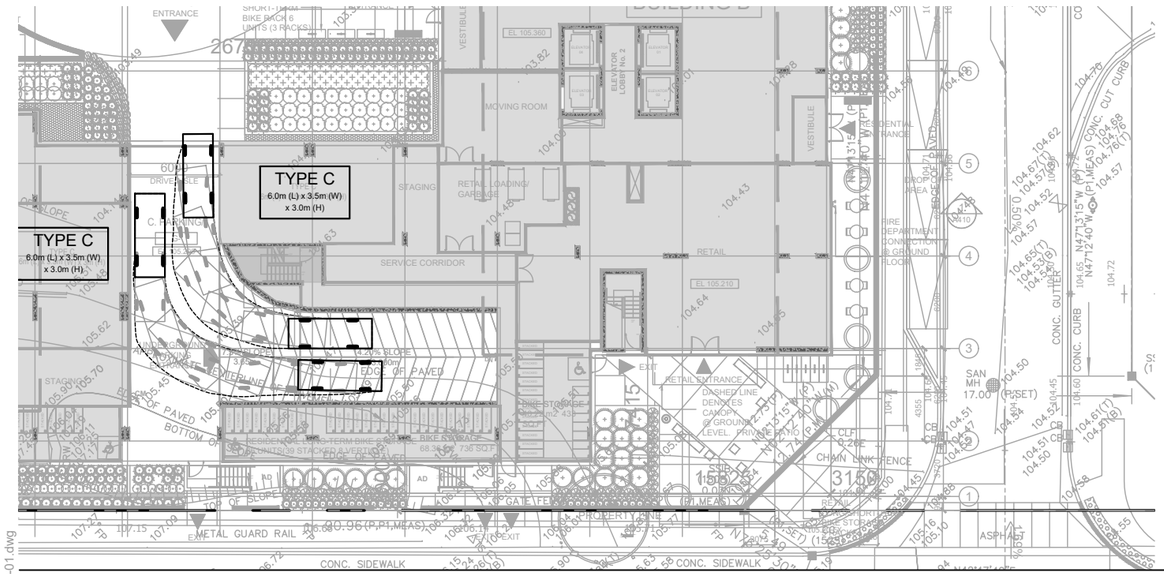
VEHICLE MANOEUVRING DIAGRAM
FORD 350 CUBE VAN

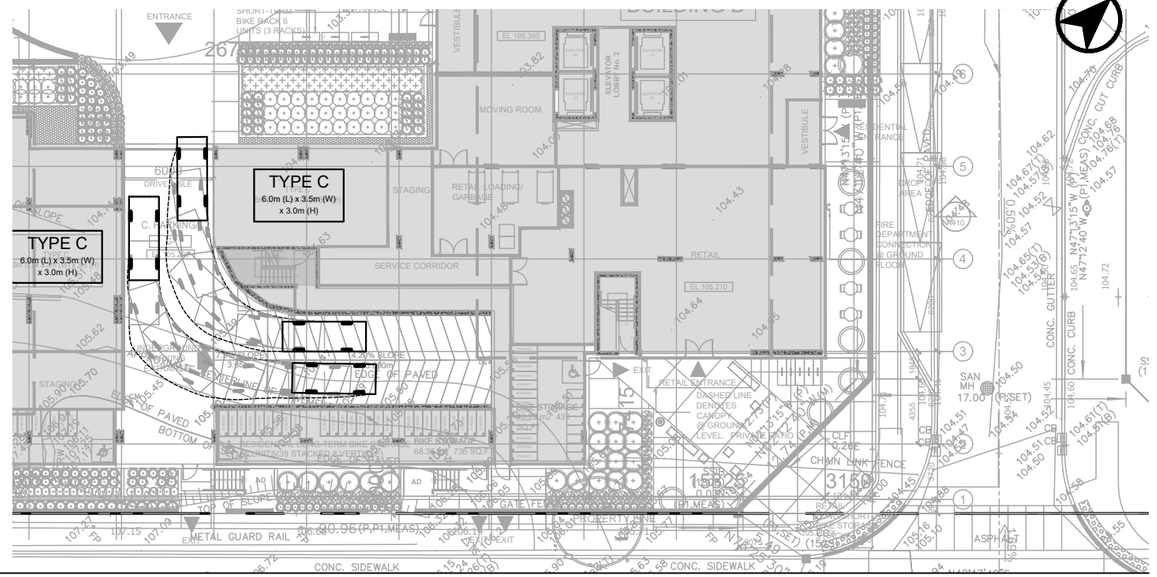
Project:	101 Masonry Ct
Project No.	8057-01
Date:	NOVEMBER 2021
Revised:	--

Scale 1:400 — 0 2 4 6 8 10 20m

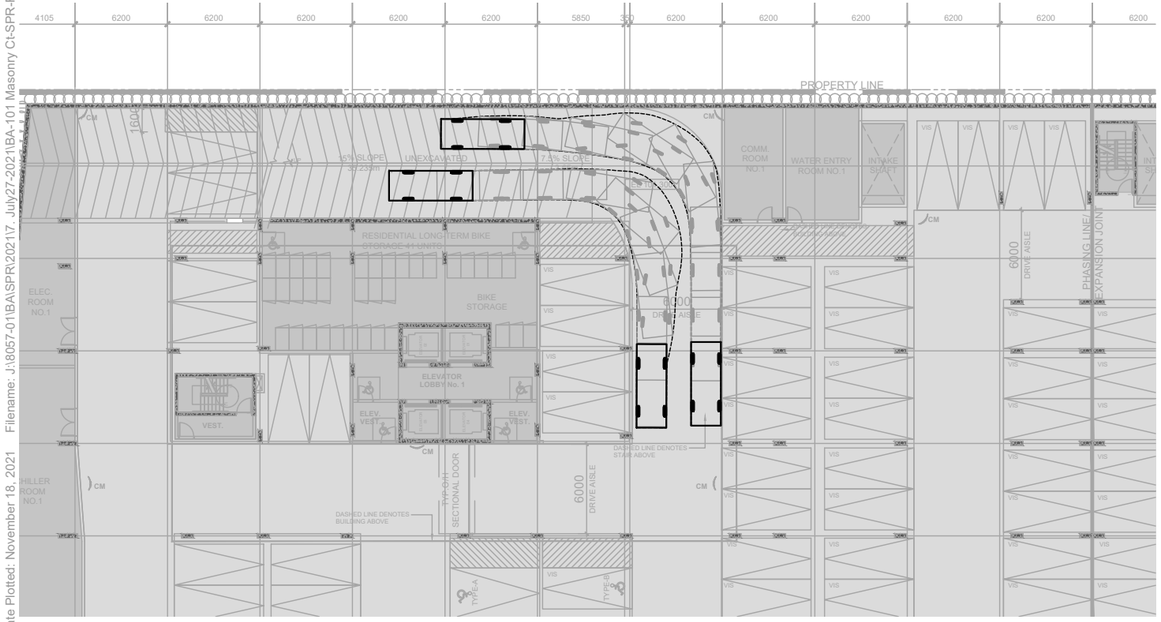
Drawing No. VMD-04

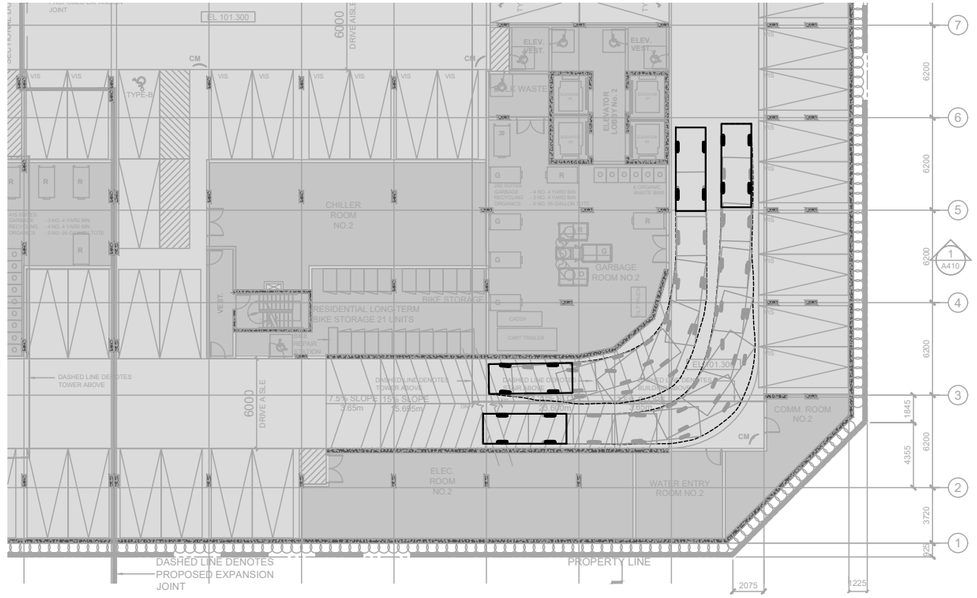
TOP OF RAMP





BOTTOM OF RAMP





101 MASONRY CT

VEHICLE MANOEUVRING DIAGRAM
PARKING ACCESS

Project:	101 Masonry Ct
Project No.	8057-01
Date:	NOVEMBER 2021
Revised:	--

Scale 1:400 (0 2 4 6 8 10 20m)

Drawing No. VMD-05

Date Plotted: November 18, 2021 Filename: J:\8057-01\BA\SPR\20217_July27-2021\BA-101 Masonry Ct-SPR-R07-8057-01.dwg

APPENDIX E:
Signal Timing Plans & Turning Movement Counts

Intersection Name:		TS ID:	Line No:	IP address:
Aldershot Go Stn @ Bus Entrance		33	4	172.22.11.2
Controller Make:	**Model:**			
Econolite	ACS/3			

Type of Operation: 8 Phase Semi-Actuated

No	Date Y	Date M	Date D	Description	Prepared by
1	2015	2	4	Implement timings in Centracs	MA

*- Start from Main Manu

PHASE DESCRIPTION

Ph1		Ph5	
Ph2	EB -403 On Ramp	Ph6	EB -403 On Ramp
Ph3		Ph7	
Ph4	NB - Go Access	Ph8	

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

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

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1

Phase:	1	2	3	4	5	6	7	8
Minimum Green		8		8		8		
Walk		15				15		
Ped. Clearance		8				8		
Vehicle Extension		3		5		3		
MAX 1		30		35		30		
MAX 2		30		35		30		
Yellow Change		4		4		4		
Red Clearance		2		3		2		

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

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

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

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec) 1	2	3	4	5	6	7	8
10				10								

Intersection Name:		TS ID:	Line No:	IP address:
Aldershot Go Stn @ Bus Entrance		33	4	172.22.11.2
Controller Make:	**Model:**			
Econolite	ACS/3			

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

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

X - select "." deselect

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

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	10	00:00	10	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

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

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

201384-Waterdown Rd @ North Service Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

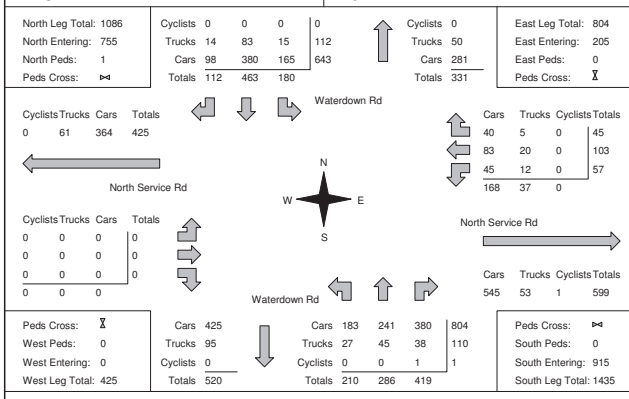
Municipality: Burlington
Site #: 0000201384
Intersection: Waterdown Rd & North Service Rd
TFR File #: 1
Count date: 11-Oct-2018

Weather conditions:
Cloudy

Person(s) who counted:
Leo
Mira

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

201384-Waterdown Rd @ North Service Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:45:00
To: 13:45:00

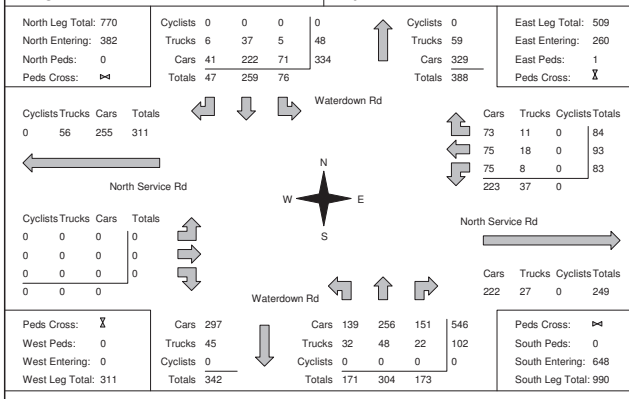
Municipality: Burlington
Site #: 0000201384
Intersection: Waterdown Rd & North Service Rd
TFR File #: 1
Count date: 11-Oct-2018

Weather conditions:
Cloudy

Person(s) who counted:
Leo
Mira

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

201384-Waterdown Rd @ North Service Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

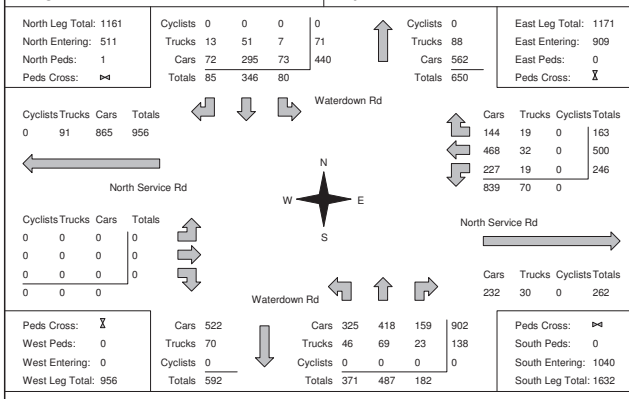
Municipality: Burlington
Site #: 0000201384
Intersection: Waterdown Rd & North Service Rd
TFR File #: 1
Count date: 11-Oct-2018

Weather conditions:
Cloudy

Person(s) who counted:
Leo
Mira

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

201384-Waterdown Rd @ North Service Rd

Total Count Diagram

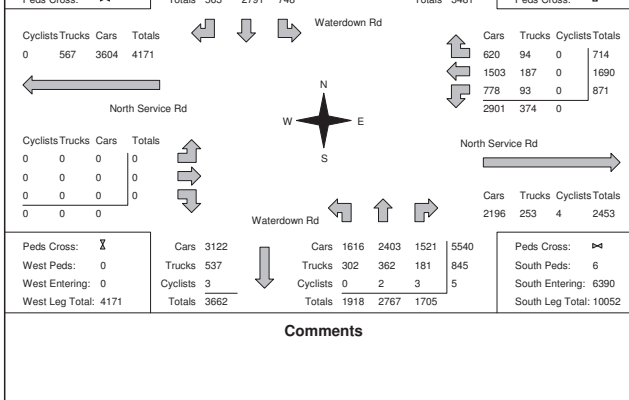
Municipality: Burlington
Site #: 0000201384
Intersection: Waterdown Rd & North Service Rd
TFR File #: 1
Count date: 11-Oct-2018

Weather conditions:
Cloudy

Person(s) who counted:
Leo
Mira

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

201384-Waterdown Rd @ North Service Rd
Traffic Count Summary

Intersection: Waterdown Rd & North Service Rd | **Count Date:** 11-Oct-2018 | **Municipality:** Burlington

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	10
8:00:00	137	504	78	719	0	1486
9:00:00	165	460	110	735	1	1618
11:00:00	3	8	0	11	0	20
12:00:00	75	286	38	399	0	959
13:00:00	67	267	38	372	0	1015
14:00:00	70	242	46	358	0	1004
15:00:00	0	1	2	3	0	17
16:00:00	80	315	78	473	0	1336
17:00:00	77	342	84	503	1	1479
18:00:00	74	364	88	526	1	1545
Totals:	748	2789	562	4099	3	10489

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	3	3	4	10	0
8:00:00	205	235	327	767	0
9:00:00	195	278	410	883	0
11:00:00	1	4	4	9	0
12:00:00	151	281	128	560	6
13:00:00	176	327	140	643	0
14:00:00	180	291	175	646	0
15:00:00	2	8	4	14	0
16:00:00	271	409	183	863	0
17:00:00	353	450	173	976	0
18:00:00	381	481	157	1019	0
Totals:	1918	2767	1705	6390	6

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	4	1	5	0	5
8:00:00	35	81	27	143	0	143
9:00:00	66	98	60	224	0	224
11:00:00	0	0	1	1	0	1
12:00:00	58	96	67	221	0	221
13:00:00	77	84	66	227	0	227
14:00:00	75	98	84	257	1	257
15:00:00	0	1	1	2	0	2
16:00:00	122	286	124	532	0	532
17:00:00	227	471	158	856	1	856
18:00:00	210	471	125	806	0	806
Totals:	870	1690	714	3274	2	3274

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0
9:00:00	0	0	0	0	0
11:00:00	0	0	0	0	0
12:00:00	0	0	0	0	0
13:00:00	0	0	0	0	0
14:00:00	0	0	0	0	0
15:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0
18:00:00	0	0	0	0	0
Totals:	0	0	0	0	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	116	165	160	161	173	408	699	682

201468-Plains Rd W @ Waterdown Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

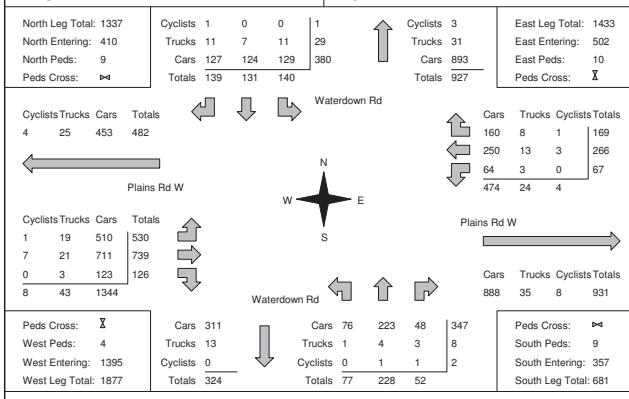
One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: Burlington
Site #: 0000201468
Intersection: Plains Rd W & Waterdown Rd
TFR File #: 1
Count date: 18-Sep-2018

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

**** Signalized Intersection ****

Major Road: Plains Rd W runs W/E



Comments

201468-Plains Rd W @ Waterdown Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

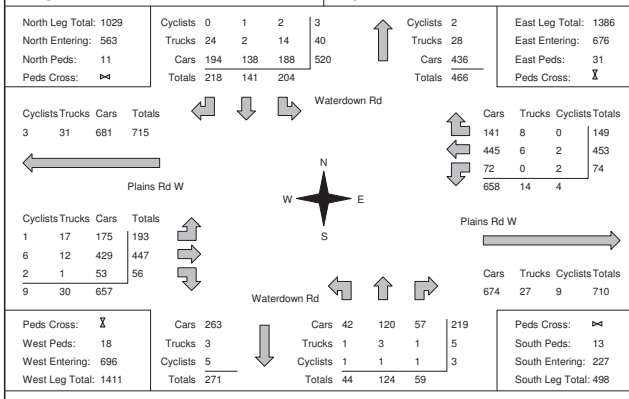
One Hour Peak
From: 11:45:00
To: 12:45:00

Municipality: Burlington
Site #: 0000201468
Intersection: Plains Rd W & Waterdown Rd
TFR File #: 1
Count date: 18-Sep-2018

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

**** Signalized Intersection ****

Major Road: Plains Rd W runs W/E



Comments

201468-Plains Rd W @ Waterdown Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

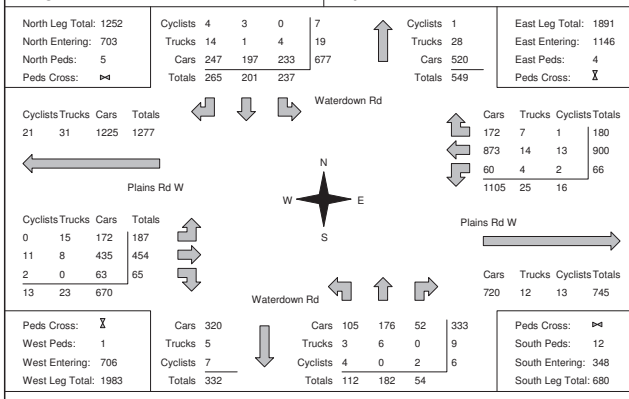
One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Burlington
Site #: 0000201468
Intersection: Plains Rd W & Waterdown Rd
TFR File #: 1
Count date: 18-Sep-2018

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

**** Signalized Intersection ****

Major Road: Plains Rd W runs W/E



Comments

201468-Plains Rd W @ Waterdown Rd

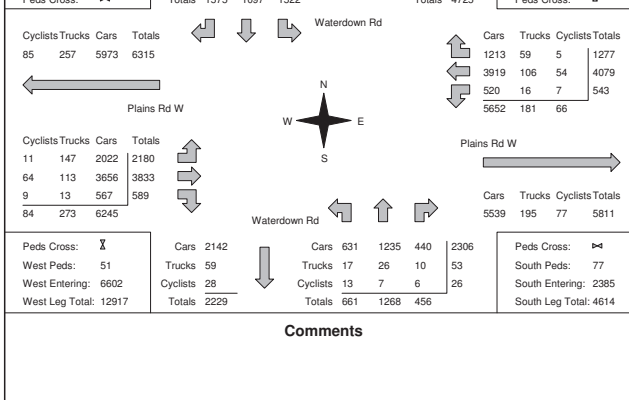
Total Count Diagram

Municipality: Burlington
Site #: 0000201468
Intersection: Plains Rd W & Waterdown Rd
TFR File #: 1
Count date: 18-Sep-2018

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

**** Signalized Intersection ****

Major Road: Plains Rd W runs W/E



Comments

201468-Plains Rd W @ Waterdown Rd
Traffic Count Summary

Intersection: Plains Rd W & Waterdown Rd | **Count Date:** 18-Sep-2018 | **Municipality:** Burlington

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	1	0
8:00:00	112	111	108	331	7	606
9:00:00	177	116	169	462	6	815
11:00:00	0	0	0	0	4	0
12:00:00	213	117	171	501	10	751
13:00:00	200	143	212	555	9	790
14:00:00	179	91	169	439	4	705
15:00:00	0	0	0	0	2	0
16:00:00	203	154	216	573	13	874
17:00:00	218	187	260	665	9	1034
18:00:00	220	178	270	668	5	1004
Totals:	1522	1097	1575	4194	70	6579

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	47	184	44	275	9
9:00:00	88	218	47	353	8
11:00:00	0	0	0	0	0
12:00:00	70	131	49	250	13
13:00:00	46	119	70	235	7
14:00:00	56	137	73	266	5
15:00:00	0	0	0	0	0
16:00:00	99	138	64	301	20
17:00:00	127	177	65	369	7
18:00:00	128	164	44	336	8
Totals:	661	1268	456	2385	77

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	56	211	154	421	8	1735
9:00:00	55	300	142	497	3	1709
11:00:00	0	0	0	0	0	0
12:00:00	55	353	144	552	32	1238
13:00:00	80	453	148	681	12	1351
14:00:00	67	396	154	617	25	1287
15:00:00	0	0	0	0	0	0
16:00:00	88	623	193	904	12	1620
17:00:00	77	799	191	1067	3	1760
18:00:00	65	944	151	1160	1	1801
Totals:	543	4079	1277	5899	96	12501

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	490	701	123	1314	5
9:00:00	457	650	105	1212	4
11:00:00	0	0	0	0	0
12:00:00	198	415	73	686	13
13:00:00	188	427	55	670	16
14:00:00	217	399	54	670	3
15:00:00	0	0	0	0	0
16:00:00	247	395	74	716	7
17:00:00	196	439	58	693	3
18:00:00	187	407	47	641	0
Totals:	2180	3833	589	6602	51

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	356	490	459	417	400	475	538	527

Waterdown Rd @ Masonry Crt

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

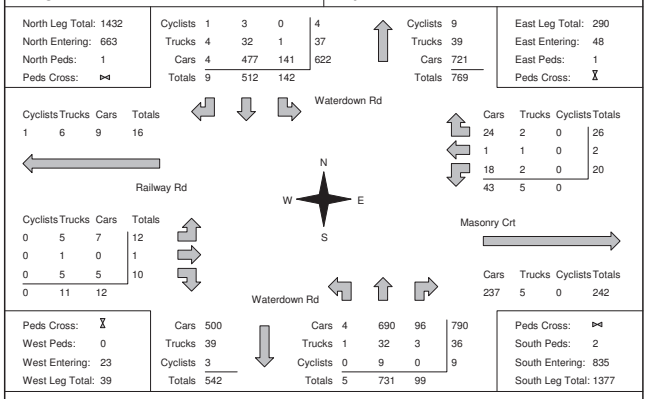
Municipality: Burlington
Site #: 0000202006
Intersection: Waterdown Rd & Masonry Crt
TFR File #: 1
Count date: 21-Jun-2018

Weather conditions:
Sunny

Person(s) who counted:
Nik

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

Waterdown Rd @ Masonry Crt

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:15:00
To: 13:15:00

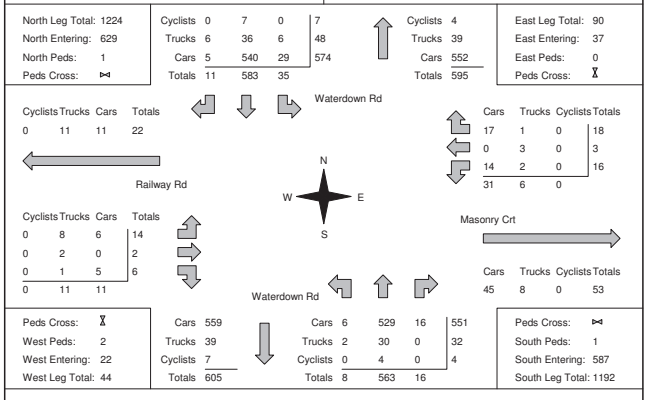
Municipality: Burlington
Site #: 0000202006
Intersection: Waterdown Rd & Masonry Crt
TFR File #: 1
Count date: 21-Jun-2018

Weather conditions:
Sunny

Person(s) who counted:
Nik

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

Waterdown Rd @ Masonry Crt

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

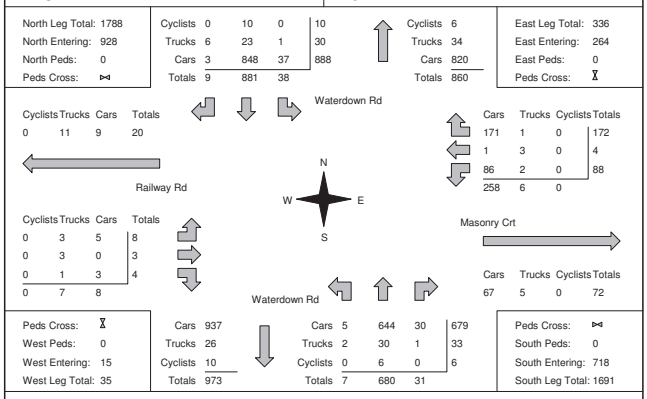
One Hour Peak
From: 17:00:00
To: 18:00:00

Municipality: Burlington
Site #: 0000202006
Intersection: Waterdown Rd & Masonry Crt
TFR File #: 1
Count date: 21-Jun-2018

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

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

Waterdown Rd @ Masonry Crt

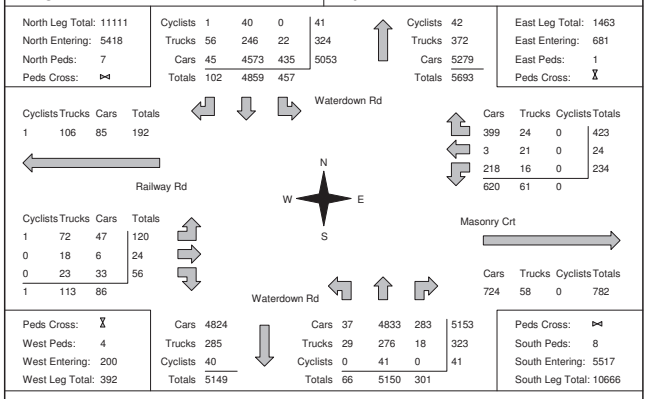
Total Count Diagram

Municipality: Burlington
Site #: 0000202006
Intersection: Waterdown Rd & Masonry Crt
TFR File #: 1
Count date: 21-Jun-2018

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

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

Waterdown Rd @ Masonry Crt
Traffic Count Summary

Intersection: Waterdown Rd & Masonry Crt | **Count Date:** 21-Jun-2018 | **Municipality:** Burlington

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	221	382	15	618	3	1432
9:00:00	68	555	19	642	0	1409
11:00:00	0	0	0	0	0	0
12:00:00	26	574	9	609	0	1163
13:00:00	28	576	12	616	0	1188
14:00:00	26	530	18	574	1	1135
15:00:00	0	0	0	0	0	0
16:00:00	30	618	12	660	3	1479
17:00:00	20	743	8	771	0	1483
18:00:00	38	881	9	928	0	1646
Totals:	457	4859	102	5418	7	10935

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	8	646	160	814	2
9:00:00	11	720	36	767	1
11:00:00	0	0	0	0	0
12:00:00	13	527	14	554	0
13:00:00	7	556	9	572	1
14:00:00	6	535	20	561	2
15:00:00	0	0	0	0	0
16:00:00	6	801	12	819	1
17:00:00	8	685	19	712	1
18:00:00	7	680	31	718	0
Totals:	66	5150	301	5517	8

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	29	2	25	56	1	95
9:00:00	14	2	20	36	0	60
11:00:00	0	0	0	0	0	0
12:00:00	16	2	19	37	0	71
13:00:00	15	2	21	38	0	60
14:00:00	15	3	26	44	0	61
15:00:00	0	0	0	0	0	0
16:00:00	14	5	52	71	0	89
17:00:00	43	4	88	135	0	166
18:00:00	88	4	172	264	0	279
Totals:	234	24	423	681	1	881

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	22	3	14	39	0
9:00:00	14	2	8	24	0
11:00:00	0	0	0	0	0
12:00:00	20	3	11	34	0
13:00:00	12	2	8	22	2
14:00:00	10	4	3	17	2
15:00:00	0	0	0	0	0
16:00:00	12	2	4	18	0
17:00:00	22	5	4	31	0
18:00:00	8	3	4	15	0
Totals:	120	24	56	200	4

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	59	31	39	30	32	35	71	100

203144-Waterdown Rd @ QEW North Ramp

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

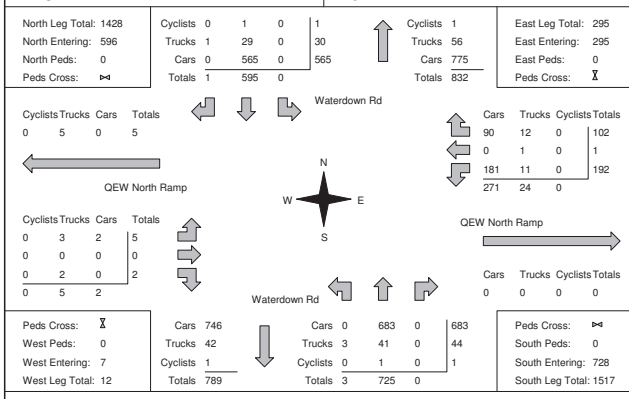
One Hour Peak
From: 7:45:00
To: 8:45:00

Municipality: Burlington
Site #: 0000203144
Intersection: Waterdown Rd & QEW North Ramp
TFR File #: 1
Count date: 27-Sep-2018

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

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

203144-Waterdown Rd @ QEW North Ramp

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

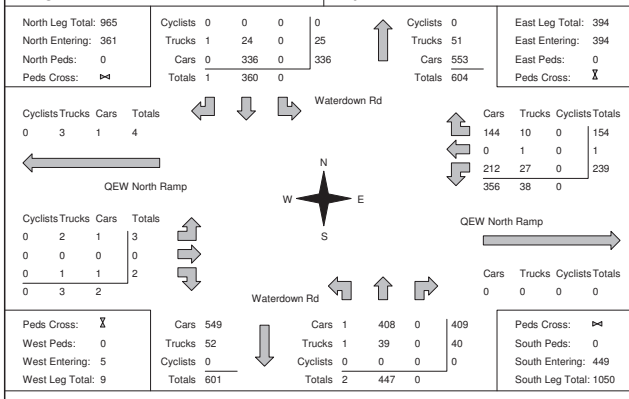
One Hour Peak
From: 12:00:00
To: 13:00:00

Municipality: Burlington
Site #: 0000203144
Intersection: Waterdown Rd & QEW North Ramp
TFR File #: 1
Count date: 27-Sep-2018

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

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

203144-Waterdown Rd @ QEW North Ramp

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

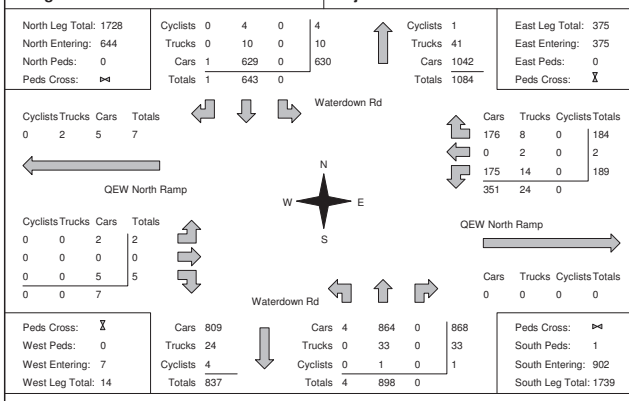
One Hour Peak
From: 17:00:00
To: 18:00:00

Municipality: Burlington
Site #: 0000203144
Intersection: Waterdown Rd & QEW North Ramp
TFR File #: 1
Count date: 27-Sep-2018

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

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

203144-Waterdown Rd @ QEW North Ramp

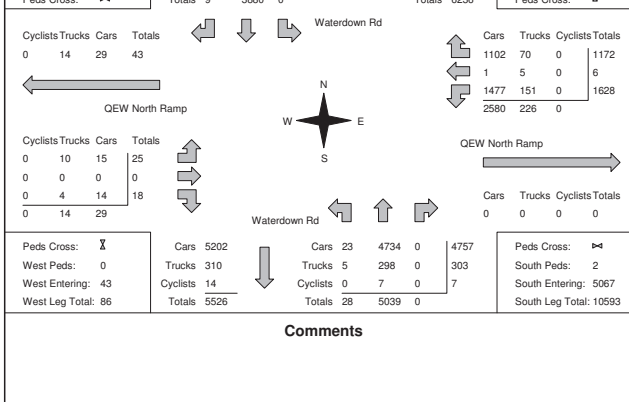
Total Count Diagram

Municipality: Burlington
Site #: 0000203144
Intersection: Waterdown Rd & QEW North Ramp
TFR File #: 1
Count date: 27-Sep-2018

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

**** Signalized Intersection ****

Major Road: Waterdown Rd runs N/S



Comments

203144-Waterdown Rd @ QEW North Ramp
Traffic Count Summary

Intersection: Waterdown Rd & QEW North Ram | **Count Date:** 27-Sep-2018 | **Municipality:** Burlington

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	0	591	1	592	0	1251
9:00:00	0	548	1	549	0	1256
11:00:00	0	0	0	0	0	0
12:00:00	0	346	2	348	0	785
13:00:00	0	360	1	361	0	810
14:00:00	0	336	2	338	0	793
15:00:00	0	0	0	0	0	0
16:00:00	0	462	1	463	0	1156
17:00:00	0	594	0	594	0	1359
18:00:00	0	643	1	644	0	1546
Totals:	0	3880	9	3889	0	8956

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	9	650	0	659	0
9:00:00	3	704	0	707	0
11:00:00	0	0	0	0	0
12:00:00	4	433	0	437	0
13:00:00	2	447	0	449	0
14:00:00	2	453	0	455	0
15:00:00	0	0	0	0	0
16:00:00	0	693	0	693	1
17:00:00	4	761	0	765	0
18:00:00	4	898	0	902	1
Totals:	28	5039	0	5067	2

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	184	2	77	263	0	267
9:00:00	188	1	104	293	0	302
11:00:00	0	0	0	0	0	0
12:00:00	229	0	110	339	0	344
13:00:00	239	1	154	394	0	399
14:00:00	212	0	170	382	0	386
15:00:00	0	0	0	0	0	0
16:00:00	193	0	207	400	0	405
17:00:00	194	0	166	360	0	364
18:00:00	189	2	184	375	0	382
Totals:	1628	6	1172	2806	0	2849

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	2	0	2	4	0
9:00:00	6	0	3	9	0
11:00:00	0	0	0	0	0
12:00:00	4	0	1	5	0
13:00:00	3	0	2	5	0
14:00:00	3	0	1	4	0
15:00:00	0	0	0	0	0
16:00:00	2	0	3	5	0
17:00:00	3	0	1	4	0
18:00:00	2	0	5	7	0
Totals:	25	0	18	43	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	188	195	233	243	215	196	197	194

Intersection Name:	TS ID:	Line No:	Model:	Controller Make:	IP address:
Aldershot Go Stn @ Bus Entrance	32	4	ACS/3	Econolite	172.22.10.2

Type of Operation:				8 Phase Semi-Actuated	
No	Date			Description	Prepared By
	Y	M	D		
2	2015	10	2	Decrease SS Max time, Increase MS Walk Time	EN
3	2020	12	14	Update Main Street FDW	JR

*- Start from Main Manu

PHASE DESCRIPTION			
Ph1		Ph5	
Ph2	EB -403 On Ramp	Ph6	WB -403 On Ramp
Ph3		Ph7	
Ph4	NB - Bus Entrance	Ph8	

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

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

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1

Phase:	1	2	3	4	5	6	7	8
Minimum Green		8		8		8		
Conditional Service Min. Green								
Walk		15		7		15		
Ped. Clearance		9		10		9		
Pedestrian Carry Over								
Vehicle Extension		3		3		3		
MAX 1		30		15		30		
MAX 2		30		15		30		
Yellow Change		4		4		4		
Red Clearance		3		3		3		

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

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

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

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec) 1	2	3	4	5	6	7	8
10			1	10								

CP # 1, 2, 10

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

Phase Omit									
Special Function Outputs									

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

X - select "." deselect

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

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	10	00:00	254	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday/Saturday/Sunday/Holidays)

Action Plan 10 = free (254)

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

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

Turning Movement Count (4 . COOKE BLVD & PLAINS RD)

Start Time	N Approach COOKE BLVD						E Approach PLAINS RD E						S Approach SOUTH DRIVEWAY						W Approach PLAINS RD E						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	2	0	0	0	2	2	1	58	0	0	0	59	0	0	0	0	0	0	0	91	4	0	0	95	156	
07:15:00	8	0	0	0	0	8	1	72	0	0	0	73	0	0	0	0	2	0	0	92	5	0	0	97	178	
07:30:00	1	0	0	0	1	1	2	85	0	0	0	87	0	0	0	0	1	0	0	124	6	0	0	130	218	
07:45:00	3	0	1	0	2	4	4	108	0	0	0	112	0	0	0	0	5	0	0	167	9	0	1	176	292	844
08:00:00	0	0	3	0	7	3	5	120	0	0	1	125	0	0	0	0	1	0	0	151	4	0	2	155	283	971
08:15:00	3	0	1	0	1	4	5	122	0	0	0	127	0	0	0	0	3	0	0	172	1	1	0	174	305	1098
08:30:00	3	0	1	0	2	4	2	149	0	0	1	151	0	0	0	0	1	0	0	132	5	0	0	137	292	1172
08:45:00	3	0	2	0	0	5	2	114	0	0	0	116	0	0	0	0	5	0	0	144	4	0	1	148	269	1149
BREAK																										
16:00:00	6	0	3	0	1	9	10	219	0	0	0	229	0	0	0	0	1	0	0	163	3	0	0	166	404	
16:15:00	7	0	7	0	4	14	1	212	0	0	0	213	0	0	0	0	3	0	0	152	2	0	0	154	381	
16:30:00	11	0	5	0	2	16	5	176	0	0	2	181	0	0	0	0	4	0	0	140	3	0	0	143	340	
16:45:00	4	0	0	0	1	4	0	203	0	0	1	203	0	0	0	0	3	0	0	146	1	0	0	147	354	1479
17:00:00	6	0	4	0	0	10	3	189	0	0	0	192	0	0	0	0	1	0	0	150	0	0	0	150	352	1427
17:15:00	4	0	3	0	1	7	4	195	0	0	0	199	0	0	0	0	4	0	0	176	2	0	1	178	384	1430
17:30:00	3	0	3	0	6	6	5	186	0	0	0	191	0	0	0	0	1	0	0	128	0	0	0	128	325	1415
17:45:00	4	0	3	0	0	7	7	145	0	0	0	152	0	0	0	0	0	0	0	96	0	0	0	96	255	1316
Grand Total	68	0	36	0	30	104	57	2353	0	0	5	2410	0	0	0	0	35	0	0	2224	49	1	5	2274	**4788**	-
Approach%	65.4%	0%	34.6%	0%		-	2.4%	97.6%	0%	0%		-	0%	0%	0%	0%		-	0%	97.8%	2.2%	0%		-	**-**	-
Totals %	1.4%	0%	0.8%	0%		2.2%	1.2%	49.1%	0%	0%		50.3%	0%	0%	0%	0%		0%	0%	46.4%	1%	0%		47.5%	**-**	-
Heavy	18	0	2	0		-	2	78	0	0		-	0	0	0	0		-	0	73	4	0		-	**-**	-
Heavy %	26.5%	0%	5.6%	0%		-	3.5%	3.3%	0%	0%		-	0%	0%	0%	0%		-	0%	3.3%	8.2%	0%		-	**-**	-
Bicycles	0	0	0	0		-	0	2	0	0		-	0	0	0	0		-	0	1	0	0		-	**-**	-
Bicycle %	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	**-**	-

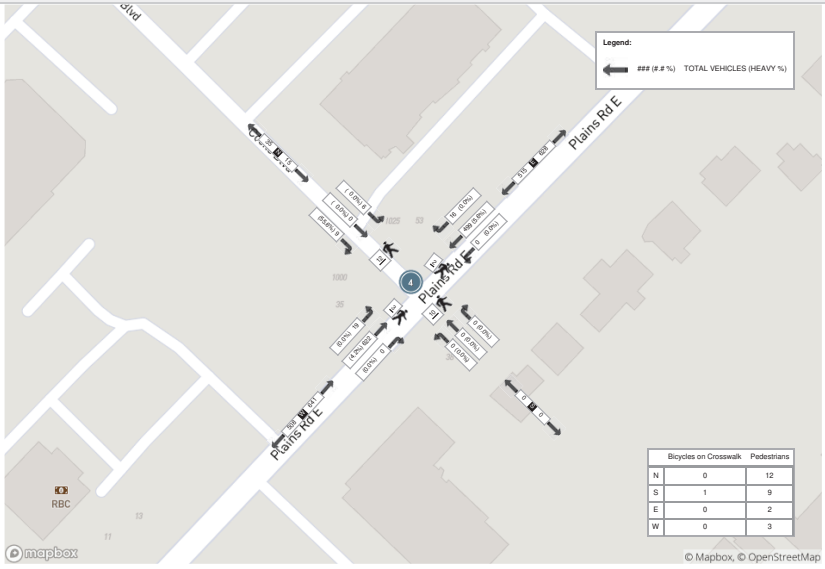
Peak Hour: 07:45 AM - 08:45 AM Weather: Broken Clouds (-10 °C)

Start Time	N Approach COOKE BLVD						E Approach PLAINS RD E						S Approach SOUTH DRIVEWAY						W Approach PLAINS RD E						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	
07:45:00	3	0	1	0	2	4	4	108	0	0	0	112	0	0	0	0	5	0	0	167	9	0	1	176	292
08:00:00	0	0	3	0	7	3	5	120	0	0	1	125	0	0	0	0	1	0	0	151	4	0	2	155	283
08:15:00	3	0	1	0	1	4	5	122	0	0	0	127	0	0	0	0	3	0	0	172	1	1	0	174	305
08:30:00	3	0	1	0	2	4	2	149	0	0	1	151	0	0	0	0	1	0	0	132	5	0	0	137	292
Grand Total	9	0	6	0	12	15	16	499	0	0	2	515	0	0	0	0	10	0	0	622	19	1	3	642	**1172**
Approach%	60%	0%	40%	0%		-	3.1%	96.9%	0%	0%		-	0%	0%	0%	0%		-	0%	96.9%	3%	0.2%		-	**-**
Totals %	0.8%	0%	0.5%	0%		1.3%	1.4%	42.6%	0%	0%		43.9%	0%	0%	0%	0%		0%	0%	53.1%	1.6%	0.1%		54.8%	**-**
PHF	0.75	0	0.5	0		0.94	0.8	0.84	0	0		0.85	0	0	0	0		0	0	0.9	0.53	0.25		0.91	**-**
Heavy	5	0	0	0		5	0	28	0	0		28	0	0	0	0		0	0	26	0	0		26	**-**
Heavy %	55.6%	0%	0%	0%		33.3%	0%	5.6%	0%	0%		5.4%	0%	0%	0%	0%		0%	0%	4.2%	0%	0%		4%	**-**
Lights	4	0	6	0		10	16	471	0	0		487	0	0	0	0		0	0	596	19	1		616	**-**
Lights %	44.4%	0%	100%	0%		66.7%	100%	94.4%	0%	0%		94.6%	0%	0%	0%	0%		0%	0%	95.8%	100%	100%		96%	**-**
Single-Unit Trucks	0	0	0	0		0	0	13	0	0		13	0	0	0	0		0	0	13	0	0		13	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	2.6%	0%	0%		2.5%	0%	0%	0%	0%		0%	0%	2.1%	0%	0%		2%	**-**
Buses	5	0	0	0		5	0	15	0	0		15	0	0	0	0		0	0	13	0	0		13	**-**
Buses %	55.6%	0%	0%	0%		33.3%	0%	3%	0%	0%		2.9%	0%	0%	0%	0%		0%	0%	2.1%	0%	0%		2%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	12	-	-	-	-	-	2	-	-	-	-	-	9	-	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	-	44.4%		-	-	-	-	7.4%		-	-	-	-	33.3%		-	-	-	-	11.1%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	3.7%		-	-	-	-	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: 04:00 PM - 05:00 PM Weather: Clear Sky (-1.12 °C)

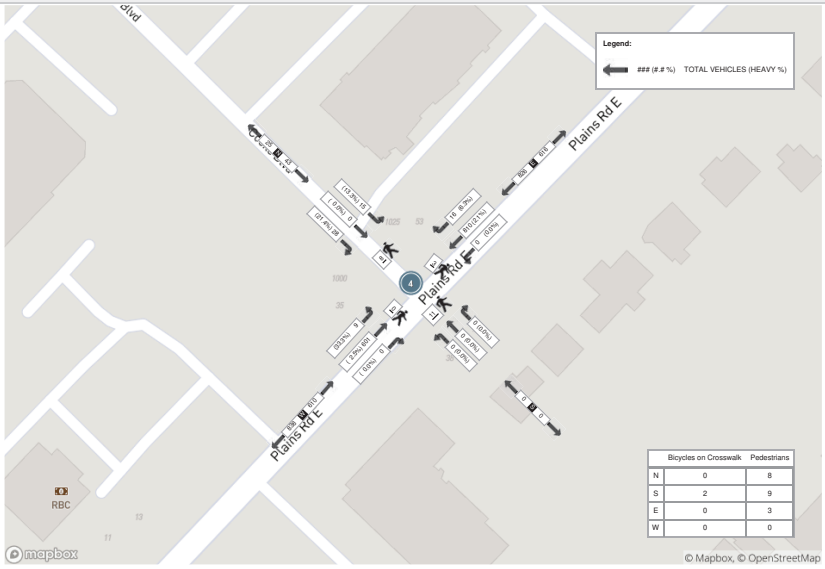
Start Time	N Approach COOKE BLVD						E Approach PLAINS RD E						S Approach SOUTH DRIVEWAY						W Approach PLAINS RD E						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	6	0	3	0	1	9	10	219	0	0	0	229	0	0	0	0	1	0	0	163	3	0	0	166	404
16:15:00	7	0	7	0	4	14	1	212	0	0	0	213	0	0	0	0	3	0	0	152	2	0	0	154	381
16:30:00	11	0	5	0	2	16	5	176	0	0	2	181	0	0	0	0	4	0	0	140	3	0	0	143	340
16:45:00	4	0	0	0	1	4	0	203	0	0	1	203	0	0	0	0	3	0	0	146	1	0	0	147	354
Grand Total	28	0	15	0	8	43	16	810	0	0	3	826	0	0	0	0	11	0	0	601	9	0	0	610	**1479**
Approach%	65.1%	0%	34.9%	0%		-	1.9%	98.1%	0%	0%		-	0%	0%	0%	0%		-	0%	98.5%	1.5%	0%		-	-
Totals %	1.9%	0%	1%	0%		2.9%	1.1%	54.8%	0%	0%		55.8%	0%	0%	0%	0%		0%	0%	40.6%	0.6%	0%		41.2%	-
PHF	0.64	0	0.54	0		0.67	0.4	0.92	0	0		0.9	0	0	0	0		0	0	0.92	0.75	0		0.92	-
Heavy	6	0	2	0		8	1	17	0	0		18	0	0	0	0		0	0	15	3	0		18	-
Heavy %	21.4%	0%	13.3%	0%		18.6%	6.3%	2.1%	0%	0%		2.2%	0%	0%	0%	0%		0%	0%	2.5%	33.3%	0%		3%	-
Lights	22	0	13	0		35	15	793	0	0		808	0	0	0	0		0	0	586	6	0		592	-
Lights %	78.6%	0%	86.7%	0%		81.4%	93.8%	97.9%	0%	0%		97.8%	0%	0%	0%	0%		0%	0%	97.5%	66.7%	0%		97%	-
Single-Unit Trucks	1	0	2	0		3	1	7	0	0		8	0	0	0	0		0	0	6	1	0		7	-
Single-Unit Trucks %	3.6%	0%	13.3%	0%		7%	6.3%	0.9%	0%	0%		1%	0%	0%	0%	0%		0%	0%	1%	11.1%	0%		1.1%	-
Buses	5	0	0	0		5	0	10	0	0		10	0	0	0	0		0	0	9	2	0		11	-
Buses %	17.9%	0%	0%	0%		11.6%	0%	1.2%	0%	0%		1.2%	0%	0%	0%	0%		0%	0%	1.5%	22.2%	0%		1.8%	-
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	-	-	-	-	8	-	-	-	-	-	3	-	-	-	-	-	9	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	36.4%		-	-	-	-	13.6%		-	-	-	-	40.9%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	9.1%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 07:45 AM - 08:45 AM Weather: Broken Clouds (-10 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	12
S	1	9
E	0	2
W	0	3

Peak Hour: 04:00 PM - 05:00 PM Weather: Clear Sky (-1.12 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	8
S	2	9
E	0	3
W	0	0

Ministry of Transportation
Ministère des Transports

Version: 1.0 Feb 1, 2016

Intersection Layout Sheet

Contract # 2015-E-0009
Work Order # 5919

Date: OCT / 13 / 16 Day: THUR / Hrs: 06 – 10 + 15 – 19 + – –

Location: HWY 403 @ WATERDOWN RD IC - BURLINGTON Ramps: NORTH / 61

Reg/Mun: CR Town/City: BURLINGTON Area: –

File Name: 4483000000 Device: Gretch / Jamar Unit # 04 / Interval 1: AM / NN / PM

Observer: OXANA VYATKINA Weather: CLEAR / Road Condition: GOOD /

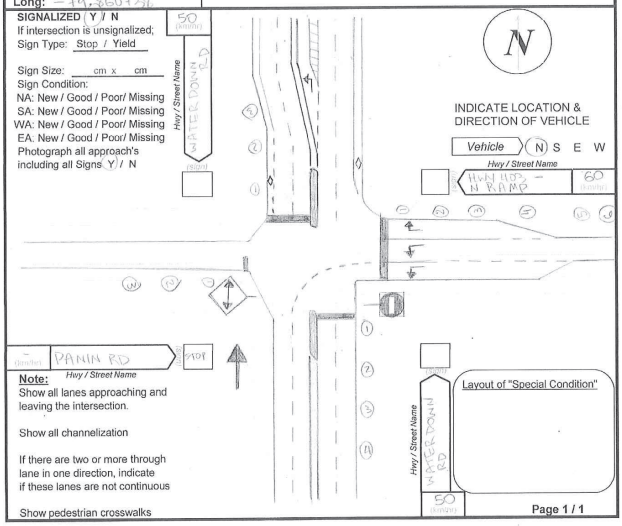
LHRS & O/S: LHRS00 — 0

GPS: G-STAR N
Datum: WGS 84 (Y) / N
Lat: 43.317644
Long: -79.860758

Comments:

SIGNALIZED (Y) / N
If intersection is unsignalized;
Sign Type: Stop / Yield

Sign Size: ___ cm x ___ cm
Sign Condition:
NA: New / Good / Poor/ Missing
SA: New / Good / Poor/ Missing
WA: New / Good / Poor/ Missing
EA: New / Good / Poor/ Missing
Photograph all approach's including all Signs Y / N



Note:
Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continuous

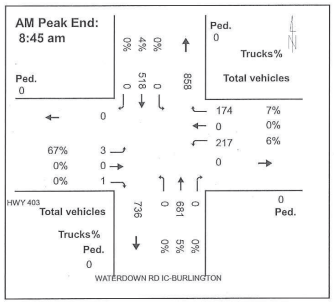
Show pedestrian crosswalks

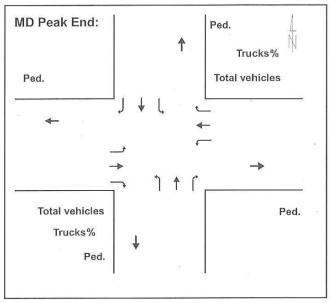
Ontario

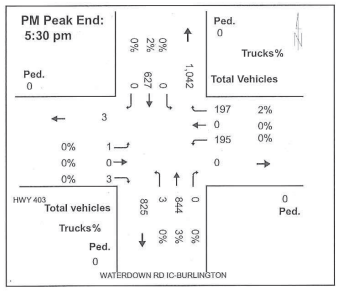
HWY 403 @ WATERDOWN RD IC-BURLINGTON

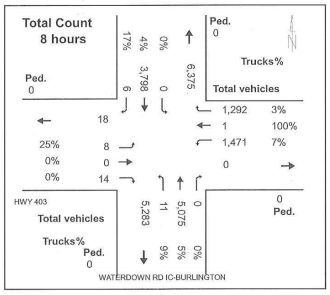
Central

Intersection ID:483000000(--N--) Count Day: Thursday Count Date: 13-Oct-2016









15 MIN REPORT

Intersection ID:483000000(--N--) **HWY 403 @ WATERDOWN RD IC-BURLINGTON** **Municipality: Central** **Date: 13-Oct-2016**

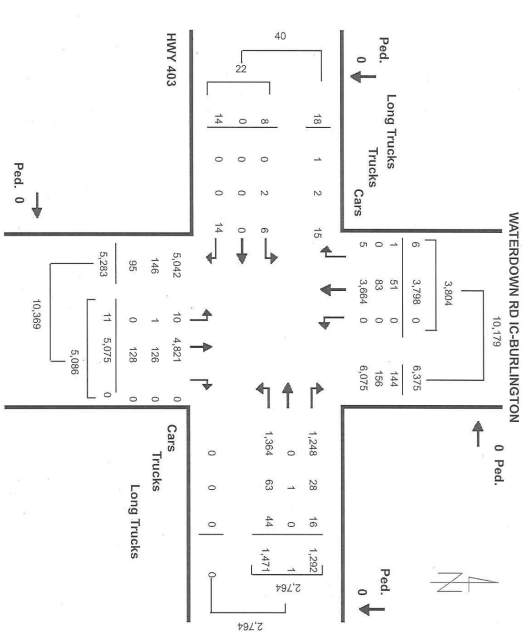
Time	NORTH APPROACH									EAST APPROACH										SOUTH APPROACH										WEST APPROACH										Total
	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Period1																																								
6:15	0	38	0	0	1	0	0	2	0	0	9	0	15	0	0	0	0	0	0	0	0	78	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	147
6:30	0	71	0	0	4	0	0	2	0	0	13	0	12	1	0	1	0	0	0	0	0	91	0	0	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	202
6:45	0	73	0	0	1	0	0	3	0	0	17	0	35	1	0	0	0	0	0	0	0	126	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	260
7:00	0	91	0	0	1	0	0	2	0	0	36	0	30	1	0	2	3	0	0	0	0	132	0	0	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	303
7:15	0	85	0	0	3	0	0	1	0	0	22	0	27	1	0	1	1	0	0	0	0	110	0	0	2	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	259
7:30	0	105	0	0	2	0	0	2	0	0	33	0	25	4	0	1	0	0	1	0	0	137	0	0	6	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	320
7:45	0	114	1	0	5	0	0	3	0	0	31	0	30	2	0	1	2	0	2	0	2	148	0	0	5	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	352
8:00	0	140	0	0	6	0	0	2	0	0	43	0	39	2	0	3	0	0	0	0	0	151	0	0	5	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	396
8:15	0	122	0	0	3	0	0	0	0	0	61	0	45	3	0	3	1	0	1	0	0	161	0	0	4	0	0	5	0	0	0	0	0	0	2	0	0	0	0	0	411
8:30	0	124	0	0	2	0	0	3	0	0	52	0	38	3	0	1	0	0	2	0	0	169	0	0	7	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	405
8:45	0	111	0	0	3	0	0	2	0	0	49	0	40	3	0	0	0	0	2	0	0	165	0	0	5	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	382
9:00	0	138	0	0	4	0	0	0	0	0	43	0	57	5	0	1	1	0	2	0	1	137	0	0	5	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	396
9:15	0	99	0	0	4	0	0	2	0	0	50	0	46	1	0	1	0	0	0	0	0	115	0	0	2	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	326
9:30	0	101	0	0	4	0	0	0	0	0	59	0	31	4	0	1	4	0	1	0	1	114	0	0	3	0	0	5	0	0	0	1	0	0	0	0	0	0	0	0	329
9:45	0	85	0	0	1	0	0	1	0	0	42	0	26	3	0	0	2	0	1	0	0	80	0	0	4	0	0	7	0	0	1	0	0	0	0	0	0	0	0	0	253
10:00	0	71	0	0	4	0	0	1	0	0	51	0	41	2	0	0	2	0	0	0	0	97	0	0	3	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	278
Period2																																									
15:15	0	90	0	0	5	0	0	2	0	0	56	0	46	4	0	0	1	0	1	0	0	148	0	0	5	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	365
15:30	0	96	0	0	6	0	0	2	0	0	54	0	53	3	0	1	5	0	0	0	0	114	0	0	8	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	347
15:45	0	106	0	0	4	0	0	2	0	0	48	0	48	3	0	0	4	0	1	0	0	131	0	0	6	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	360
16:00	0	95	0	0	3	0	0	2	0	0	41	0	48	0	0	3	4	0	0	0	0	133	0	0	3	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	338
16:15	0	131	0	0	2	0	0	0	0	0	36	0	38	3	0	0	1	0	1	0	1	162	0	0	4	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	386
16:30	0	141	0	0	0	0	0	1	0	0	47	0	48	0	0	0	2	0	0	0	0	132	0	0	6	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	380
16:45	0	152	0	0	2	0	0	2	0	0	58	0	45	5	0	0	2	0	0	0	0	240	0	0	4	0	0	5	0	0	0	0	0	0	2	0	0	0	0	0	517
17:00	0	163	0	0	1	0	0	2	0	0	47	0	60	0	0	1	3	0	0	0	0	170	0	0	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	453
17:15	0	144	0	0	2	0	0	2	0	0	35	0	48	1	0	1	2	0	1	0	2	238	0	0	4	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	484
17:30	0	154	0	0	1	0	0	2	0	0	40	0	40	2	0	1	0	0	0	0	1	167	0	0	4	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	416
17:45	0	143	1	0	1	0	0	2	1	0	38	0	39	1	1	2	0	0	0	0	0	235	0	0	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	471
18:00	0	165	2	0	3	0	0	1	0	0	44	0	38	2	0	3	0	0	0	0	0	107	0	0	4	0	0	2	0	0	1	0	1	0	0	0	0	0	0	0	373
18:15	0	130	0	0	0	0	0	2	0	0	54	0	31	2	0	0	1	0	0	0	0	253	0	1	2	0	0	4	0	0	0	0	3	0	0	0	0	0	0	0	483
18:30	0	137	0	0	3	0	0	3	0	0	45	0	39	1	0	0	1	0	0	0	0	213	0	0	2	0	0	5	0	0	0	0	1	0	0	0	0	0	0	0	451
18:45	0	138	0	0	1	0	0	0	0	0	61	0	50	0	0	0	2	0	0	0	0	197	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	454
19:00	0	111	1	0	1	0	0	0	0	0	49	0	40	0	0	0	0	0	0	0	0	170	0	0	4	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	379

COUNT TOTAL

HWY 403 @ WATERDOWN RD IC-BURLINGTON

Central

Intersection ID:483000000(--N--) **Date: 13-Oct-2016**



Ministry of Transportation
Ministère des Transports

Version: 1.0 Feb 1, 2016

Intersection Layout Sheet

Contract # 9015-E-0004
Work Order # 604

Date: OCT / 13/16 Day: THUR / Hrs: 06 – 10 + 13 – 19 + –

Location: HWY 403 @ WATERDOWN RD @ NORTH SERVICE ROAD Ramps: / 16

Reg/Mun: CR Town/City: BURLINGTON Area:

File Name: 0483000000 Device: Gretch / Jamar Unit # 04 / Interval 1: AM / NN / PM

Observer: EKATERINA VYATKINA Weather: CLEAR / Road Condition: GOOD /

LHRS & O/S: 46300 — 0

GPS: G-STAR N

Datum: WGS 84 (Y) / N

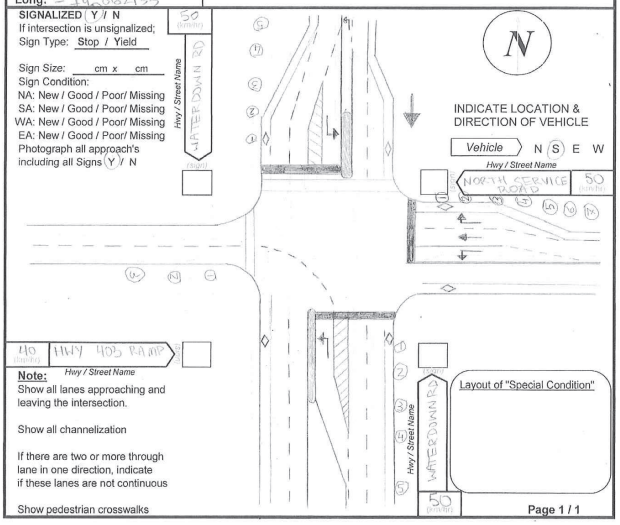
Lat: 43.321669

Long: -79.867133

Comments:

SIGNALIZED (Y) / N
If intersection is unsignalized;
Sign Type: Stop / Yield

Sign Size: cm x cm
Sign Condition:
NA: New / Good / Poor/ Missing
SA: New / Good / Poor/ Missing
WA: New / Good / Poor/ Missing
EA: New / Good / Poor/ Missing
Photograph all approach's including all Signs (Y) / N



Note:
Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continuous

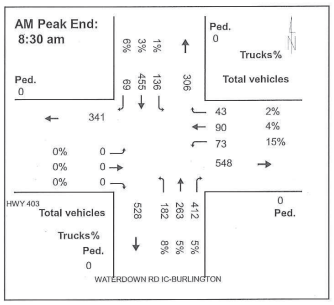
Show pedestrian crosswalks

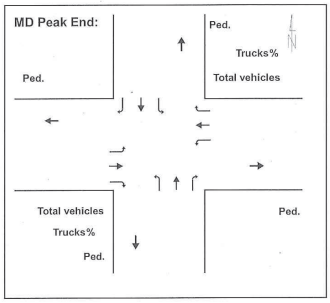
Ontario

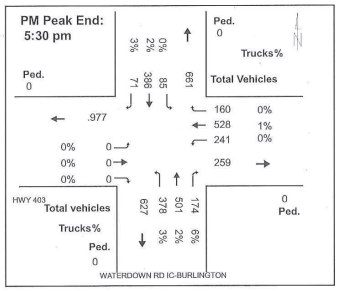
HWY 403 @ WATERDOWN RD IC-BURLINGTON

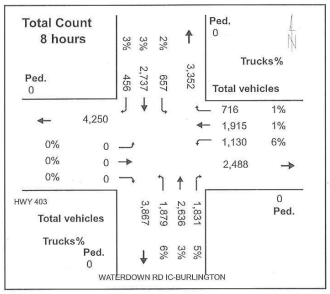
Central

Intersection ID:483000000 **Count Day: Thursday** **Count Date: 13-Oct-2016**









15 MIN REPORT

Intersection ID:483000000 **HWY 403 @ WATERDOWN RD IC-BURLINGTON** **Municipality: Central** **Date: 13-Oct-2016**

Time	NORTH APPROACH												EAST APPROACH												SOUTH APPROACH												WEST APPROACH												Total
	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right			
Period1																																																
6:15	4	37	2	1	2	0	0	1	0	0	5	6	2	0	0	0	0	0	0	0	19	21	41	3	1	3	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151
6:30	13	72	4	1	4	0	0	0	0	0	4	11	4	2	1	0	1	1	0	0	17	31	44	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	214
6:45	12	75	9	1	1	1	0	0	0	0	4	8	8	0	0	0	3	0	0	0	26	67	43	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	263
7:00	17	88	6	0	2	0	0	0	0	0	6	6	5	0	0	0	2	0	0	0	31	47	61	0	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	277
7:15	14	79	12	0	1	0	0	0	0	0	4	6	5	1	1	1	1	0	0	0	27	51	53	0	1	2	3	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	266
7:30	23	105	3	0	2	0	0	1	1	0	6	16	3	0	0	0	2	1	0	0	30	59	63	2	4	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	327
7:45	30	115	19	0	6	0	1	0	0	0	11	19	10	4	0	1	2	1	0	0	48	49	87	2	3	3	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	416
8:00	31	117	10	0	3	1	0	0	1	0	18	27	6	1	1	0	1	1	0	0	47	59	102	1	4	5	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	439
8:15	37	101	16	1	2	0	0	0	1	0	20	21	12	0	0	0	0	0	0	0	38	72	105	2	1	5	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	440
8:30	36	108	20	0	1	0	0	2	1	0	13	19	14	1	0	0	2	1	0	0	34	69	97	2	3	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	428
8:45	17	88	17	1	2	0	0	0	0	0	24	16	21	2	0	1	1	1	0	0	40	68	93	2	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	399
9:00	37	117	27	1	3	0	0	0	0	0	22	29	7	1	2	1	0	0	0	0	31	76	93	2	2	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	455
9:15	18	97	13	0	4	1	0	1	0	0	13	16	14	1	0	0	1	0	0	0	30	62	54	1	1	1	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	335
9:30	14	80	18	0	3	0	0	0	0	0	16	21	11	0	0	0	0	0	0	0	24	53	53	3	2	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	304
9:45	13	66	4	0	2	0	0	1	0	0	16	16	13	1	0	0	0	0	0	0	32	62	36	1	1	2	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	271
10:00	28	59	9	0	2	0	0	1	1	0	15	9	14	1	3	0	0	0	0	0	30	57	36	1	2	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	271
Period2																																															
15:15	21	69	14	1	3	0	0	1	0	0	20	39	24	0	0	0	3	0	0	0	68	75	48	1	4	3	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	400
15:30	22	62	11	1	4	2	0	0	0	0	31	48	36	3	1	0	0	0	0	0	56	89	39	2	4	5	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	421
15:45	16	74	13	1	2	1	0	3	0	0	32	75	34	2	0	2	1	2	0	0	56	89	36	1	2	0	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	450
16:00	18	54	15	0	1	0	0	0	0	0	38	71	33	1	0	0	1	0	1	0	66	87	39	1	3	1	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	436
16:15	18	80	20	2	1	0	0	0	0	0	58	128	36	3	0	1	0	0	0	0	67	87	37	2	4	2	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	552
16:30	14	82	26	0	0	1	0	0	0	0	67	109	49	0	0	0	1	2	0	0	42	90	45	1	3	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	538
16:45	16	97	24	0	2	1	0	2	1	0	49	139	36	0	0	0	1	1	0	0	134	135	44	0	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	690
17:00	27	100	12	0	1	0	0	0	0	0	82	128	50	0	0	0	2	2	0	0	63	122	37	1	5	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	637
17:15	17	91	18	0	1	0	0	0	0	0	56	123	41	1	0	0	2	0	0	0	104	130	44	0	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	633
17:30	25	90	15	0	1	0	0	1	0	0	47	134	33	0	0	0	1	1	0	0	66	103	39	2	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	564
17:45	20	76	17	0	1	0	0	0	0	0	79	131	46	1	0	0	2	0	0	0	123	124	37	3	3	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	666
18:00	17	87	15	0	3	0	0	0	0	0	71	107	33	0	0	0	1	0	0	0	60	70	38	2	3	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	511
18:15	17	81	18	0	0	0	0	1	0	0	59	121	22	1	0	0	2	0	0	0	119	122	42	0	1	1	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	612
18:30	21	71	11	0	2	0	1	0	0	0	73	110	33	2	0	0	1	0	0	0	85	112	44	0	1	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	572
18:45	16	63	11	0	1	0	0	0	0	0	77	100	23	0	2	0	0	0	0	0	108	120	50	0	0	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	575
19:00	15	77	12	0	0	1	0	1	0	0	31	79	30	0	1	0	0	1	0	0	51	86	53	0	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	444

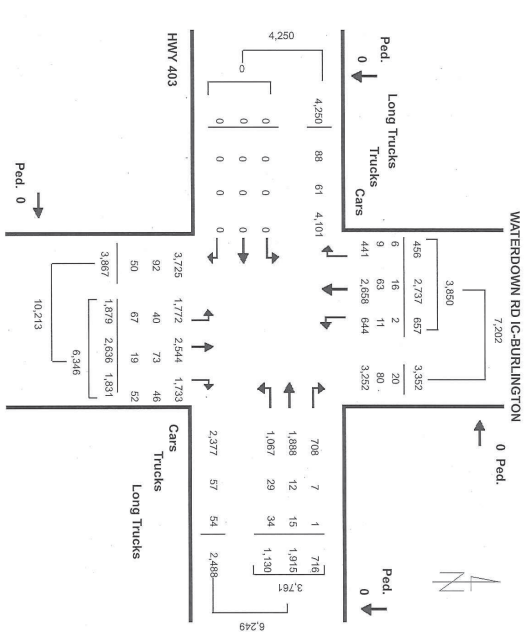
Traffic Engineering Software

COUNT TOTAL

HWY 403 @ WATERDOWN RD IC-BURLINGTON

Central

Intersection ID:483000000 **Date: 13-Oct-2016**



Ministry of Transportation
Ministère des Transports

Version: 1.0 Feb 1, 2016

Intersection Layout Sheet

Contract # 2016-E-0003
Work Order # 600

Date: OCT / 13/16 Day: THUR / Hrs: 06 – 10 + 15 – 19 + – .

Location: HWY 403 @ WATERDOWN RD IC - BURLINGTON Ramps: SOUTH / S1

Reg/Mun: CR Town/City: BURLINGTON Area: -

File Name: 2416300000 Device: Gretch / Jamar Unit # 06 / Interval 1: AM / NN / PM

Observer: DIANA VYATKINA Weather: CLEAR / Road Condition: GOOD /

LHRS & O/S: 16300 —0

GPS: S-STAR W

Datum: WGS 84 Y / N

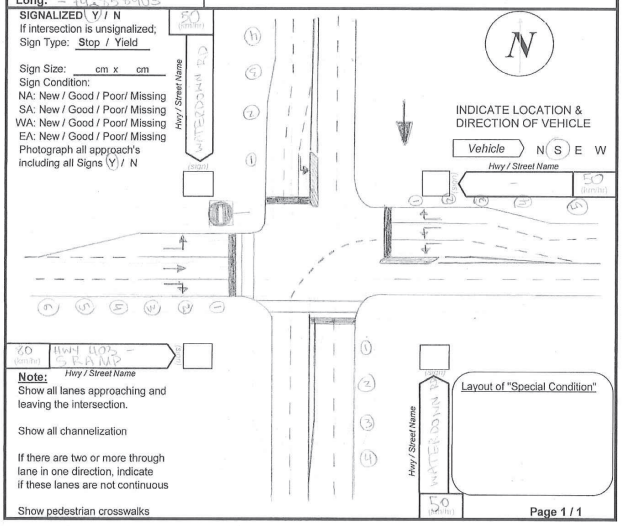
Lat: 43.31426

Long: -79.75903

Comments:

SIGNALIZED Y / N
If intersection is unsignalized;
Sign Type: Stop / Yield

Sign Size: cm x cm
Sign Condition:
NA: New / Good / Poor/ Missing
SA: New / Good / Poor/ Missing
WA: New / Good / Poor/ Missing
EA: New / Good / Poor/ Missing
Photograph all approach's including all Signs Y / N



Note:
Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continuous

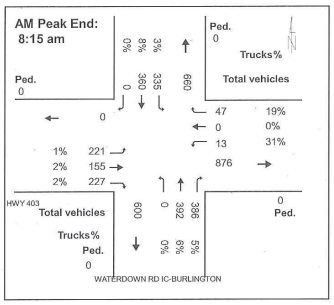
Show pedestrian crosswalks

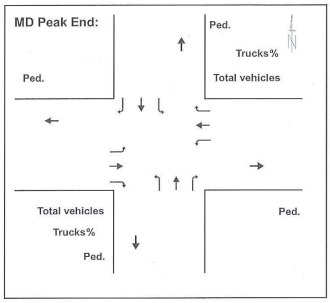
Ontario

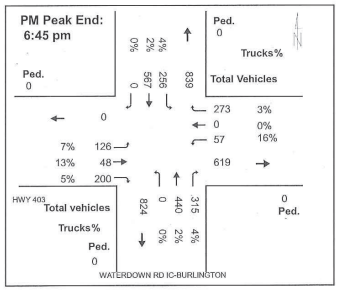
HWY 403 @ WATERDOWN RD IC-BURLINGTON

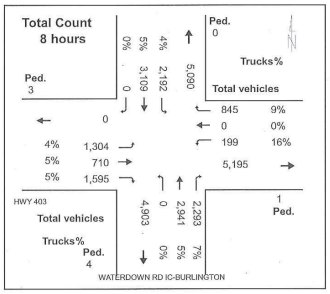
Central

Intersection ID:483000000(--S--) Count Day: Thursday Count Date: 13-Oct-2016







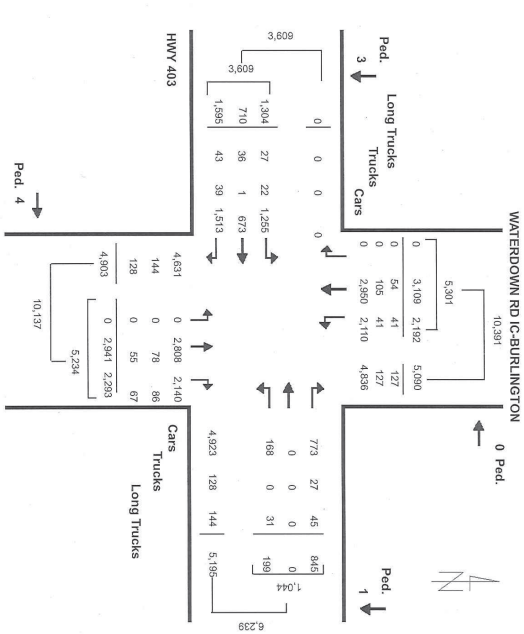


15 MIN REPORT

Intersection ID:483000000(--S--) **HWY 403 @ WATERDOWN RD IC-BURLINGTON** **Municipality: Central** **Date: 13-Oct-2016**

	NORTH APPROACH												EAST APPROACH											
Time	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period1																								
6:15	38	14	0	2	2	0	0	0	0	0	1	0	2	0	0	1	1	0	1	0
6:30	64	28	0	0	3	0	1	1	0	0	5	0	8	0	0	1	1	0	1	0
6:45	62	33	0	0	1	0	2	1	0	0	0	0	8	0	0	1	1	0	0	0
7:00	66	63	0	2	1	0	1	3	0	0	5	0	6	0	0	1	1	0	2	0
7:15	64	34	0	0	3	0	1	1	0	0	3	0	12	0	0	1	1	0	2	0
7:30	92	50	0	1	3	0	1	5	0	0	3	0	16	0	0	1	1	0	0	0
7:45	84	77	0	2	8	0	3	1	0	0	3	0	9	0	0	1	1	0	3	0
8:00	79	107	0	2	6	0	1	1	0	0	3	0	10	0	0	1	1	0	2	0
8:15	69	97	0	1	4	0	0	1	0	0	0	0	3	0	0	1	1	0	0	0
8:30	95	89	0	1	5	0	3	1	0	0	3	0	3	0	0	1	0	0	1	0
8:45	76	80	0	2	2	0	1	1	0	0	1	0	6	0	0	1	1	0	2	0
9:00	80	81	0	1	8	0	0	0	0	0	1	0	6	0	0	1	1	0	0	0
9:15	75	79	0	3	3	0	2	1	0	0	1	0	6	0	0	1	0	0	3	1
9:30	56	93	0	2	5	0	2	2	0	0	1	0	5	0	0	0	1	0	0	0
9:45	60	74	0	1	4	0	0	3	0	0	5	0	3	0	0	1	1	0	2	0
10:00	41	64	0	2	4	0	3	2	0	0	0	0	4	0	0	1	1	0	0	0
Period2																								
15:15	66	85	0	2	7	0	2	2	0	0	3	0	10	0	0	1	1	0	1	0
15:30	59	94	0	2	6	0	0	6	0	0	3	0	13	0	0	0	1	0	3	0
15:45	56	89	0	2	6	0	3	1	0	0	3	0	8	0	0	1	1	0	1	0
16:00	52	92	0	1	2	0	1	2	0	0	1	0	36	0	0	0	1	0	1	0
16:15	63	112	0	2	3	0	0	3	0	0	4	0	12	0	0	1	1	0	3	0
16:30	74	128	0	0	0	0	0	3	0	0	1	0	5	0	0	1	1	0	0	0
16:45	79	115	0	1	7	0	1	2	0	0	12	0	69	0	0	1	1	0	4	0
17:00	79	138	0	1	0	0	2	3	0	0	5	0	32	0	0	1	1	0	3	0
17:15	66	126	0	1	2	0	2	2	0	0	9	0	60	0	0	1	1	0	0	0
17:30	56	117	0	1	2	0	1	1	0	0	15	0	31	0	0	0	2	0	1	0
17:45	54	145	0	2	2	0	2	0	0	0	20	0	92	0	0	1	0	0	2	0
18:00	55	151	0	2	1	0	1	0	0	0	4	0	18	0	0	1	2	0	0	0
18:15	72	126	0	0	2	0	3	2	0	0	25	0	96	0	0	1	1	0	2	0
18:30	58	131	0	1	3	0	0	2	0	0	13	0	61	0	0	1	0	0	2	0
18:45	62	148	0	1	0	0	1	1	0	0	10	0	89	0	0	0	2	0	2	0
19:00	58	90	0	0	0	0	1	0	0	0	5	0	34	0	0	1	1	0	0	0

	SOUTH APPROACH												WEST APPROACH												
Time	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Period1																					
6:15	0	30	41	0	3	0	0	1	1	0	49	52	49	0	0	3	1	1	0	0	293
6:30	0	32	44	0	0	2	0	2	0	0	53	46	56	1	0	0	1	1	2	2	355
6:45	0	70	55	0	3	4	0	0	2	0	48	79	55	0	0	0	0	0	1	0	426
7:00	0	45	67	0	1	5	0	1	2	0	72	73	68	0	0	0	0	2	1	0	488
7:15	0	61	52	0	0	3	0	5	1	0	42	74	68	0	1	0	1	1	3	0	434
7:30	0	81	83	0	7	2	0	2	1	0	45	75	66	0	0	0	0	1	0	0	536
7:45	0	85	96	0	1	1	0	3	3	0	55	41	60	0	0	0	0	1	0	0	538
8:00	0	101	93	0	3	6	0	2	1	0	62	21	57	1	0	1	2	1	2	0	566
8:15	0	101	95	0	3	2	0	3	3	0	56	15	39	0	0	1	0	0	1	0	496
8:30	0	92	94	0	4	3	0	2	1	0	67	10	43	2	0	3	0	2	0	0	525
8:45	0	106	82	0	3	7	0	1	2	0	39	8	33	1	0	0	0	0	2	0	457
9:00	0	67	79	0	2	0	0	1	3	0	57	14	40	0	0	2	0	2	1	0	447
9:15	0	63	64	0	2	3	0	2	2	1	38	9	36	0	0	1	2	2	2	1	403
9:30	0	60	69	0	2	1	0	6	2	0	33	7	37	1	0	3	0	0	1	0	389
9:45	0	68	69	0	1	1	0	3	4	0	21	10	47	1	0	0	0	1	1	0	381
10:00	0	53	47	0	3	5	0	2	1	0	35	6	35	1	0	3	0	3	2	0	318
Period2																					
15:15	0	99	65	0	5	3	0	3	2	0	29	4	34	2	0	0	0	2	5	0	433
15:30	0	85	70	0	4	5	0	1	2	0	29	7	46	1	0	0	2	0	1	0	440
15:45	0	95	51	0	4	5	0	3	4	0	31	11	42	1	0	1	3	3	1	0	426
16:00	0	89	48	0	2	3	0	1	5	0	32	8	40	0	0	2	3	0	2	0	424
16:15	0	98	58	0	4	7	0	1	3	0	20	4	32	1	0	2	1	3	2	0	440
16:30	0	87	53	0	3	1	0	1	4	0	43	6	47	1	0	2	2	0	0	0	463
16:45	0	144	69	0	2	7	0	0	1	0	36	5	64	0	0	1	1	1	3	0	626
17:00	0	110	60	0	4	0	0	0	2	0	29	10	61	2	0	1	0	1	2	0	547
17:15	0	130	71	0	1	0	0	0	2	1	39	13	44	0	0	2	1	1	4	0	579
17:30	0	109	57	0	3	1	0	4	2	1	31	8	54	0	0	1	0	1	0	0	499
17:45	0	137	54	0	1	2	0	0	3	0	14	6	28	4	0	3	0	0	1	0	573
18:00	0	91	78	0	1	1	0	0	3	0	20	14	40	1	0	3	3	1	0	0	491
18:15	0	128	87	0	3	2	0	1	1	0	27	7	57	1	0	1	1	1	1	0	648
18:30	0	91	69	0	0	2	0	1	1	0	39	16	64	0	0	2	2	2	2	0	563
18:45	0	123	67	0	0	2	0	1	2	0	31	5	30	0	0	0	1	2	0	0	580
19:00	0	77	53	0	3	0	0	2	1	1	33	9	41	0	0	1	0	0	0	0	412



Ministry of Transportation
Ministère des Transports

Version: 1.0 Feb 1, 2016

Intersection Layout Sheet

Contract # 9015-E-0005
Work Order # 602

Date: OCT / 13 / 16 Day: THUR / Hrs: 08 - 10 + 15 - 19 + __ - __

Location: HWY 403 @ WATERDOWN RD IC-GO STATION Ramps: SOUTH / IS

Reg/Mun: CR Town/City: SOUTH RAMP BURLINGTON Area: -

File Name: 2487000000 Device: Gretch / Jamar Unit # 06 / Interval 1: AM / NN / PM

Observer: EKATERINA WATKINA Weather: CLEAR / Road Condition: GOOD /

LHRS & O/S: 48300 — 0

GPS: G-STAR IV

Datum: WGS 84 (Y) / N

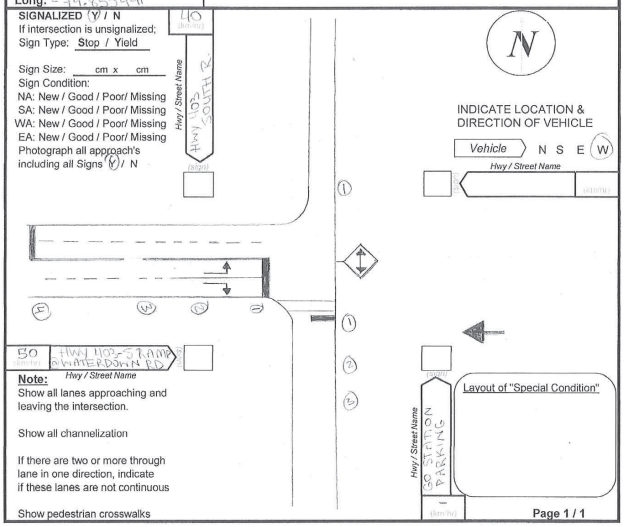
Lat: 43.314531

Long: -79.755411

Comments:

SIGNALIZED (Y) / N
If intersection is unsignalized;
Sign Type: Stop / Yield

Sign Size: cm x cm
Sign Condition:
NA: New / Good / Poor/ Missing
SA: New / Good / Poor/ Missing
WA: New / Good / Poor/ Missing
EA: New / Good / Poor/ Missing
Photograph all approach's including all Signs (Y) / N

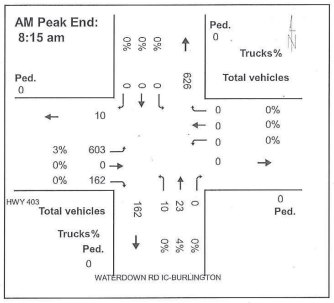


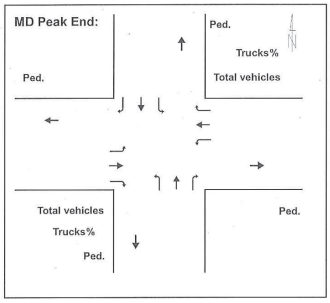
Ontario

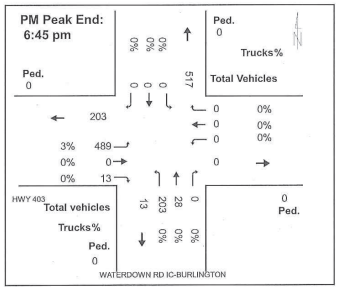
HWY 403 @ WATERDOWN RD IC-BURLINGTON

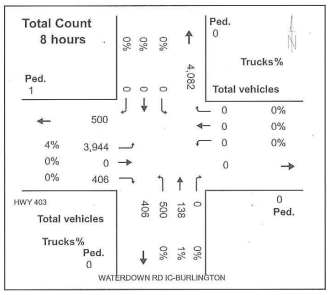
Central

Intersection ID: 483000000 Count Day: Thursday Count Date: 13-Oct-2016









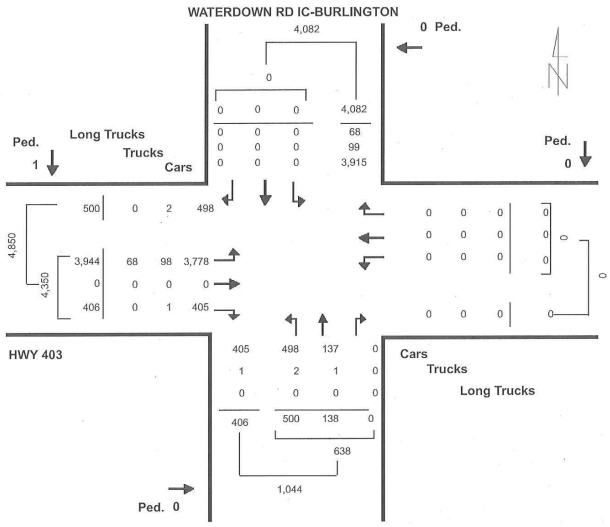
Traffic Engineering Software

COUNT TOTAL

HWY 403 @ WATERDOWN RD IC-BURLINGTON

Central

Intersection ID:483000000 Date: 13-Oct-2016



15 MIN REPORT

Intersection ID:483000000 HWY 403 @ WATERDOWN RD IC-BURLINGTON Municipality: Central Date: 13-Oct-2016

Time	NORTH APPROACH									EAST APPROACH										SOUTH APPROACH										WEST APPROACH										
	Cars			Trucks			Heavies		Ped	Cars			Trucks		Heavies		Ped	Cars			Trucks		Heavies		Ped	Cars			Trucks		Heavies		Ped	Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period1																																							
6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	70	0	16	0	0	0	0	0	0	92
6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	83	0	26	1	0	0	0	0	0	114
6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	95	0	17	3	0	0	3	0	0	123
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	0	0	0	0	0	0	0	0	102	0	44	2	0	0	0	0	0	159
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	97	0	53	5	0	0	1	0	0	162
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	0	0	0	0	0	0	0	0	118	0	80	1	0	0	1	0	0	211
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	0	0	1	0	0	0	0	0	145	0	39	2	0	0	4	0	0	201
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	0	0	0	0	0	0	0	0	163	0	28	7	0	0	2	0	0	206
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	156	0	17	2	0	0	2	0	0	180
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	177	0	16	3	0	0	3	0	0	201
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	147	0	8	4	0	0	5	0	0	169
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	159	0	9	1	0	0	2	0	0	173
9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	133	0	2	5	0	0	4	0	1	148
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	129	0	5	2	0	0	3	0	0	144
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	121	0	0	1	0	0	2	0	0	125
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	90	0	2	6	0	0	2	0	0	104
Period2																																							
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	4	0	0	0	0	0	0	0	0	130	0	6	6	0	0	1	0	0	154
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	0	0	0	0	0	0	0	0	116	0	2	5	0	0	3	0	0	139
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	0	0	1	0	0	0	0	0	105	0	1	7	0	0	6	0	0	127
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	2	0	0	0	0	0	0	0	0	95	0	1	4	0	0	3	0	0	120
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	0	0	0	0	0	0	0	0	108	0	3	5	0	0	2	0	0	129
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	120	0	1	4	0	0	2	0	0	129
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	7	0	1	0	0	0	0	0	0	125	0	4	6	0	0	2	0	0	187
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	4	0	0	0	0	0	0	0	0	111	0	1	1	0	0	1	0	0	139
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	5	0	0	0	0	0	0	0	0	104	0	4	0	0	0	2	0	0	154
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	10	0	0	0	0	0	0	0	0	106	0	4	2	0	0	2	0	0	147
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76	6	0	0	0	0	0	0	0	0	97	0	3	3	0	0	3	0	0	187
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	3	0	0	0	0	0	0	0	0	103	0	5	3	0	0	3	0	0	134
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	13	0	0	0	0	0	0	0	0	143	0	3	1	0	0	1	0	0	234
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	5	0	0	0	0	0	0	0	0	114	0	3	3	0	0	0	0	0	175
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	7	0	0	0	0	0	0	0	0	112	0	2	4	0	0	2	0	0	190
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	4	0	0	0	0	0	0	0	0	104	0	2	0	0	0	0	0	0	132

Turning Movement Count (2 . MASONARY CT & COOKE BLVD)

Start Time	N Approach NORTH DRIVEWAY						E Approach MASONARY CT						S Approach COOKE BLVD						W Approach MASONARY CT						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	3	0	0	0	0	3	0	0	2	0	2	2	0	3	1	0	0	4	1	5	5	0	0	11	20	
07:15:00	1	1	0	0	6	2	0	4	0	0	0	4	3	3	1	0	0	7	13	8	4	0	0	25	38	
07:30:00	3	1	0	0	2	4	0	5	0	0	0	5	2	0	2	0	0	4	6	4	1	0	0	11	24	
07:45:00	3	0	0	0	0	3	0	1	0	0	0	1	1	1	2	0	0	4	10	5	2	0	0	17	25	107
08:00:00	3	0	0	0	1	3	0	2	0	0	2	2	2	0	1	0	0	3	7	3	3	0	1	13	21	108
08:15:00	6	2	1	0	1	9	1	2	1	0	3	4	3	1	3	0	0	7	7	7	2	0	0	16	36	106
08:30:00	3	1	0	0	2	4	2	1	1	0	2	4	1	0	9	0	0	10	3	3	2	0	0	8	26	108
08:45:00	1	2	0	0	2	3	1	3	1	0	1	5	2	0	5	0	0	7	9	4	1	1	1	15	30	113
BREAK																										
16:00:00	4	2	0	0	1	6	0	2	3	0	4	5	3	4	13	0	0	20	6	2	9	0	0	17	48	
16:15:00	6	2	0	0	0	8	1	12	4	0	2	17	1	0	1	0	1	2	6	1	3	0	0	10	37	
16:30:00	6	3	0	0	0	9	1	1	2	0	5	4	3	1	21	0	0	25	3	3	3	0	0	9	47	
16:45:00	4	1	0	0	0	5	0	6	1	0	0	7	1	0	6	0	0	7	3	1	3	0	0	7	26	158
17:00:00	2	1	0	0	0	3	0	3	5	0	1	8	1	0	6	0	0	7	3	3	5	0	0	11	29	139
17:15:00	2	0	0	0	0	2	1	8	4	0	0	13	2	3	4	0	0	9	2	1	1	0	0	4	28	130
17:30:00	3	2	0	0	0	5	1	7	5	0	1	13	1	5	3	0	0	9	3	2	3	1	0	9	36	119
17:45:00	3	2	0	0	0	5	0	5	1	0	0	6	2	3	4	0	0	9	3	3	5	0	0	11	31	124
Grand Total	53	20	1	0	15	74	8	62	30	0	23	100	28	24	82	0	1	134	85	55	52	2	2	194	**502**	-
Approach%	71.6%	27%	1.4%	0%		-	8%	62%	30%	0%		-	20.9%	17.9%	61.2%	0%		-	43.8%	28.4%	26.8%	1%		-	-	-
Totals %	10.6%	4%	0.2%	0%		14.7%	1.6%	12.4%	6%	0%		19.9%	5.6%	4.8%	16.3%	0%		26.7%	16.9%	11%	10.4%	0.4%		38.6%	-	-
Heavy	1	0	0	0		-	1	1	0	0		-	2	0	5	0		-	18	1	1	0		-	-	-
Heavy %	1.9%	0%	0%	0%		-	12.5%	1.6%	0%	0%		-	7.1%	0%	6.1%	0%		-	21.2%	1.8%	1.9%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Broken Clouds (-10 °C)

Start Time	N Approach NORTH DRIVEWAY						E Approach MASONARY CT						S Approach COOKE BLVD						W Approach MASONARY CT						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	1	3	0	2	0	0	2	2	2	0	1	0	0	3	7	3	3	0	1	13	21
08:15:00	6	2	1	0	1	9	1	2	1	0	3	4	3	1	3	0	0	7	7	7	2	0	0	16	36
08:30:00	3	1	0	0	2	4	2	1	1	0	2	4	1	0	9	0	0	10	3	3	2	0	0	8	26
08:45:00	1	2	0	0	2	3	1	3	1	0	1	5	2	0	5	0	0	7	9	4	1	1	1	15	30
Grand Total	13	5	1	0	6	19	4	8	3	0	8	15	8	1	18	0	0	27	26	17	8	1	2	52	**113**
Approach%	68.4%	26.3%	5.3%	0%		-	26.7%	53.3%	20%	0%		-	29.6%	3.7%	66.7%	0%		-	50%	32.7%	15.4%	1.9%		-	-
Totals %	11.5%	4.4%	0.9%	0%		16.8%	3.5%	7.1%	2.7%	0%		13.3%	7.1%	0.9%	15.9%	0%		23.9%	23%	15%	7.1%	0.9%		46%	-
PHF	0.54	0.63	0.25	0		0.53	0.5	0.67	0.75	0		0.75	0.67	0.25	0.5	0		0.68	0.72	0.61	0.67	0.25		0.81	-
Heavy	1	0	0	0		1	1	0	0	0		1	0	0	1	0		1	3	1	0	0		4	-
Heavy %	7.7%	0%	0%	0%		5.3%	25%	0%	0%	0%		6.7%	0%	0%	5.6%	0%		3.7%	11.5%	5.9%	0%	0%		7.7%	-
Lights	12	5	1	0		18	3	8	3	0		14	8	1	17	0		26	23	16	8	1		48	-
Lights %	92.3%	100%	100%	0%		94.7%	75%	100%	100%	0%		93.3%	100%	100%	94.4%	0%		96.3%	88.5%	94.1%	100%	100%		92.3%	-
Single-Unit Trucks	1	0	0	0		1	1	0	0	0		1	0	0	0	0		0	0	1	0	0		1	-
Single-Unit Trucks %	7.7%	0%	0%	0%		5.3%	25%	0%	0%	0%		6.7%	0%	0%	0%	0%		0%	0%	5.9%	0%	0%		1.9%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	3	0	0	0		3	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	5.6%	0%		3.7%	11.5%	0%	0%	0%		5.8%	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	37.5%		-	-	-	-	50%		-	-	-	-	0%		-	-	-	-	12.5%		-

Peak Hour: 04:00 PM - 05:00 PM Weather: Clear Sky (-1.12 °C)

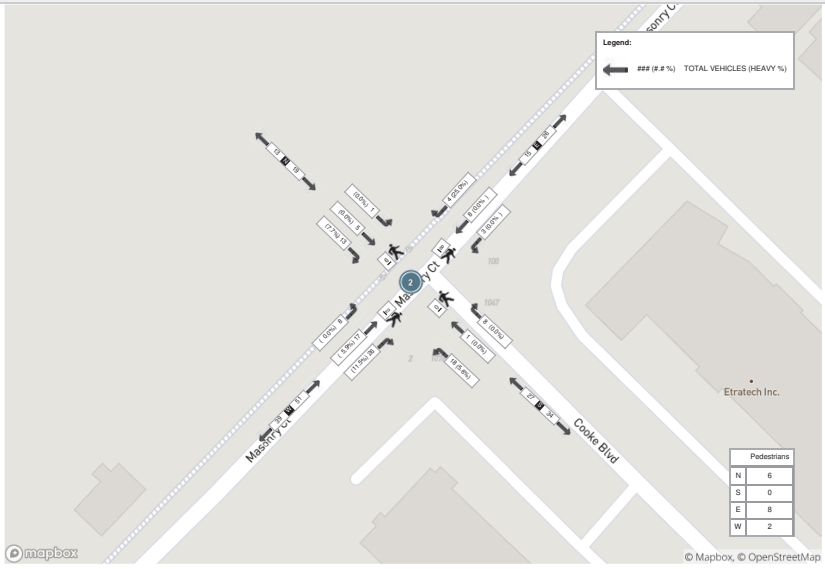
Start Time	N Approach NORTH DRIVEWAY						E Approach MASONARY CT						S Approach COOKE BLVD						W Approach MASONARY CT						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	4	2	0	0	1	6	0	2	3	0	4	5	3	4	13	0	0	20	6	2	9	0	0	17	48
16:15:00	6	2	0	0	0	8	1	12	4	0	2	17	1	0	1	0	1	2	6	1	3	0	0	10	37
16:30:00	6	3	0	0	0	9	1	1	2	0	5	4	3	1	21	0	0	25	3	3	3	0	0	9	47
16:45:00	4	1	0	0	0	5	0	6	1	0	0	7	1	0	6	0	0	7	3	1	3	0	0	7	26
Grand Total	20	8	0	0	1	28	2	21	10	0	11	33	8	5	41	0	1	54	18	7	18	0	0	43	**158**
Approach%	71.4%	28.6%	0%	0%		-	6.1%	63.6%	30.3%	0%		-	14.8%	9.3%	75.9%	0%		-	41.9%	16.3%	41.9%	0%		-	-
Totals %	12.7%	5.1%	0%	0%		17.7%	1.3%	13.3%	6.3%	0%		20.9%	5.1%	3.2%	25.9%	0%		34.2%	11.4%	4.4%	11.4%	0%		27.2%	-
PHF	0.83	0.67	0	0		0.78	0.5	0.44	0.63	0		0.49	0.67	0.31	0.49	0		0.54	0.75	0.58	0.5	0		0.63	-
Heavy	0	0	0	0		0	0	0	0	0		0	1	0	2	0		3	6	0	0	0		6	-
Heavy %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	12.5%	0%	4.9%	0%		5.6%	33.3%	0%	0%	0%		14%	-
Lights	20	8	0	0		28	2	21	10	0		33	7	5	39	0		51	12	7	18	0		37	-
Lights %	100%	100%	0%	0%		100%	100%	100%	100%	0%		100%	87.5%	100%	95.1%	0%		94.4%	66.7%	100%	100%	0%		86%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	1	0	0	0		1	1	0	0	0		1	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	12.5%	0%	0%	0%		1.9%	5.6%	0%	0%	0%		2.3%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	0	2	0		2	5	0	0	0		5	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	4.9%	0%		3.7%	27.8%	0%	0%	0%		11.6%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	11	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	7.7%		-	-	-	-	84.6%		-	-	-	-	7.7%		-	-	-	-	0%		-

Spectrum

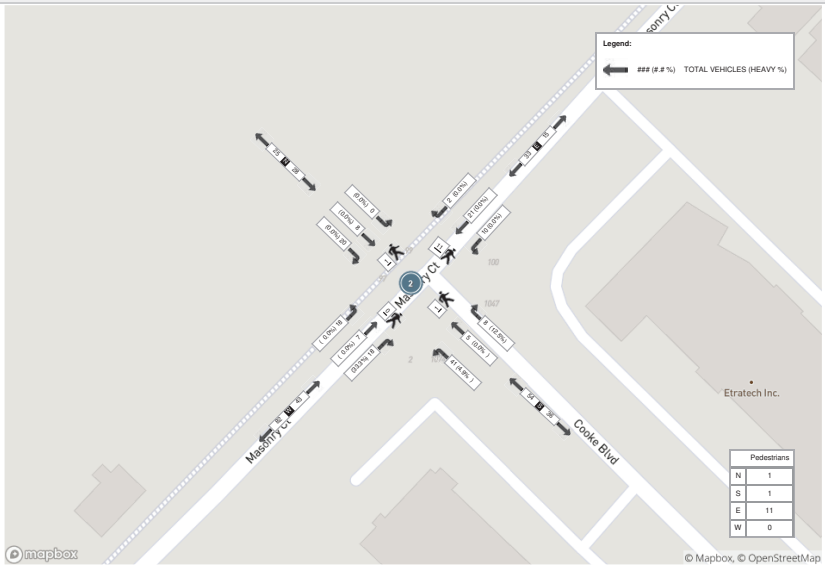
Turning Movement Count
Location Name: MASONARY CT & COOKE BLVD
Date: Tue, Mar 02, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Broken Clouds (-10 °C)



Peak Hour: 04:00 PM - 05:00 PM **Weather: Clear Sky (-1.12 °C)**



Spectrum

Turning Movement Count
Location Name: MASONARY CT & WATERDOWN RD
Date: Tue, Mar 02, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (3 . MASONARY CT & WATERDOWN RD)

Start Time	N Approach WATERDOWN RD						E Approach MASONRY CT						S Approach WATERDOWN RD						W Approach RAILWAY RD						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	6	34	12	0	0	52	4	0	0	0	0	4	0	83	1	0	0	84	0	0	1	0	0	1	141	
07:15:00	0	58	24	0	0	82	5	0	0	0	1	5	0	102	0	0	0	102	2	0	0	0	0	2	191	
07:30:00	1	92	11	0	0	104	8	0	1	0	0	9	0	113	1	0	0	114	0	0	3	0	0	3	230	
07:45:00	0	128	19	1	0	148	5	0	0	0	0	5	1	145	2	0	0	148	0	0	0	0	0	0	301	863
08:00:00	2	105	12	0	0	119	5	0	1	0	0	6	2	146	1	0	0	149	0	0	3	0	1	3	277	999
08:15:00	1	107	13	0	0	121	10	0	1	0	0	11	1	139	1	0	0	141	2	0	2	0	0	4	277	1085
08:30:00	2	99	7	0	0	108	12	0	0	0	1	12	2	134	0	0	0	136	2	0	3	0	0	5	261	1116
08:45:00	1	115	17	0	0	133	10	0	2	0	2	12	0	103	1	0	0	104	1	0	1	0	0	2	251	1066
BREAK																										
16:00:00	1	135	8	0	0	144	20	0	1	0	0	21	7	145	1	0	0	153	0	0	4	0	0	4	322	
16:15:00	1	128	8	1	0	138	18	0	0	0	0	18	2	112	1	0	0	115	2	0	1	0	0	3	274	
16:30:00	1	150	8	0	0	159	27	0	0	0	0	27	1	104	0	0	0	105	0	0	1	0	0	1	292	
16:45:00	3	145	7	0	0	155	16	0	2	0	0	18	0	124	0	0	0	124	1	0	3	0	0	4	301	1189
17:00:00	1	139	9	0	0	149	12	0	0	0	0	12	2	109	0	0	0	111	3	0	1	0	0	4	276	1143
17:15:00	1	158	5	0	0	164	15	0	1	0	1	16	1	110	0	0	0	111	0	0	0	0	0	0	291	1160
17:30:00	2	122	9	1	0	134	13	0	0	0	1	13	1	108	0	0	0	109	0	0	3	0	0	3	259	1127
17:45:00	4	91	10	0	0	105	12	0	0	0	1	12	1	88	0	0	0	89	1	0	1	0	1	2	208	1034
Grand Total	27	1806	179	3	0	2015	192	0	9	0	7	201	21	1865	9	0	0	1895	14	0	27	0	2	41	**4152**	-
Approach%	1.3%	89.6%	8.9%	0.1%		-	95.5%	0%	4.5%	0%		-	1.1%	98.4%	0.5%	0%		-	34.1%	0%	65.9%	0%		-	-	-
Totals %	0.7%	43.5%	4.3%	0.1%		48.5%	4.6%	0%	0.2%	0%		4.8%	0.5%	44.9%	0.2%	0%		45.6%	0.3%	0%	0.7%	0%		1%	-	-
Heavy	4	79	20	0		-	6	0	2	0		-	0	83	0	0		-	1	0	6	0		-	-	-
Heavy %	14.8%	4.4%	11.2%	0%		-	3.1%	0%	22.2%	0%		-	0%	4.5%	0%	0%		-	7.1%	0%	22.2%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Spectrum

Turning Movement Count
Location Name: MASONARY CT & WATERDOWN RD
Date: Tue, Mar 02, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

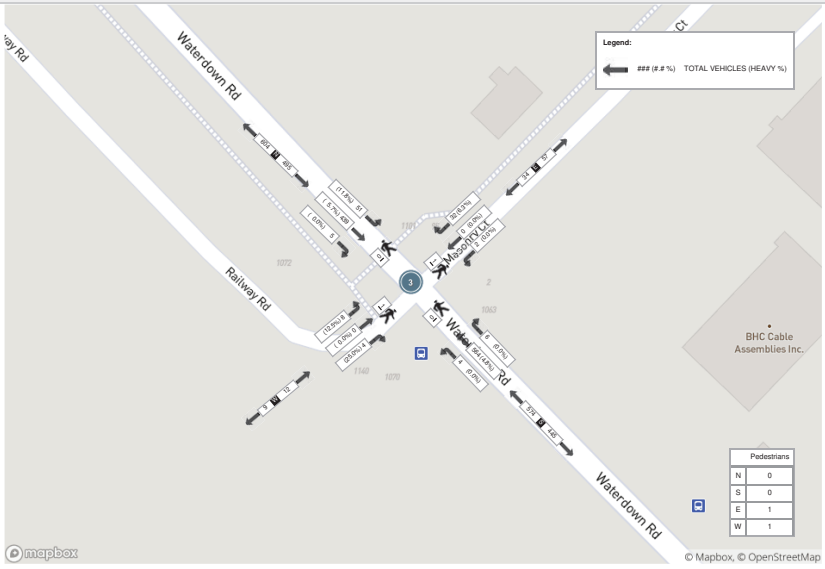
Peak Hour: 07:45 AM - 08:45 AM Weather: Broken Clouds (-10 °C)

Start Time	N Approach WATERDOWN RD						E Approach MASONRY CT						S Approach WATERDOWN RD						W Approach RAILWAY RD						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	
07:45:00	0	128	19	1	0	148	5	0	0	0	0	5	1	145	2	0	0	148	0	0	0	0	0	0	301
08:00:00	2	105	12	0	0	119	5	0	1	0	0	6	2	146	1	0	0	149	0	0	3	0	1	3	277
08:15:00	1	107	13	0	0	121	10	0	1	0	0	11	1	139	1	0	0	141	2	0	2	0	0	4	277
08:30:00	2	99	7	0	0	108	12	0	0	0	1	12	2	134	0	0	0	136	2	0	3	0	0	5	261
Grand Total	5	439	51	1	0	496	32	0	2	0	1	34	6	564	4	0	0	574	4	0	8	0	1	12	**1116**
Approach%	1%	88.5%	10.3%	0.2%		-	94.1%	0%	5.9%	0%		-	1%	98.3%	0.7%	0%		-	33.3%	0%	66.7%	0%		-	-
Totals %	0.4%	39.3%	4.6%	0.1%		44.4%	2.9%	0%	0.2%	0%		3%	0.5%	50.5%	0.4%	0%		51.4%	0.4%	0%	0.7%	0%		1.1%	-
PHF	0.63	0.86	0.67	0.25		0.84	0.67	0	0.5	0		0.71	0.75	0.97	0.5	0		0.96	0.5	0	0.67	0		0.6	-
Heavy	0	25	6	0		31	2	0	0	0		2	0	27	0	0		27	1	0	1	0		2	-
Heavy %	0%	5.7%	11.8%	0%		6.3%	6.3%	0%	0%	0%		5.9%	0%	4.8%	0%	0%		4.7%	25%	0%	12.5%	0%		16.7%	-
Lights	5	414	45	1		465	30	0	2	0		32	6	537	4	0		547	3	0	7	0		10	-
Lights %	100%	94.3%	88.2%	100%		93.8%	93.8%	0%	100%	0%		94.1%	100%	95.2%	100%	0%		95.3%	75%	0%	87.5%	0%		83.3%	-
Single-Unit Trucks	0	13	2	0		15	1	0	0	0		1	0	16	0	0		16	1	0	1	0		2	-
Single-Unit Trucks %	0%	3%	3.9%	0%		3%	3.1%	0%	0%	0%		2.9%	0%	2.8%	0%	0%		2.8%	25%	0%	12.5%	0%		16.7%	-
Buses	0	8	4	0		12	0	0	0	0		0	0	10	0	0		10	0	0	0	0		0	-
Buses %	0%	1.8%	7.8%	0%		2.4%	0%	0%	0%	0%		0%	0%	1.8%	0%	0%		1.7%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	4	0	0		4	1	0	0	0		1	0	1	0	0		1	0	0	0	0		0	-
Articulated Trucks %	0%	0.9%	0%	0%		0.8%	3.1%	0%	0%	0%		2.9%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	50%		-	-	-	-	0%		-	-	-	-	50%		-

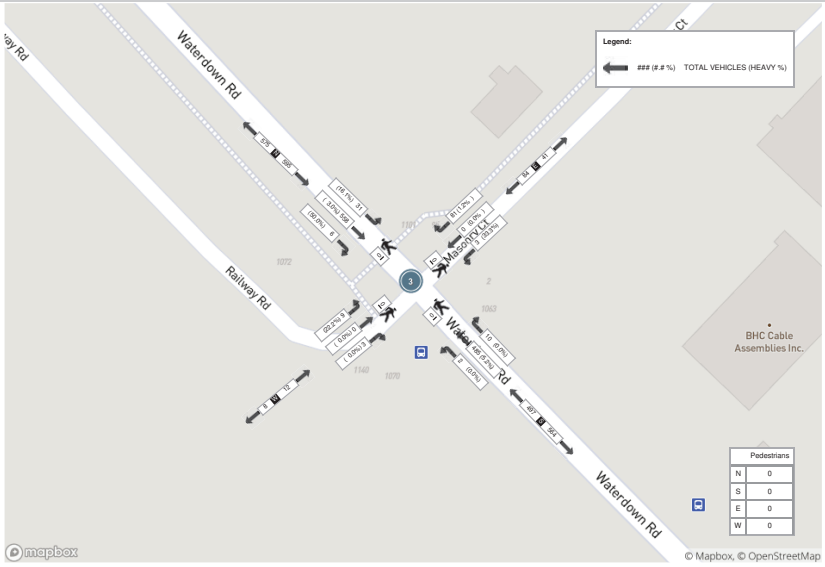
Peak Hour: 04:00 PM - 05:00 PM Weather: Clear Sky (-1.12 °C)

Start Time	N Approach WATERDOWN RD						E Approach MASONRY CT						S Approach WATERDOWN RD						W Approach RAILWAY RD						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	
16:00:00	1	135	8	0	0	144	20	0	1	0	0	21	7	145	1	0	0	153	0	0	4	0	0	4	322
16:15:00	1	128	8	1	0	138	18	0	0	0	0	18	2	112	1	0	0	115	2	0	1	0	0	3	274
16:30:00	1	150	8	0	0	159	27	0	0	0	0	27	1	104	0	0	0	105	0	0	1	0	0	1	292
16:45:00	3	145	7	0	0	155	16	0	2	0	0	18	0	124	0	0	0	124	1	0	3	0	0	4	301
Grand Total	6	558	31	1	0	596	81	0	3	0	0	84	10	485	2	0	0	497	3	0	9	0	0	12	**1189**
Approach%	1%	93.6%	5.2%	0.2%		-	96.4%	0%	3.6%	0%		-	2%	97.6%	0.4%	0%		-	25%	0%	75%	0%		-	-
Totals %	0.5%	46.9%	2.6%	0.1%		50.1%	6.8%	0%	0.3%	0%		7.1%	0.8%	40.8%	0.2%	0%		41.8%	0.3%	0%	0.8%	0%		1%	-
PHF	0.5	0.93	0.97	0.25		0.94	0.75	0	0.38	0		0.78	0.36	0.84	0.5	0		0.81	0.38	0	0.56	0		0.75	-
Heavy	3	17	5	0		25	1	0	1	0		2	0	25	0	0		25	0	0	2	0		2	-
Heavy %	50%	3%	16.1%	0%		4.2%	1.2%	0%	33.3%	0%		2.4%	0%	5.2%	0%	0%		5%	0%	0%	22.2%	0%		16.7%	-
Lights	3	541	26	1		571	80	0	2	0		82	10	460	2	0		472	3	0	7	0		10	-
Lights %	50%	97%	83.9%	100%		95.8%	98.8%	0%	66.7%	0%		97.6%	100%	94.8%	100%	0%		95%	100%	0%	77.8%	0%		83.3%	-
Single-Unit Trucks	2	12	1	0		15	0	0	0	0		0	0	11	0	0		11	0	0	2	0		2	-
Single-Unit Trucks %	33.3%	2.2%	3.2%	0%		2.5%	0%	0%	0%	0%		0%	0%	2.3%	0%	0%		2.2%	0%	0%	22.2%	0%		16.7%	-
Buses	0	5	4	0		9	1	0	1	0		2	0	12	0	0		12	0	0	0	0		0	-
Buses %	0%	0.9%	12.9%	0%		1.5%	1.2%	0%	33.3%	0%		2.4%	0%	2.5%	0%	0%		2.4%	0%	0%	0%	0%		0%	-
Articulated Trucks	1	0	0	0		1	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Articulated Trucks %	16.7%	0%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 07:45 AM - 08:45 AM Weather: Broken Clouds (-10 °C)



Peak Hour: 04:00 PM - 05:00 PM **Weather: Clear Sky (-1.12 °C)**



Intersection Name:	TS ID:	Line No:	Model:	IP address:	Controller Make:
Plains Road @ Cooke Blvd	117	4	ACS/3	172.22.15.2	Econolite

Type of Operation: 8 Phase Semi-Actuated

*-Start from Main Menu

No	Date			Description	Prepared by
	Y	M	D		
5	2019	5	8	Plains Road Optimization	MA

PHASE DESCRIPTION

Ph1		Ph5	EBLT - Plains Road
Ph2	EB - Plains Road	Ph6	WB - Plains Road
Ph3		Ph7	
Ph4	NB - Driveway	Ph8	SB - Cooke Blvd

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

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

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1

Phase:	1	2	3	4	5	6	7	8
Minimum Green		8		8	6	8		8
Walk		8		8		8		8
Ped. Clearance		11		14		11		14
Pedestrian Carry Over								
Vehicle Extension		3		3	3	3		3
MAX 1		40		30	10	40		30
MAX 2		40		30	10	40		30
Yellow Change		4		4	3	4		4
Red Clearance		3		3		3		3
Phase Minimum:	1	27	1	30	10	27	1	30

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

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

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

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	100	20	1	1		68		32	15	53		32
2	90	84	1	2		52		38	12	40		38
3	110	23	1	3		78		32	16	62		32
4	85	52	1	4		55		30	12	43		30
10	0	0	1	10		0		0	0	0		0

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

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	
1	1	4	06:00	4	1	
1	1	1	07:00	1	1	Schedule 1 = Day Plan 1
1	1	2	09:00	2	1	Schedule 2 = Day Plan 2
1	1	3	15:30	3	1	Schedule 3 = Day Plan 3
1	1	4	19:00	4	1	
1	1	10	22:00	254	1	Day Plan 1 (Weekday)
2	2	4	08:00	4	1	Day Plan 2 (Saturday)
2	2	3	10:30	3	1	Day Plan 3 (Sunday, Holidays)
2	2	4	17:00	4	1	
2	2	10	21:00	254	1	Action Plan 10 = free (254)
3	3	4	09:30	4	1	
3	3	2	12:00	2	1	
3	3	4	17:00	4	1	
3	3	10	21:00	254	1	

Special Programming:

Intersection Name:	TS ID:	Line No:	Model:	IP address:	Controller Make:
Plains Road @ Waterdown Rd	100	4	ACS/3	172.22.7.2	Econolite

Type of Operation: 8 Phase Semi-Actuated

*-Start from Main Menu

No	Date			Description	Prepared by
	Y	M	D		
8	2019	5	15	Plains Road Optimization	MA

PHASE DESCRIPTION

Ph1	WBLT - Plains Road	Ph5	EBLT - Plains Road
Ph2	EB - Plains Road	Ph6	WB - Plains Road
Ph3	SBLT - Waterdown Road	Ph7	NBLT - Waterdown Road
Ph4	NB - Waterdown Road	Ph8	SB - Waterdown Road

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

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

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1

	Phase: 1	2	3	4	5	6	7	8
Minimum Green	6	8	6	8	6	8	6	8
Walk		8		10		8		10
Ped. Clearance		13		17		13		17
Pedestrian Carry Over								
Vehicle Extension	3	3	3	3	3	3	3	3
MAX 1	12	35	12	25	12	35	12	25
MAX 2	12	35	12	25	12	35	12	25
Yellow Change	3	4	3	4	3	4	3	4
Red Clearance		2		3		2		3
Phase Minimum:	10	28	10	35	10	28	10	35

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

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

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

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec) 1	2	3	4	5	6	7	8
1	110	0	1	1	12	51	13	34	32	31	10	37
2	90	84	1	2	12	34	10	34	14	32	10	34
3	110	37	1	3	18	46	20	26	18	46	10	36
4	85	52	1	4	12	30	10	33	14	28	10	33
10	0	0	1	10	0	0	0	0	0	0		

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

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	
1	1	4	06:00	4	1	
1	1	1	07:00	1	1	Schedule 1 = Day Plan 1
1	1	2	09:00	2	1	Schedule 2 = Day Plan 2
1	1	3	15:30	3	1	Schedule 3 = Day Plan 3
1	1	4	19:00	4	1	
1	1	10	22:00	254	1	Day Plan 1 (Weekday)
2	2	4	08:00	4	1	Day Plan 2 (Saturday)
2	2	3	10:30	3	1	Day Plan 3 (Sunday, Holidays)
2	2	4	17:00	4	1	
2	2	10	21:00	254	1	Action Plan 10 = free (254)
3	3	4	09:30	4	1	
3	3	2	12:00	2	1	
3	3	4	17:00	4	1	
3	3	10	21:00	254	1	

Special Programming:

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (1 . SOUTH SERVICE RD & ALDERSHOT GO PARKING ACCESS)

Start Time	E Approach SOUTH SERVICE RD					S Approach ALDERSHOT GO PARKING ACCESS					W Approach SOUTH SERVICE RD					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	UTurn W:W	Peds W:	Approach Total		
07:00:00	11	0	0	0	11	0	4	0	0	4	7	126	0	0	133	148	
07:15:00	2	0	0	0	2	0	4	0	0	4	5	119	0	0	124	130	
07:30:00	2	0	0	0	2	0	5	0	0	5	3	131	0	0	134	141	
07:45:00	2	0	0	0	2	0	3	0	0	3	3	126	0	0	129	134	553
08:00:00	2	0	0	0	2	0	3	0	0	3	3	147	0	0	150	155	560
08:15:00	5	0	0	0	5	0	5	0	0	5	6	122	0	0	128	138	568
08:30:00	2	0	0	0	2	1	3	0	0	4	3	118	0	0	121	127	554
08:45:00	3	0	0	0	3	0	3	0	0	3	4	119	0	0	123	129	549
BREAK																	
16:00:00	9	0	0	0	9	0	3	0	0	3	3	122	0	0	125	137	
16:15:00	13	0	0	0	13	0	4	0	0	4	5	97	0	0	102	119	
16:30:00	8	0	0	0	8	1	5	0	0	6	7	118	0	0	125	139	
16:45:00	14	0	0	0	14	0	2	0	0	2	4	109	0	0	113	129	524
17:00:00	9	0	0	0	9	0	4	0	0	4	3	98	0	0	101	114	501
17:15:00	13	0	0	0	13	0	2	0	0	2	2	101	0	0	103	118	500
17:30:00	20	0	0	0	20	0	3	0	1	3	5	112	0	0	117	140	501
17:45:00	10	0	0	0	10	0	4	0	1	4	2	93	0	0	95	109	481
Grand Total	125	0	0	0	125	2	57	0	2	59	65	1858	0	0	1923	**2107**	-
Approach%	100%	0%	0%		-	3.4%	96.6%	0%		-	3.4%	96.6%	0%		-	-	-
Totals %	5.9%	0%	0%		5.9%	0.1%	2.7%	0%		2.8%	3.1%	88.2%	0%		91.3%	-	-
Heavy	0	0	0		-	2	52	0		-	57	62	0		-	-	-
Heavy %	0%	0%	0%		-	100%	91.2%	0%		-	87.7%	3.3%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-

Spectrum

Turning Movement Count
Location Name: SOUTH SERVICE RD & ALDERSHOT GO PARKING ACCESS
Date: Tue, Mar 02, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

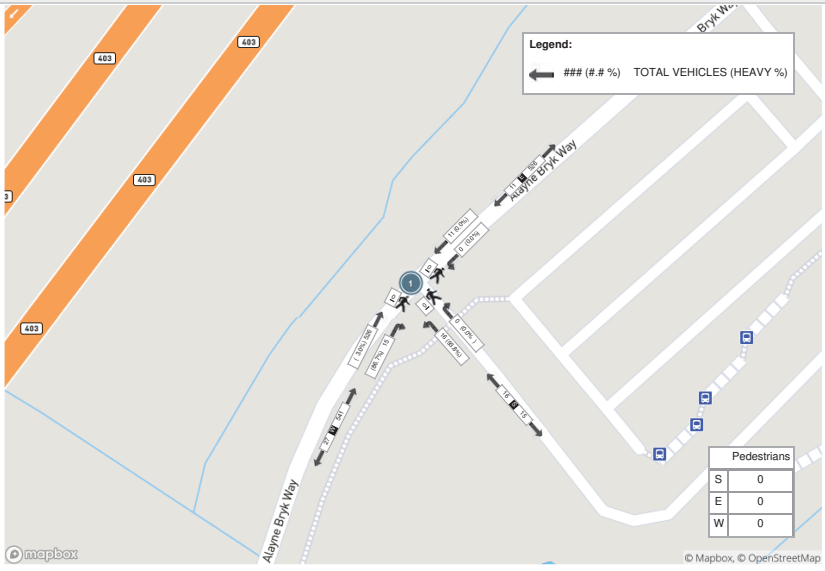
Peak Hour: 07:30 AM - 08:30 AM Weather: Broken Clouds (-10 °C)

Start Time	E Approach SOUTH SERVICE RD					S Approach ALDERSHOT GO PARKING ACCESS					W Approach SOUTH SERVICE RD					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
07:30:00	2	0	0	0	2	0	5	0	0	5	3	131	0	0	134	141
07:45:00	2	0	0	0	2	0	3	0	0	3	3	126	0	0	129	134
08:00:00	2	0	0	0	2	0	3	0	0	3	3	147	0	0	150	155
08:15:00	5	0	0	0	5	0	5	0	0	5	6	122	0	0	128	138
Grand Total	11	0	0	0	11	0	16	0	0	16	15	526	0	0	541	**568**
Approach%	100%	0%	0%		-	0%	100%	0%		-	2.8%	97.2%	0%		-	-
Totals %	1.9%	0%	0%		1.9%	0%	2.8%	0%		2.8%	2.6%	92.6%	0%		95.2%	-
PHF	0.55	0	0		0.55	0	0.8	0		0.8	0.63	0.89	0		0.9	-
Heavy	0	0	0		0	0	15	0		15	13	16	0		29	-
Heavy %	0%	0%	0%		0%	0%	93.8%	0%		93.8%	86.7%	3%	0%		5.4%	-
Lights	11	0	0		11	0	1	0		1	2	510	0		512	-
Lights %	100%	0%	0%		100%	0%	6.3%	0%		6.3%	13.3%	97%	0%		94.6%	-
Single-Unit Trucks	0	0	0		0	0	0	0		0	0	11	0		11	-
Single-Unit Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	2.1%	0%		2%	-
Buses	0	0	0		0	0	15	0		15	13	3	0		16	-
Buses %	0%	0%	0%		0%	0%	93.8%	0%		93.8%	86.7%	0.6%	0%		3%	-
Articulated Trucks	0	0	0		0	0	0	0		0	0	2	0		2	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0.4%	0%		0.4%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

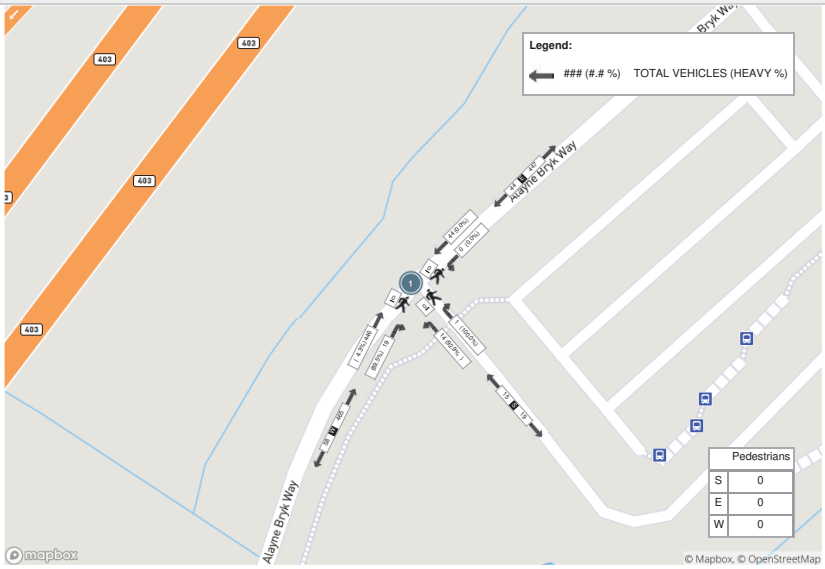
Peak Hour: 04:00 PM - 05:00 PM Weather: Clear Sky (-1.12 °C)

Start Time	E Approach SOUTH SERVICE RD					S Approach ALDERSHOT GO PARKING ACCESS					W Approach SOUTH SERVICE RD					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:00:00	9	0	0	0	9	0	3	0	0	3	3	122	0	0	125	137
16:15:00	13	0	0	0	13	0	4	0	0	4	5	97	0	0	102	119
16:30:00	8	0	0	0	8	1	5	0	0	6	7	118	0	0	125	139
16:45:00	14	0	0	0	14	0	2	0	0	2	4	109	0	0	113	129
Grand Total	44	0	0	0	44	1	14	0	0	15	19	446	0	0	465	**524**
Approach%	100%	0%	0%		-	6.7%	93.3%	0%		-	4.1%	95.9%	0%		-	-
Totals %	8.4%	0%	0%		8.4%	0.2%	2.7%	0%		2.9%	3.6%	85.1%	0%		88.7%	-
PHF	0.79	0	0		0.79	0.25	0.7	0		0.63	0.68	0.91	0		0.93	-
Heavy	0	0	0		0	1	13	0		14	17	19	0		36	-
Heavy %	0%	0%	0%		0%	100%	92.9%	0%		93.3%	89.5%	4.3%	0%		7.7%	-
Lights	44	0	0		44	0	1	0		1	2	427	0		429	-
Lights %	100%	0%	0%		100%	0%	7.1%	0%		6.7%	10.5%	95.7%	0%		92.3%	-
Single-Unit Trucks	0	0	0		0	0	0	0		0	0	13	0		13	-
Single-Unit Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	2.9%	0%		2.8%	-
Buses	0	0	0		0	1	13	0		14	17	3	0		20	-
Buses %	0%	0%	0%		0%	100%	92.9%	0%		93.3%	89.5%	0.7%	0%		4.3%	-
Articulated Trucks	0	0	0		0	0	0	0		0	0	3	0		3	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0.7%	0%		0.6%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Peak Hour: 07:30 AM - 08:30 AM Weather: Broken Clouds (-10 °C)



Peak Hour: 04:00 PM - 05:00 PM Weather: Clear Sky (-1.12 °C)



Intersection Name:	Group No:	TS ID:	Model:	Controller Make:	IP address:
Waterdown Rd @ 403 North Ramp		31	ACS/3	Econolite	172.22.12.2

Type of Operation:				8 Phase Semi-Actuated	
No	Date			Description	Prepared By
	Y	M	D		
1	2015	1		Implement timings in Centracs	MA
2	2020	12	21	Update Phase 2&6 All-Red	JR

*- Start from Main Manu

PHASE DESCRIPTION			
Ph1		Ph5	
Ph2	NB -Waterdown Rd	Ph6	SB -Waterdown Rd
Ph3		Ph7	WB - North Ramp
Ph4		Ph8	EB - Private Entrance

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

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

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1

Phase:	1	2	3	4	5	6	7	8
Minimum Green		8				8	8	8
Walk		8				8		
Ped. Clearance		16				16		
Vehicle Extension		3				3	3	3
MAX 1		40				40	30	15
MAX 2		40				40	30	15
Yellow Change		4				4	4	4
Red Clearance		3				3	3	3

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

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

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

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)						
					1	2	3	4	5	6	7	8
1	100	55	1	1		55				55	27	18
2	90	49	1	2		45				45	27	18
3	110	94	1	3		65				65	26	19
10			1	10								

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

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

X - select "." deselect

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

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	1	06:00	1	1
1	1	2	09:00	2	1
1	1	3	15:30	3	1
1	1	10	19:00	10	1
2	2	2	08:00	2	1
2	2	10	19:00	10	1
3	3	2	09:00	2	1
3	3	10	19:00	3	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

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

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

Sum of 1&2 = 5&6		Sum of 3&4 = 7&8		Culculated	
				Total 1-4	Total 5-8
				Actual	Actual
1&2	5&6	3&4	7&8	Cycle	Cycle
55	55	0	45	55	100
45	45	0	45	45	90
65	65	0	45	65	110
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Intersection Name:	TS ID:	Line No:	Model:	IP address:	Controller Make:
Waterdown Rd @ Masonry Crt	104	4	ACS/3	172.22.8.2	Econolite

Type of Operation: 8 Phase Semi-Actuated

*-Start from Main Menu

No	Date Y	Date M	Date D	Description	Prepared by
					BP
8	2017	12	19	Timings reverted back to original	

PHASE DESCRIPTION

Ph1	SBL - Waterdown Road	Ph5	
Ph2	NB - Waterdown Road	Ph6	SB - Waterdown Road
Ph3		Ph7	
Ph4	EB - Railway Road	Ph8	WB - Masonry Court

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

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

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1

Phase:	1	2	3	4	5	6	7	8
Minimum Green	8	8		8		8		8
Walk		15		8		15		8
Ped. Clearance		14		14		14		14
Pedestrian Carry Over								
Vehicle Extension	3	3		5		3		5
MAX 1	15	40		30		40		30
MAX 2	15	40		30		40		30
Yellow Change	3	4		4		4		4
Red Clearance	0	2		3		2		3
Phase Minimum:	12	36	1	30	1	36	1	30

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

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

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

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec) 1	2	3	4	5	6	7	8
1	100	22	1	1	18	42		40		60		40
2	0	0	0	0	0	0		0		0		0
3	110	72	1	3	18	60		32		78		32
10	0	0	1	10	0	0		0		0		0

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

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	1	06:00	1	1
1	1	10	09:00	254	1
1	1	3	15:30	3	1
1	1	10	19:00	254	1
2	2	1	09:00	1	1
2	2	10	18:00	254	1
3	3	1	9:00	1	1
3	3	10	18:00	254	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

Special Programming:

Intersection Name:	Group No:	TS ID:	Model:	Controller Make:	IP address:
Waterdown Rd @ NSR		106	ACS/3	Econolite	172.22.13.2

Type of Operation:				8 Phase Semi-Actuated	
No	Date			Description	Prepared By
	Y	M	D		
1	2015	1	28	Implement timings in Centracs	MA
2	2020	12	21	Update All-Red Intervals, Phase 8 FDW	JR

*- Start from Main Manu

PHASE DESCRIPTION			
Ph1	SBLT - Waterdown Rd	Ph5	NBLT - Waterdown Rd
Ph2	NB -Waterdown Rd	Ph6	SB -Waterdown Rd
Ph3		Ph7	
Ph4		Ph8	WB - NSR

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

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

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1

Phase:	1	2	3	4	5	6	7	8
Minimum Green	7	8			7	8		8
Walk		15				15		10
Ped. Clearance		8				8		22
Vehicle Extension	3	3			3	3		3
MAX 1	15	40			20	40		30
MAX 2	15	40			20	40		30
Yellow Change	3	4			3	4		4
Red Clearance	0	4			0	4		4

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

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

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

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)						
					1	2	3	4	5	6	7	8
1	100	48	1	1	25	55			22	58		20
2	90	50	1	2	17	39			22	34		34
3	110	97	1	3	11	62			21	52		37
10			1	10								

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

Phase Omit									
Special Function Outputs									

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

X - select "." deselect

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

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	1	06:00	1	1
1	1	2	09:00	2	1
1	1	3	15:30	3	1
1	1	10	19:00	10	1
2	2	2	08:00	2	1
2	2	10	19:00	10	1
3	3	2	09:00	2	1
3	3	10	19:00	3	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

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

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

Sum of 1&2 = 5&6		Sum of 3&4 = 7&8		Culculated	
				Total 1-4	Total 5-8
				Actual	Actual
1&2	5&6	3&4	7&8	Cycle	Cycle
80	80	0	20	80	100
56	56	0	34	56	90
73	73	0	37	73	110
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Intersection Name:	Group No:	TS ID:	Model:	Controller Make:	IP address:
Waterdown Rd @ 403 South Ramp		105	ACS/3	Econolite	172.22.9.2

Type of Operation:				8 Phase Semi-Actuated	
No	Date Y	M	D	Description	Prepared By
2	2015	2	27	Change Split 1	MA
3	2020	12	21	Update All-Red Intervals	JR

*- Start from Main Manu

PHASE DESCRIPTION			
Ph1	SBLT - Waterdown Rd	Ph5	
Ph2	NB -Waterdown Rd	Ph6	SB -Waterdown Rd
Ph3	WB -403 EB on Ramp	Ph7	
Ph4	EB - 403 EB off Ramp	Ph8	

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

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

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1

Phase:	1	2	3	4	5	6	7	8
Minimum Green :	6	8	8	8		8		
Walk :		8		8		8		
Ped. Clearance :		14		14		14		
Vehicle Extension :	3	3	3	3		3		
MAX 1 :	15	40	20	30		40		
MAX 2 :	15	40	20	30		40		
Yellow Change :	3	4	4	4		4		
Red Clearance :	0	3	4	4		3		

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

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

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

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec) 1	2	3	4	5	6	7	8
1	100	54	1	1	15	35	20	30		50		
2	90	46	1	2	12	32	16	30		44		
3	110	99	1	3	17	44	22	27		61		
10			1	10								

CP # 1, 2, 10

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

Phase Omit :									
Special Function Outputs :									

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

X - select "." deselect

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

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	1	06:00	1	1
1	1	2	09:00	2	1
1	1	3	15:30	3	1
1	1	10	19:00	10	1
2	2	2	08:00	2	1
2	2	10	19:00	10	1
3	3	2	09:00	2	1
3	3	10	19:00	3	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

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

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

Sum of 1&2 = 5&6		Sum of 3&4 = 7&8		Culculated	
				Total 1-4	Total 5-8
				Actual	Actual
1&2	5&6	3&4	7&8	Cycle	Cycle
50	50	50	0	100	50
44	44	46	0	90	44
61	61	49	0	110	61
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

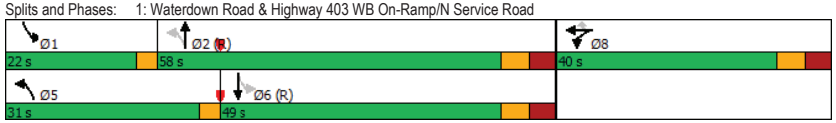
APPENDIX F:
Synchro Worksheets

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	60	105	65	310	440	235	735
Future Volume (vph)	60	105	65	310	440	235	735
Lane Group Flow (vph)	61	107	66	316	888	240	964
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	31.0	58.0	22.0	49.0
Total Split (%)	33.3%	33.3%	33.3%	25.8%	48.3%	18.3%	40.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.35	0.56	0.25	0.63	0.45	0.47	0.55
Control Delay	52.8	60.3	5.3	16.8	5.1	7.4	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	52.8	60.3	5.3	16.8	5.2	7.4	18.7
Queue Length 50th (m)	14.1	25.4	0.0	4.4	50.0	10.9	70.6
Queue Length 95th (m)	26.9	42.4	5.3	61.1	15.1	22.1	123.6
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	468	593	1977	588	1749
Starvation Cap Reductn	0	0	0	8	249	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.14	0.54	0.51	0.41	0.55

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	105	65	310	440	430	235	735	210
Future Volume (vph)	0	0	0	60	105	65	310	440	430	235	735	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	1544	2970		1616	2986	
Flt Permitted				0.95	1.00	1.00	0.24	1.00		0.31	1.00	
Satd. Flow (perm)				1442	1597	1439	384	2970		529	2986	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	61	107	66	316	449	439	240	750	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	94	0	0	14	0
Lane Group Flow (vph)	0	0	0	61	107	8	316	794	0	240	950	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	90.6	75.1		81.2	68.7	
Effective Green, g (s)				14.4	14.4	14.4	91.6	76.1		83.2	69.7	
Actuated g/C Ratio				0.12	0.12	0.12	0.76	0.63		0.69	0.58	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	485	1883		489	1734	
v/s Ratio Prot				0.04	c0.07		c0.11	0.27		0.06	c0.32	
v/s Ratio Perm						0.01	0.39			0.28		
v/c Ratio				0.35	0.56	0.05	0.65	0.42		0.49	0.55	
Uniform Delay, d1				48.5	49.8	46.7	6.8	11.0		6.7	15.5	
Progression Factor				1.00	1.00	1.00	2.46	0.52		1.00	1.00	
Incremental Delay, d2				1.2	3.7	0.1	2.8	0.6		0.8	1.2	
Delay (s)				49.8	53.5	46.8	19.6	6.4		7.4	16.7	
Level of Service				D	D	D	B	A		A	B	
Approach Delay (s)		0.0			50.7			9.9			14.9	
Approach LOS		A			D			A			B	

Intersection Summary

HCM 2000 Control Delay	15.8	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.57				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	65.9%	ICU Level of Service		C	
Analysis Period (min)	15				

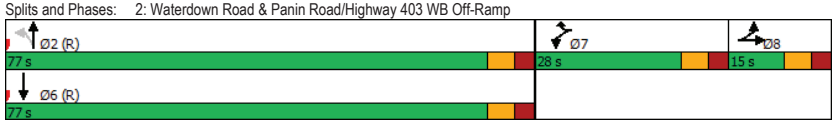
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	265	150	5	1025	795
Future Volume (vph)	0	265	150	5	1025	795
Lane Group Flow (vph)	5	288	163	0	1119	864
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	28.0	28.0	77.0	77.0	77.0
Total Split (%)	12.5%	23.3%	23.3%	64.2%	64.2%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.63	0.48		0.47	0.34
Control Delay	53.4	54.7	11.5		12.1	4.3
Queue Delay	0.0	0.0	0.0		0.3	0.1
Total Delay	53.4	54.7	11.5		12.4	4.4
Queue Length 50th (m)	1.2	35.1	0.0		71.4	21.9
Queue Length 95th (m)	5.5	48.1	19.1		114.2	19.5
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	585	394		2365	2518
Starvation Cap Reductn	0	0	0		567	594
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.49	0.41		0.62	0.45

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	265	0	150	5	1025	0	0	795	0
Future Volume (vph)	5	0	0	265	0	150	5	1025	0	0	795	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3391			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3228			3438	
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)	5	0	0	288	0	163	5	1114	0	0	864	0
RTOR Reduction (vph)	0	0	0	0	0	140	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	288	0	23	0	1119	0	0	864	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		16.1		16.1		81.3			81.3	
Effective Green, g (s)		2.6		17.1		17.1		82.3			82.3	
Actuated g/C Ratio		0.02		0.14		0.14		0.69			0.69	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		455		203		2213			2357	
v/s Ratio Prot		c0.00		c0.09		0.02					0.25	
v/s Ratio Perm								c0.35				
v/c Ratio		0.21		0.63		0.11		0.51			0.37	
Uniform Delay, d1		57.7		48.5		44.8		9.1			7.9	
Progression Factor		1.00		1.00		1.00		1.47			0.57	
Incremental Delay, d2		4.3		2.9		0.3		0.5			0.4	
Delay (s)		62.0		51.4		45.1		13.9			4.9	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			49.1			13.9			4.9	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.3	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.52				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	59.4%	ICU Level of Service		B	
Analysis Period (min)	15				

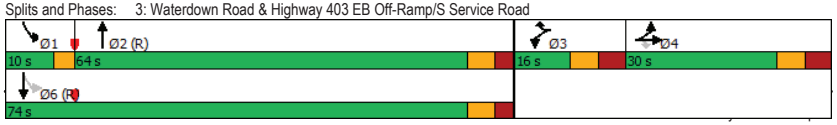
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	275	315	380	25	100	655	565	495
Future Volume (vph)	275	315	380	25	100	655	565	495
Lane Group Flow (vph)	296	339	409	27	108	1306	608	532
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	16.0	16.0	64.0	10.0	74.0
Total Split (%)	25.0%	25.0%	25.0%	13.3%	13.3%	53.3%	8.3%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.79	0.83	0.67	0.15	0.50	0.86	1.31	0.29
Control Delay	61.1	63.8	12.9	58.4	17.7	18.9	177.7	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.1	63.8	12.9	58.4	17.7	18.9	177.7	12.8
Queue Length 50th (m)	67.2	77.8	8.7	3.4	0.0	95.4	~165.4	20.9
Queue Length 95th (m)	#124.0	#141.7	45.2	8.6	15.9	54.8	#262.5	25.7
Internal Link Dist (m)		253.6				353.3		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	373	406	611	208	232	1661	465	1906
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.83	0.67	0.13	0.47	0.79	1.31	0.28

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	275	315	380	25	0	100	0	655	560	565	495	0
Future Volume (vph)	275	315	380	25	0	100	0	655	560	565	495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		0.93		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	2775		1426		3170		1766	3343	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	2775		1426		3170		583	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	296	339	409	27	0	108	0	704	602	608	532	0
RTOR Reduction (vph)	0	0	285	0	0	101	0	142	0	0	0	0
Lane Group Flow (vph)	296	339	124	27	0	7	0	1164	0	608	532	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	24.9	24.9	24.9	6.7		6.7		50.9		65.4	65.4	
Effective Green, g (s)	25.9	25.9	25.9	7.7		7.7		51.9		66.4	66.4	
Actuated g/C Ratio	0.22	0.22	0.22	0.06		0.06		0.43		0.55	0.55	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	372	405	325	178		91		1371		445	1849	
v/s Ratio Prot	0.17	c0.18		c0.01		0.00		c0.37		c0.14	0.16	
v/s Ratio Perm			0.08							0.61		
v/c Ratio	0.80	0.84	0.38	0.15		0.08		0.85		1.37	0.29	
Uniform Delay, d1	44.5	45.0	40.2	53.1		52.8		30.5		19.3	14.2	
Progression Factor	1.00	1.00	1.00	1.07		2.14		0.55		1.23	0.86	
Incremental Delay, d2	11.2	14.0	0.7	0.4		0.4		5.5		178.0	0.4	
Delay (s)	55.7	59.0	40.9	57.2		113.1		22.3		201.7	12.6	
Level of Service	E	E	D	E		F		C		F	B	
Approach Delay (s)		51.0			102.0			22.3			113.5	
Approach LOS		D			F			C			F	

Intersection Summary

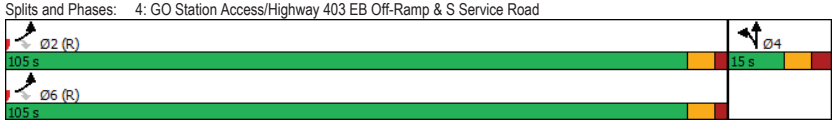
HCM 2000 Control Delay	62.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	850	160	25		
Future Volume (vph)	850	160	25		
Lane Group Flow (vph)	895	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.74	0.12	0.27		
Control Delay	9.4	0.5	57.4		
Queue Delay	0.3	0.0	0.0		
Total Delay	9.7	0.5	57.4		
Queue Length 50th (m)	84.8	2.4	8.8		
Queue Length 95th (m)	206.7	0.0	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	139		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.77	0.12	0.27		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	850	160	10	25	0	0
Future Volume (vph)	850	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	895	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	895	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.0	102.0		5.0		
Effective Green, g (s)	103.0	103.0		6.0		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1151	1370		91		
v/s Ratio Prot	c0.67			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.78	0.11		0.41		
Uniform Delay, d1	3.6	1.3		55.3		
Progression Factor	1.18	1.38		1.00		
Incremental Delay, d2	4.6	0.1		2.9		
Delay (s)	8.9	2.0		58.2		
Level of Service	A	A		E		
Approach Delay (s)	7.8			58.2	0.0	
Approach LOS	A			E	A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

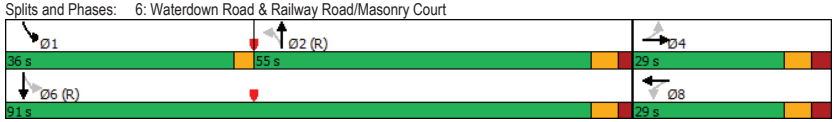
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	0	25	0	5	1015	355	535
Future Volume (vph)	10	0	25	0	5	1015	355	535
Lane Group Flow (vph)	0	22	28	216	6	1278	403	619
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	55.0	55.0	36.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	45.8%	45.8%	30.0%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.27	0.27	0.40	0.02	0.66	0.73	0.22
Control Delay		8.2	57.7	2.2	8.2	12.5	27.8	2.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		8.2	57.7	2.2	8.2	12.5	27.8	2.6
Queue Length 50th (m)		0.0	6.7	0.0	0.3	51.7	50.6	9.1
Queue Length 95th (m)		0.2	16.0	0.0	m0.0	m143.9	89.2	24.8
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		114	237	653	365	1941	635	2782
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.19	0.12	0.33	0.02	0.66	0.63	0.22

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	25	0	190	5	1015	110	355	535	10
Future Volume (vph)	10	0	10	25	0	190	5	1015	110	355	535	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184		1586	1495		1454	3380		1728	3374	
Flt Permitted		0.30		0.74	1.00		0.42	1.00		0.13	1.00	
Satd. Flow (perm)		364		1241	1495		639	3380		241	3374	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	28	0	216	6	1153	125	403	608	11
RTOR Reduction (vph)	0	20	0	0	198	0	0	5	0	0	1	0
Lane Group Flow (vph)	0	2	0	28	18	0	6	1273	0	403	618	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.0		9.0	9.0		67.8	67.8		98.0	98.0	
Effective Green, g (s)		10.0		10.0	10.0		68.8	68.8		99.0	99.0	
Actuated g/C Ratio		0.08		0.08	0.08		0.57	0.57		0.82	0.82	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		30		103	124		366	1937		548	2783	
v/s Ratio Prot					0.01			c0.38		c0.17	0.18	
v/s Ratio Perm		0.01		c0.02			0.01			0.43		
v/c Ratio		0.06		0.27	0.15		0.02	0.66		0.74	0.22	
Uniform Delay, d1		50.7		51.6	51.0		11.0	17.5		23.2	2.2	
Progression Factor		1.00		1.00	1.00		0.55	0.61		1.18	1.03	
Incremental Delay, d2		0.9		1.4	0.5		0.0	0.9		4.7	0.2	
Delay (s)		51.5		53.0	51.6		6.1	11.5		32.0	2.5	
Level of Service		D		D	D		A	B		C	A	
Approach Delay (s)		51.5			51.7			11.5			14.1	
Approach LOS		D			D			B			B	

Intersection Summary

HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.64				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	75.5%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	420	45	15	135	0	80	0	20	0	0	0
Future Volume (Veh/h)	0	420	45	15	135	0	80	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	0	538	58	19	173	0	103	0	26	0	0	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)		144										
pX, platoon unblocked				0.96			0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	173			596			778	778	567	804	807	173
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	173			554			744	744	523	771	775	173
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			98			66	100	95	100	100	100
cM capacity (veh/h)	1416			981			306	323	533	286	311	855

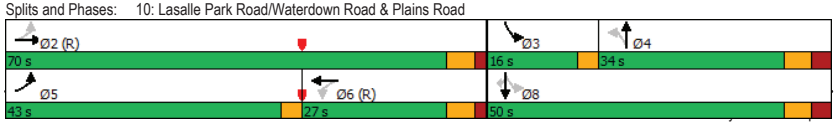
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	596	192	129	0
Volume Left	0	19	103	0
Volume Right	58	0	26	0
cSH	1416	981	335	1700
Volume to Capacity	0.00	0.02	0.38	0.00
Queue Length 95th (m)	0.0	0.5	14.1	0.0
Control Delay (s)	0.0	1.0	22.3	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	1.0	22.3	0.0
Approach LOS			C	A

Intersection Summary			
Average Delay		3.4	
Intersection Capacity Utilization		37.2%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	630	805	70	315	80	265	230	155	185
Future Volume (vph)	630	805	70	315	80	265	230	155	185
Lane Group Flow (vph)	670	1000	74	585	85	341	245	165	197
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	43.0	70.0	27.0	27.0	34.0	34.0	16.0	50.0	50.0
Total Split (%)	35.8%	58.3%	22.5%	22.5%	28.3%	28.3%	13.3%	41.7%	41.7%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.99	0.53	0.84	0.87	0.33	0.86	0.87	0.26	0.31
Control Delay	63.9	17.8	108.0	51.4	42.8	65.4	59.7	26.6	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.9	17.8	108.0	51.4	42.8	65.4	59.7	26.6	8.1
Queue Length 50th (m)	~162.1	78.7	17.8	57.9	17.5	78.4	38.2	23.2	1.7
Queue Length 95th (m)	#237.1	98.0	#46.9	#86.6	33.1	#124.3	#82.7	45.2	21.4
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	675	1903	92	693	275	424	282	663	654
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.53	0.80	0.84	0.31	0.80	0.87	0.25	0.30

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	630	805	135	70	315	235	80	265	55	230	155	185
Future Volume (vph)	630	805	135	70	315	235	80	265	55	230	155	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.94		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1677	3407		1666	3170		1718	1794		1614	1810	1446
Flt Permitted	0.17	1.00		0.29	1.00		0.65	1.00		0.20	1.00	1.00
Satd. Flow (perm)	306	3407		503	3170		1181	1794		341	1810	1446
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)	670	856	144	74	335	250	85	282	59	245	165	197
RTOR Reduction (vph)	0	11	0	0	113	0	0	6	0	0	0	128
Lane Group Flow (vph)	670	989	0	74	472	0	85	335	0	245	165	69
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	65.7	65.7		20.1	20.1		25.1	25.1		41.3	41.3	41.3
Effective Green, g (s)	66.7	66.7		21.1	21.1		26.1	26.1		42.3	42.3	42.3
Actuated g/C Ratio	0.56	0.56		0.18	0.18		0.22	0.22		0.35	0.35	0.35
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	668	1893		88	557		256	390		270	638	509
v/s Ratio Prot	c0.36	0.29			c0.15			c0.19		c0.11	0.09	
v/s Ratio Perm	0.19			0.15			0.07			0.21		0.05
v/c Ratio	1.00	0.52		0.84	0.85		0.33	0.86		0.91	0.26	0.14
Uniform Delay, d1	31.3	16.7		47.8	47.9		39.6	45.2		31.5	27.7	26.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.11	0.93	1.89
Incremental Delay, d2	35.6	1.0		59.2	14.8		0.8	16.8		31.0	0.2	0.1
Delay (s)	66.9	17.7		107.0	62.7		40.4	62.0		66.0	26.0	50.1
Level of Service	E	B		F	E		D	E		E	C	D
Approach Delay (s)		37.4			67.7			57.7			50.0	
Approach LOS		D			E			E			D	

Intersection Summary				
HCM 2000 Control Delay	48.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	99.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	90	1015	620	40
Future Volume (vph)	90	1015	620	40
Lane Group Flow (vph)	100	1128	756	105
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.17	0.42	0.32	0.50
Control Delay	2.9	4.4	7.0	28.1
Queue Delay	0.0	0.3	0.0	0.0
Total Delay	2.9	4.7	7.0	28.1
Queue Length 50th (m)	2.8	31.4	28.4	8.5
Queue Length 95th (m)	7.8	54.7	48.5	24.0
Internal Link Dist (m)		135.9	129.0	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	628	2665	2375	410
Starvation Cap Reductn	0	859	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.62	0.32	0.26

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



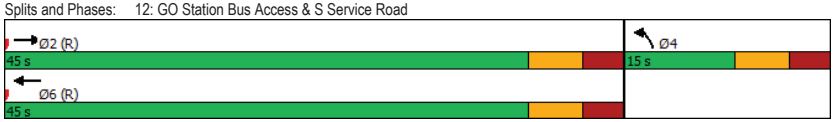
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	90	1015	620	60	40	55
Future Volume (vph)	90	1015	620	60	40	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1631	3282	3242		1405	
Flt Permitted	0.34	1.00	1.00		0.98	
Satd. Flow (perm)	587	3282	3242		1405	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1128	689	67	44	61
RTOR Reduction (vph)	0	0	4	0	55	0
Lane Group Flow (vph)	100	1128	752	0	50	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	77.6	77.6	68.9		8.4	
Effective Green, g (s)	78.6	78.6	69.9		9.4	
Actuated g/C Ratio	0.79	0.79	0.70		0.09	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	531	2579	2266		132	
v/s Ratio Prot	0.01	c0.34	0.23			
v/s Ratio Perm	0.14				c0.04	
v/c Ratio	0.19	0.44	0.33		0.38	
Uniform Delay, d1	2.6	3.5	5.9		42.5	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.5	0.4		1.8	
Delay (s)	2.7	4.0	6.3		44.4	
Level of Service	A	A	A		D	
Approach Delay (s)		3.9	6.3		44.4	
Approach LOS		A	A		D	

Intersection Summary				
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	44.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1425	110	15
Future Volume (vph)	1425	110	15
Lane Group Flow (vph)	1565	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.49	0.04	0.12
Control Delay	2.7	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	2.8	1.2	24.5
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m82.6	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3226	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	48	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.49	0.04	0.12

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1425	15	0	110	15	0
Future Volume (vph)	1425	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3471			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3471			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1549	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1564	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2626			2731	38	
v/s Ratio Prot	c0.45			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.60			0.04	0.42	
Uniform Delay, d1	3.2			1.8	28.0	
Progression Factor	1.42			0.90	1.00	
Incremental Delay, d2	0.2			0.0	7.4	
Delay (s)	4.8			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	4.8			1.7	35.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues — Future Background 2026 - Without Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	255	500	220	560	825	115	550
Future Volume (vph)	255	500	220	560	825	115	550
Lane Group Flow (vph)	268	526	232	589	1063	121	737
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	41.0	41.0	41.0	43.0	67.0	12.0	36.0
Total Split (%)	34.2%	34.2%	34.2%	35.8%	55.8%	10.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.59	1.04	0.41	0.99	0.68	0.48	0.98
Control Delay	43.1	92.4	6.5	55.4	22.4	21.7	71.5
Queue Delay	0.0	0.0	0.0	7.7	0.6	0.0	0.0
Total Delay	43.1	92.4	6.5	63.0	23.0	21.7	71.5
Queue Length 50th (m)	57.1	~140.4	0.0	136.9	127.0	10.8	92.9
Queue Length 95th (m)	86.5	#209.5	19.2	#201.0	37.8	18.6	#135.2
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	457	507	570	597	1572	261	754
Starvation Cap Reductn	0	0	0	18	198	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	1.04	0.41	1.02	0.77	0.46	0.98

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

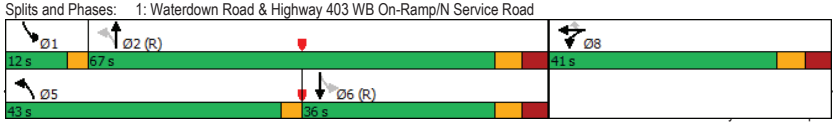
Natural Cycle: 105

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



HCM Signalized Intersection Capacity Analysis — Future Background 2026 - Without Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	500	220	560	825	185	115	550	150
Future Volume (vph)	0	0	0	255	500	220	560	825	185	115	550	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	1558	3084		1601	3038	
Flt Permitted				0.95	1.00	1.00	0.13	1.00		0.27	1.00	
Satd. Flow (perm)				1616	1792	1426	216	3084		454	3038	
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	0	268	526	232	589	868	195	121	579	158
RTOR Reduction (vph)	0	0	0	0	0	166	0	16	0	0	20	0
Lane Group Flow (vph)	0	0	0	268	526	66	589	1047	0	121	717	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				33.0	33.0	33.0	71.0	59.6		36.4	28.0	
Effective Green, g (s)				34.0	34.0	34.0	72.0	60.6		38.4	29.0	
Actuated g/C Ratio				0.28	0.28	0.28	0.60	0.51		0.32	0.24	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				457	507	404	588	1557		235	734	
v/s Ratio Prot				0.17	c0.29		c0.34	0.34		0.04	c0.24	
v/s Ratio Perm						0.05	0.26			0.12		
v/c Ratio				0.59	1.04	0.16	1.00	0.67		0.51	0.98	
Uniform Delay, d1				37.0	43.0	32.3	32.5	22.3		30.0	45.2	
Progression Factor				1.00	1.00	1.00	0.77	0.92		1.00	1.00	
Incremental Delay, d2				1.9	50.0	0.2	34.4	2.0		1.9	27.9	
Delay (s)				38.9	93.0	32.5	59.3	22.6		31.9	73.1	
Level of Service				D	F	C	E	C		C	E	
Approach Delay (s)		0.0			65.2			35.6			67.3	
Approach LOS		A			E			D			E	

Intersection Summary

HCM 2000 Control Delay	51.9	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	1.00				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	92.3%	ICU Level of Service		F	
Analysis Period (min)	15				

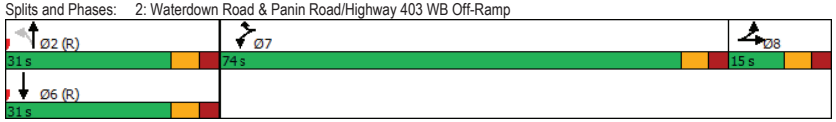
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	255	325	5	1245	805
Future Volume (vph)	0	255	325	5	1245	805
Lane Group Flow (vph)	6	290	369	0	1421	915
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	74.0	74.0	31.0	31.0	31.0
Total Split (%)	12.5%	61.7%	61.7%	25.8%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.01	0.56	0.77		0.61	0.36
Control Delay	0.0	49.5	23.7		19.9	16.4
Queue Delay	0.0	0.0	0.1		0.1	0.0
Total Delay	0.0	49.5	23.8		20.1	16.4
Queue Length 50th (m)	0.0	35.2	22.3		113.8	76.0
Queue Length 95th (m)	0.0	42.5	49.6		m174.5	m90.3
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	509	1792	988		2348	2517
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	74		185	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.01	0.16	0.40		0.66	0.36

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	255	0	325	5	1245	0	0	805	0
Future Volume (vph)	0	0	5	255	0	325	5	1245	0	0	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3302			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	290	0	369	6	1415	0	0	915	0
RTOR Reduction (vph)	0	6	0	0	0	228	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	290	0	141	0	1421	0	0	915	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		18.6		18.6		78.8			78.8	
Effective Green, g (s)		2.6		19.6		19.6		79.8			79.8	
Actuated g/C Ratio		0.02		0.16		0.16		0.66			0.66	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		516		250		2195			2353	
v/s Ratio Prot		c0.00		c0.09		0.09					0.26	
v/s Ratio Perm								c0.43				
v/c Ratio		0.00		0.56		0.56		0.65			0.39	
Uniform Delay, d1		57.4		46.2		46.2		11.8			9.1	
Progression Factor		1.00		1.00		1.00		1.70			1.87	
Incremental Delay, d2		0.0		1.4		2.9		0.7			0.3	
Delay (s)		57.5		47.7		49.1		20.7			17.3	
Level of Service		E		D		D		C			B	
Approach Delay (s)		57.5			48.5			20.7			17.3	
Approach LOS		E			D			C			B	

Intersection Summary

HCM 2000 Control Delay	25.8	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	76.4%	ICU Level of Service		D	
Analysis Period (min)	15				

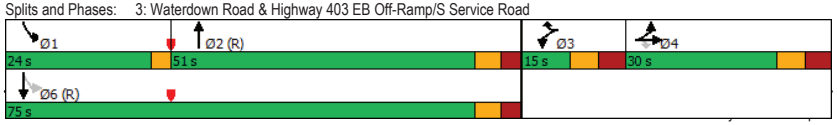
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	235	95	315	50	260	755	370	695
Future Volume (vph)	235	95	315	50	260	755	370	695
Lane Group Flow (vph)	264	107	354	56	292	1264	416	781
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	15.0	15.0	51.0	24.0	75.0
Total Split (%)	25.0%	25.0%	25.0%	12.5%	12.5%	42.5%	20.0%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.85	0.33	0.81	0.28	0.79	0.97	1.06	0.38
Control Delay	72.3	45.3	35.8	59.2	47.9	45.8	101.3	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.3	45.3	35.8	59.2	47.9	45.8	101.3	22.0
Queue Length 50th (m)	63.1	23.0	38.0	7.5	52.5	147.1	~105.8	80.1
Queue Length 95th (m)	#103.7	39.9	#81.8	14.6	#79.7	#194.3	#157.9	36.0
Internal Link Dist (m)		253.6				353.3		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	327	346	450	208	373	1308	391	2076
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.31	0.79	0.27	0.78	0.97	1.06	0.38

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	95	315	50	0	260	0	755	370	370	695	0
Future Volume (vph)	235	95	315	50	0	260	0	755	370	370	695	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		0.95		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	3134		1521		3354		1678	3539	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.09	1.00	
Satd. Flow (perm)	1711	1810	1521	3134		1521		3354		150	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	264	107	354	56	0	292	0	848	416	416	781	0
RTOR Reduction (vph)	0	0	161	0	0	273	0	50	0	0	0	0
Lane Group Flow (vph)	264	107	193	56	0	19	0	1214	0	416	781	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	20.8	20.8	20.8	6.8		6.8		44.0		69.4	69.4	
Effective Green, g (s)	21.8	21.8	21.8	7.8		7.8		45.0		70.4	70.4	
Actuated g/C Ratio	0.18	0.18	0.18	0.06		0.06		0.38		0.59	0.59	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	310	328	276	203		98		1257		385	2076	
v/s Ratio Prot	c0.15	0.06		c0.02		0.01		c0.36		c0.21	0.22	
v/s Ratio Perm			0.13							0.42		
v/c Ratio	0.85	0.33	0.70	0.28		0.19		0.97		1.08	0.38	
Uniform Delay, d1	47.5	42.7	46.0	53.4		53.1		36.7		38.4	13.2	
Progression Factor	1.00	1.00	1.00	1.04		6.26		0.82		1.15	1.59	
Incremental Delay, d2	19.6	0.6	7.5	0.7		1.0		17.0		68.3	0.5	
Delay (s)	67.1	43.3	53.5	56.4		333.3		47.3		112.4	21.4	
Level of Service	E	D	D	E		F		D		F	C	
Approach Delay (s)		57.0			288.7			47.3			53.0	
Approach LOS		E			F			D			D	

Intersection Summary

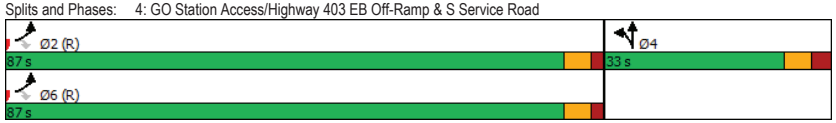
HCM 2000 Control Delay	75.0	HCM 2000 Level of Service	E			
HCM 2000 Volume to Capacity ratio	0.91					
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0			
Intersection Capacity Utilization	84.0%	ICU Level of Service	E			
Analysis Period (min)	15					
c Critical Lane Group						

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	695	15	30		
Future Volume (vph)	695	15	30		
Lane Group Flow (vph)	891	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			33.0	87.0	87.0
Total Split (%)			27.5%	73%	73%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.75	0.02	0.80		
Control Delay	15.0	0.6	61.9		
Queue Delay	0.3	0.0	0.0		
Total Delay	15.4	0.6	61.9		
Queue Length 50th (m)	97.7	0.2	70.5		
Queue Length 95th (m)	47.8	0.0	85.6		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1196	1133	415		
Starvation Cap Reductn	53	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.78	0.02	0.73		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	695	15	205	30	0	0
Future Volume (vph)	695	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	891	19	263	38	0	0
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	891	13	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	83.3	83.3		23.7		
Effective Green, g (s)	84.3	84.3		24.7		
Actuated g/C Ratio	0.70	0.70		0.21		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1190	1121		374		
v/s Ratio Prot	c0.53			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.75	0.01		0.80		
Uniform Delay, d1	11.2	5.4		45.4		
Progression Factor	0.84	0.23		1.00		
Incremental Delay, d2	4.3	0.0		11.9		
Delay (s)	13.8	1.2		57.2		
Level of Service	B	A		E		
Approach Delay (s)	13.5			57.2	0.0	
Approach LOS	B			E	A	

Intersection Summary

HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

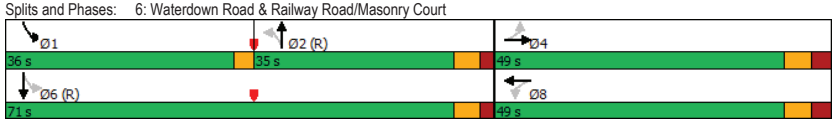
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	5	100	5	5	680	165	885
Future Volume (vph)	10	5	100	5	5	680	165	885
Lane Group Flow (vph)	0	25	127	557	6	905	209	1133
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	49.0	49.0	49.0	49.0	35.0	35.0	36.0	71.0
Total Split (%)	40.8%	40.8%	40.8%	40.8%	29.2%	29.2%	30.0%	59.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.47	0.61	0.78	0.03	0.42	0.42	0.43
Control Delay		63.5	58.1	12.1	15.4	14.9	7.9	3.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		63.5	58.1	12.1	15.4	14.9	7.9	3.0
Queue Length 50th (m)		4.3	29.7	1.3	0.6	56.3	4.7	20.5
Queue Length 95th (m)		11.3	40.0	11.3	m1.2	62.8	m19.5	36.3
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		114	478	923	223	2138	709	2608
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.22	0.27	0.60	0.03	0.42	0.29	0.43

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	100	5	435	5	680	35	165	885	10
Future Volume (vph)	10	5	5	100	5	435	5	680	35	165	885	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196		1711	1590		1353	3409		1694	3473	
Flt Permitted		0.25		0.74	1.00		0.25	1.00		0.26	1.00	
Satd. Flow (perm)		310		1334	1590		357	3409		466	3473	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	127	6	551	6	861	44	209	1120	13
RTOR Reduction (vph)	0	5	0	0	464	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	20	0	127	93	0	6	904	0	209	1133	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.9		17.9	17.9		74.2	74.2		89.1	89.1	
Effective Green, g (s)		18.9		18.9	18.9		75.2	75.2		90.1	90.1	
Actuated g/C Ratio		0.16		0.16	0.16		0.63	0.63		0.75	0.75	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		48		210	250		223	2136		481	2607	
v/s Ratio Prot					0.06			0.27		0.05	c0.33	
v/s Ratio Perm		0.06		c0.10			0.02			0.28		
v/c Ratio		0.42		0.60	0.37		0.03	0.42		0.43	0.43	
Uniform Delay, d1		45.6		47.1	45.2		8.5	11.4		5.4	5.5	
Progression Factor		1.00		1.00	1.00		1.14	1.11		1.30	0.40	
Incremental Delay, d2		5.7		4.9	0.9		0.2	0.4		0.6	0.5	
Delay (s)		51.3		51.9	46.2		9.9	13.1		7.6	2.7	
Level of Service		D		D	D		A	B		A	A	
Approach Delay (s)		51.3			47.2			13.0			3.5	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	150	55	20	465	0	75	0	20	0	0	0
Future Volume (Veh/h)	0	150	55	20	465	0	75	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	183	67	24	567	0	91	0	24	0	0	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)		144										
pX, platoon unblocked				0.99			0.99	0.99	0.99	0.99	0.99	
vC, conflicting volume	567			250			832	832	216	856	865	567
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	567			234			823	823	200	847	857	567
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			98			68	100	97	100	100	100
cM capacity (veh/h)	1015			1328			281	301	804	268	288	527

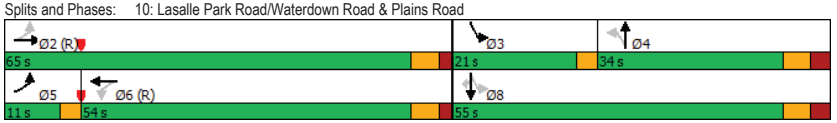
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	250	591	115	0
Volume Left	0	24	91	0
Volume Right	67	0	24	0
cSH	1015	1328	326	1700
Volume to Capacity	0.00	0.02	0.35	0.00
Queue Length 95th (m)	0.0	0.4	12.4	0.0
Control Delay (s)	0.0	0.5	22.0	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	0.5	22.0	0.0
Approach LOS			C	A

Intersection Summary				
Average Delay			3.0	
Intersection Capacity Utilization			52.2%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	225	525	70	995	115	200	360	260	370
Future Volume (vph)	225	525	70	995	115	200	360	260	370
Lane Group Flow (vph)	232	613	72	1330	119	268	371	268	381
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	11.0	65.0	54.0	54.0	34.0	34.0	21.0	55.0	55.0
Total Split (%)	9.2%	54.2%	45.0%	45.0%	28.3%	28.3%	17.5%	45.8%	45.8%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.92	0.33	0.25	0.96	0.59	0.77	0.93	0.38	0.57
Control Delay	71.5	16.1	26.3	49.5	55.8	58.3	60.8	26.2	16.3
Queue Delay	0.0	0.0	0.0	44.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.5	16.1	26.3	93.5	55.8	58.3	60.8	26.2	16.3
Queue Length 50th (m)	41.7	41.7	11.6	161.4	27.0	60.4	75.7	48.5	41.1
Queue Length 95th (m)	#109.7	59.2	23.6	#211.9	45.7	87.4	#109.5	76.2	76.3
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	252	1879	293	1403	247	425	397	775	719
Starvation Cap Reductn	0	0	0	243	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.33	0.25	1.15	0.48	0.63	0.93	0.35	0.53

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	525	70	70	995	295	115	200	60	360	260	370
Future Volume (vph)	225	525	70	70	995	295	115	200	60	360	260	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1616	3463		1626	3380		1694	1785		1709	1900	1492
Flt Permitted	0.08	1.00		0.42	1.00		0.59	1.00		0.28	1.00	1.00
Satd. Flow (perm)	134	3463		718	3380		1059	1785		511	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	232	541	72	72	1026	304	119	206	62	371	268	381
RTOR Reduction (vph)	0	8	0	0	23	0	0	10	0	0	0	118
Lane Group Flow (vph)	232	605	0	72	1307	0	119	258	0	371	268	263
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	63.9	63.9		47.6	47.6		21.9	21.9		43.1	43.1	43.1
Effective Green, g (s)	64.9	64.9		48.6	48.6		22.9	22.9		44.1	44.1	44.1
Actuated g/C Ratio	0.54	0.54		0.41	0.41		0.19	0.19		0.37	0.37	0.37
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	249	1872		290	1368		202	340		379	698	548
v/s Ratio Prot	c0.11	0.17			c0.39			c0.14		c0.16	0.14	
v/s Ratio Perm	0.39			0.10			0.11			0.20		0.18
v/c Ratio	0.93	0.32		0.25	0.96		0.59	0.76		0.98	0.38	0.48
Uniform Delay, d1	36.2	15.3		23.6	34.6		44.3	45.9		32.9	27.9	29.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.07	0.90	0.91
Incremental Delay, d2	38.7	0.5		2.0	15.8		4.3	9.4		38.5	0.3	0.6
Delay (s)	74.9	15.8		25.7	50.4		48.6	55.3		73.7	25.4	27.1
Level of Service	E	B		C	D		D	E		E	C	C
Approach Delay (s)		32.0			49.1			53.3			43.6	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	100.8%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	55	900	1360	75
Future Volume (vph)	55	900	1360	75
Lane Group Flow (vph)	57	928	1448	149
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.21	0.36	0.63	0.61
Control Delay	4.7	5.1	12.1	43.1
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	4.7	5.6	12.1	43.1
Queue Length 50th (m)	2.1	29.8	87.3	23.5
Queue Length 95th (m)	6.1	49.5	136.3	42.7
Internal Link Dist (m)		135.9	127.4	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	359	2570	2294	412
Starvation Cap Reductn	0	1036	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.60	0.63	0.36

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



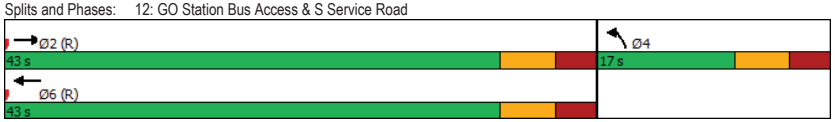
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	900	1360	45	75	70
Future Volume (vph)	55	900	1360	45	75	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.93	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3314		1617	
Flt Permitted	0.13	1.00	1.00		0.97	
Satd. Flow (perm)	227	3374	3314		1617	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	928	1402	46	77	72
RTOR Reduction (vph)	0	0	1	0	35	0
Lane Group Flow (vph)	57	928	1447	0	114	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	82.8	82.8	74.5		13.2	
Effective Green, g (s)	83.8	83.8	75.5		14.2	
Actuated g/C Ratio	0.76	0.76	0.69		0.13	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	253	2570	2274		208	
v/s Ratio Prot	0.01	c0.28	c0.44			
v/s Ratio Perm	0.16				c0.07	
v/c Ratio	0.23	0.36	0.64		0.55	
Uniform Delay, d1	5.8	4.3	9.6		44.9	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.5	0.4	1.4		2.9	
Delay (s)	6.2	4.7	11.0		47.8	
Level of Service	A	A	B		D	
Approach Delay (s)		4.8	11.0		47.8	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	635	295	15
Future Volume (vph)	635	295	15
Lane Group Flow (vph)	697	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.22	0.09	0.12
Control Delay	1.4	0.2	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.4	0.2	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m23.7	1.3	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3123	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.22	0.09	0.10

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	635	20	0	295	15	0
Future Volume (vph)	635	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3371			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3371			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	676	21	0	314	16	0
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	695	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2539			2719	42	
v/s Ratio Prot	c0.21			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.27			0.12	0.38	
Uniform Delay, d1	2.3			2.0	27.8	
Progression Factor	1.01			0.15	1.00	
Incremental Delay, d2	0.1			0.1	5.7	
Delay (s)	2.4			0.4	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.4			0.4	33.4	
Approach LOS	A			A	C	

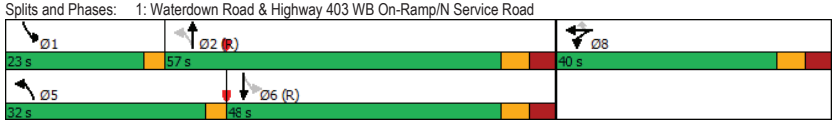
Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	60	105	65	335	505	235	765
Future Volume (vph)	60	105	65	335	505	235	765
Lane Group Flow (vph)	61	107	66	342	954	240	995
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	32.0	57.0	23.0	48.0
Total Split (%)	33.3%	33.3%	33.3%	26.7%	47.5%	19.2%	40.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.35	0.56	0.25	0.66	0.49	0.49	0.60
Control Delay	52.8	60.3	5.3	17.9	7.7	8.4	22.3
Queue Delay	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Total Delay	52.8	60.3	5.3	18.0	7.8	8.4	22.3
Queue Length 50th (m)	14.1	25.4	0.0	6.8	56.3	10.9	82.0
Queue Length 95th (m)	26.9	42.4	5.3	80.0	40.8	22.1	137.7
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	468	588	1949	574	1646
Starvation Cap Reductn	0	0	0	13	218	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.14	0.59	0.55	0.42	0.60

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	105	65	335	505	430	235	765	210
Future Volume (vph)	0	0	0	60	105	65	335	505	430	235	765	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	1544	2980		1616	2988	
Flt Permitted				0.95	1.00	1.00	0.21	1.00		0.30	1.00	
Satd. Flow (perm)				1442	1597	1439	348	2980		505	2988	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	61	107	66	342	515	439	240	781	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	82	0	0	14	0
Lane Group Flow (vph)	0	0	0	61	107	8	342	872	0	240	981	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	90.6	74.2		77.9	64.5	
Effective Green, g (s)				14.4	14.4	14.4	91.6	75.2		79.9	65.5	
Actuated g/C Ratio				0.12	0.12	0.12	0.76	0.63		0.67	0.55	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	505	1867		469	1630	
v/s Ratio Prot				0.04	c0.07		c0.14	0.29		0.06	c0.33	
v/s Ratio Perm						0.01	0.38			0.28		
v/c Ratio				0.35	0.56	0.05	0.68	0.47		0.51	0.60	
Uniform Delay, d1				48.5	49.8	46.7	9.0	11.8		7.9	18.4	
Progression Factor				1.00	1.00	1.00	1.77	0.68		1.00	1.00	
Incremental Delay, d2				1.2	3.7	0.1	3.2	0.7		0.9	1.7	
Delay (s)				49.8	53.5	46.8	19.1	8.8		8.8	20.1	
Level of Service				D	D	D	B	A		A	C	
Approach Delay (s)		0.0			50.7			11.5			17.9	
Approach LOS		A			D			B			B	

Intersection Summary

HCM 2000 Control Delay	17.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	68.1%	ICU Level of Service		C	
Analysis Period (min)	15				

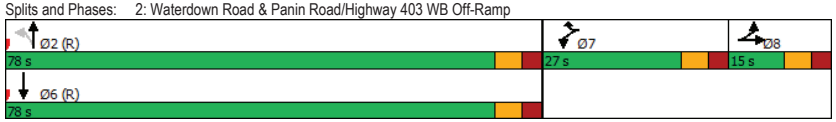
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	285	160	5	1105	825
Future Volume (vph)	0	285	160	5	1105	825
Lane Group Flow (vph)	5	310	174	0	1206	897
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	27.0	27.0	78.0	78.0	78.0
Total Split (%)	12.5%	22.5%	22.5%	65.0%	65.0%	65.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.65	0.49		0.51	0.36
Control Delay	53.4	54.6	11.8		11.6	4.1
Queue Delay	0.0	0.0	0.0		0.6	0.2
Total Delay	53.4	54.6	11.8		12.2	4.3
Queue Length 50th (m)	1.2	37.8	0.9		77.3	22.8
Queue Length 95th (m)	5.5	51.0	20.8		m85.0	14.8
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	565	392		2353	2505
Starvation Cap Reductn	0	0	0		672	667
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.55	0.44		0.72	0.49

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	285	0	160	5	1105	0	0	825	0
Future Volume (vph)	5	0	0	285	0	160	5	1105	0	0	825	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3392			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3229			3438	
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)	5	0	0	310	0	174	5	1201	0	0	897	0
RTOR Reduction (vph)	0	0	0	0	0	145	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	310	0	29	0	1206	0	0	897	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		16.8		16.8		80.6			80.6	
Effective Green, g (s)		2.6		17.8		17.8		81.6			81.6	
Actuated g/C Ratio		0.02		0.15		0.15		0.68			0.68	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		473		211		2195			2337	
v/s Ratio Prot		c0.00		c0.10		0.02					0.26	
v/s Ratio Perm								c0.37				
v/c Ratio		0.21		0.66		0.14		0.55			0.38	
Uniform Delay, d1		57.7		48.2		44.4		9.8			8.3	
Progression Factor		1.00		1.00		1.00		1.31			0.52	
Incremental Delay, d2		4.3		3.3		0.3		0.3			0.4	
Delay (s)		62.0		51.5		44.7		13.2			4.7	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			49.0			13.2			4.7	
Approach LOS		E			D			B			A	

Intersection Summary				
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	62.3%	ICU Level of Service	B	
Analysis Period (min)	15			

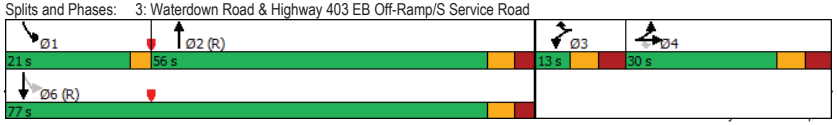
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	300	315	405	25	100	735	595	515
Future Volume (vph)	300	315	405	25	100	735	595	515
Lane Group Flow (vph)	323	339	435	27	108	1430	640	554
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	13.0	13.0	56.0	21.0	77.0
Total Split (%)	25.0%	25.0%	25.0%	10.8%	10.8%	46.7%	17.5%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.98	0.94	0.77	0.20	0.54	0.99	1.16	0.28
Control Delay	92.4	83.1	21.3	59.4	18.6	40.7	118.1	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.4	83.1	21.3	59.4	18.6	40.7	118.1	14.3
Queue Length 50th (m)	80.3	83.7	20.9	3.5	0.0	42.8	~85.5	34.4
Queue Length 95th (m)	#140.0	#141.7	64.4	8.9	15.9	#214.9	#163.0	44.4
Internal Link Dist (m)		253.6				353.3		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	331	360	562	138	200	1441	551	1977
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.94	0.77	0.20	0.54	0.99	1.16	0.28

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	315	405	25	0	100	0	735	595	595	515	0
Future Volume (vph)	300	315	405	25	0	100	0	735	595	595	515	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		0.93		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	2775		1426		3177		1766	3343	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	2775		1426		3177		583	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	339	435	27	0	108	0	790	640	640	554	0
RTOR Reduction (vph)	0	0	274	0	0	103	0	117	0	0	0	0
Lane Group Flow (vph)	323	339	161	27	0	5	0	1313	0	640	554	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	22.0	22.0	22.0	5.0		5.0		49.0		70.0	70.0	
Effective Green, g (s)	23.0	23.0	23.0	6.0		6.0		50.0		71.0	71.0	
Actuated g/C Ratio	0.19	0.19	0.19	0.05		0.05		0.42		0.59	0.59	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	331	360	288	138		71		1323		532	1977	
v/s Ratio Prot	c0.19	0.18		c0.01		0.00		c0.41		c0.19	0.17	
v/s Ratio Perm			0.11							0.52		
v/c Ratio	0.98	0.94	0.56	0.20		0.08		0.99		1.20	0.28	
Uniform Delay, d1	48.2	47.8	43.9	54.7		54.4		34.8		15.3	12.0	
Progression Factor	1.00	1.00	1.00	1.02		1.75		0.70		2.11	1.15	
Incremental Delay, d2	42.6	32.6	2.3	0.7		0.5		19.5		107.2	0.3	
Delay (s)	90.8	80.4	46.3	56.6		95.8		43.8		139.6	14.1	
Level of Service	F	F	D	E		F		D		F	B	
Approach Delay (s)		69.9			87.9			43.8			81.4	
Approach LOS		E			F			D			F	

Intersection Summary

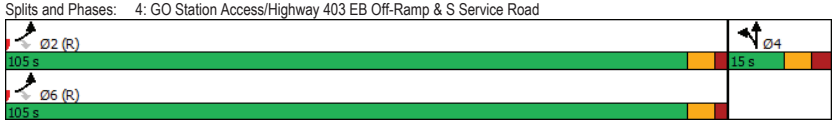
HCM 2000 Control Delay	64.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	109.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	915	160	25		
Future Volume (vph)	915	160	25		
Lane Group Flow (vph)	963	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.80	0.12	0.27		
Control Delay	11.7	0.5	57.9		
Queue Delay	0.5	0.0	0.0		
Total Delay	12.2	0.5	57.9		
Queue Length 50th (m)	31.6	0.3	8.8		
Queue Length 95th (m)	#225.7	2.1	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	136		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.83	0.12	0.27		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	915	160	10	25	0	0
Future Volume (vph)	915	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	963	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	963	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.72			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.83	0.11		0.42		
Uniform Delay, d1	4.2	1.3		55.5		
Progression Factor	1.17	1.19		1.00		
Incremental Delay, d2	6.3	0.1		3.2		
Delay (s)	11.2	1.7		58.7		
Level of Service	B	A		E		
Approach Delay (s)	9.8			58.7	0.0	
Approach LOS	A			E	A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

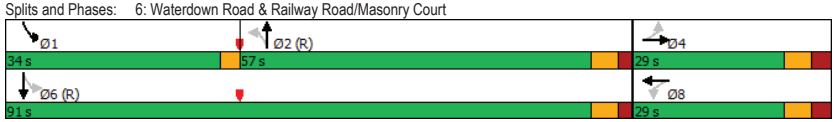
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	0	25	0	5	1130	355	580
Future Volume (vph)	10	0	25	0	5	1130	355	580
Lane Group Flow (vph)	0	22	28	216	6	1409	403	670
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	57.0	57.0	34.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	47.5%	47.5%	28.3%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.27	0.27	0.42	0.02	0.73	0.78	0.24
Control Delay		8.2	57.7	2.5	9.4	14.4	36.0	2.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		8.2	57.7	2.5	9.4	14.4	36.0	2.6
Queue Length 50th (m)		0.0	6.7	0.0	0.3	100.2	64.5	10.6
Queue Length 95th (m)		0.2	16.0	0.0	m0.6	m157.7	88.1	25.4
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		114	237	629	347	1942	583	2786
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.19	0.12	0.34	0.02	0.73	0.69	0.24

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	25	0	190	5	1130	110	355	580	10
Future Volume (vph)	10	0	10	25	0	190	5	1130	110	355	580	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184		1586	1495		1454	3386		1728	3376	
Flt Permitted		0.30		0.74	1.00		0.40	1.00		0.10	1.00	
Satd. Flow (perm)		364		1241	1495		608	3386		185	3376	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	28	0	216	6	1284	125	403	659	11
RTOR Reduction (vph)	0	20	0	0	198	0	0	5	0	0	1	0
Lane Group Flow (vph)	0	2	0	28	18	0	6	1404	0	403	669	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.0		9.0	9.0		67.7	67.7		98.0	98.0	
Effective Green, g (s)		10.0		10.0	10.0		68.7	68.7		99.0	99.0	
Actuated g/C Ratio		0.08		0.08	0.08		0.57	0.57		0.82	0.82	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		30		103	124		348	1938		516	2785	
v/s Ratio Prot					0.01			c0.41		c0.18	0.20	
v/s Ratio Perm		0.01		c0.02			0.01			0.46		
v/c Ratio		0.06		0.27	0.15		0.02	0.72		0.78	0.24	
Uniform Delay, d1		50.7		51.6	51.0		11.1	18.7		28.7	2.3	
Progression Factor		1.00		1.00	1.00		0.62	0.65		1.13	1.00	
Incremental Delay, d2		0.9		1.4	0.5		0.0	0.8		6.8	0.2	
Delay (s)		51.5		53.0	51.6		6.9	13.0		39.3	2.5	
Level of Service		D		D	D		A	B		D	A	
Approach Delay (s)		51.5			51.7			13.0			16.3	
Approach LOS		D			D			B			B	

Intersection Summary

HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.69				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	78.7%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	420	45	15	135	0	80	0	20	0	0	0
Future Volume (Veh/h)	0	420	45	15	135	0	80	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	0	538	58	19	173	0	103	0	26	0	0	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)		144										
pX, platoon unblocked				0.96			0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	173			596			778	778	567	804	807	173
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	173			554			744	744	523	771	775	173
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			98			66	100	95	100	100	100
cM capacity (veh/h)	1416			981			306	323	533	286	311	855

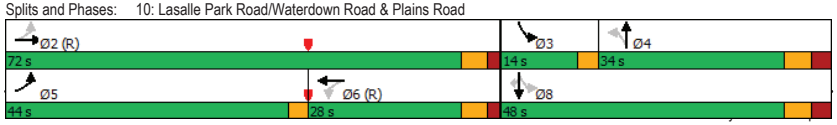
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	596	192	129	0
Volume Left	0	19	103	0
Volume Right	58	0	26	0
cSH	1416	981	335	1700
Volume to Capacity	0.00	0.02	0.38	0.00
Queue Length 95th (m)	0.0	0.5	14.1	0.0
Control Delay (s)	0.0	1.0	22.3	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	1.0	22.3	0.0
Approach LOS			C	A

Intersection Summary			
Average Delay		3.4	
Intersection Capacity Utilization		37.2%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	695	885	75	345	90	295	245	170	200
Future Volume (vph)	695	885	75	345	90	295	245	170	200
Lane Group Flow (vph)	739	1101	80	638	96	378	261	181	213
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	44.0	72.0	28.0	28.0	34.0	34.0	14.0	48.0	48.0
Total Split (%)	36.7%	60.0%	23.3%	23.3%	28.3%	28.3%	11.7%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	1.11	0.57	0.94	0.91	0.37	0.92	1.08	0.29	0.33
Control Delay	100.4	18.2	132.7	54.9	43.4	72.1	109.0	26.9	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	100.4	18.2	132.7	54.9	43.4	72.1	109.0	26.9	7.2
Queue Length 50th (m)	~195.1	87.1	19.6	65.4	20.0	89.4	~48.4	24.8	1.0
Queue Length 95th (m)	#272.2	107.3	#52.3	#98.4	37.0	#146.2	#104.6	51.0	21.4
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	664	1918	87	719	271	425	242	633	644
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.11	0.57	0.92	0.89	0.35	0.89	1.08	0.29	0.33

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	695	885	150	75	345	255	90	295	60	245	170	200
Future Volume (vph)	695	885	150	75	345	255	90	295	60	245	170	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.94		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1677	3406		1667	3172		1719	1796		1615	1810	1446
Flt Permitted	0.16	1.00		0.26	1.00		0.64	1.00		0.16	1.00	1.00
Satd. Flow (perm)	289	3406		455	3172		1164	1796		267	1810	1446
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)	739	941	160	80	367	271	96	314	64	261	181	213
RTOR Reduction (vph)	0	11	0	0	112	0	0	6	0	0	0	139
Lane Group Flow (vph)	739	1090	0	80	526	0	96	372	0	261	181	74
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	66.2	66.2		21.4	21.4		26.2	26.2		40.8	40.8	40.8
Effective Green, g (s)	67.2	67.2		22.4	22.4		27.2	27.2		41.8	41.8	41.8
Actuated g/C Ratio	0.56	0.56		0.19	0.19		0.23	0.23		0.35	0.35	0.35
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	656	1907		84	592		263	407		234	630	503
v/s Ratio Prot	c0.40	0.32			0.17			c0.21		c0.12	0.10	
v/s Ratio Perm	0.23			c0.18			0.08			0.27		0.05
v/c Ratio	1.13	0.57		0.95	0.89		0.37	0.91		1.12	0.29	0.15
Uniform Delay, d1	31.7	17.1		48.3	47.6		39.1	45.3		33.1	28.3	26.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.96	0.90	1.58
Incremental Delay, d2	75.4	1.3		85.7	17.8		0.9	24.5		92.8	0.2	0.1
Delay (s)	107.1	18.3		134.0	65.4		40.0	69.8		124.5	25.7	42.7
Level of Service	F	B		F	E		D	E		F	C	D
Approach Delay (s)		54.0			73.0			63.8			70.6	
Approach LOS		D			E			E			E	

Intersection Summary				
HCM 2000 Control Delay	61.9	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	106.3%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	90	1115	675	40
Future Volume (vph)	90	1115	675	40
Lane Group Flow (vph)	100	1239	817	105
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.18	0.46	0.34	0.50
Control Delay	2.9	4.7	7.2	28.1
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	2.9	5.1	7.2	28.1
Queue Length 50th (m)	2.8	36.3	31.5	8.5
Queue Length 95th (m)	7.8	63.1	53.6	24.0
Internal Link Dist (m)		135.9	129.0	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	599	2665	2376	410
Starvation Cap Reductn	0	811	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.67	0.34	0.26

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



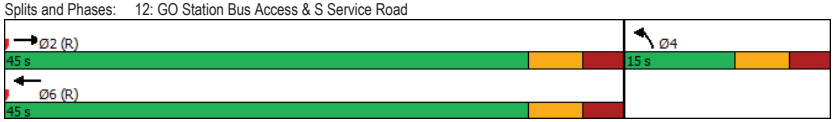
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	90	1115	675	60	40	55
Future Volume (vph)	90	1115	675	60	40	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1631	3282	3244		1405	
Flt Permitted	0.32	1.00	1.00		0.98	
Satd. Flow (perm)	545	3282	3244		1405	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1239	750	67	44	61
RTOR Reduction (vph)	0	0	4	0	55	0
Lane Group Flow (vph)	100	1239	813	0	50	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	77.6	77.6	68.9		8.4	
Effective Green, g (s)	78.6	78.6	69.9		9.4	
Actuated g/C Ratio	0.79	0.79	0.70		0.09	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	501	2579	2267		132	
v/s Ratio Prot	0.01	c0.38	0.25			
v/s Ratio Perm	0.14				c0.04	
v/c Ratio	0.20	0.48	0.36		0.38	
Uniform Delay, d1	2.6	3.7	6.0		42.5	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.6	0.4		1.8	
Delay (s)	2.8	4.3	6.5		44.4	
Level of Service	A	A	A		D	
Approach Delay (s)		4.2	6.5		44.4	
Approach LOS		A	A		D	

Intersection Summary				
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	47.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1490	110	15
Future Volume (vph)	1490	110	15
Lane Group Flow (vph)	1636	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.51	0.04	0.12
Control Delay	2.2	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	2.2	1.2	24.5
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m70.6	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3231	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	63	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.52	0.04	0.12

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1490	15	0	110	15	0
Future Volume (vph)	1490	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3472			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3472			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1620	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1635	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2627			2731	38	
v/s Ratio Prot	c0.47			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.62			0.04	0.42	
Uniform Delay, d1	3.4			1.8	28.0	
Progression Factor	1.12			0.90	1.00	
Incremental Delay, d2	0.1			0.0	7.4	
Delay (s)	3.9			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	3.9			1.7	35.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues — Future Background 2031 - Without Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	255	500	220	600	835	115	620
Future Volume (vph)	255	500	220	600	835	115	620
Lane Group Flow (vph)	268	526	232	632	1074	121	811
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	42.0	42.0	42.0	38.0	66.0	12.0	40.0
Total Split (%)	35.0%	35.0%	35.0%	31.7%	55.0%	10.0%	33.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	2.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.55	0.97	0.39	1.18	0.69	0.46	0.94
Control Delay	40.1	73.5	6.1	125.8	26.9	19.5	59.6
Queue Delay	0.0	0.0	0.0	0.2	0.9	0.0	0.0
Total Delay	40.1	73.5	6.1	126.0	27.8	19.5	59.6
Queue Length 50th (m)	55.7	129.1	0.0	~167.0	119.7	11.0	100.0
Queue Length 95th (m)	84.3	#201.8	18.7	#251.5	116.4	19.1	#139.1
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	489	543	594	535	1564	273	881
Starvation Cap Reductn	0	0	0	13	230	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.97	0.39	1.21	0.81	0.44	0.92

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

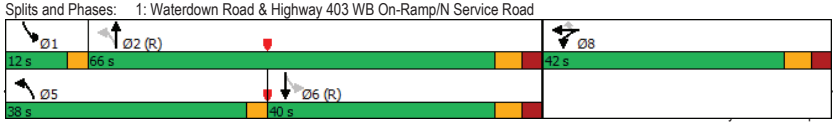
Natural Cycle: 125

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



HCM Signalized Intersection Capacity Analysis — Future Background 2031 - Without Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	500	220	600	835	185	115	620	150
Future Volume (vph)	0	0	0	255	500	220	600	835	185	115	620	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	2.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	1558	3085		1601	3047	
Flt Permitted				0.95	1.00	1.00	0.12	1.00		0.27	1.00	
Satd. Flow (perm)				1616	1792	1426	200	3085		449	3047	
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	0	268	526	232	632	879	195	121	653	158
RTOR Reduction (vph)	0	0	0	0	0	162	0	16	0	0	18	0
Lane Group Flow (vph)	0	0	0	268	526	70	632	1058	0	121	793	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				35.4	35.4	35.4	70.6	59.2		40.8	32.4	
Effective Green, g (s)				36.4	36.4	36.4	71.6	60.2		42.8	33.4	
Actuated g/C Ratio				0.30	0.30	0.30	0.60	0.50		0.36	0.28	
Clearance Time (s)				7.0	7.0	7.0	3.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				490	543	432	528	1547		250	848	
v/s Ratio Prot				0.17	c0.29		c0.36	0.34		0.04	c0.26	
v/s Ratio Perm						0.05	0.35			0.13		
v/c Ratio				0.55	0.97	0.16	1.20	0.68		0.48	0.94	
Uniform Delay, d1				34.9	41.2	30.6	33.7	22.7		26.9	42.2	
Progression Factor				1.00	1.00	1.00	1.01	1.12		1.00	1.00	
Incremental Delay, d2				1.3	30.4	0.2	101.3	1.7		1.5	18.7	
Delay (s)				36.2	71.6	30.8	135.5	27.3		28.3	60.9	
Level of Service				D	E	C	F	C		C	E	
Approach Delay (s)		0.0			53.1			67.4			56.7	
Approach LOS		A			D			E			E	

Intersection Summary					
HCM 2000 Control Delay	60.7	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.03				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	94.8%	ICU Level of Service		F	
Analysis Period (min)	15				

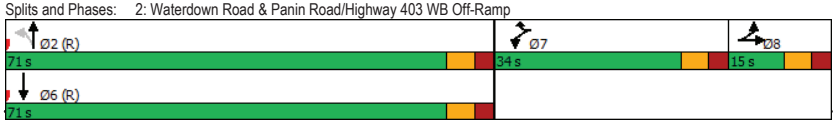
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	275	345	5	1275	875
Future Volume (vph)	0	275	345	5	1275	875
Lane Group Flow (vph)	6	313	392	0	1455	994
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	34.0	34.0	71.0	71.0	71.0
Total Split (%)	12.5%	28.3%	28.3%	59.2%	59.2%	59.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.03	0.45	0.87		0.67	0.43
Control Delay	0.2	41.8	46.9		14.5	9.1
Queue Delay	0.0	0.0	8.7		0.4	0.3
Total Delay	0.2	41.8	55.6		14.8	9.4
Queue Length 50th (m)	0.0	34.0	60.0		103.4	42.6
Queue Length 95th (m)	0.0	47.0	#107.7		m74.1	m26.7
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	237	779	489		2161	2316
Starvation Cap Reductn	0	0	0		251	661
Spillback Cap Reductn	0	0	70		179	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.03	0.40	0.94		0.76	0.60

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	275	0	345	5	1275	0	0	875	0
Future Volume (vph)	0	0	5	275	0	345	5	1275	0	0	875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3300			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	312	0	392	6	1449	0	0	994	0
RTOR Reduction (vph)	0	6	0	0	0	115	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	313	0	277	0	1455	0	0	994	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		25.5		25.5		71.9			71.9	
Effective Green, g (s)		2.6		26.5		26.5		72.9			72.9	
Actuated g/C Ratio		0.02		0.22		0.22		0.61			0.61	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		698		339		2004			2149	
v/s Ratio Prot		c0.00		0.10		c0.18					0.28	
v/s Ratio Perm								c0.44				
v/c Ratio		0.00		0.45		0.82		0.73			0.46	
Uniform Delay, d1		57.4		40.4		44.5		16.5			12.9	
Progression Factor		1.00		1.00		1.00		0.92			0.76	
Incremental Delay, d2		0.0		0.5		14.2		0.9			0.5	
Delay (s)		57.5		40.9		58.7		16.1			10.2	
Level of Service		E		D		E		B			B	
Approach Delay (s)		57.5			50.8			16.1			10.2	
Approach LOS		E			D			B			B	

Intersection Summary

HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues — Future Background 2031 - Without Improvements

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	250	95	340	50	260	785	395	760
Future Volume (vph)	250	95	340	50	260	785	395	760
Lane Group Flow (vph)	281	107	382	56	292	1331	444	854
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	13.0	13.0	53.0	24.0	77.0
Total Split (%)	25.0%	25.0%	25.0%	10.8%	10.8%	44.2%	20.0%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.89	0.32	0.92	0.36	0.83	0.98	1.17	0.40
Control Delay	76.6	44.9	54.7	59.3	51.7	44.3	135.8	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.2	4.7	0.0	0.0
Total Delay	76.6	44.9	54.7	59.3	52.0	49.0	135.8	16.8
Queue Length 50th (m)	68.0	23.0	55.4	7.6	50.6	148.5	~120.8	56.8
Queue Length 95th (m)	#113.5	39.9	#111.4	14.7	#77.7	#202.1	#185.6	72.7
Internal Link Dist (m)		253.6				353.3		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	327	346	425	156	353	1364	381	2114
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	2	33	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.31	0.90	0.36	0.83	1.00	1.17	0.40

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

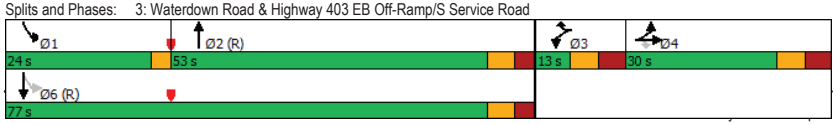
Natural Cycle: 125

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



HCM Signalized Intersection Capacity Analysis — Future Background 2031 - Without Improvements

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	95	340	50	0	260	0	785	400	395	760	0
Future Volume (vph)	250	95	340	50	0	260	0	785	400	395	760	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		0.95		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	3134		1521		3349		1678	3539	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.08	1.00	
Satd. Flow (perm)	1711	1810	1521	3134		1521		3349		144	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	281	107	382	56	0	292	0	882	449	444	854	0
RTOR Reduction (vph)	0	0	135	0	0	277	0	54	0	0	0	0
Lane Group Flow (vph)	281	107	247	56	0	15	0	1277	0	444	854	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	21.3	21.3	21.3	5.0		5.0		46.0		70.7	70.7	
Effective Green, g (s)	22.3	22.3	22.3	6.0		6.0		47.0		71.7	71.7	
Actuated g/C Ratio	0.19	0.19	0.19	0.05		0.05		0.39		0.60	0.60	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	317	336	282	156		76		1311		376	2114	
v/s Ratio Prot	c0.16	0.06		c0.02		0.01		c0.38		c0.22	0.24	
v/s Ratio Perm			0.16							0.48		
v/c Ratio	0.89	0.32	0.88	0.36		0.19		0.97		1.18	0.40	
Uniform Delay, d1	47.6	42.3	47.5	55.1		54.7		35.9		38.8	12.8	
Progression Factor	1.00	1.00	1.00	0.95		6.98		0.78		1.22	1.24	
Incremental Delay, d2	24.3	0.5	24.7	1.4		1.2		17.5		104.0	0.5	
Delay (s)	71.9	42.8	72.2	54.0		382.8		45.5		151.2	16.5	
Level of Service	E	D	E	D		F		D		F	B	
Approach Delay (s)		68.0			329.9			45.5			62.6	
Approach LOS		E			F			D			E	

Intersection Summary

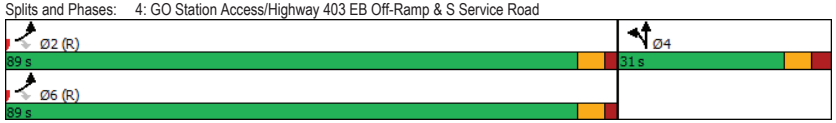
HCM 2000 Control Delay	82.4	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	0.96				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		22.0	
Intersection Capacity Utilization	87.2%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	750	15	30		
Future Volume (vph)	750	15	30		
Lane Group Flow (vph)	962	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			31.0	89.0	89.0
Total Split (%)			25.8%	74%	74%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.80	0.02	0.82		
Control Delay	16.7	0.3	64.3		
Queue Delay	0.3	0.0	0.0		
Total Delay	17.0	0.3	64.3		
Queue Length 50th (m)	87.6	0.2	70.1		
Queue Length 95th (m)	52.3	0.0	87.5		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1207	1144	390		
Starvation Cap Reductn	34	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.82	0.02	0.77		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	750	15	205	30	0	0
Future Volume (vph)	750	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	962	19	263	38	0	0
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	962	13	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	83.8	83.8		23.2		
Effective Green, g (s)	84.8	84.8		24.2		
Actuated g/C Ratio	0.71	0.71		0.20		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1197	1128		367		
v/s Ratio Prot	c0.57			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.80	0.01		0.82		
Uniform Delay, d1	11.9	5.2		45.8		
Progression Factor	0.81	0.14		1.00		
Incremental Delay, d2	5.7	0.0		13.6		
Delay (s)	15.4	0.7		59.4		
Level of Service	B	A		E		
Approach Delay (s)	15.1			59.4	0.0	
Approach LOS	B			E	A	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

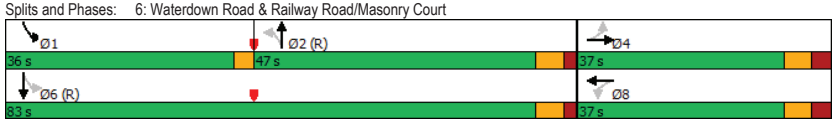
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	5	100	5	5	740	165	975
Future Volume (vph)	10	5	100	5	5	740	165	975
Lane Group Flow (vph)	0	25	127	557	6	981	209	1247
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	37.0	37.0	37.0	37.0	47.0	47.0	36.0	83.0
Total Split (%)	30.8%	30.8%	30.8%	30.8%	39.2%	39.2%	30.0%	69.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.45	0.59	0.82	0.03	0.47	0.44	0.48
Control Delay		59.0	56.4	17.0	15.8	15.1	7.6	5.1
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		59.0	56.4	17.0	15.8	15.1	7.6	5.1
Queue Length 50th (m)		4.3	29.8	11.9	0.6	63.3	4.3	12.5
Queue Length 95th (m)		10.8	38.7	20.8	m1.1	m77.7	m23.7	73.7
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		86	344	783	194	2081	681	2596
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.29	0.37	0.71	0.03	0.47	0.31	0.48

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	100	5	435	5	740	35	165	975	10
Future Volume (vph)	10	5	5	100	5	435	5	740	35	165	975	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196		1711	1590		1353	3411		1694	3476	
Flt Permitted		0.26		0.74	1.00		0.22	1.00		0.23	1.00	
Satd. Flow (perm)		319		1334	1590		319	3411		411	3476	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	127	6	551	6	937	44	209	1234	13
RTOR Reduction (vph)	0	5	0	0	422	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	20	0	127	135	0	6	979	0	209	1246	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.3		18.3	18.3		72.2	72.2		88.7	88.7	
Effective Green, g (s)		19.3		19.3	19.3		73.2	73.2		89.7	89.7	
Actuated g/C Ratio		0.16		0.16	0.16		0.61	0.61		0.75	0.75	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		51		214	255		194	2080		462	2598	
v/s Ratio Prot					0.08			0.29		0.05	c0.36	
v/s Ratio Perm		0.06		c0.10			0.02			0.28		
v/c Ratio		0.39		0.59	0.53		0.03	0.47		0.45	0.48	
Uniform Delay, d1		45.1		46.7	46.2		9.3	12.8		6.1	6.0	
Progression Factor		1.00		1.00	1.00		1.03	0.98		1.08	0.65	
Incremental Delay, d2		4.9		4.4	2.0		0.2	0.5		0.6	0.6	
Delay (s)		50.0		51.1	48.2		9.8	13.0		7.2	4.4	
Level of Service		D		D	D		A	B		A	A	
Approach Delay (s)		50.0			48.7			13.0			4.8	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.3	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.51				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	74.5%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	150	55	20	465	0	75	0	20	0	0	0
Future Volume (Veh/h)	0	150	55	20	465	0	75	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	183	67	24	567	0	91	0	24	0	0	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)		144										
pX, platoon unblocked				0.99			0.99	0.99	0.99	0.99	0.99	
vC, conflicting volume	567			250			832	832	216	856	865	567
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	567			233			822	822	199	847	856	567
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			98			68	100	97	100	100	100
cM capacity (veh/h)	1015			1328			281	301	804	268	288	527

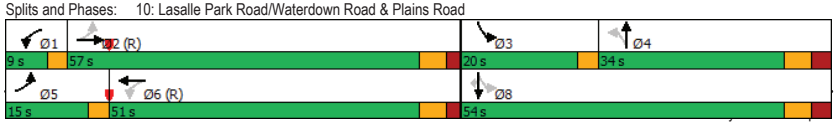
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	250	591	115	0
Volume Left	0	24	91	0
Volume Right	67	0	24	0
cSH	1015	1328	326	1700
Volume to Capacity	0.00	0.02	0.35	0.00
Queue Length 95th (m)	0.0	0.4	12.4	0.0
Control Delay (s)	0.0	0.5	22.0	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	0.5	22.0	0.0
Approach LOS			C	A

Intersection Summary					
Average Delay			3.0		
Intersection Capacity Utilization			52.2%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	245	575	75	1095	125	220	390	285	405
Future Volume (vph)	245	575	75	1095	125	220	390	285	405
Lane Group Flow (vph)	253	670	77	1454	129	294	402	294	418
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	1	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	9.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	15.0	57.0	9.0	51.0	34.0	34.0	20.0	54.0	54.0
Total Split (%)	12.5%	47.5%	7.5%	42.5%	28.3%	28.3%	16.7%	45.0%	45.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	2.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.88	0.41	0.20	1.10	0.62	0.80	1.09	0.42	0.62
Control Delay	61.8	22.0	14.7	92.8	56.7	59.9	103.2	31.4	21.9
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	22.0	14.7	93.4	56.7	59.9	103.2	31.4	21.9
Queue Length 50th (m)	46.5	58.1	8.5	~213.2	29.1	66.4	~95.0	52.1	42.6
Queue Length 95th (m)	#108.1	75.4	17.0	#258.5	49.8	96.4	#141.8	97.7	111.3
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	287	1654	383	1318	241	425	370	760	716
Starvation Cap Reductn	0	0	0	182	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.41	0.20	1.28	0.54	0.69	1.09	0.39	0.58

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	575	75	75	1095	315	125	220	65	390	285	405
Future Volume (vph)	245	575	75	75	1095	315	125	220	65	390	285	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		2.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1616	3464		1639	3384		1694	1786		1709	1900	1492
Flt Permitted	0.08	1.00		0.40	1.00		0.58	1.00		0.25	1.00	1.00
Satd. Flow (perm)	142	3464		685	3384		1035	1786		455	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	253	593	77	77	1129	325	129	227	67	402	294	418
RTOR Reduction (vph)	0	8	0	0	22	0	0	10	0	0	0	125
Lane Group Flow (vph)	253	662	0	77	1432	0	129	284	0	402	294	293
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	63.9	55.5		50.4	45.0		23.1	23.1		43.1	43.1	43.1
Effective Green, g (s)	64.9	56.5		52.4	46.0		24.1	24.1		44.1	44.1	44.1
Actuated g/C Ratio	0.54	0.47		0.44	0.38		0.20	0.20		0.37	0.37	0.37
Clearance Time (s)	3.0	6.0		3.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	284	1630		349	1297		207	358		355	698	548
v/s Ratio Prot	c0.13	0.19		0.01	c0.42			c0.16		c0.17	0.15	
v/s Ratio Perm	0.36			0.08			0.12			0.25		0.20
v/c Ratio	0.89	0.41		0.22	1.10		0.62	0.79		1.13	0.42	0.53
Uniform Delay, d1	36.0	20.8		20.0	37.0		43.8	45.6		33.1	28.4	29.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.21	1.06	1.19
Incremental Delay, d2	27.4	0.8		0.3	58.5		5.7	11.5		86.4	0.4	0.9
Delay (s)	63.4	21.5		20.3	95.5		49.5	57.1		126.4	30.5	36.5
Level of Service	E	C		C	F		D	E		F	C	D
Approach Delay (s)		33.0			91.8			54.8			67.3	
Approach LOS		C			F			D			E	

Intersection Summary				
HCM 2000 Control Delay	67.4	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	108.2%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	55	985	1485	75
Future Volume (vph)	55	985	1485	75
Lane Group Flow (vph)	57	1015	1577	149
Turn Type	Prot	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases		2		8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.38	0.39	0.71	0.61
Control Delay	53.1	5.4	15.9	43.1
Queue Delay	0.0	0.5	0.0	0.0
Total Delay	53.1	5.9	15.9	43.1
Queue Length 50th (m)	12.3	33.8	112.6	23.5
Queue Length 95th (m)	24.8	55.7	182.4	42.7
Internal Link Dist (m)		135.9	127.4	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	207	2570	2212	412
Starvation Cap Reductn	0	996	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.28	0.64	0.71	0.36

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



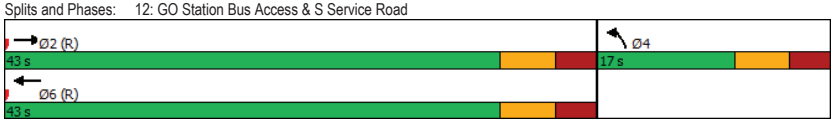
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	985	1485	45	75	70
Future Volume (vph)	55	985	1485	45	75	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.93	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3315		1617	
Flt Permitted	0.95	1.00	1.00		0.97	
Satd. Flow (perm)	1631	3374	3315		1617	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1015	1531	46	77	72
RTOR Reduction (vph)	0	0	1	0	35	0
Lane Group Flow (vph)	57	1015	1576	0	114	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	Prot	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases		2			8	
Actuated Green, G (s)	8.1	82.8	71.7		13.2	
Effective Green, g (s)	9.1	83.8	72.7		14.2	
Actuated g/C Ratio	0.08	0.76	0.66		0.13	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	134	2570	2190		208	
v/s Ratio Prot	c0.03	0.30	c0.48			
v/s Ratio Perm					c0.07	
v/c Ratio	0.43	0.39	0.72		0.55	
Uniform Delay, d1	48.0	4.5	12.1		44.9	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.2	0.5	2.1		2.9	
Delay (s)	50.1	4.9	14.1		47.8	
Level of Service	D	A	B		D	
Approach Delay (s)		7.3	14.1		47.8	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	690	295	15
Future Volume (vph)	690	295	15
Lane Group Flow (vph)	755	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.24	0.09	0.12
Control Delay	1.4	0.2	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.4	0.2	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m23.8	m1.2	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3133	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	25	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.24	0.09	0.10

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	690	20	0	295	15	0
Future Volume (vph)	690	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3379			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3379			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	734	21	0	314	16	0
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	753	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2545			2719	42	
v/s Ratio Prot	c0.22			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.30			0.12	0.38	
Uniform Delay, d1	2.3			2.0	27.8	
Progression Factor	0.99			0.15	1.00	
Incremental Delay, d2	0.1			0.1	5.7	
Delay (s)	2.4			0.4	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.4			0.4	33.4	
Approach LOS	A			A	C	

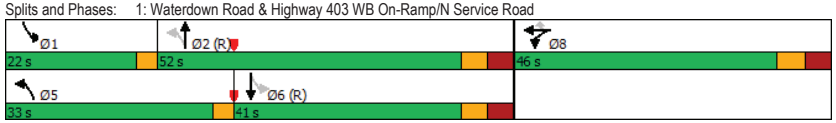
Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	60	105	65	395	575	235	805
Future Volume (vph)	60	105	65	395	575	235	805
Lane Group Flow (vph)	61	107	66	403	1031	240	1035
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	46.0	46.0	46.0	33.0	52.0	22.0	41.0
Total Split (%)	38.3%	38.3%	38.3%	27.5%	43.3%	18.3%	34.2%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.35	0.56	0.25	0.74	0.55	0.50	0.69
Control Delay	52.7	60.0	5.3	31.1	12.7	9.5	27.8
Queue Delay	0.0	0.0	0.0	0.5	0.2	0.0	0.0
Total Delay	52.7	60.0	5.3	31.6	12.8	9.5	27.8
Queue Length 50th (m)	14.1	25.4	0.0	47.0	17.2	10.9	99.0
Queue Length 95th (m)	26.9	42.4	5.3	118.2	106.8	22.2	#167.8
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	468	519	535	585	1871	533	1505
Starvation Cap Reductn	0	0	0	29	221	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.21	0.12	0.72	0.62	0.45	0.69

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 48 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	105	65	395	575	435	235	805	210
Future Volume (vph)	0	0	0	60	105	65	395	575	435	235	805	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	1544	2989		1616	2991	
Flt Permitted				0.95	1.00	1.00	0.18	1.00		0.27	1.00	
Satd. Flow (perm)				1442	1597	1439	296	2989		463	2991	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	61	107	66	403	587	444	240	821	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	72	0	0	14	0
Lane Group Flow (vph)	0	0	0	61	107	8	403	959	0	240	1021	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.5	13.5	13.5	90.5	71.2		75.1	58.8	
Effective Green, g (s)				14.5	14.5	14.5	91.5	72.2		77.1	59.8	
Actuated g/C Ratio				0.12	0.12	0.12	0.76	0.60		0.64	0.50	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				174	192	173	534	1798		463	1490	
v/s Ratio Prot				0.04	c0.07		c0.19	0.32		0.07	c0.34	
v/s Ratio Perm						0.01	0.39			0.26		
v/c Ratio				0.35	0.56	0.05	0.75	0.53		0.52	0.69	
Uniform Delay, d1				48.4	49.7	46.6	18.5	14.0		9.0	22.9	
Progression Factor				1.00	1.00	1.00	1.76	0.90		1.00	1.00	
Incremental Delay, d2				1.2	3.5	0.1	5.0	0.9		1.0	2.6	
Delay (s)				49.7	53.2	46.7	37.6	13.6		10.0	25.5	
Level of Service				D	D	D	D	B		B	C	
Approach Delay (s)		0.0			50.5			20.3			22.6	
Approach LOS		A			D			C			C	

Intersection Summary

HCM 2000 Control Delay	23.7	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	72.5%	ICU Level of Service		C	
Analysis Period (min)	15				

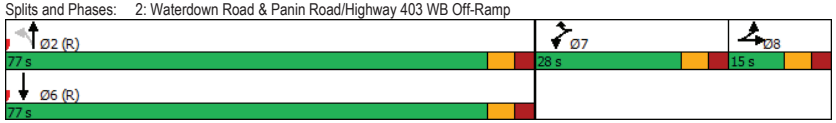
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	345	175	5	1225	865
Future Volume (vph)	0	345	175	5	1225	865
Lane Group Flow (vph)	5	375	190	0	1337	940
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	28.0	28.0	77.0	77.0	77.0
Total Split (%)	12.5%	23.3%	23.3%	64.2%	64.2%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.70	0.52		0.59	0.39
Control Delay	53.4	54.0	16.5		11.7	3.2
Queue Delay	0.0	0.0	0.2		0.6	0.2
Total Delay	53.4	54.0	16.7		12.3	3.3
Queue Length 50th (m)	1.2	45.6	8.4		70.0	13.2
Queue Length 95th (m)	5.5	59.4	30.0		150.8	16.8
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	602	391		2299	2447
Starvation Cap Reductn	0	0	0		527	577
Spillback Cap Reductn	0	0	19		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.62	0.51		0.75	0.50

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 55 (46%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	345	0	175	5	1225	0	0	865	0
Future Volume (vph)	5	0	0	345	0	175	5	1225	0	0	865	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3394			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3231			3438	
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)	5	0	0	375	0	190	5	1332	0	0	940	0
RTOR Reduction (vph)	0	0	0	0	0	126	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	375	0	64	0	1337	0	0	940	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		19.2		19.2		78.2			78.2	
Effective Green, g (s)		2.6		20.2		20.2		79.2			79.2	
Actuated g/C Ratio		0.02		0.17		0.17		0.66			0.66	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		537		240		2132			2269	
v/s Ratio Prot		c0.00		c0.12		0.05					0.27	
v/s Ratio Perm								c0.41				
v/c Ratio		0.21		0.70		0.27		0.63			0.41	
Uniform Delay, d1		57.7		47.0		43.5		11.8			9.5	
Progression Factor		1.00		1.00		1.00		1.00			0.33	
Incremental Delay, d2		4.3		4.0		0.6		1.4			0.4	
Delay (s)		62.0		51.0		44.1		13.2			3.6	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			48.7			13.2			3.6	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

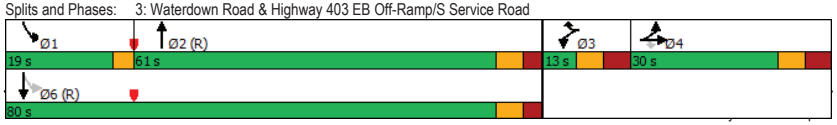
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	330	315	525	25	100	855	630	580
Future Volume (vph)	330	315	525	25	100	855	630	580
Lane Group Flow (vph)	355	339	565	27	108	1618	677	624
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	13.0	13.0	61.0	19.0	80.0
Total Split (%)	24.4%	24.4%	24.4%	10.6%	10.6%	49.6%	15.4%	65.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	1.10	0.97	1.08	0.20	0.55	1.06	1.27	0.31
Control Delay	125.7	90.1	84.0	59.9	16.2	69.1	154.2	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	125.7	90.1	84.0	59.9	16.2	69.1	154.2	12.5
Queue Length 50th (m)	~102.4	86.4	~93.6	3.4	0.0	~221.8	~150.7	38.5
Queue Length 95th (m)	#163.7	#146.7	#165.6	8.6	12.0	#267.2	#258.0	49.6
Internal Link Dist (m)		253.6				353.3		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	323	351	525	135	196	1532	533	2011
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.97	1.08	0.20	0.55	1.06	1.27	0.31

Intersection Summary

Cycle Length: 123
Actuated Cycle Length: 123
Offset: 54 (44%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	315	525	25	0	100	0	855	650	630	580	0
Future Volume (vph)	330	315	525	25	0	100	0	855	650	630	580	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	2775		1426		3185		1766	3343	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	2775		1426		3185		583	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	355	339	565	27	0	108	0	919	699	677	624	0
RTOR Reduction (vph)	0	0	244	0	0	103	0	109	0	0	0	0
Lane Group Flow (vph)	355	339	321	27	0	5	0	1509	0	677	624	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	22.0	22.0	22.0	5.0		5.0		54.0		73.0	73.0	
Effective Green, g (s)	23.0	23.0	23.0	6.0		6.0		55.0		74.0	74.0	
Actuated g/C Ratio	0.19	0.19	0.19	0.05		0.05		0.45		0.60	0.60	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	323	351	281	135		69		1424		514	2011	
v/s Ratio Prot	0.21	0.18		c0.01		0.00		c0.47		c0.18	0.19	
v/s Ratio Perm			c0.21							0.61		
v/c Ratio	1.10	0.97	1.14	0.20		0.08		1.06		1.32	0.31	
Uniform Delay, d1	50.0	49.6	50.0	56.2		55.9		34.0		15.4	12.0	
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Incremental Delay, d2	79.3	38.6	97.9	0.7		0.5		41.4		156.0	0.4	
Delay (s)	129.3	88.2	147.9	56.9		56.3		75.4		171.4	12.4	
Level of Service	F	F	F	E		E		E		F	B	
Approach Delay (s)		126.6			56.4			75.4			95.2	
Approach LOS		F			E			E			F	

Intersection Summary

HCM 2000 Control Delay	95.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	123.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	118.5%	ICU Level of Service	H
Analysis Period (min)	15		

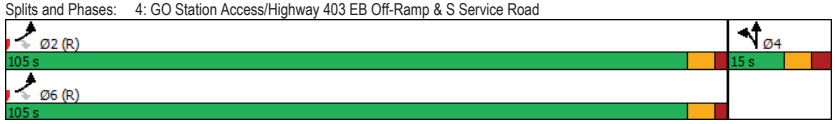
c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	1005	160	25		
Future Volume (vph)	1005	160	25		
Lane Group Flow (vph)	1058	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	36.0	36.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.88	0.12	0.27		
Control Delay	17.3	0.6	57.9		
Queue Delay	1.5	0.0	0.0		
Total Delay	18.8	0.6	57.9		
Queue Length 50th (m)	156.2	0.0	8.8		
Queue Length 95th (m)	#333.3	5.3	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	136		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.91	0.12	0.27		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1005	160	10	25	0	0
Future Volume (vph)	1005	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1058	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	1058	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.79			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.92	0.11		0.42		
Uniform Delay, d1	5.6	1.3		55.5		
Progression Factor	1.24	1.70		1.00		
Incremental Delay, d2	11.3	0.1		3.2		
Delay (s)	18.2	2.3		58.7		
Level of Service	B	A		E		
Approach Delay (s)	16.0			58.7	0.0	
Approach LOS	B			E	A	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

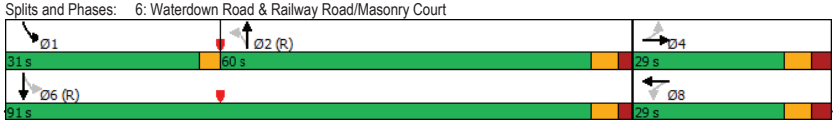
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	0	30	0	5	1250	485	635
Future Volume (vph)	10	0	30	0	5	1250	485	635
Lane Group Flow (vph)	0	22	34	278	6	1551	551	733
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	60.0	60.0	31.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	50.0%	50.0%	25.8%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.28	0.31	0.58	0.02	1.00	0.83	0.26
Control Delay		8.3	58.5	5.4	21.0	43.7	41.4	2.8
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		8.3	58.5	5.4	21.0	43.7	41.4	2.8
Queue Length 50th (m)		0.0	8.1	0.0	0.9	197.7	104.0	16.0
Queue Length 95th (m)		0.2	18.3	0.0	m1.0	m176.7	#170.7	25.0
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		110	237	596	261	1557	660	2774
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.20	0.14	0.47	0.02	1.00	0.83	0.26

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 22 (18%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	30	0	245	5	1250	115	485	635	10
Future Volume (vph)	10	0	10	30	0	245	5	1250	115	485	635	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184		1586	1495		1454	3388		1728	3379	
Flt Permitted		0.29		0.74	1.00		0.37	1.00		0.07	1.00	
Satd. Flow (perm)		347		1241	1495		571	3388		128	3379	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	34	0	278	6	1420	131	551	722	11
RTOR Reduction (vph)	0	20	0	0	254	0	0	6	0	0	1	0
Lane Group Flow (vph)	0	2	0	34	24	0	6	1545	0	551	732	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.5		9.5	9.5		54.0	54.0		97.5	97.5	
Effective Green, g (s)		10.5		10.5	10.5		55.0	55.0		98.5	98.5	
Actuated g/C Ratio		0.09		0.09	0.09		0.46	0.46		0.82	0.82	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		30		108	130		261	1552		658	2773	
v/s Ratio Prot					0.02			c0.46		c0.29	0.22	
v/s Ratio Perm		0.01		c0.03			0.01			0.40		
v/c Ratio		0.06		0.31	0.19		0.02	1.00		0.84	0.26	
Uniform Delay, d1		50.2		51.4	50.8		17.8	32.4		31.3	2.5	
Progression Factor		1.00		1.00	1.00		1.16	1.18		1.00	1.00	
Incremental Delay, d2		0.9		1.7	0.7		0.0	5.9		9.1	0.2	
Delay (s)		51.1		53.1	51.5		20.6	44.0		40.4	2.7	
Level of Service		D		D	D		C	D		D	A	
Approach Delay (s)		51.1			51.7			43.9			18.9	
Approach LOS		D			D			D			B	

Intersection Summary

HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	555	45	15	190	0	85	0	25	0	0	0
Future Volume (Veh/h)	0	555	45	15	190	0	85	0	25	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	0	712	58	19	244	0	109	0	32	0	0	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)		144										
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	244			770			1023	1023	741	1055	1052	244
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	244			703			979	979	671	1014	1011	244
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			98			46	100	92	100	100	100
cM capacity (veh/h)	1334			828			203	226	421	182	216	780

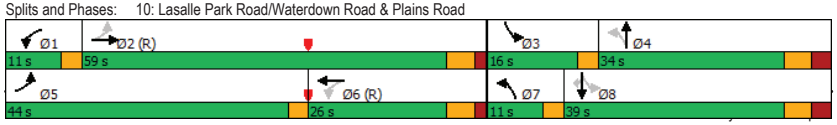
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	770	263	141	0
Volume Left	0	19	109	0
Volume Right	58	0	32	0
cSH	1334	828	230	1700
Volume to Capacity	0.00	0.02	0.61	0.00
Queue Length 95th (m)	0.0	0.6	28.8	0.0
Control Delay (s)	0.0	0.9	42.7	0.0
Lane LOS		A	E	A
Approach Delay (s)	0.0	0.9	42.7	0.0
Approach LOS			E	A

Intersection Summary				
Average Delay			5.3	
Intersection Capacity Utilization			44.8%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	770	975	85	375	100	325	265	190	220
Future Volume (vph)	770	975	85	375	100	325	265	190	220
Lane Group Flow (vph)	819	1213	90	692	106	415	282	202	234
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6	7	4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	1	6	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	9.0	27.0	9.0	34.0	9.0	34.0	34.0
Total Split (s)	44.0	59.0	11.0	26.0	11.0	34.0	16.0	39.0	39.0
Total Split (%)	36.7%	49.2%	9.2%	21.7%	9.2%	28.3%	13.3%	32.5%	32.5%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	2.0	5.0	2.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	1.25	0.78	0.45	1.04	0.25	0.98	1.12	0.40	0.41
Control Delay	155.6	31.6	26.4	84.3	24.9	83.5	119.9	36.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	155.6	31.6	26.4	84.3	24.9	83.5	119.9	36.7	8.2
Queue Length 50th (m)	~237.5	129.6	9.7	~81.9	16.6	101.0	~64.2	41.7	0.0
Queue Length 95th (m)	#316.2	159.0	17.9	#121.6	29.3	#167.7	#121.1	64.8	24.1
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	653	1556	207	666	434	425	252	500	569
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.25	0.78	0.43	1.04	0.24	0.98	1.12	0.40	0.41

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	770	975	165	85	375	275	100	325	65	265	190	220
Future Volume (vph)	770	975	165	85	375	275	100	325	65	265	190	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		2.0	5.0		2.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.94		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1678	3406		1676	3172		1722	1797		1615	1810	1446
Flt Permitted	0.17	1.00		0.23	1.00		0.63	1.00		0.13	1.00	1.00
Satd. Flow (perm)	307	3406		409	3172		1144	1797		227	1810	1446
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)	819	1037	176	90	399	293	106	346	69	282	202	234
RTOR Reduction (vph)	0	11	0	0	111	0	0	6	0	0	0	169
Lane Group Flow (vph)	819	1202	0	90	581	0	106	409	0	282	202	65
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	64.0	53.5		27.5	20.0		34.8	27.0		43.0	32.2	32.2
Effective Green, g (s)	65.0	54.5		29.5	21.0		36.8	28.0		44.0	33.2	33.2
Actuated g/C Ratio	0.54	0.45		0.25	0.18		0.31	0.23		0.37	0.28	0.28
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	646	1546		190	555		393	419		245	500	400
v/s Ratio Prot	c0.44	0.35		0.03	c0.18		0.02	c0.23		c0.13	0.11	
v/s Ratio Perm	0.24			0.08			0.06			0.29		0.04
v/c Ratio	1.27	0.78		0.47	1.05		0.27	0.98		1.15	0.40	0.16
Uniform Delay, d1	31.9	27.6		36.1	49.5		30.7	45.7		33.1	35.3	32.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.90	0.95	1.39
Incremental Delay, d2	132.5	3.9		1.9	50.8		0.4	37.3		103.8	0.5	0.2
Delay (s)	164.4	31.5		37.9	100.3		31.1	82.9		133.7	34.2	45.7
Level of Service	F	C		D	F		C	F		F	C	D
Approach Delay (s)		85.1			93.1			72.4			77.1	
Approach LOS		F			F			E			E	

Intersection Summary				
HCM 2000 Control Delay	83.6	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.12			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	114.4%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	90	1230	735	40
Future Volume (vph)	90	1230	735	40
Lane Group Flow (vph)	100	1367	884	105
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	6.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.20	0.51	0.37	0.53
Control Delay	3.0	5.0	7.3	29.4
Queue Delay	0.0	0.5	0.0	0.0
Total Delay	3.0	5.5	7.3	29.4
Queue Length 50th (m)	2.8	42.7	35.3	8.5
Queue Length 95th (m)	7.8	74.3	59.3	24.0
Internal Link Dist (m)		135.9	129.0	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	570	2676	2389	410
Starvation Cap Reductn	0	757	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.71	0.37	0.26

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



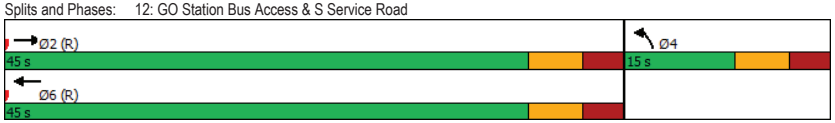
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	90	1230	735	60	40	55
Future Volume (vph)	90	1230	735	60	40	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1631	3282	3246		1405	
Flt Permitted	0.29	1.00	1.00		0.98	
Satd. Flow (perm)	503	3282	3246		1405	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1367	817	67	44	61
RTOR Reduction (vph)	0	0	3	0	55	0
Lane Group Flow (vph)	100	1367	881	0	50	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	77.9	77.9	69.3		8.1	
Effective Green, g (s)	78.9	78.9	70.3		9.1	
Actuated g/C Ratio	0.79	0.79	0.70		0.09	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	471	2589	2281		127	
v/s Ratio Prot	0.01	c0.42	0.27			
v/s Ratio Perm	0.15				c0.04	
v/c Ratio	0.21	0.53	0.39		0.39	
Uniform Delay, d1	2.6	3.8	6.1		42.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8	0.5		2.0	
Delay (s)	2.8	4.6	6.5		44.8	
Level of Service	A	A	A		D	
Approach Delay (s)		4.5	6.5		44.8	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1580	110	15
Future Volume (vph)	1580	110	15
Lane Group Flow (vph)	1733	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.54	0.04	0.12
Control Delay	3.0	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	3.0	1.2	24.5
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	86.3	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3232	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	89	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.55	0.04	0.12

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1580	15	0	110	15	0
Future Volume (vph)	1580	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3474			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3474			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1717	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1732	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2628			2731	38	
v/s Ratio Prot	c0.50			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.66			0.04	0.42	
Uniform Delay, d1	3.5			1.8	28.0	
Progression Factor	1.00			0.90	1.00	
Incremental Delay, d2	1.3			0.0	7.4	
Delay (s)	4.9			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	4.9			1.7	35.3	
Approach LOS	A			A	D	

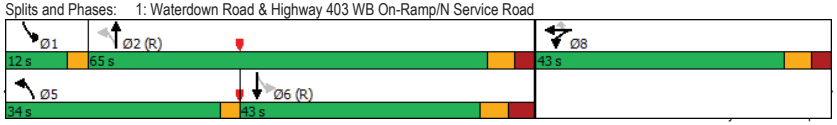
Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	255	500	220	745	860	115	700
Future Volume (vph)	255	500	220	745	860	115	700
Lane Group Flow (vph)	268	526	232	784	1105	121	895
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	43.0	43.0	43.0	34.0	65.0	12.0	43.0
Total Split (%)	35.8%	35.8%	35.8%	28.3%	54.2%	10.0%	35.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	0.0	3.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	2.0	6.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.54	0.96	0.39	1.61	0.71	0.44	0.96
Control Delay	39.5	71.5	5.9	305.3	19.2	18.1	61.9
Queue Delay	0.0	0.0	0.0	0.1	1.4	0.0	0.0
Total Delay	39.5	71.5	5.9	305.4	20.6	18.1	61.9
Queue Length 50th (m)	55.0	127.4	0.0	~261.6	127.4	11.3	112.4
Queue Length 95th (m)	83.3	#197.9	18.4	#337.8	25.8	19.6	#156.5
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	498	552	600	487	1556	282	932
Starvation Cap Reductn	0	0	0	4	250	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.95	0.39	1.62	0.85	0.43	0.96

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	500	220	745	860	190	115	700	150
Future Volume (vph)	0	0	0	255	500	220	745	860	190	115	700	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	2.0	6.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	1558	3086		1601	3056	
Flt Permitted				0.95	1.00	1.00	0.12	1.00		0.26	1.00	
Satd. Flow (perm)				1616	1792	1426	190	3086		435	3056	
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	0	268	526	232	784	905	200	121	737	158
RTOR Reduction (vph)	0	0	0	0	0	161	0	16	0	0	15	0
Lane Group Flow (vph)	0	0	0	268	526	71	784	1089	0	121	880	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				35.7	35.7	35.7	70.3	58.9		43.4	35.0	
Effective Green, g (s)				36.7	36.7	36.7	71.3	59.9		45.4	36.0	
Actuated g/C Ratio				0.31	0.31	0.31	0.59	0.50		0.38	0.30	
Clearance Time (s)				7.0	7.0	7.0	3.0	7.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				494	548	436	481	1540		255	916	
v/s Ratio Prot				0.17	c0.29		c0.44	0.35		0.04	c0.29	
v/s Ratio Perm						0.05	0.53			0.14		
v/c Ratio				0.54	0.96	0.16	1.63	0.71		0.47	0.96	
Uniform Delay, d1				34.7	40.9	30.4	34.6	23.3		25.1	41.3	
Progression Factor				1.00	1.00	1.00	0.80	0.74		1.00	1.00	
Incremental Delay, d2				1.2	28.2	0.2	290.5	2.1		1.4	21.5	
Delay (s)				35.9	69.1	30.6	318.3	19.3		26.5	62.8	
Level of Service				D	E	C	F	B		C	E	
Approach Delay (s)		0.0			51.7			143.4			58.5	
Approach LOS		A			D			F			E	

Intersection Summary

HCM 2000 Control Delay	97.5	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	1.16				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		15.0	
Intersection Capacity Utilization	105.9%	ICU Level of Service		G	
Analysis Period (min)	15				

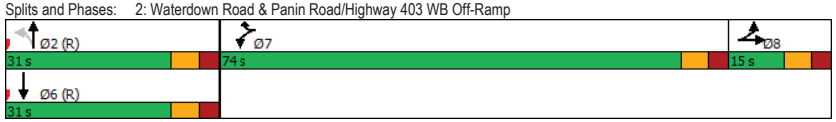
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	315	370	5	1425	955
Future Volume (vph)	0	315	370	5	1425	955
Lane Group Flow (vph)	6	358	420	0	1625	1085
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	74.0	74.0	31.0	31.0	31.0
Total Split (%)	12.5%	61.7%	61.7%	25.8%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.01	0.57	0.80		0.73	0.45
Control Delay	0.0	45.8	26.7		25.7	21.3
Queue Delay	0.0	0.0	0.5		1.2	0.0
Total Delay	0.0	45.8	27.2		27.0	21.3
Queue Length 50th (m)	0.0	43.0	36.9		184.0	97.3
Queue Length 95th (m)	0.0	47.9	62.0		m177.6	m115.0
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	453	1792	988		2231	2391
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	234		362	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.01	0.20	0.56		0.87	0.45

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	315	0	370	5	1425	0	0	955	0
Future Volume (vph)	0	0	5	315	0	370	5	1425	0	0	955	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3300			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	358	0	420	6	1619	0	0	1085	0
RTOR Reduction (vph)	0	6	0	0	0	219	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	358	0	201	0	1625	0	0	1085	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		22.9		22.9		74.5			74.5	
Effective Green, g (s)		2.6		23.9		23.9		75.5			75.5	
Actuated g/C Ratio		0.02		0.20		0.20		0.63			0.63	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		630		305		2076			2226	
v/s Ratio Prot		c0.00		0.11		c0.13					0.31	
v/s Ratio Perm								c0.49				
v/c Ratio		0.00		0.57		0.66		0.78			0.49	
Uniform Delay, d1		57.4		43.4		44.3		16.3			11.9	
Progression Factor		1.00		1.00		1.00		1.75			1.79	
Incremental Delay, d2		0.0		1.2		5.3		0.3			0.5	
Delay (s)		57.5		44.6		49.6		28.8			21.8	
Level of Service		E		D		D		C			C	
Approach Delay (s)		57.5			47.3			28.8			21.8	
Approach LOS		E			D			C			C	

Intersection Summary

HCM 2000 Control Delay	30.8	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	84.1%	ICU Level of Service		E	
Analysis Period (min)	15				

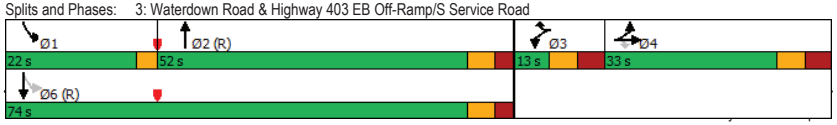
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	265	95	400	50	260	935	425	850
Future Volume (vph)	265	95	400	50	260	935	425	850
Lane Group Flow (vph)	298	107	449	56	292	1573	478	955
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	33.0	33.0	33.0	13.0	13.0	52.0	22.0	74.0
Total Split (%)	27.5%	27.5%	27.5%	10.8%	10.8%	43.3%	18.3%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.81	0.27	1.03	0.36	0.83	1.18	1.39	0.48
Control Delay	62.3	41.4	83.6	50.9	50.9	114.1	225.7	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.3	41.4	83.6	50.9	50.9	114.1	225.7	22.9
Queue Length 50th (m)	70.6	22.3	~90.8	7.6	50.0	~236.2	~146.3	101.0
Queue Length 95th (m)	#112.8	38.6	#154.3	14.6	#82.1	#273.5	#201.2	36.8
Internal Link Dist (m)		253.6				353.3		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	370	392	436	156	353	1335	343	2005
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.27	1.03	0.36	0.83	1.18	1.39	0.48

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	95	400	50	0	260	0	935	465	425	850	0
Future Volume (vph)	265	95	400	50	0	260	0	935	465	425	850	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		0.95		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	3134		1521		3352		1678	3539	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.08	1.00	
Satd. Flow (perm)	1711	1810	1521	3134		1521		3352		147	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	298	107	449	56	0	292	0	1051	522	478	955	0
RTOR Reduction (vph)	0	0	107	0	0	277	0	51	0	0	0	0
Lane Group Flow (vph)	298	107	342	56	0	15	0	1522	0	478	955	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	25.0	25.0	25.0	5.0		5.0		45.0		67.0	67.0	
Effective Green, g (s)	26.0	26.0	26.0	6.0		6.0		46.0		68.0	68.0	
Actuated g/C Ratio	0.22	0.22	0.22	0.05		0.05		0.38		0.57	0.57	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	370	392	329	156		76		1284		338	2005	
v/s Ratio Prot	0.17	0.06		c0.02		0.01		c0.45		c0.24	0.27	
v/s Ratio Perm			c0.23							0.56		
v/c Ratio	0.81	0.27	1.04	0.36		0.19		1.19		1.41	0.48	
Uniform Delay, d1	44.6	39.1	47.0	55.1		54.7		37.0		38.8	15.4	
Progression Factor	1.00	1.00	1.00	0.80		6.79		0.83		1.16	1.42	
Incremental Delay, d2	12.0	0.4	60.7	1.4		1.2		88.9		202.1	0.8	
Delay (s)	56.6	39.5	107.7	45.7		372.5		119.5		247.1	22.6	
Level of Service	E	D	F	D		F		F		F	C	
Approach Delay (s)		81.3			319.9			119.5			97.5	
Approach LOS		F			F			F			F	

Intersection Summary

HCM 2000 Control Delay	120.8	HCM 2000 Level of Service		F		
HCM 2000 Volume to Capacity ratio	1.13					
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		22.0		
Intersection Capacity Utilization	95.1%	ICU Level of Service		F		
Analysis Period (min)	15					

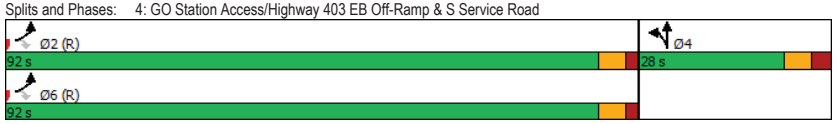
c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	850	15	30		
Future Volume (vph)	850	15	30		
Lane Group Flow (vph)	1090	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			28.0	92.0	92.0
Total Split (%)			23.3%	77%	77%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.89	0.02	0.89		
Control Delay	20.4	0.3	76.2		
Queue Delay	2.7	0.0	0.0		
Total Delay	23.1	0.3	76.2		
Queue Length 50th (m)	35.1	0.2	73.7		
Queue Length 95th (m)	202.5	0.3	#97.6		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1232	1167	342		
Starvation Cap Reductn	71	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.94	0.02	0.88		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	850	15	205	30	0	0
Future Volume (vph)	850	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	1090	19	263	38	0	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	1090	14	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	85.7	85.7		21.3		
Effective Green, g (s)	86.7	86.7		22.3		
Actuated g/C Ratio	0.72	0.72		0.19		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1223	1153		338		
v/s Ratio Prot	c0.64			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.89	0.01		0.89		
Uniform Delay, d1	13.0	4.7		47.7		
Progression Factor	0.73	0.14		1.00		
Incremental Delay, d2	9.7	0.0		24.0		
Delay (s)	19.2	0.7		71.7		
Level of Service	B	A		E		
Approach Delay (s)	18.9			71.7	0.0	
Approach LOS	B			E	A	

Intersection Summary

HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

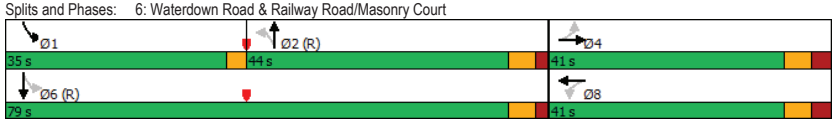
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	5	110	5	5	815	210	1080
Future Volume (vph)	10	5	110	5	5	815	210	1080
Lane Group Flow (vph)	0	25	139	734	6	1076	266	1380
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	41.0	41.0	41.0	41.0	44.0	44.0	35.0	79.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	36.7%	36.7%	29.2%	65.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.22	0.43	0.95	0.05	0.64	0.65	0.60
Control Delay		31.6	40.8	36.3	22.8	24.6	26.7	7.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		31.6	40.8	36.3	22.8	24.6	26.7	7.3
Queue Length 50th (m)		3.5	27.2	61.9	0.7	96.1	30.2	50.1
Queue Length 95th (m)		9.7	39.9	78.0	m1.2	m94.8	m38.7	m55.0
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		138	389	822	133	1687	582	2314
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.18	0.36	0.89	0.05	0.64	0.46	0.60

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	110	5	575	5	815	35	210	1080	10
Future Volume (vph)	10	5	5	110	5	575	5	815	35	210	1080	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196		1711	1592		1353	3413		1694	3479	
Flt Permitted		0.38		0.74	1.00		0.19	1.00		0.16	1.00	
Satd. Flow (perm)		461		1334	1592		271	3413		282	3479	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	139	6	728	6	1032	44	266	1367	13
RTOR Reduction (vph)	0	5	0	0	383	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	20	0	139	351	0	6	1074	0	266	1380	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.2		28.2	28.2		58.3	58.3		78.8	78.8	
Effective Green, g (s)		29.2		29.2	29.2		59.3	59.3		79.8	79.8	
Actuated g/C Ratio		0.24		0.24	0.24		0.49	0.49		0.66	0.66	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		112		324	387		133	1686		405	2313	
v/s Ratio Prot					c0.22			c0.31		c0.10	0.40	
v/s Ratio Perm		0.04		0.10			0.02			0.34		
v/c Ratio		0.18		0.43	0.91		0.05	0.64		0.66	0.60	
Uniform Delay, d1		36.0		38.4	44.1		15.7	22.4		13.9	11.2	
Progression Factor		1.00		1.00	1.00		0.96	0.92		1.77	0.50	
Incremental Delay, d2		0.8		0.9	24.2		0.3	1.0		3.2	0.9	
Delay (s)		36.7		39.3	68.3		15.3	21.5		27.7	6.6	
Level of Service		D		D	E		B	C		C	A	
Approach Delay (s)		36.7			63.7			21.5			10.0	
Approach LOS		D			E			C			A	

Intersection Summary

HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	195	55	25	615	0	75	0	20	0	0	0
Future Volume (Veh/h)	0	195	55	25	615	0	75	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	238	67	30	750	0	91	0	24	0	0	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)		144										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	750			305			1082	1082	272	1106	1115	750
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	750			244			1060	1060	208	1085	1095	750
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			98			51	100	97	100	100	100
cM capacity (veh/h)	868			1269			186	210	766	177	200	415

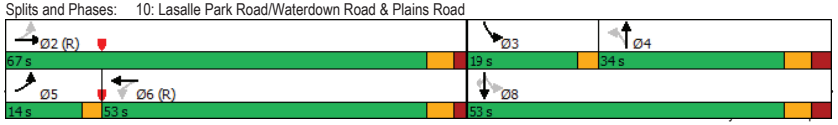
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	305	780	115	0
Volume Left	0	30	91	0
Volume Right	67	0	24	0
cSH	868	1269	221	1700
Volume to Capacity	0.00	0.02	0.52	0.00
Queue Length 95th (m)	0.0	0.6	21.6	0.0
Control Delay (s)	0.0	0.6	37.7	0.0
Lane LOS		A	E	A
Approach Delay (s)	0.0	0.6	37.7	0.0
Approach LOS			E	A

Intersection Summary				
Average Delay			4.0	
Intersection Capacity Utilization			62.7%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	270	630	85	1205	140	245	425	315	455
Future Volume (vph)	270	630	85	1205	140	245	425	315	455
Lane Group Flow (vph)	278	737	88	1593	144	330	438	325	469
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	14.0	67.0	53.0	53.0	34.0	34.0	19.0	53.0	53.0
Total Split (%)	11.7%	55.8%	44.2%	44.2%	28.3%	28.3%	15.8%	44.2%	44.2%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	1.10	0.40	0.35	1.16	0.67	0.84	1.28	0.46	0.68
Control Delay	118.7	17.1	30.0	112.8	58.9	63.1	176.6	37.2	31.1
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	118.7	17.1	30.0	113.4	58.9	63.1	176.6	37.2	31.1
Queue Length 50th (m)	~70.7	55.4	15.0	~243.6	32.1	74.4	~110.7	78.9	86.7
Queue Length 95th (m)	#126.8	70.5	30.3	#289.2	56.1	#117.5	#177.8	108.3	101.6
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	252	1863	255	1376	234	425	343	744	717
Starvation Cap Reductn	0	0	0	198	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.40	0.35	1.35	0.62	0.78	1.28	0.44	0.65

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	630	85	85	1205	340	140	245	75	425	315	455
Future Volume (vph)	270	630	85	85	1205	340	140	245	75	425	315	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1616	3461		1629	3386		1694	1785		1710	1900	1492
Flt Permitted	0.08	1.00		0.37	1.00		0.56	1.00		0.21	1.00	1.00
Satd. Flow (perm)	136	3461		637	3386		1006	1785		384	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	278	649	88	88	1242	351	144	253	77	438	325	469
RTOR Reduction (vph)	0	8	0	0	22	0	0	9	0	0	0	137
Lane Group Flow (vph)	278	729	0	88	1571	0	144	321	0	438	325	332
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	63.3	63.3		47.0	47.0		24.7	24.7		43.7	43.7	43.7
Effective Green, g (s)	64.3	64.3		48.0	48.0		25.7	25.7		44.7	44.7	44.7
Actuated g/C Ratio	0.54	0.54		0.40	0.40		0.21	0.21		0.37	0.37	0.37
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	249	1854		254	1354		215	382		330	707	555
v/s Ratio Prot	c0.13	0.21			c0.46			c0.18		c0.19	0.17	
v/s Ratio Perm	0.46			0.14			0.14			0.31		0.22
v/c Ratio	1.12	0.39		0.35	1.16		0.67	0.84		1.33	0.46	0.60
Uniform Delay, d1	38.1	16.4		25.1	36.0		43.3	45.2		32.0	28.5	30.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.45	1.25	1.67
Incremental Delay, d2	91.9	0.6		3.7	80.8		7.7	14.9		163.7	0.4	1.4
Delay (s)	130.0	17.0		28.8	116.8		50.9	60.0		210.2	35.9	52.3
Level of Service	F	B		C	F		D	E		F	D	D
Approach Delay (s)		48.0			112.2			57.3			104.1	
Approach LOS		D			F			E			F	

Intersection Summary				
HCM 2000 Control Delay	89.2	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.09			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	117.0%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	55	1085	1625	80
Future Volume (vph)	55	1085	1625	80
Lane Group Flow (vph)	57	1119	1727	154
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.27	0.44	0.76	0.63
Control Delay	6.2	5.9	15.6	44.3
Queue Delay	0.0	0.6	0.0	0.0
Total Delay	6.2	6.4	15.6	44.3
Queue Length 50th (m)	2.2	40.0	124.9	25.0
Queue Length 95th (m)	6.2	65.1	195.0	44.4
Internal Link Dist (m)		135.9	127.4	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	300	2559	2282	411
Starvation Cap Reductn	0	940	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.19	0.69	0.76	0.37

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	1085	1625	50	80	70
Future Volume (vph)	55	1085	1625	50	80	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3315		1619	
Flt Permitted	0.08	1.00	1.00		0.97	
Satd. Flow (perm)	140	3374	3315		1619	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1119	1675	52	82	72
RTOR Reduction (vph)	0	0	1	0	33	0
Lane Group Flow (vph)	57	1119	1726	0	121	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	82.5	82.5	74.2		13.5	
Effective Green, g (s)	83.5	83.5	75.2		14.5	
Actuated g/C Ratio	0.76	0.76	0.68		0.13	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	191	2561	2266		213	
v/s Ratio Prot	0.02	c0.33	c0.52			
v/s Ratio Perm	0.21				c0.07	
v/c Ratio	0.30	0.44	0.76		0.57	
Uniform Delay, d1	9.3	4.8	11.5		44.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.9	0.5	2.5		3.5	
Delay (s)	10.1	5.3	14.0		48.3	
Level of Service	B	A	B		D	
Approach Delay (s)		5.6	14.0		48.3	
Approach LOS		A	B		D	

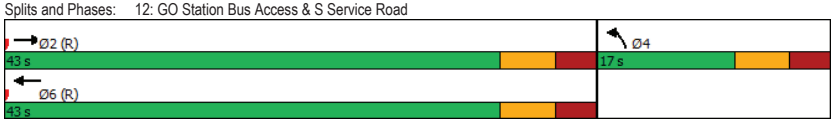
Intersection Summary				
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	65.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	965	295	15
Future Volume (vph)	965	295	15
Lane Group Flow (vph)	1048	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.33	0.09	0.12
Control Delay	1.6	0.3	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.6	0.3	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m33.7	m1.1	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3155	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	87	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.34	0.09	0.10

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	965	20	0	295	15	0
Future Volume (vph)	965	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3404			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3404			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1027	21	0	314	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1047	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2564			2719	42	
v/s Ratio Prot	c0.31			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.41			0.12	0.38	
Uniform Delay, d1	2.6			2.0	27.8	
Progression Factor	1.01			0.20	1.00	
Incremental Delay, d2	0.0			0.1	5.7	
Delay (s)	2.7			0.5	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.7			0.5	33.4	
Approach LOS	A			A	C	

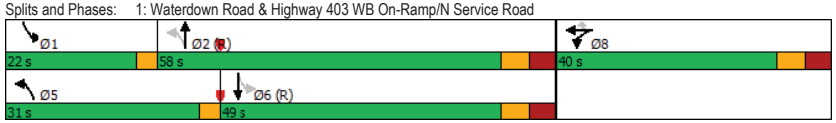
Intersection Summary			
HCM 2000 Control Delay	2.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	70	105	65	380	465	235	740
Future Volume (vph)	70	105	65	380	465	235	740
Lane Group Flow (vph)	71	107	66	388	943	240	969
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	31.0	58.0	22.0	49.0
Total Split (%)	33.3%	33.3%	33.3%	25.8%	48.3%	18.3%	40.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.41	0.56	0.25	0.70	0.48	0.50	0.62
Control Delay	54.8	60.3	5.3	21.0	6.1	9.6	24.4
Queue Delay	0.0	0.0	0.0	0.3	0.1	0.0	0.0
Total Delay	54.8	60.3	5.3	21.2	6.2	9.6	24.4
Queue Length 50th (m)	16.5	25.4	0.0	8.5	53.0	10.9	84.5
Queue Length 95th (m)	30.4	42.4	5.3	96.9	38.7	22.1	138.0
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	468	593	1963	557	1566
Starvation Cap Reductn	0	0	0	22	228	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.24	0.14	0.68	0.54	0.43	0.62

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	70	105	65	380	465	460	235	740	210
Future Volume (vph)	0	0	0	70	105	65	380	465	460	235	740	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	1544	2969		1616	2986	
Flt Permitted				0.95	1.00	1.00	0.21	1.00		0.30	1.00	
Satd. Flow (perm)				1442	1597	1439	347	2969		516	2986	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	71	107	66	388	474	469	240	755	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	96	0	0	16	0
Lane Group Flow (vph)	0	0	0	71	107	8	388	847	0	240	953	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	90.6	74.5		74.4	61.3	
Effective Green, g (s)				14.4	14.4	14.4	91.6	75.5		76.4	62.3	
Actuated g/C Ratio				0.12	0.12	0.12	0.76	0.63		0.64	0.52	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	537	1867		457	1550	
v/s Ratio Prot				0.05	c0.07		c0.16	0.29		0.06	c0.32	
v/s Ratio Perm						0.01	0.39			0.27		
v/c Ratio				0.41	0.56	0.05	0.72	0.45		0.53	0.61	
Uniform Delay, d1				48.9	49.8	46.7	12.8	11.5		9.3	20.4	
Progression Factor				1.00	1.00	1.00	1.59	0.59		1.00	1.00	
Incremental Delay, d2				1.6	3.7	0.1	4.1	0.7		1.1	1.8	
Delay (s)				50.5	53.5	46.8	24.4	7.4		10.4	22.2	
Level of Service				D	D	D	C	A		B	C	
Approach Delay (s)		0.0			50.8			12.4			19.9	
Approach LOS		A			D			B			B	

Intersection Summary

HCM 2000 Control Delay	19.0	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.63				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	69.9%	ICU Level of Service		C	
Analysis Period (min)	15				

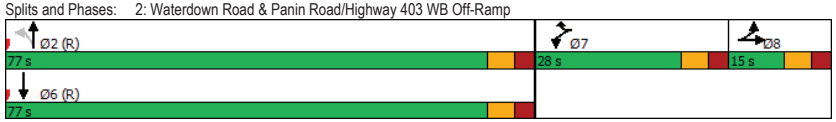
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	300	150	5	1150	810
Future Volume (vph)	0	300	150	5	1150	810
Lane Group Flow (vph)	5	326	163	0	1255	880
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	28.0	28.0	77.0	77.0	77.0
Total Split (%)	12.5%	23.3%	23.3%	64.2%	64.2%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.67	0.46		0.54	0.35
Control Delay	53.4	54.5	11.2		11.5	4.3
Queue Delay	0.0	0.0	0.0		0.5	0.2
Total Delay	53.4	54.5	11.2		11.9	4.5
Queue Length 50th (m)	1.2	39.7	0.4		84.4	27.1
Queue Length 95th (m)	5.5	53.1	19.2		m93.4	16.6
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	590	394		2337	2486
Starvation Cap Reductn	0	0	0		566	698
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.55	0.41		0.71	0.49

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	300	0	150	5	1150	0	0	810	0
Future Volume (vph)	5	0	0	300	0	150	5	1150	0	0	810	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3393			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3230			3438	
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)	5	0	0	326	0	163	5	1250	0	0	880	0
RTOR Reduction (vph)	0	0	0	0	0	136	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	326	0	27	0	1255	0	0	880	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		17.4		17.4		80.0			80.0	
Effective Green, g (s)		2.6		18.4		18.4		81.0			81.0	
Actuated g/C Ratio		0.02		0.15		0.15		0.68			0.68	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		489		218		2180			2320	
v/s Ratio Prot		c0.00		c0.10		0.02					0.26	
v/s Ratio Perm								c0.39				
v/c Ratio		0.21		0.67		0.12		0.58			0.38	
Uniform Delay, d1		57.7		47.9		43.8		10.4			8.5	
Progression Factor		1.00		1.00		1.00		1.21			0.53	
Incremental Delay, d2		4.3		3.4		0.3		0.5			0.4	
Delay (s)		62.0		51.3		44.1		13.0			5.0	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			48.9			13.0			5.0	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues — Future Total 2026 - Without Improvements

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	275	315	395	25	100	780	565	545
Future Volume (vph)	275	315	395	25	100	780	565	545
Lane Group Flow (vph)	296	339	425	27	108	1613	608	586
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	16.0	16.0	64.0	10.0	74.0
Total Split (%)	25.0%	25.0%	25.0%	13.3%	13.3%	53.3%	8.3%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.86	0.91	0.75	0.15	0.50	0.97	1.39	0.31
Control Delay	70.7	75.5	20.5	57.7	17.2	30.4	213.8	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.7	75.5	20.5	57.7	17.2	30.4	213.8	13.3
Queue Length 50th (m)	71.2	82.4	20.5	3.4	0.0	48.0	~106.4	25.5
Queue Length 95th (m)	#124.0	#141.7	63.6	8.6	15.9	#229.9	#235.7	39.9
Internal Link Dist (m)		253.6				236.1		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	344	374	563	208	232	1666	436	1906
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.91	0.75	0.13	0.47	0.97	1.39	0.31

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

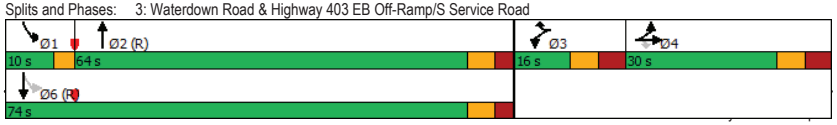
Natural Cycle: 145

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



HCM Signalized Intersection Capacity Analysis — Future Total 2026 - Without Improvements

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	275	315	395	25	0	100	0	780	720	565	545	0
Future Volume (vph)	275	315	395	25	0	100	0	780	720	565	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		0.93		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	2775		1426		3161		1766	3343	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	2775		1426		3161		583	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	296	339	425	27	0	108	0	839	774	608	586	0
RTOR Reduction (vph)	0	0	263	0	0	101	0	139	0	0	0	0
Lane Group Flow (vph)	296	339	162	27	0	7	0	1474	0	608	586	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	22.9	22.9	22.9	6.7		6.7		56.8		67.4	67.4	
Effective Green, g (s)	23.9	23.9	23.9	7.7		7.7		57.8		68.4	68.4	
Actuated g/C Ratio	0.20	0.20	0.20	0.06		0.06		0.48		0.57	0.57	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	344	374	300	178		91		1522		417	1905	
v/s Ratio Prot	0.17	c0.18		c0.01		0.00		c0.47		c0.10	0.18	
v/s Ratio Perm			0.11							0.73		
v/c Ratio	0.86	0.91	0.54	0.15		0.08		0.97		1.46	0.31	
Uniform Delay, d1	46.4	47.0	43.1	53.1		52.8		30.2		19.7	13.5	
Progression Factor	1.00	1.00	1.00	1.06		2.02		0.61		1.24	0.95	
Incremental Delay, d2	19.2	24.7	1.9	0.4		0.4		14.6		218.2	0.4	
Delay (s)	65.6	71.6	45.0	56.6		106.9		32.9		242.6	13.1	
Level of Service	E	E	D	E		F		C		F	B	
Approach Delay (s)		59.3			96.9			32.9			130.0	
Approach LOS		E			F			C			F	

Intersection Summary

HCM 2000 Control Delay	71.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	112.1%	ICU Level of Service	H
Analysis Period (min)	15		

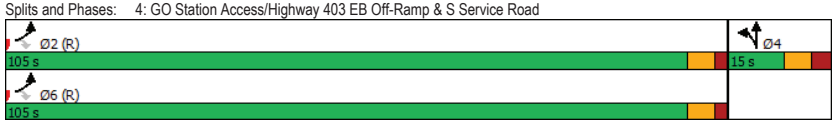
c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	1010	160	25		
Future Volume (vph)	1010	160	25		
Lane Group Flow (vph)	1063	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.88	0.12	0.27		
Control Delay	15.5	0.5	57.9		
Queue Delay	1.6	0.0	0.0		
Total Delay	17.1	0.5	57.9		
Queue Length 50th (m)	61.8	0.2	8.8		
Queue Length 95th (m)	#336.0	2.3	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	136		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.92	0.12	0.27		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1010	160	10	25	0	0
Future Volume (vph)	1010	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1063	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	1063	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.79			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.92	0.11		0.42		
Uniform Delay, d1	5.7	1.3		55.5		
Progression Factor	0.86	1.26		1.00		
Incremental Delay, d2	11.7	0.1		3.2		
Delay (s)	16.6	1.8		58.7		
Level of Service	B	A		E		
Approach Delay (s)	14.5			58.7	0.0	
Approach LOS	B			E	A	

Intersection Summary

HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	195	1305	10	0	965
Future Volume (Veh/h)	0	195	1305	10	0	965
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	212	1418	11	0	1049
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.75	0.71			0.71	
vC, conflicting volume	1948	714			1429	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1161	0			801	
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	73			100	
cM capacity (veh/h)	144	779			594	

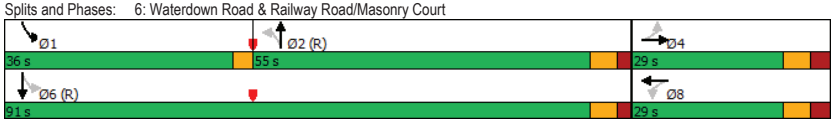
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	212	945	484	524	524
Volume Left	0	0	0	0	0
Volume Right	212	0	11	0	0
cSH	779	1700	1700	1700	1700
Volume to Capacity	0.27	0.56	0.28	0.31	0.31
Queue Length 95th (m)	8.8	0.0	0.0	0.0	0.0
Control Delay (s)	11.3	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.3	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		55.1%	ICU Level of Service B
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	0	25	0	5	1025	420	535
Future Volume (vph)	10	0	25	0	5	1025	420	535
Lane Group Flow (vph)	0	22	28	318	6	1290	477	619
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	55.0	55.0	36.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	45.8%	45.8%	30.0%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.27	0.27	0.59	0.02	0.73	0.79	0.22
Control Delay		8.2	57.7	4.6	11.0	16.8	34.3	2.8
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		8.2	57.7	4.6	11.0	16.8	34.3	2.8
Queue Length 50th (m)		0.0	6.7	0.0	0.4	90.5	87.6	13.5
Queue Length 95th (m)		0.2	16.0	0.0	m0.9	m163.7	114.8	23.7
Internal Link Dist (m)		95.0		120.3		328.3		93.2
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		114	237	653	332	1767	640	2782
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.19	0.12	0.49	0.02	0.73	0.75	0.22

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2026 - Without Improvements

6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour



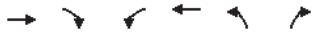
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	25	0	280	5	1025	110	420	535	10
Future Volume (vph)	10	0	10	25	0	280	5	1025	110	420	535	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184		1586	1495		1454	3381		1728	3374	
Flt Permitted		0.30		0.74	1.00		0.42	1.00		0.11	1.00	
Satd. Flow (perm)		364		1241	1495		639	3381		198	3374	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	28	0	318	6	1165	125	477	608	11
RTOR Reduction (vph)	0	20	0	0	292	0	0	6	0	0	1	0
Lane Group Flow (vph)	0	2	0	28	27	0	6	1284	0	477	618	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.0		9.0	9.0		61.6	61.6		98.0	98.0	
Effective Green, g (s)		10.0		10.0	10.0		62.6	62.6		99.0	99.0	
Actuated g/C Ratio		0.08		0.08	0.08		0.52	0.52		0.82	0.82	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		30		103	124		333	1763		601	2783	
v/s Ratio Prot					0.02			c0.38		c0.23	0.18	
v/s Ratio Perm		0.01		c0.02			0.01			0.43		
v/c Ratio		0.06		0.27	0.21		0.02	0.73		0.79	0.22	
Uniform Delay, d1		50.7		51.6	51.3		13.9	22.1		27.6	2.2	
Progression Factor		1.00		1.00	1.00		0.59	0.63		1.09	1.12	
Incremental Delay, d2		0.9		1.4	0.9		0.0	1.3		6.5	0.2	
Delay (s)		51.5		53.0	52.2		8.2	15.2		36.6	2.7	
Level of Service		D		D	D		A	B		D	A	
Approach Delay (s)		51.5			52.3			15.2			17.5	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	84.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2026 - Without Improvements

7: Cooke Boulevard & Site Driveway (East) — AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	85	30	0	70	5
Future Volume (Veh/h)	0	85	30	0	70	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	92	33	0	76	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)						
pX, platoon unblocked						
vC, conflicting volume			92		66	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		66	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	100
cM capacity (veh/h)			1515		924	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	33	81
Volume Left	0	33	76
Volume Right	92	0	5
cSH	1700	1515	933
Volume to Capacity	0.05	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.3
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Future Total 2026 - Without Improvements

8: Cooke Boulevard & Masonry Court — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	430	45	45	180	0	80	20	25	0	70	45
Future Volume (Veh/h)	55	430	45	45	180	0	80	20	25	0	70	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	71	551	58	58	231	0	103	26	32	0	90	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.94			0.94	0.94	0.94	0.94	0.94	
vC, conflicting volume	231			609			1172	1069	580	1114	1098	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			549			1150	1040	518	1088	1071	231
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	95			94			0	87	94	100	52	93
cM capacity (veh/h)	1349			966			86	194	526	141	186	793

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	680	289	161	148
Volume Left	71	58	103	0
Volume Right	58	0	32	58
cSH	1349	966	115	265
Volume to Capacity	0.05	0.06	1.40	0.56
Queue Length 95th (m)	1.3	1.5	89.2	25.0
Control Delay (s)	1.4	2.3	292.8	34.4
Lane LOS	A	A	F	D
Approach Delay (s)	1.4	2.3	292.8	34.4
Approach LOS			F	D

Intersection Summary				
Average Delay			42.1	
Intersection Capacity Utilization			53.0%	ICU Level of Service
Analysis Period (min)			15	

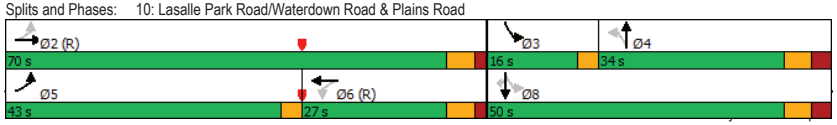
Queues — Future Total 2026 - Without Improvements

10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	630	810	70	335	80	265	230	155	185
Future Volume (vph)	630	810	70	335	80	265	230	155	185
Lane Group Flow (vph)	670	1006	74	617	85	341	245	165	197
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	43.0	70.0	27.0	27.0	34.0	34.0	16.0	50.0	50.0
Total Split (%)	35.8%	58.3%	22.5%	22.5%	28.3%	28.3%	13.3%	41.7%	41.7%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	1.00	0.53	0.83	0.91	0.33	0.86	0.87	0.26	0.31
Control Delay	66.0	17.8	106.2	55.9	42.8	65.4	59.0	26.7	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.0	17.8	106.2	55.9	42.8	65.4	59.0	26.7	8.4
Queue Length 50th (m)	~162.7	79.5	17.8	63.2	17.5	78.4	38.5	25.6	2.0
Queue Length 95th (m)	#237.7	98.7	#47.0	#96.3	33.1	#124.3	#82.9	43.1	19.8
Internal Link Dist (m)		134.8		135.4		101.9		328.3	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	670	1906	91	692	275	424	281	663	654
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.53	0.81	0.89	0.31	0.80	0.87	0.25	0.30

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	630	810	135	70	335	245	80	265	55	230	155	185
Future Volume (vph)	630	810	135	70	335	245	80	265	55	230	155	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.94		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1677	3408		1666	3173		1718	1794		1614	1810	1446
Flt Permitted	0.17	1.00		0.28	1.00		0.65	1.00		0.20	1.00	1.00
Satd. Flow (perm)	300	3408		500	3173		1181	1794		341	1810	1446
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)	670	862	144	74	356	261	85	282	59	245	165	197
RTOR Reduction (vph)	0	11	0	0	111	0	0	6	0	0	0	128
Lane Group Flow (vph)	670	995	0	74	506	0	85	335	0	245	165	69
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	65.7	65.7		20.5	20.5		25.1	25.1		41.3	41.3	41.3
Effective Green, g (s)	66.7	66.7		21.5	21.5		26.1	26.1		42.3	42.3	42.3
Actuated g/C Ratio	0.56	0.56		0.18	0.18		0.22	0.22		0.35	0.35	0.35
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	662	1894		89	568		256	390		270	638	509
v/s Ratio Prot	c0.36	0.29			c0.16			c0.19		c0.11	0.09	
v/s Ratio Perm	0.20			0.15			0.07			0.21		0.05
v/c Ratio	1.01	0.53		0.83	0.89		0.33	0.86		0.91	0.26	0.14
Uniform Delay, d1	31.5	16.7		47.5	48.1		39.6	45.2		31.5	27.7	26.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.07	0.93	1.97
Incremental Delay, d2	38.0	1.0		57.0	18.8		0.8	16.8		31.0	0.2	0.1
Delay (s)	69.5	17.8		104.5	66.9		40.4	62.0		64.7	26.1	52.1
Level of Service	E	B		F	E		D	E		E	C	D
Approach Delay (s)		38.5			70.9			57.7			50.1	
Approach LOS		D			E			E			D	

Intersection Summary				
HCM 2000 Control Delay	49.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	99.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	95	1015	630	110
Future Volume (vph)	95	1015	630	110
Lane Group Flow (vph)	106	1128	789	205
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.22	0.50	0.42	0.71
Control Delay	6.0	9.0	13.1	44.7
Queue Delay	0.0	0.5	0.0	0.0
Total Delay	6.0	9.6	13.1	44.7
Queue Length 50th (m)	5.3	50.3	41.9	33.2
Queue Length 95th (m)	13.4	83.7	71.1	53.1
Internal Link Dist (m)		135.4	129.2	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	525	2272	1899	385
Starvation Cap Reductn	0	652	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.70	0.42	0.53

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



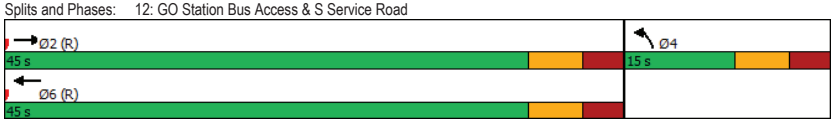
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	95	1015	630	80	110	75
Future Volume (vph)	95	1015	630	80	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.98		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3282	3234		1381	
Flt Permitted	0.30	1.00	1.00		0.97	
Satd. Flow (perm)	522	3282	3234		1381	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1128	700	89	122	83
RTOR Reduction (vph)	0	0	8	0	27	0
Lane Group Flow (vph)	106	1128	781	0	178	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	68.1	68.1	57.5		17.9	
Effective Green, g (s)	69.1	69.1	58.5		18.9	
Actuated g/C Ratio	0.69	0.69	0.58		0.19	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	456	2267	1891		261	
v/s Ratio Prot	0.02	c0.34	0.24			
v/s Ratio Perm	0.14				c0.13	
v/c Ratio	0.23	0.50	0.41		0.68	
Uniform Delay, d1	5.5	7.3	11.4		37.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	0.8	0.7		7.2	
Delay (s)	5.8	8.1	12.0		44.9	
Level of Service	A	A	B		D	
Approach Delay (s)		7.9	12.0		44.9	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	49.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1585	110	15
Future Volume (vph)	1585	110	15
Lane Group Flow (vph)	1739	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.54	0.04	0.12
Control Delay	2.8	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	2.8	1.2	24.5
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m93.8	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3232	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	88	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.55	0.04	0.12

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1585	15	0	110	15	0
Future Volume (vph)	1585	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3474			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3474			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1723	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1738	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2628			2731	38	
v/s Ratio Prot	c0.50			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.66			0.04	0.42	
Uniform Delay, d1	3.6			1.8	28.0	
Progression Factor	1.32			0.90	1.00	
Incremental Delay, d2	0.1			0.0	7.4	
Delay (s)	4.8			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	4.8			1.7	35.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues — Future Total 2026 - Without Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	280	500	220	600	840	115	570
Future Volume (vph)	280	500	220	600	840	115	570
Lane Group Flow (vph)	295	526	232	632	1100	121	758
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	41.0	41.0	41.0	43.0	67.0	12.0	36.0
Total Split (%)	34.2%	34.2%	34.2%	35.8%	55.8%	10.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.65	1.04	0.41	1.06	0.70	0.49	1.01
Control Delay	45.4	92.4	6.5	73.9	20.9	22.2	78.1
Queue Delay	0.0	0.0	0.0	12.0	0.8	0.0	0.0
Total Delay	45.4	92.4	6.5	85.9	21.6	22.2	78.1
Queue Length 50th (m)	64.2	~140.4	0.0	~159.7	132.2	10.8	~97.3
Queue Length 95th (m)	96.1	#209.5	19.2	#225.6	42.8	18.6	#141.1
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	457	507	570	595	1573	256	754
Starvation Cap Reductn	0	0	0	17	202	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	1.04	0.41	1.09	0.80	0.47	1.01

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

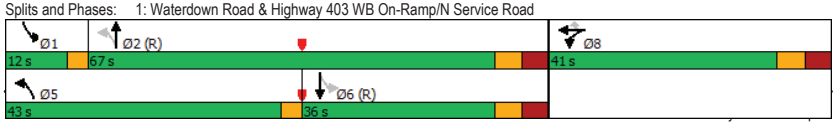
Natural Cycle: 115

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



HCM Signalized Intersection Capacity Analysis — Future Total 2026 - Without Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	280	500	220	600	840	205	115	570	150
Future Volume (vph)	0	0	0	280	500	220	600	840	205	115	570	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	1558	3079		1601	3041	
Flt Permitted				0.95	1.00	1.00	0.13	1.00		0.26	1.00	
Satd. Flow (perm)				1616	1792	1426	212	3079		437	3041	
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	0	295	526	232	632	884	216	121	600	158
RTOR Reduction (vph)	0	0	0	0	0	166	0	18	0	0	20	0
Lane Group Flow (vph)	0	0	0	295	526	66	632	1082	0	121	738	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				33.0	33.0	33.0	71.0	59.6		36.4	28.0	
Effective Green, g (s)				34.0	34.0	34.0	72.0	60.6		38.4	29.0	
Actuated g/C Ratio				0.28	0.28	0.28	0.60	0.51		0.32	0.24	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				457	507	404	587	1554		231	734	
v/s Ratio Prot				0.18	c0.29		c0.37	0.35		0.04	c0.24	
v/s Ratio Perm						0.05	0.28			0.13		
v/c Ratio				0.65	1.04	0.16	1.08	0.70		0.52	1.01	
Uniform Delay, d1				37.7	43.0	32.3	32.7	22.7		30.0	45.5	
Progression Factor				1.00	1.00	1.00	0.69	0.84		1.00	1.00	
Incremental Delay, d2				3.1	50.0	0.2	55.7	2.1		2.1	34.7	
Delay (s)				40.8	93.0	32.5	78.2	21.1		32.2	80.2	
Level of Service				D	F	C	E	C		C	F	
Approach Delay (s)		0.0			65.1			41.9			73.5	
Approach LOS		A			E			D			E	

Intersection Summary

HCM 2000 Control Delay	56.2	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.04				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	95.1%	ICU Level of Service		F	
Analysis Period (min)	15				

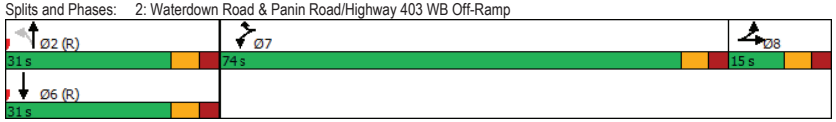
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	355	325	5	1320	850
Future Volume (vph)	0	355	325	5	1320	850
Lane Group Flow (vph)	6	403	369	0	1506	966
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	74.0	74.0	31.0	31.0	31.0
Total Split (%)	12.5%	61.7%	61.7%	25.8%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.01	0.67	0.72		0.67	0.40
Control Delay	0.0	49.9	20.1		23.1	18.7
Queue Delay	0.0	0.0	0.1		0.3	0.0
Total Delay	0.0	49.9	20.2		23.4	18.7
Queue Length 50th (m)	0.0	48.5	21.0		140.1	85.2
Queue Length 95th (m)	0.0	58.6	49.6		m169.7	m94.7
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	420	1792	988		2256	2418
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	122		236	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.01	0.22	0.43		0.75	0.40

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	355	0	325	5	1320	0	0	850	0
Future Volume (vph)	0	0	5	355	0	325	5	1320	0	0	850	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3302			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	403	0	369	6	1500	0	0	966	0
RTOR Reduction (vph)	0	6	0	0	0	221	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	403	0	148	0	1506	0	0	966	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		22.0		22.0		75.4			75.4	
Effective Green, g (s)		2.6		23.0		23.0		76.4			76.4	
Actuated g/C Ratio		0.02		0.19		0.19		0.64			0.64	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		606		294		2102			2253	
v/s Ratio Prot		c0.00		c0.13		0.10					0.27	
v/s Ratio Perm								c0.46				
v/c Ratio		0.00		0.67		0.50		0.72			0.43	
Uniform Delay, d1		57.4		44.9		43.4		14.6			10.9	
Progression Factor		1.00		1.00		1.00		1.69			1.85	
Incremental Delay, d2		0.0		2.8		1.4		0.6			0.3	
Delay (s)		57.5		47.7		44.8		25.2			20.4	
Level of Service		E		D		D		C			C	
Approach Delay (s)		57.5			46.3			25.2			20.4	
Approach LOS		E			D			C			C	

Intersection Summary

HCM 2000 Control Delay	28.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.69				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	78.4%	ICU Level of Service		D	
Analysis Period (min)	15				

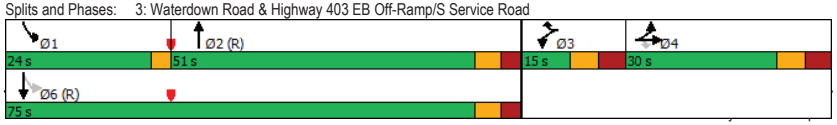
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	235	95	385	50	260	830	370	840
Future Volume (vph)	235	95	385	50	260	830	370	840
Lane Group Flow (vph)	264	107	433	56	292	1439	416	944
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	15.0	15.0	51.0	24.0	75.0
Total Split (%)	25.0%	25.0%	25.0%	12.5%	12.5%	42.5%	20.0%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.80	0.31	1.05	0.28	0.79	1.10	1.12	0.46
Control Delay	65.2	44.4	90.4	62.9	25.9	80.7	119.1	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.2	44.4	90.4	62.9	25.9	80.7	119.1	25.0
Queue Length 50th (m)	63.1	23.0	~86.5	7.0	1.6	~201.6	~106.0	101.1
Queue Length 95th (m)	#103.7	39.9	#148.9	14.9	#46.7	#234.3	#158.9	75.5
Internal Link Dist (m)		253.6				236.1		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	330	349	411	208	373	1313	371	2034
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.31	1.05	0.27	0.78	1.10	1.12	0.46

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	95	385	50	0	260	0	830	450	370	840	0
Future Volume (vph)	235	95	385	50	0	260	0	830	450	370	840	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		0.95		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	3134		1521		3341		1678	3539	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.09	1.00	
Satd. Flow (perm)	1711	1810	1521	3134		1521		3341		150	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	264	107	433	56	0	292	0	933	506	416	944	0
RTOR Reduction (vph)	0	0	118	0	0	273	0	61	0	0	0	0
Lane Group Flow (vph)	264	107	315	56	0	19	0	1378	0	416	944	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	22.2	22.2	22.2	6.8		6.8		44.0		68.0	68.0	
Effective Green, g (s)	23.2	23.2	23.2	7.8		7.8		45.0		69.0	69.0	
Actuated g/C Ratio	0.19	0.19	0.19	0.06		0.06		0.38		0.58	0.58	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	330	349	294	203		98		1252		366	2034	
v/s Ratio Prot	0.15	0.06		c0.02		0.01		c0.41		c0.21	0.27	
v/s Ratio Perm			c0.21							0.44		
v/c Ratio	0.80	0.31	1.07	0.28		0.19		1.10		1.14	0.46	
Uniform Delay, d1	46.2	41.5	48.4	53.4		53.1		37.5		38.7	14.8	
Progression Factor	1.00	1.00	1.00	1.11		1.80		0.75		1.11	1.62	
Incremental Delay, d2	13.0	0.5	73.0	0.7		1.0		56.1		88.6	0.7	
Delay (s)	59.2	42.0	121.4	60.0		96.7		84.4		131.6	24.8	
Level of Service	E	D	F	E		F		F		F	C	
Approach Delay (s)		90.4			90.8			84.4			57.4	
Approach LOS		F			F			F			E	

Intersection Summary

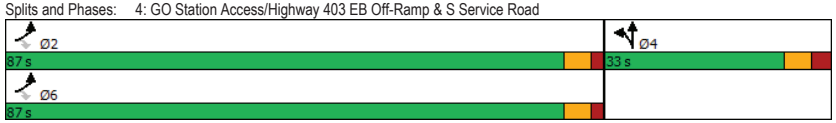
HCM 2000 Control Delay	76.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	775	15	30		
Future Volume (vph)	775	15	30		
Lane Group Flow (vph)	994	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			33.0	87.0	87.0
Total Split (%)			27.5%	73%	73%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	Min	Min
v/c Ratio	0.90	0.02	0.74		
Control Delay	26.8	2.6	49.1		
Queue Delay	0.4	0.0	0.0		
Total Delay	27.2	2.6	49.1		
Queue Length 50th (m)	146.1	0.0	55.8		
Queue Length 95th (m)	172.5	1.9	85.6		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1432	1353	557		
Starvation Cap Reductn	118	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.76	0.01	0.54		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 94.5
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	775	15	205	30	0	0
Future Volume (vph)	775	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	994	19	263	38	0	0
RTOR Reduction (vph)	0	7	0	0	0	0
Lane Group Flow (vph)	994	12	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	60.4	60.4		20.1		
Effective Green, g (s)	61.4	61.4		21.1		
Actuated g/C Ratio	0.66	0.66		0.23		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1112	1048		410		
v/s Ratio Prot	c0.59			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.89	0.01		0.73		
Uniform Delay, d1	13.3	5.6		33.6		
Progression Factor	1.00	1.00		1.00		
Incremental Delay, d2	9.4	0.0		6.7		
Delay (s)	22.7	5.6		40.3		
Level of Service	C	A		D		
Approach Delay (s)	22.4			40.3	0.0	
Approach LOS	C			D	A	

Intersection Summary				
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	93.5	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	65.0%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	1170	25	0	1275
Future Volume (Veh/h)	0	110	1170	25	0	1275
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	1272	27	0	1386
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.88	0.81			0.81	
vC, conflicting volume	1978	650			1299	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1075	91			894	
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	84			100	
cM capacity (veh/h)	192	772			620	

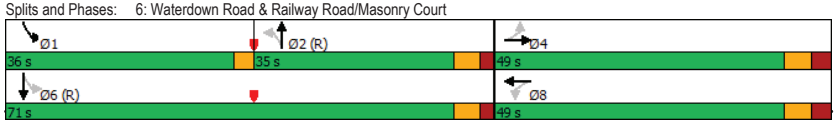
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	848	451	693	693
Volume Left	0	0	0	0	0
Volume Right	120	0	27	0	0
cSH	772	1700	1700	1700	1700
Volume to Capacity	0.16	0.50	0.27	0.41	0.41
Queue Length 95th (m)	4.4	0.0	0.0	0.0	0.0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.5	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		46.6%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	5	100	5	5	705	380	885
Future Volume (vph)	10	5	100	5	5	705	380	885
Lane Group Flow (vph)	0	25	127	614	6	936	481	1133
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	49.0	49.0	49.0	49.0	35.0	35.0	36.0	71.0
Total Split (%)	40.8%	40.8%	40.8%	40.8%	29.2%	29.2%	30.0%	59.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.43	0.58	0.82	0.04	0.61	0.76	0.44
Control Delay		55.7	55.2	14.3	31.2	30.7	32.1	3.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		55.7	55.2	14.3	31.2	30.7	32.1	3.6
Queue Length 50th (m)		4.3	29.7	6.5	0.7	79.7	75.2	19.0
Queue Length 95th (m)		10.6	38.0	14.7	m1.7	#142.4	m83.9	m42.6
Internal Link Dist (m)		95.0		120.3		324.2		93.2
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		121	478	944	159	1528	673	2582
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.21	0.27	0.65	0.04	0.61	0.71	0.44

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2026 - Without Improvements

6: Waterdown Road & Railway Road/Masonry Court — PM Peak Hour



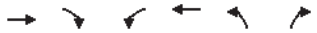
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	100	5	480	5	705	35	380	885	10
Future Volume (vph)	10	5	5	100	5	480	5	705	35	380	885	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196		1711	1590		1353	3410		1694	3473	
Flt Permitted		0.27		0.74	1.00		0.25	1.00		0.18	1.00	
Satd. Flow (perm)		327		1334	1590		357	3410		330	3473	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	127	6	608	6	892	44	481	1120	13
RTOR Reduction (vph)	0	5	0	0	488	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	20	0	127	126	0	6	934	0	481	1133	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.7		18.7	18.7		52.7	52.7		88.3	88.3	
Effective Green, g (s)		19.7		19.7	19.7		53.7	53.7		89.3	89.3	
Actuated g/C Ratio		0.16		0.16	0.16		0.45	0.45		0.74	0.74	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		53		218	261		159	1525		627	2584	
v/s Ratio Prot					0.08			c0.27		c0.21	0.33	
v/s Ratio Perm		0.06		c0.10			0.02			0.36		
v/c Ratio		0.38		0.58	0.48		0.04	0.61		0.77	0.44	
Uniform Delay, d1		44.7		46.3	45.5		18.6	25.2		19.8	5.8	
Progression Factor		1.00		1.00	1.00		1.05	1.03		1.62	0.46	
Incremental Delay, d2		4.5		3.9	1.4		0.3	1.3		4.8	0.5	
Delay (s)		49.1		50.3	46.9		19.8	27.2		36.9	3.1	
Level of Service		D		D	D		B	C		D	A	
Approach Delay (s)		49.1			47.5			27.2			13.2	
Approach LOS		D			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	84.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2026 - Without Improvements

7: Cooke Boulevard & Site Driveway (East) — PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	15	0	225	30
Future Volume (Veh/h)	0	50	15	0	225	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	16	0	245	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		32	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		32	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	97
cM capacity (veh/h)			1564		977	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	16	278
Volume Left	0	16	245
Volume Right	54	0	33
cSH	1700	1564	989
Volume to Capacity	0.03	0.01	0.28
Queue Length 95th (m)	0.0	0.2	9.3
Control Delay (s)	0.0	7.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.1
Approach LOS			B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Future Total 2026 - Without Improvements
8: Cooke Boulevard & Masonry Court — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	180	55	30	485	0	75	70	45	0	40	25
Future Volume (Veh/h)	185	180	55	30	485	0	75	70	45	0	40	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	226	220	67	37	591	0	91	85	55	0	49	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	591			287			1425	1370	254	1468	1404	591
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	591			159			1417	1357	122	1465	1394	591
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 %	77			97			0	17	93	100	49	94
cM capacity (veh/h)	995			1296			48	102	815	23	97	511

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	513	628	231	79
Volume Left	226	37	91	0
Volume Right	67	0	55	30
cSH	995	1296	82	140
Volume to Capacity	0.23	0.03	2.80	0.56
Queue Length 95th (m)	7.0	0.7	179.5	22.6
Control Delay (s)	5.7	0.8	924.0	59.6
Lane LOS	A	A	F	F
Approach Delay (s)	5.7	0.8	924.0	59.6
Approach LOS			F	F

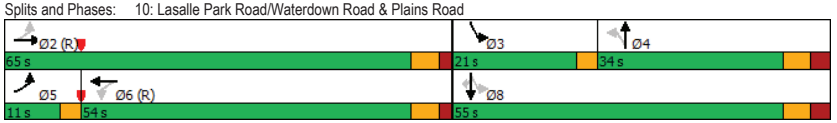
Intersection Summary					
Average Delay			152.7		
Intersection Capacity Utilization			77.5%	ICU Level of Service	D
Analysis Period (min)			15		

Queues — Future Total 2026 - Without Improvements
10: Lasalle Park Road/Waterdown Road & Plains Road — PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	225	545	70	1010	115	200	360	260	370
Future Volume (vph)	225	545	70	1010	115	200	360	260	370
Lane Group Flow (vph)	232	634	72	1371	119	268	371	268	381
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	11.0	65.0	54.0	54.0	34.0	34.0	21.0	55.0	55.0
Total Split (%)	9.2%	54.2%	45.0%	45.0%	28.3%	28.3%	17.5%	45.8%	45.8%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.93	0.34	0.25	0.98	0.59	0.77	0.94	0.39	0.57
Control Delay	73.0	16.2	26.4	53.5	55.8	58.3	63.5	28.7	18.9
Queue Delay	0.0	0.0	0.0	40.7	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	16.2	26.4	94.2	55.8	58.3	63.5	28.7	18.9
Queue Length 50th (m)	41.9	43.7	11.6	169.6	27.0	60.4	76.2	50.4	42.6
Queue Length 95th (m)	#109.9	61.6	23.7	#223.3	45.7	87.4	#140.6	85.8	90.9
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	250	1888	287	1402	247	425	393	775	719
Starvation Cap Reductn	0	0	0	236	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.34	0.25	1.18	0.48	0.63	0.94	0.35	0.53

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis — Future Total 2026 - Without Improvements

10: Lasalle Park Road/Waterdown Road & Plains Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	545	70	70	1010	320	115	200	60	360	260	370
Future Volume (vph)	225	545	70	70	1010	320	115	200	60	360	260	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.96		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1616	3465		1627	3372		1694	1785		1709	1900	1492
Flt Permitted	0.08	1.00		0.41	1.00		0.59	1.00		0.28	1.00	1.00
Satd. Flow (perm)	133	3465		704	3372		1059	1785		511	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	232	562	72	72	1041	330	119	206	62	371	268	381
RTOR Reduction (vph)	0	7	0	0	25	0	0	10	0	0	0	117
Lane Group Flow (vph)	232	627	0	72	1346	0	119	258	0	371	268	264
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	64.1	64.1		48.0	48.0		21.9	21.9		42.9	42.9	42.9
Effective Green, g (s)	65.1	65.1		49.0	49.0		22.9	22.9		43.9	43.9	43.9
Actuated g/C Ratio	0.54	0.54		0.41	0.41		0.19	0.19		0.37	0.37	0.37
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	246	1879		287	1376		202	340		376	695	545
v/s Ratio Prot	c0.11	0.18			c0.40			c0.14		c0.16	0.14	
v/s Ratio Perm	0.40			0.10			0.11			0.20		0.18
v/c Ratio	0.94	0.33		0.25	0.98		0.59	0.76		0.99	0.39	0.48
Uniform Delay, d1	36.6	15.3		23.4	35.0		44.3	45.9		33.2	28.1	29.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.10	0.99	1.08
Incremental Delay, d2	41.7	0.5		2.1	19.5		4.3	9.4		40.7	0.3	0.6
Delay (s)	78.3	15.8		25.5	54.5		48.6	55.3		77.4	28.1	32.2
Level of Service	E	B		C	D		D	E		E	C	C
Approach Delay (s)		32.6			53.0			53.3			47.6	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	46.8	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	102.1%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Total 2026 - Without Improvements

11: Plains Road & Cooke Boulevard — PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	75	900	1385	110
Future Volume (vph)	75	900	1385	110
Lane Group Flow (vph)	77	928	1552	201
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.32	0.38	0.72	0.69
Control Delay	7.5	6.7	17.0	47.9
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	7.5	7.1	17.0	47.9
Queue Length 50th (m)	3.6	35.8	114.6	36.2
Queue Length 95th (m)	9.4	58.4	184.4	57.3
Internal Link Dist (m)		135.9	118.9	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	317	2457	2146	408
Starvation Cap Reductn	0	944	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.24	0.61	0.72	0.49

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



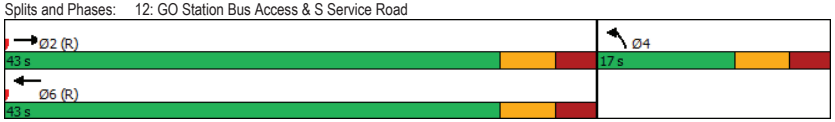
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	900	1385	120	110	85
Future Volume (vph)	75	900	1385	120	110	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3284		1621	
Flt Permitted	0.10	1.00	1.00		0.97	
Satd. Flow (perm)	173	3374	3284		1621	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	928	1428	124	113	88
RTOR Reduction (vph)	0	0	4	0	28	0
Lane Group Flow (vph)	77	928	1548	0	173	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	79.1	79.1	70.1		16.9	
Effective Green, g (s)	80.1	80.1	71.1		17.9	
Actuated g/C Ratio	0.73	0.73	0.65		0.16	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	218	2456	2122		263	
v/s Ratio Prot	0.02	c0.28	c0.47			
v/s Ratio Perm	0.23				c0.11	
v/c Ratio	0.35	0.38	0.73		0.66	
Uniform Delay, d1	9.3	5.6	13.0		43.2	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.0	0.4	2.2		5.9	
Delay (s)	10.3	6.1	15.3		49.1	
Level of Service	B	A	B		D	
Approach Delay (s)		6.4	15.3		49.1	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	71.8%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	715	295	15
Future Volume (vph)	715	295	15
Lane Group Flow (vph)	782	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.25	0.09	0.12
Control Delay	1.6	1.5	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.6	1.5	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m27.5	10.5	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3134	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.25	0.09	0.10

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	715	20	0	295	15	0
Future Volume (vph)	715	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3382			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3382			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	761	21	0	314	16	0
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	780	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2547			2719	42	
v/s Ratio Prot	c0.23			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.31			0.12	0.38	
Uniform Delay, d1	2.4			2.0	27.8	
Progression Factor	1.13			1.00	1.00	
Incremental Delay, d2	0.0			0.1	5.7	
Delay (s)	2.7			2.1	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.7			2.1	33.4	
Approach LOS	A			A	C	

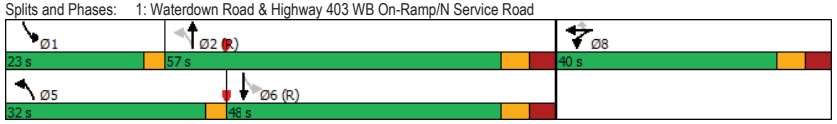
Intersection Summary			
HCM 2000 Control Delay	3.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	70	105	65	405	530	235	770
Future Volume (vph)	70	105	65	405	530	235	770
Lane Group Flow (vph)	71	107	66	413	1010	240	1000
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	32.0	57.0	23.0	48.0
Total Split (%)	33.3%	33.3%	33.3%	26.7%	47.5%	19.2%	40.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.41	0.56	0.25	0.72	0.52	0.53	0.69
Control Delay	54.8	60.3	5.3	21.9	9.3	12.0	29.2
Queue Delay	0.0	0.0	0.0	0.7	0.1	0.0	0.0
Total Delay	54.8	60.3	5.3	22.6	9.4	12.0	29.2
Queue Length 50th (m)	16.5	25.4	0.0	18.0	47.0	10.9	97.6
Queue Length 95th (m)	30.4	42.4	5.3	114.8	63.7	24.1	#167.6
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	468	599	1930	537	1444
Starvation Cap Reductn	0	0	0	39	217	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.24	0.14	0.74	0.59	0.45	0.69

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	70	105	65	405	530	460	235	770	210
Future Volume (vph)	0	0	0	70	105	65	405	530	460	235	770	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	1544	2979		1616	2988	
Flt Permitted				0.95	1.00	1.00	0.19	1.00		0.28	1.00	
Satd. Flow (perm)				1442	1597	1439	302	2979		483	2988	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	71	107	66	413	541	469	240	786	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	85	0	0	16	0
Lane Group Flow (vph)	0	0	0	71	107	8	413	925	0	240	984	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	90.6	73.4		70.6	56.4	
Effective Green, g (s)				14.4	14.4	14.4	91.6	74.4		72.6	57.4	
Actuated g/C Ratio				0.12	0.12	0.12	0.76	0.62		0.60	0.48	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	563	1846		435	1429	
v/s Ratio Prot				0.05	c0.07		c0.20	0.31		0.07	c0.33	
v/s Ratio Perm						0.01	0.36			0.26		
v/c Ratio				0.41	0.56	0.05	0.73	0.50		0.55	0.69	
Uniform Delay, d1				48.9	49.8	46.7	17.8	12.6		11.0	24.3	
Progression Factor				1.00	1.00	1.00	1.20	0.77		1.00	1.00	
Incremental Delay, d2				1.6	3.7	0.1	4.1	0.8		1.5	2.7	
Delay (s)				50.5	53.5	46.8	25.5	10.5		12.5	27.1	
Level of Service				D	D	D	C	B		B	C	
Approach Delay (s)		0.0			50.8			14.8			24.3	
Approach LOS		A			D			B			C	

Intersection Summary

HCM 2000 Control Delay	21.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	72.1%	ICU Level of Service		C	
Analysis Period (min)	15				

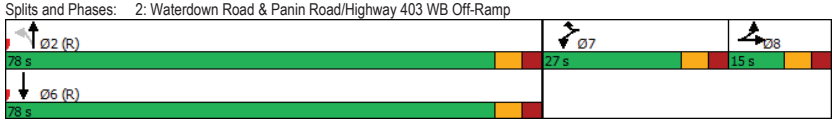
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	320	160	5	1230	840
Future Volume (vph)	0	320	160	5	1230	840
Lane Group Flow (vph)	5	348	174	0	1342	913
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	27.0	27.0	78.0	78.0	78.0
Total Split (%)	12.5%	22.5%	22.5%	65.0%	65.0%	65.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.68	0.49		0.58	0.37
Control Delay	53.4	54.3	14.6		10.8	3.8
Queue Delay	0.0	0.0	0.0		0.8	0.2
Total Delay	53.4	54.3	14.6		11.6	4.0
Queue Length 50th (m)	1.2	42.4	4.9		78.3	27.3
Queue Length 95th (m)	5.5	56.0	25.3		m56.7	9.4
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	575	380		2326	2474
Starvation Cap Reductn	0	0	0		612	739
Spillback Cap Reductn	0	0	3		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.61	0.46		0.78	0.53

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	320	0	160	5	1230	0	0	840	0
Future Volume (vph)	5	0	0	320	0	160	5	1230	0	0	840	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3394			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3231			3438	
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)	5	0	0	348	0	174	5	1337	0	0	913	0
RTOR Reduction (vph)	0	0	0	0	0	127	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	348	0	47	0	1342	0	0	913	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		18.2		18.2		79.2			79.2	
Effective Green, g (s)		2.6		19.2		19.2		80.2			80.2	
Actuated g/C Ratio		0.02		0.16		0.16		0.67			0.67	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		510		228		2159			2297	
v/s Ratio Prot		c0.00		c0.11		0.03					0.27	
v/s Ratio Perm								c0.42				
v/c Ratio		0.21		0.68		0.21		0.62			0.40	
Uniform Delay, d1		57.7		47.5		43.8		11.3			9.0	
Progression Factor		1.00		1.00		1.00		1.07			0.44	
Incremental Delay, d2		4.3		3.8		0.5		0.1			0.4	
Delay (s)		62.0		51.3		44.2		12.2			4.4	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			48.9			12.2			4.4	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

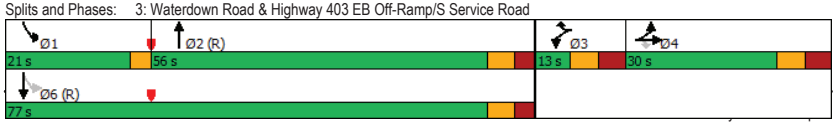
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	300	315	420	25	100	860	595	565
Future Volume (vph)	300	315	420	25	100	860	595	565
Lane Group Flow (vph)	323	339	452	27	108	1737	640	608
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	13.0	13.0	56.0	21.0	77.0
Total Split (%)	25.0%	25.0%	25.0%	10.8%	10.8%	46.7%	17.5%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.98	0.94	0.84	0.20	0.54	1.21	1.16	0.31
Control Delay	92.4	83.1	30.6	58.2	18.4	125.0	119.7	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.4	83.1	30.6	58.2	18.4	125.0	119.7	15.2
Queue Length 50th (m)	80.3	83.7	36.7	3.4	0.0	~253.6	~100.9	37.8
Queue Length 95th (m)	#140.0	#141.7	#95.7	8.9	15.9	#299.2	#175.1	57.8
Internal Link Dist (m)		253.6				236.1		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	331	360	535	138	200	1436	551	1977
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.94	0.84	0.20	0.54	1.21	1.16	0.31

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	315	420	25	0	100	0	860	755	595	565	0
Future Volume (vph)	300	315	420	25	0	100	0	860	755	595	565	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		0.93		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	2775		1426		3167		1766	3343	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	2775		1426		3167		583	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	339	452	27	0	108	0	925	812	640	608	0
RTOR Reduction (vph)	0	0	247	0	0	103	0	117	0	0	0	0
Lane Group Flow (vph)	323	339	205	27	0	5	0	1620	0	640	608	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	22.0	22.0	22.0	5.0		5.0		49.0		70.0	70.0	
Effective Green, g (s)	23.0	23.0	23.0	6.0		6.0		50.0		71.0	71.0	
Actuated g/C Ratio	0.19	0.19	0.19	0.05		0.05		0.42		0.59	0.59	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	331	360	288	138		71		1319		532	1977	
v/s Ratio Prot	c0.19	0.18		c0.01		0.00		c0.51		c0.19	0.18	
v/s Ratio Perm			0.14							0.52		
v/c Ratio	0.98	0.94	0.71	0.20		0.08		1.23		1.20	0.31	
Uniform Delay, d1	48.2	47.8	45.4	54.7		54.4		35.0		15.3	12.2	
Progression Factor	1.00	1.00	1.00	1.00		1.71		0.82		2.31	1.21	
Incremental Delay, d2	42.6	32.6	8.1	0.7		0.5		107.9		107.0	0.4	
Delay (s)	90.8	80.4	53.5	55.4		93.4		136.6		142.5	15.1	
Level of Service	F	F	D	E		F		F		F	B	
Approach Delay (s)		72.5			85.8			136.6			80.4	
Approach LOS		E			F			F			F	

Intersection Summary

HCM 2000 Control Delay	101.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	118.4%	ICU Level of Service	H
Analysis Period (min)	15		

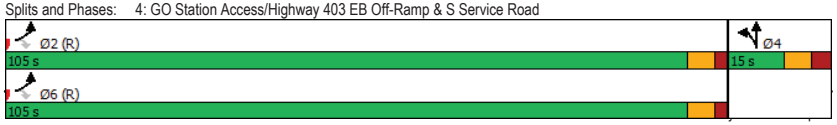
c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	1075	160	25		
Future Volume (vph)	1075	160	25		
Lane Group Flow (vph)	1132	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.94	0.12	0.27		
Control Delay	24.8	0.6	57.9		
Queue Delay	4.7	0.0	0.0		
Total Delay	29.5	0.6	57.9		
Queue Length 50th (m)	~305.1	0.5	8.8		
Queue Length 95th (m)	#373.3	5.1	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	136		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.98	0.12	0.27		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1075	160	10	25	0	0
Future Volume (vph)	1075	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1132	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	1132	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.84			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.98	0.11		0.42		
Uniform Delay, d1	7.5	1.3		55.5		
Progression Factor	1.35	1.89		1.00		
Incremental Delay, d2	20.1	0.1		3.2		
Delay (s)	30.3	2.6		58.7		
Level of Service	C	A		E		
Approach Delay (s)	26.7			58.7	0.0	
Approach LOS	C			E	A	

Intersection Summary

HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	195	1420	10	0	1010
Future Volume (Veh/h)	0	195	1420	10	0	1010
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	212	1543	11	0	1098
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.70	0.66			0.66	
vC, conflicting volume	2098	777			1554	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1232	0			806	
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	71			100	
cM capacity (veh/h)	120	719			545	

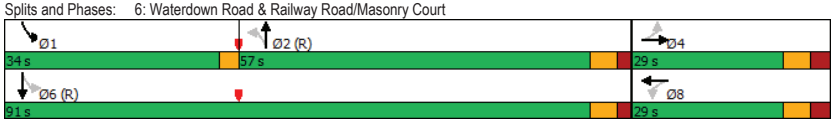
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	212	1029	525	549	549
Volume Left	0	0	0	0	0
Volume Right	212	0	11	0	0
cSH	719	1700	1700	1700	1700
Volume to Capacity	0.29	0.61	0.31	0.32	0.32
Queue Length 95th (m)	9.8	0.0	0.0	0.0	0.0
Control Delay (s)	12.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.1	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		58.3%	ICU Level of Service B
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	0	25	0	5	1140	420	580
Future Volume (vph)	10	0	25	0	5	1140	420	580
Lane Group Flow (vph)	0	22	28	318	6	1420	477	670
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	57.0	57.0	34.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	47.5%	47.5%	28.3%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.27	0.27	0.62	0.02	0.81	0.82	0.24
Control Delay		8.2	57.7	6.1	11.4	19.7	41.8	2.9
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		8.2	57.7	6.1	11.4	19.7	41.8	2.9
Queue Length 50th (m)		0.0	6.7	0.0	0.4	145.0	86.8	17.7
Queue Length 95th (m)		0.2	16.0	0.0	m0.7	m174.5	m106.0	m28.5
Internal Link Dist (m)		95.0		120.3		328.3		93.2
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		114	237	629	314	1758	598	2786
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.19	0.12	0.51	0.02	0.81	0.80	0.24

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2031 - Without Improvements

6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour



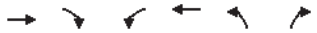
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	25	0	280	5	1140	110	420	580	10
Future Volume (vph)	10	0	10	25	0	280	5	1140	110	420	580	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184		1586	1495		1454	3386		1728	3376	
Flt Permitted		0.30		0.74	1.00		0.40	1.00		0.08	1.00	
Satd. Flow (perm)		364		1241	1495		608	3386		139	3376	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	28	0	318	6	1295	125	477	659	11
RTOR Reduction (vph)	0	20	0	0	292	0	0	5	0	0	1	0
Lane Group Flow (vph)	0	2	0	28	27	0	6	1415	0	477	669	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.0		9.0	9.0		61.2	61.2		98.0	98.0	
Effective Green, g (s)		10.0		10.0	10.0		62.2	62.2		99.0	99.0	
Actuated g/C Ratio		0.08		0.08	0.08		0.52	0.52		0.82	0.82	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		30		103	124		315	1755		575	2785	
v/s Ratio Prot					0.02			c0.42		c0.24	0.20	
v/s Ratio Perm		0.01		c0.02			0.01			0.44		
v/c Ratio		0.06		0.27	0.21		0.02	0.81		0.83	0.24	
Uniform Delay, d1		50.7		51.6	51.3		14.1	23.9		31.9	2.3	
Progression Factor		1.00		1.00	1.00		0.63	0.69		1.09	1.13	
Incremental Delay, d2		0.9		1.4	0.9		0.0	1.3		8.6	0.2	
Delay (s)		51.5		53.0	52.2		8.9	17.9		43.3	2.8	
Level of Service		D		D	D		A	B		D	A	
Approach Delay (s)		51.5			52.3			17.9			19.6	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	88.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2031 - Without Improvements

7: Cooke Boulevard & Site Driveway (East) — AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	85	30	0	70	5
Future Volume (Veh/h)	0	85	30	0	70	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	92	33	0	76	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)						
pX, platoon unblocked						
vC, conflicting volume			92		66	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		66	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	100
cM capacity (veh/h)			1515		924	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	33	81
Volume Left	0	33	76
Volume Right	92	0	5
cSH	1700	1515	933
Volume to Capacity	0.05	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.3
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Future Total 2031 - Without Improvements

8: Cooke Boulevard & Masonry Court — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	430	45	45	180	0	80	20	25	0	70	45
Future Volume (Veh/h)	55	430	45	45	180	0	80	20	25	0	70	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	71	551	58	58	231	0	103	26	32	0	90	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.94			0.94	0.94	0.94	0.94	0.94	
vC, conflicting volume	231			609			1172	1069	580	1114	1098	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			549			1150	1040	518	1088	1071	231
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	95			94			0	87	94	100	52	93
cM capacity (veh/h)	1349			966			86	194	526	141	186	793

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	680	289	161	148
Volume Left	71	58	103	0
Volume Right	58	0	32	58
cSH	1349	966	115	265
Volume to Capacity	0.05	0.06	1.40	0.56
Queue Length 95th (m)	1.3	1.5	89.2	25.0
Control Delay (s)	1.4	2.3	292.8	34.4
Lane LOS	A	A	F	D
Approach Delay (s)	1.4	2.3	292.8	34.4
Approach LOS			F	D

Intersection Summary					
Average Delay			42.1		
Intersection Capacity Utilization			53.0%	ICU Level of Service	A
Analysis Period (min)			15		

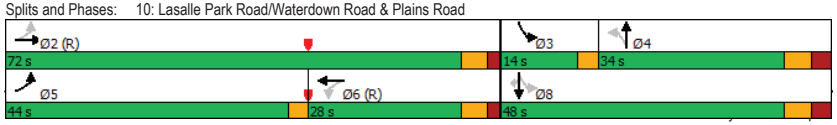
Queues — Future Total 2031 - Without Improvements

10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	695	890	75	365	90	295	245	170	200
Future Volume (vph)	695	890	75	365	90	295	245	170	200
Lane Group Flow (vph)	739	1107	80	670	96	378	261	181	213
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	44.0	72.0	28.0	28.0	34.0	34.0	14.0	48.0	48.0
Total Split (%)	36.7%	60.0%	23.3%	23.3%	28.3%	28.3%	11.7%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	1.11	0.57	0.94	0.94	0.37	0.92	1.11	0.29	0.33
Control Delay	100.5	18.0	130.7	59.9	43.4	72.1	117.8	26.8	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	100.5	18.0	130.7	59.9	43.4	72.1	117.8	26.8	8.2
Queue Length 50th (m)	~195.8	87.9	19.7	70.8	20.0	89.4	~60.8	29.0	4.4
Queue Length 95th (m)	#272.9	108.3	#52.4	#108.2	37.0	#146.2	#105.0	47.6	22.9
Internal Link Dist (m)		134.8		135.4		101.9		328.3	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	664	1931	86	718	271	425	236	633	644
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.11	0.57	0.93	0.93	0.35	0.89	1.11	0.29	0.33

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	695	890	150	75	365	265	90	295	60	245	170	200
Future Volume (vph)	695	890	150	75	365	265	90	295	60	245	170	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.94		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1677	3407		1667	3174		1719	1796		1615	1810	1446
Flt Permitted	0.16	1.00		0.26	1.00		0.64	1.00		0.16	1.00	1.00
Satd. Flow (perm)	285	3407		452	3174		1164	1796		267	1810	1446
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)	739	947	160	80	388	282	96	314	64	261	181	213
RTOR Reduction (vph)	0	11	0	0	110	0	0	6	0	0	0	140
Lane Group Flow (vph)	739	1096	0	80	560	0	96	372	0	261	181	73
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	66.6	66.6		21.8	21.8		26.2	26.2		40.4	40.4	40.4
Effective Green, g (s)	67.6	67.6		22.8	22.8		27.2	27.2		41.4	41.4	41.4
Actuated g/C Ratio	0.56	0.56		0.19	0.19		0.23	0.23		0.34	0.34	0.34
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	657	1919		85	603		263	407		229	624	498
v/s Ratio Prot	c0.40	0.32			0.18			c0.21		c0.12	0.10	
v/s Ratio Perm	0.23			c0.18			0.08			0.28		0.05
v/c Ratio	1.12	0.57		0.94	0.93		0.37	0.91		1.14	0.29	0.15
Uniform Delay, d1	31.8	16.9		47.9	47.8		39.1	45.3		33.5	28.6	27.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.96	0.89	1.84
Incremental Delay, d2	74.7	1.2		82.4	22.7		0.9	24.5		101.8	0.3	0.1
Delay (s)	106.5	18.1		130.3	70.5		40.0	69.8		134.0	25.7	50.1
Level of Service	F	B		F	E		D	E		F	C	D
Approach Delay (s)		53.5			76.9			63.8			76.8	
Approach LOS		D			E			E			E	

Intersection Summary				
HCM 2000 Control Delay	63.6	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	107.2%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	95	1115	685	110
Future Volume (vph)	95	1115	685	110
Lane Group Flow (vph)	106	1239	850	205
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.24	0.55	0.45	0.71
Control Delay	6.2	9.7	13.6	44.7
Queue Delay	0.0	0.7	0.0	0.0
Total Delay	6.2	10.4	13.6	44.7
Queue Length 50th (m)	5.3	58.3	46.5	33.2
Queue Length 95th (m)	13.4	96.5	78.4	53.1
Internal Link Dist (m)		135.4	129.2	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	500	2272	1899	385
Starvation Cap Reductn	0	616	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.21	0.75	0.45	0.53

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



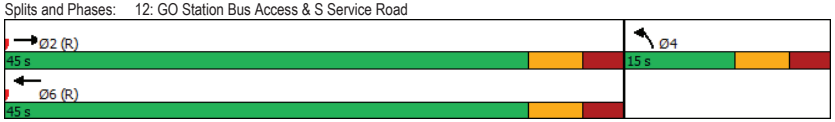
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	95	1115	685	80	110	75
Future Volume (vph)	95	1115	685	80	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.98		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3282	3236		1381	
Flt Permitted	0.28	1.00	1.00		0.97	
Satd. Flow (perm)	479	3282	3236		1381	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1239	761	89	122	83
RTOR Reduction (vph)	0	0	7	0	27	0
Lane Group Flow (vph)	106	1239	843	0	178	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	68.1	68.1	57.5		17.9	
Effective Green, g (s)	69.1	69.1	58.5		18.9	
Actuated g/C Ratio	0.69	0.69	0.58		0.19	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	430	2267	1893		261	
v/s Ratio Prot	0.02	c0.38	0.26			
v/s Ratio Perm	0.15				c0.13	
v/c Ratio	0.25	0.55	0.45		0.68	
Uniform Delay, d1	5.7	7.7	11.6		37.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	1.0	0.8		7.2	
Delay (s)	6.0	8.6	12.4		44.9	
Level of Service	A	A	B		D	
Approach Delay (s)		8.4	12.4		44.9	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	51.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1650	110	15
Future Volume (vph)	1650	110	15
Lane Group Flow (vph)	1809	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.56	0.04	0.12
Control Delay	2.5	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	2.5	1.2	24.5
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m76.4	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3233	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	172	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.59	0.04	0.12

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1650	15	0	110	15	0
Future Volume (vph)	1650	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3475			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3475			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1793	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1808	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2629			2731	38	
v/s Ratio Prot	c0.52			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.69			0.04	0.42	
Uniform Delay, d1	3.7			1.8	28.0	
Progression Factor	1.12			0.90	1.00	
Incremental Delay, d2	0.1			0.0	7.4	
Delay (s)	4.3			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	4.3			1.7	35.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	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 — Future Total 2031 - Without Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	280	500	220	640	850	115	640
Future Volume (vph)	280	500	220	640	850	115	640
Lane Group Flow (vph)	295	526	232	674	1111	121	832
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	42.0	42.0	42.0	38.0	66.0	12.0	40.0
Total Split (%)	35.0%	35.0%	35.0%	31.7%	55.0%	10.0%	33.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	2.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.60	0.97	0.39	1.27	0.71	0.46	0.95
Control Delay	42.1	74.4	6.1	164.8	27.8	19.8	62.1
Queue Delay	0.0	0.0	0.0	0.2	1.1	0.0	0.0
Total Delay	42.1	74.4	6.1	165.0	28.9	19.8	62.1
Queue Length 50th (m)	62.6	129.1	0.0	~191.7	106.6	11.0	103.7
Queue Length 95th (m)	93.7	#201.8	18.7	#278.0	121.4	19.1	#145.2
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	488	541	593	529	1566	269	881
Starvation Cap Reductn	0	0	0	13	232	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.97	0.39	1.31	0.83	0.45	0.94

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

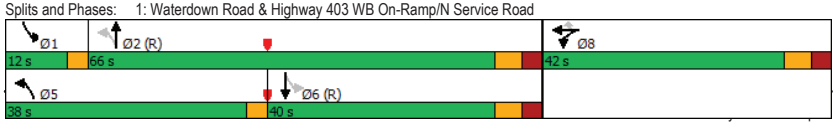
Natural Cycle: 125

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



HCM Signalized Intersection Capacity Analysis — Future Total 2031 - Without Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	280	500	220	640	850	205	115	640	150
Future Volume (vph)	0	0	0	280	500	220	640	850	205	115	640	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	2.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	1558	3080		1601	3050	
Flt Permitted				0.95	1.00	1.00	0.11	1.00		0.26	1.00	
Satd. Flow (perm)				1616	1792	1426	186	3080		432	3050	
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	0	295	526	232	674	895	216	121	674	158
RTOR Reduction (vph)	0	0	0	0	0	162	0	17	0	0	17	0
Lane Group Flow (vph)	0	0	0	295	526	70	674	1094	0	121	815	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				35.3	35.3	35.3	70.7	59.3		41.1	32.7	
Effective Green, g (s)				36.3	36.3	36.3	71.7	60.3		43.1	33.7	
Actuated g/C Ratio				0.30	0.30	0.30	0.60	0.50		0.36	0.28	
Clearance Time (s)				7.0	7.0	7.0	3.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				488	542	431	522	1547		246	856	
v/s Ratio Prot				0.18	c0.29		c0.39	0.36		0.04	c0.27	
v/s Ratio Perm						0.05	0.38			0.14		
v/c Ratio				0.60	0.97	0.16	1.29	0.71		0.49	0.95	
Uniform Delay, d1				35.7	41.3	30.7	34.3	23.0		26.7	42.4	
Progression Factor				1.00	1.00	1.00	1.06	1.14		1.00	1.00	
Incremental Delay, d2				2.1	31.1	0.2	140.5	1.8		1.5	21.1	
Delay (s)				37.8	72.4	30.9	177.0	28.2		28.2	63.4	
Level of Service				D	E	C	F	C		C	E	
Approach Delay (s)		0.0			53.6			84.4			58.9	
Approach LOS		A			D			F			E	

Intersection Summary				
HCM 2000 Control Delay	69.4	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.07			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	97.6%	ICU Level of Service	F	
Analysis Period (min)	15			

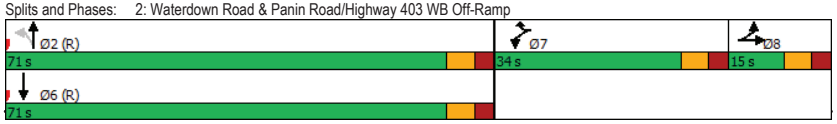
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	375	345	5	1350	920
Future Volume (vph)	0	375	345	5	1350	920
Lane Group Flow (vph)	6	426	392	0	1540	1045
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	34.0	34.0	71.0	71.0	71.0
Total Split (%)	12.5%	28.3%	28.3%	59.2%	59.2%	59.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.03	0.60	0.86		0.72	0.45
Control Delay	0.2	44.8	46.7		13.8	9.2
Queue Delay	0.0	0.0	38.7		0.5	0.3
Total Delay	0.2	44.8	85.4		14.3	9.6
Queue Length 50th (m)	0.0	47.6	60.5		97.4	44.5
Queue Length 95th (m)	0.0	64.0	#109.7		m69.6	m30.5
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	215	790	490		2145	2299
Starvation Cap Reductn	0	0	0		227	622
Spillback Cap Reductn	0	0	120		210	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.03	0.54	1.06		0.80	0.62

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	375	0	345	5	1350	0	0	920	0
Future Volume (vph)	0	0	5	375	0	345	5	1350	0	0	920	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3300			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	426	0	392	6	1534	0	0	1045	0
RTOR Reduction (vph)	0	6	0	0	0	110	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	426	0	282	0	1540	0	0	1045	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		26.0		26.0		71.4			71.4	
Effective Green, g (s)		2.6		27.0		27.0		72.4			72.4	
Actuated g/C Ratio		0.02		0.22		0.22		0.60			0.60	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		711		345		1991			2135	
v/s Ratio Prot		c0.00		0.13		c0.18					0.30	
v/s Ratio Perm								c0.47				
v/c Ratio		0.00		0.60		0.82		0.77			0.49	
Uniform Delay, d1		57.4		41.7		44.2		17.7			13.4	
Progression Factor		1.00		1.00		1.00		0.84			0.74	
Incremental Delay, d2		0.0		1.4		13.9		0.3			0.5	
Delay (s)		57.5		43.0		58.0		15.2			10.3	
Level of Service		E		D		E		B			B	
Approach Delay (s)		57.5			50.2			15.2			10.3	
Approach LOS		E			D			B			B	

Intersection Summary

HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues — Future Total 2031 - Without Improvements

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	250	95	410	50	260	860	395	905
Future Volume (vph)	250	95	410	50	260	860	395	905
Lane Group Flow (vph)	281	107	461	56	292	1505	444	1017
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	13.0	13.0	53.0	24.0	77.0
Total Split (%)	25.0%	25.0%	25.0%	10.8%	10.8%	44.2%	20.0%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.86	0.31	1.15	0.36	0.83	1.10	1.20	0.49
Control Delay	71.9	44.6	123.6	54.6	50.8	82.5	146.5	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.5	0.8	0.0	0.1
Total Delay	71.9	44.6	123.6	54.6	51.3	83.3	146.5	17.9
Queue Length 50th (m)	68.0	23.0	~105.5	7.6	50.5	~211.9	~111.6	63.7
Queue Length 95th (m)	#113.5	39.9	#168.9	14.9	#70.4	#247.8	#184.7	90.1
Internal Link Dist (m)		253.6				236.1		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	327	346	401	156	353	1370	371	2093
Starvation Cap Reductn	0	0	0	0	0	0	0	295
Spillback Cap Reductn	0	0	0	0	4	54	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.31	1.15	0.36	0.84	1.14	1.20	0.57

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

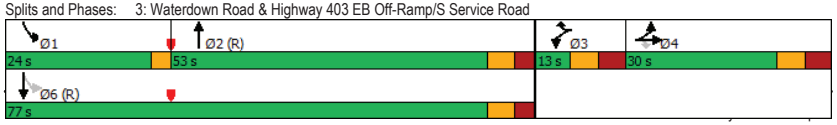
Natural Cycle: 125

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



HCM Signalized Intersection Capacity Analysis — Future Total 2031 - Without Improvements

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	95	410	50	0	260	0	860	480	395	905	0
Future Volume (vph)	250	95	410	50	0	260	0	860	480	395	905	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		0.95		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	3134		1521		3337		1678	3539	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.08	1.00	
Satd. Flow (perm)	1711	1810	1521	3134		1521		3337		144	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	281	107	461	56	0	292	0	966	539	444	1017	0
RTOR Reduction (vph)	0	0	110	0	0	277	0	64	0	0	0	0
Lane Group Flow (vph)	281	107	351	56	0	15	0	1441	0	444	1017	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	22.0	22.0	22.0	5.0		5.0		46.0		70.0	70.0	
Effective Green, g (s)	23.0	23.0	23.0	6.0		6.0		47.0		71.0	71.0	
Actuated g/C Ratio	0.19	0.19	0.19	0.05		0.05		0.39		0.59	0.59	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	327	346	291	156		76		1306		366	2093	
v/s Ratio Prot	0.16	0.06		c0.02		0.01		c0.43		c0.22	0.29	
v/s Ratio Perm			c0.23							0.49		
v/c Ratio	0.86	0.31	1.21	0.36		0.19		1.10		1.21	0.49	
Uniform Delay, d1	46.9	41.7	48.5	55.1		54.7		36.5		39.0	14.0	
Progression Factor	1.00	1.00	1.00	0.87		6.77		0.85		1.18	1.20	
Incremental Delay, d2	19.5	0.5	120.7	1.4		1.2		56.0		116.5	0.7	
Delay (s)	66.5	42.2	169.2	49.3		371.5		87.0		162.5	17.6	
Level of Service	E	D	F	D		F		F		F	B	
Approach Delay (s)		119.2			319.7			87.0			61.6	
Approach LOS		F			F			F			E	

Intersection Summary

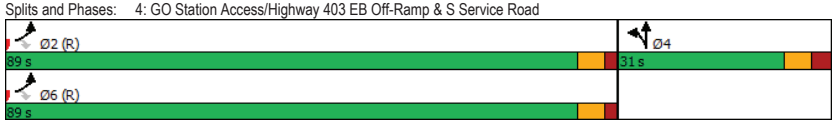
HCM 2000 Control Delay	104.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	830	15	30		
Future Volume (vph)	830	15	30		
Lane Group Flow (vph)	1064	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			31.0	89.0	89.0
Total Split (%)			25.8%	74%	74%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.88	0.02	0.84		
Control Delay	21.0	0.3	66.6		
Queue Delay	1.0	0.0	0.0		
Total Delay	22.0	0.3	66.6		
Queue Length 50th (m)	50.6	0.1	70.1		
Queue Length 95th (m)	176.1	0.3	87.5		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1207	1144	383		
Starvation Cap Reductn	36	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.91	0.02	0.79		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	830	15	205	30	0	0
Future Volume (vph)	830	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	1064	19	263	38	0	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	1064	14	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	84.3	84.3		22.7		
Effective Green, g (s)	85.3	85.3		23.7		
Actuated g/C Ratio	0.71	0.71		0.20		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1204	1135		359		
v/s Ratio Prot	c0.63			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.88	0.01		0.84		
Uniform Delay, d1	13.5	5.1		46.3		
Progression Factor	0.72	0.10		1.00		
Incremental Delay, d2	9.5	0.0		15.6		
Delay (s)	19.3	0.5		61.9		
Level of Service	B	A		E		
Approach Delay (s)	18.9			61.9	0.0	
Approach LOS	B			E	A	

Intersection Summary				
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	68.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	1230	25	0	1365
Future Volume (Veh/h)	0	110	1230	25	0	1365
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	1337	27	0	1484
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.86	0.78			0.78	
vC, conflicting volume	2092	682			1364	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1097	31			905	
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	85			100	
cM capacity (veh/h)	182	814			594	

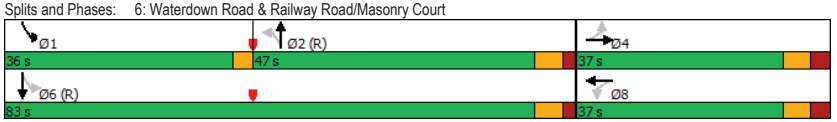
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	891	473	742	742
Volume Left	0	0	0	0	0
Volume Right	120	0	27	0	0
cSH	814	1700	1700	1700	1700
Volume to Capacity	0.15	0.52	0.28	0.44	0.44
Queue Length 95th (m)	4.1	0.0	0.0	0.0	0.0
Control Delay (s)	10.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.2	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		48.3%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	5	100	5	5	765	380	975
Future Volume (vph)	10	5	100	5	5	765	380	975
Lane Group Flow (vph)	0	25	127	614	6	1012	481	1247
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	37.0	37.0	37.0	37.0	47.0	47.0	36.0	83.0
Total Split (%)	30.8%	30.8%	30.8%	30.8%	39.2%	39.2%	30.0%	69.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.38	0.55	0.89	0.04	0.67	0.80	0.49
Control Delay		49.8	52.6	25.2	24.8	29.2	36.0	6.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		49.8	52.6	25.2	24.8	29.2	36.0	6.0
Queue Length 50th (m)		4.2	29.4	27.8	0.7	89.7	76.7	44.5
Queue Length 95th (m)		10.7	38.7	39.2	m1.4	m109.0	m89.5	m64.3
Internal Link Dist (m)		95.0		120.3		324.2		93.2
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		94	344	782	141	1513	624	2554
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.27	0.37	0.79	0.04	0.67	0.77	0.49

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2031 - Without Improvements

6: Waterdown Road & Railway Road/Masonry Court — PM Peak Hour



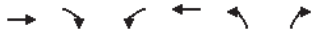
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	100	5	480	5	765	35	380	975	10
Future Volume (vph)	10	5	5	100	5	480	5	765	35	380	975	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196		1711	1590		1353	3412		1694	3476	
Flt Permitted		0.28		0.74	1.00		0.22	1.00		0.15	1.00	
Satd. Flow (perm)		349		1334	1590		319	3412		275	3476	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	127	6	608	6	968	44	481	1234	13
RTOR Reduction (vph)	0	5	0	0	414	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	20	0	127	200	0	6	1010	0	481	1246	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.8		19.8	19.8		52.1	52.1		87.2	87.2	
Effective Green, g (s)		20.8		20.8	20.8		53.1	53.1		88.2	88.2	
Actuated g/C Ratio		0.17		0.17	0.17		0.44	0.44		0.74	0.74	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		60		231	275		141	1509		593	2554	
v/s Ratio Prot					c0.13			c0.30		c0.22	0.36	
v/s Ratio Perm		0.06		0.10			0.02			0.37		
v/c Ratio		0.33		0.55	0.73		0.04	0.67		0.81	0.49	
Uniform Delay, d1		43.5		45.3	46.9		19.0	26.5		24.3	6.6	
Progression Factor		1.00		1.00	1.00		0.94	0.95		1.31	0.72	
Incremental Delay, d2		3.3		2.7	9.2		0.4	1.5		6.9	0.5	
Delay (s)		46.8		48.0	56.1		18.2	26.8		38.5	5.2	
Level of Service		D		D	E		B	C		D	A	
Approach Delay (s)		46.8			54.7			26.7			14.5	
Approach LOS		D			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	85.8%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2031 - Without Improvements

7: Cooke Boulevard & Site Driveway (East) — PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	15	0	225	30
Future Volume (Veh/h)	0	50	15	0	225	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	16	0	245	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		32	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		32	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	97
cM capacity (veh/h)			1564		977	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	16	278
Volume Left	0	16	245
Volume Right	54	0	33
cSH	1700	1564	989
Volume to Capacity	0.03	0.01	0.28
Queue Length 95th (m)	0.0	0.2	9.3
Control Delay (s)	0.0	7.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.1
Approach LOS			B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	180	55	30	485	0	75	70	45	0	40	25
Future Volume (Veh/h)	185	180	55	30	485	0	75	70	45	0	40	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	226	220	67	37	591	0	91	85	55	0	49	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	591			287			1425	1370	254	1468	1404	591
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	591			153			1417	1356	116	1464	1393	591
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 %	77			97			0	16	93	100	49	94
cM capacity (veh/h)	995			1297			47	102	817	23	97	511

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	513	628	231	79
Volume Left	226	37	91	0
Volume Right	67	0	55	30
cSH	995	1297	82	140
Volume to Capacity	0.23	0.03	2.82	0.57
Queue Length 95th (m)	7.0	0.7	179.9	22.7
Control Delay (s)	5.7	0.8	930.7	60.0
Lane LOS	A	A	F	F
Approach Delay (s)	5.7	0.8	930.7	60.0
Approach LOS			F	F

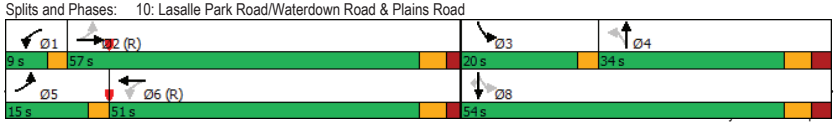
Intersection Summary					
Average Delay			153.8		
Intersection Capacity Utilization			77.5%	ICU Level of Service	D
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	245	595	75	1110	125	220	390	285	405
Future Volume (vph)	245	595	75	1110	125	220	390	285	405
Lane Group Flow (vph)	253	690	77	1495	129	294	402	294	418
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	1	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	9.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	15.0	57.0	9.0	51.0	34.0	34.0	20.0	54.0	54.0
Total Split (%)	12.5%	47.5%	7.5%	42.5%	28.3%	28.3%	16.7%	45.0%	45.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	2.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.88	0.42	0.21	1.13	0.62	0.80	1.09	0.42	0.62
Control Delay	61.8	22.2	14.8	104.5	56.7	59.9	106.7	36.3	27.5
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	22.2	14.8	105.1	56.7	59.9	106.7	36.3	27.5
Queue Length 50th (m)	46.5	60.3	8.5	~224.3	29.1	66.4	~101.6	68.2	65.0
Queue Length 95th (m)	#108.1	78.1	17.0	#269.5	49.8	96.4	#141.7	97.7	98.5
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	287	1654	374	1318	241	425	370	760	715
Starvation Cap Reductn	0	0	0	177	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.42	0.21	1.31	0.54	0.69	1.09	0.39	0.58

Intersection Summary

Cycle Length: 120
Actual Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis — Future Total 2031 - Without Improvements

10: Lasalle Park Road/Waterdown Road & Plains Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	595	75	75	1110	340	125	220	65	390	285	405
Future Volume (vph)	245	595	75	75	1110	340	125	220	65	390	285	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		2.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.96		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1616	3466		1640	3376		1694	1786		1709	1900	1492
Flt Permitted	0.08	1.00		0.38	1.00		0.58	1.00		0.25	1.00	1.00
Satd. Flow (perm)	142	3466		664	3376		1035	1786		455	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	253	613	77	77	1144	351	129	227	67	402	294	418
RTOR Reduction (vph)	0	7	0	0	24	0	0	10	0	0	0	125
Lane Group Flow (vph)	253	683	0	77	1471	0	129	284	0	402	294	293
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	63.9	55.5		50.4	45.0		23.1	23.1		43.1	43.1	43.1
Effective Green, g (s)	64.9	56.5		52.4	46.0		24.1	24.1		44.1	44.1	44.1
Actuated g/C Ratio	0.54	0.47		0.44	0.38		0.20	0.20		0.37	0.37	0.37
Clearance Time (s)	3.0	6.0		3.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	284	1631		342	1294		207	358		355	698	548
v/s Ratio Prot	c0.13	0.20		0.01	c0.44			c0.16		c0.17	0.15	
v/s Ratio Perm	0.36			0.09			0.12			0.25		0.20
v/c Ratio	0.89	0.42		0.23	1.14		0.62	0.79		1.13	0.42	0.54
Uniform Delay, d1	36.0	20.9		20.0	37.0		43.8	45.6		33.1	28.4	29.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.37	1.24	1.55
Incremental Delay, d2	27.4	0.8		0.3	71.5		5.7	11.5		86.3	0.4	0.9
Delay (s)	63.4	21.7		20.3	108.5		49.5	57.1		131.6	35.5	47.1
Level of Service	E	C		C	F		D	E		F	D	D
Approach Delay (s)		32.9			104.2			54.8			74.6	
Approach LOS		C			F			D			E	

Intersection Summary				
HCM 2000 Control Delay	74.3	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.01			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	109.4%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Total 2031 - Without Improvements

11: Plains Road & Cooke Boulevard — PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	75	985	1510	110
Future Volume (vph)	75	985	1510	110
Lane Group Flow (vph)	77	1015	1681	201
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.36	0.41	0.78	0.69
Control Delay	9.5	7.0	19.0	47.9
Queue Delay	0.0	0.5	0.0	0.0
Total Delay	9.5	7.5	19.0	47.9
Queue Length 50th (m)	3.6	40.6	134.2	36.2
Queue Length 95th (m)	11.0	65.7	#235.6	57.3
Internal Link Dist (m)		135.9	118.9	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	292	2457	2148	408
Starvation Cap Reductn	0	909	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.26	0.66	0.78	0.49

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Plains Road & Cooke Boulevard



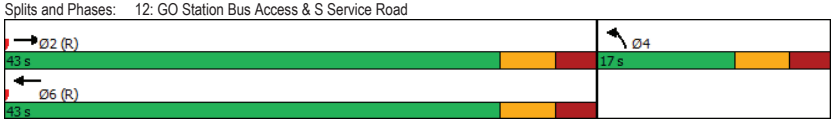
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	985	1510	120	110	85
Future Volume (vph)	75	985	1510	120	110	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3288		1621	
Flt Permitted	0.08	1.00	1.00		0.97	
Satd. Flow (perm)	134	3374	3288		1621	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	1015	1557	124	113	88
RTOR Reduction (vph)	0	0	4	0	28	0
Lane Group Flow (vph)	77	1015	1677	0	173	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	79.1	79.1	70.1		16.9	
Effective Green, g (s)	80.1	80.1	71.1		17.9	
Actuated g/C Ratio	0.73	0.73	0.65		0.16	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	192	2456	2125		263	
v/s Ratio Prot	0.03	c0.30	c0.51			
v/s Ratio Perm	0.27				c0.11	
v/c Ratio	0.40	0.41	0.79		0.66	
Uniform Delay, d1	11.7	5.8	14.0		43.2	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.4	0.5	3.1		5.9	
Delay (s)	13.1	6.3	17.1		49.1	
Level of Service	B	A	B		D	
Approach Delay (s)		6.8	17.1		49.1	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	75.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	770	295	15
Future Volume (vph)	770	295	15
Lane Group Flow (vph)	840	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.27	0.09	0.12
Control Delay	1.6	0.2	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.6	0.2	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m27.7	m1.2	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3139	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	71	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.27	0.09	0.10

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	770	20	0	295	15	0
Future Volume (vph)	770	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3388			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3388			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	819	21	0	314	16	0
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	838	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2552			2719	42	
v/s Ratio Prot	c0.25			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.33			0.12	0.38	
Uniform Delay, d1	2.4			2.0	27.8	
Progression Factor	1.08			0.15	1.00	
Incremental Delay, d2	0.0			0.1	5.7	
Delay (s)	2.7			0.4	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.7			0.4	33.4	
Approach LOS	A			A	C	

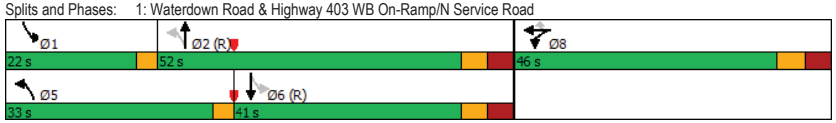
Intersection Summary			
HCM 2000 Control Delay	2.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	70	105	65	465	600	235	810
Future Volume (vph)	70	105	65	465	600	235	810
Lane Group Flow (vph)	71	107	66	474	1086	240	1041
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	46.0	46.0	46.0	33.0	52.0	22.0	41.0
Total Split (%)	38.3%	38.3%	38.3%	27.5%	43.3%	18.3%	34.2%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.41	0.56	0.25	0.75	0.59	0.54	0.85
Control Delay	54.7	60.0	5.3	32.4	15.4	14.8	41.0
Queue Delay	0.0	0.0	0.0	2.4	0.2	0.0	0.0
Total Delay	54.7	60.0	5.3	34.8	15.6	14.8	41.0
Queue Length 50th (m)	16.5	25.4	0.0	62.2	32.8	11.1	117.2
Queue Length 95th (m)	30.4	42.4	5.3	145.1	103.9	29.8	#195.0
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	468	519	535	628	1845	487	1219
Starvation Cap Reductn	0	0	0	68	206	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.21	0.12	0.85	0.66	0.49	0.85

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	70	105	65	465	600	465	235	810	210
Future Volume (vph)	0	0	0	70	105	65	465	600	465	235	810	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	1544	2987		1616	2991	
Flt Permitted				0.95	1.00	1.00	0.13	1.00		0.26	1.00	
Satd. Flow (perm)				1442	1597	1439	212	2987		447	2991	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	71	107	66	474	612	474	240	827	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	76	0	0	16	0
Lane Group Flow (vph)	0	0	0	71	107	8	474	1010	0	240	1025	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.5	13.5	13.5	90.5	70.1		64.6	47.2	
Effective Green, g (s)				14.5	14.5	14.5	91.5	71.1		66.6	48.2	
Actuated g/C Ratio				0.12	0.12	0.12	0.76	0.59		0.55	0.40	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				174	192	173	620	1769		427	1201	
v/s Ratio Prot				0.05	c0.07		c0.26	0.34		0.09	c0.34	
v/s Ratio Perm						0.01	0.32			0.23		
v/c Ratio				0.41	0.56	0.05	0.76	0.57		0.56	0.85	
Uniform Delay, d1				48.8	49.7	46.6	24.1	15.1		14.0	32.7	
Progression Factor				1.00	1.00	1.00	1.22	1.02		1.00	1.00	
Incremental Delay, d2				1.6	3.5	0.1	4.4	1.0		1.7	7.8	
Delay (s)				50.3	53.2	46.7	33.8	16.4		15.6	40.5	
Level of Service				D	D	D	C	B		B	D	
Approach Delay (s)		0.0			50.6			21.7			35.8	
Approach LOS		A			D			C			D	

Intersection Summary

HCM 2000 Control Delay	29.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.77				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	76.5%	ICU Level of Service		D	
Analysis Period (min)	15				

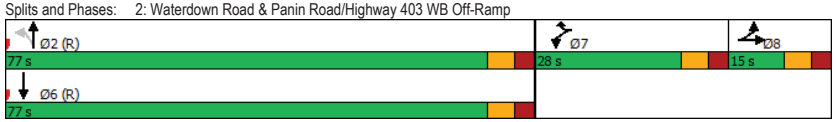
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	380	175	5	1350	880
Future Volume (vph)	0	380	175	5	1350	880
Lane Group Flow (vph)	5	413	190	0	1472	957
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	28.0	28.0	77.0	77.0	77.0
Total Split (%)	12.5%	23.3%	23.3%	64.2%	64.2%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.75	0.53		0.65	0.40
Control Delay	53.4	56.4	19.7		11.5	2.9
Queue Delay	0.0	0.0	0.5		1.3	0.2
Total Delay	53.4	56.4	20.2		12.8	3.1
Queue Length 50th (m)	1.2	50.2	11.3		90.8	15.8
Queue Length 95th (m)	5.5	67.8	35.0		m55.6	5.0
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	594	377		2272	2417
Starvation Cap Reductn	0	0	0		537	670
Spillback Cap Reductn	0	0	34		63	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.70	0.55		0.85	0.55

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	380	0	175	5	1350	0	0	880	0
Future Volume (vph)	5	0	0	380	0	175	5	1350	0	0	880	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3395			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3232			3438	
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)	5	0	0	413	0	190	5	1467	0	0	957	0
RTOR Reduction (vph)	0	0	0	0	0	113	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	413	0	77	0	1472	0	0	957	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		19.6		19.6		77.8			77.8	
Effective Green, g (s)		2.6		20.6		20.6		78.8			78.8	
Actuated g/C Ratio		0.02		0.17		0.17		0.66			0.66	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		548		244		2122			2257	
v/s Ratio Prot		c0.00		c0.13		0.05					0.28	
v/s Ratio Perm								c0.46				
v/c Ratio		0.21		0.75		0.31		0.69			0.42	
Uniform Delay, d1		57.7		47.3		43.5		13.0			9.8	
Progression Factor		1.00		1.00		1.00		1.01			0.31	
Incremental Delay, d2		4.3		5.8		0.7		0.2			0.4	
Delay (s)		62.0		53.1		44.3		13.3			3.4	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			50.3			13.3			3.4	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues — Future Total 2036 - Without Improvements

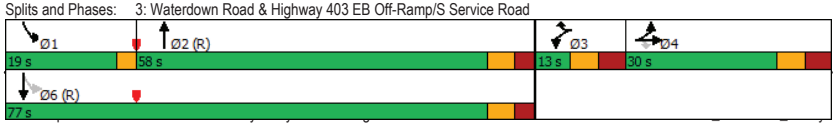
3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	330	315	540	25	100	980	630	630
Future Volume (vph)	330	315	540	25	100	980	630	630
Lane Group Flow (vph)	355	339	581	27	108	1925	677	677
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	30.0	30.0	30.0	13.0	13.0	58.0	19.0	77.0
Total Split (%)	25.0%	25.0%	25.0%	10.8%	10.8%	48.3%	15.8%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	1.07	0.94	1.16	0.20	0.54	1.29	1.27	0.34
Control Delay	116.3	83.1	114.6	57.7	18.6	163.8	164.6	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	116.3	83.1	114.6	57.7	18.6	163.9	164.6	13.4
Queue Length 50th (m)	~97.7	83.7	~113.1	3.4	0.0	~299.5	~111.3	39.1
Queue Length 95th (m)	#158.6	#141.7	#184.9	8.8	15.9 m	#312.6	#172.7	45.9
Internal Link Dist (m)		253.6				236.1		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	331	360	503	138	200	1488	531	1977
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	14	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	0.94	1.16	0.20	0.54	1.31	1.27	0.34

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	315	540	25	0	100	0	980	810	630	630	0
Future Volume (vph)	330	315	540	25	0	100	0	980	810	630	630	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		0.93		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	2775		1426		3175		1766	3343	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	2775		1426		3175		583	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	355	339	581	27	0	108	0	1054	871	677	677	0
RTOR Reduction (vph)	0	0	215	0	0	103	0	113	0	0	0	0
Lane Group Flow (vph)	355	339	366	27	0	5	0	1812	0	677	677	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	22.0	22.0	22.0	5.0		5.0		51.0		70.0	70.0	
Effective Green, g (s)	23.0	23.0	23.0	6.0		6.0		52.0		71.0	71.0	
Actuated g/C Ratio	0.19	0.19	0.19	0.05		0.05		0.43		0.59	0.59	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	331	360	288	138		71		1375		512	1977	
v/s Ratio Prot	0.21	0.18		c0.01		0.00		c0.57		c0.19	0.20	
v/s Ratio Perm			c0.24							0.59		
v/c Ratio	1.07	0.94	1.27	0.20		0.08		1.32		1.32	0.34	
Uniform Delay, d1	48.5	47.8	48.5	54.7		54.4		34.0		15.6	12.5	
Progression Factor	1.00	1.00	1.00	0.99		1.75		1.04		2.23	1.03	
Incremental Delay, d2	70.1	32.6	146.3	0.7		0.5		145.8		156.9	0.4	
Delay (s)	118.6	80.4	194.8	54.9		95.5		181.2		191.7	13.3	
Level of Service	F	F	F	D		F		F		F	B	
Approach Delay (s)		143.2			87.4			181.2			102.5	
Approach LOS		F			F			F			F	

Intersection Summary

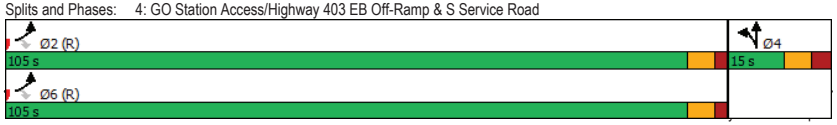
HCM 2000 Control Delay	145.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	127.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	1165	160	25		
Future Volume (vph)	1165	160	25		
Lane Group Flow (vph)	1226	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	1.01	0.12	0.27		
Control Delay	40.5	0.6	57.9		
Queue Delay	15.5	0.0	0.0		
Total Delay	56.0	0.6	57.9		
Queue Length 50th (m)	~355.1	0.2	8.8		
Queue Length 95th (m)	#423.2	5.0	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	136		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	1.06	0.12	0.27		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1165	160	10	25	0	0
Future Volume (vph)	1165	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1226	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	1226	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.91			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	1.06	0.11		0.42		
Uniform Delay, d1	8.4	1.3		55.5		
Progression Factor	1.28	1.78		1.00		
Incremental Delay, d2	42.4	0.1		3.2		
Delay (s)	53.1	2.4		58.7		
Level of Service	D	A		E		
Approach Delay (s)	47.0			58.7	0.0	
Approach LOS	D			E	A	

Intersection Summary			
HCM 2000 Control Delay	47.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements
5: Waterdown Road & Site Driveway (West) — AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	195	1595	10	0	1195
Future Volume (Veh/h)	0	195	1595	10	0	1195
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	212	1734	11	0	1299
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.60	0.56			0.56	
vC, conflicting volume	2389	872			1745	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1322	0			748	
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	65			100	
cM capacity (veh/h)	91	608			485	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	212	1156	589	650	650
Volume Left	0	0	0	0	0
Volume Right	212	0	11	0	0
cSH	608	1700	1700	1700	1700
Volume to Capacity	0.35	0.68	0.35	0.38	0.38
Queue Length 95th (m)	12.5	0.0	0.0	0.0	0.0
Control Delay (s)	14.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.1	0.0		0.0	
Approach LOS	B				

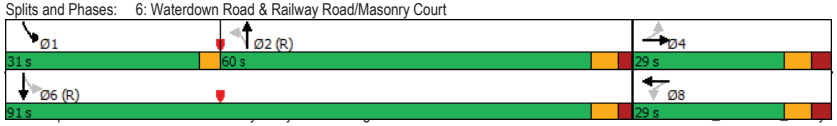
Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		63.1%	ICU Level of Service B
Analysis Period (min)		15	

Queues — Future Total 2036 - Without Improvements
6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	0	30	0	5	1260	550	635
Future Volume (vph)	10	0	30	0	5	1260	550	635
Lane Group Flow (vph)	0	22	34	381	6	1563	625	733
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	60.0	60.0	31.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	50.0%	50.0%	25.8%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.28	0.27	0.77	0.02	1.00	0.98	0.27
Control Delay		8.5	53.3	15.8	12.8	36.3	62.2	3.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		8.5	53.3	15.8	12.8	36.3	62.2	3.6
Queue Length 50th (m)		0.0	8.1	0.0	0.6	~219.4	116.9	18.8
Queue Length 95th (m)		0.2	17.0	25.4	m0.7	m176.0	m#190.2	m31.3
Internal Link Dist (m)		95.0		120.3		328.3		93.2
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		102	237	596	261	1557	637	2729
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.22	0.14	0.64	0.02	1.00	0.98	0.27

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements

6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour



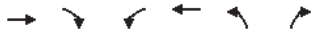
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	30	0	335	5	1260	115	550	635	10
Future Volume (vph)	10	0	10	30	0	335	5	1260	115	550	635	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184		1586	1495		1454	3388		1728	3379	
Flt Permitted		0.25		0.74	1.00		0.37	1.00		0.07	1.00	
Satd. Flow (perm)		301		1241	1495		571	3388		128	3379	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	34	0	381	6	1432	131	625	722	11
RTOR Reduction (vph)	0	20	0	0	343	0	0	5	0	0	1	0
Lane Group Flow (vph)	0	2	0	34	38	0	6	1558	0	625	732	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.1		11.1	11.1		54.0	54.0		95.9	95.9	
Effective Green, g (s)		12.1		12.1	12.1		55.0	55.0		96.9	96.9	
Actuated g/C Ratio		0.10		0.10	0.10		0.46	0.46		0.81	0.81	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		30		125	150		261	1552		635	2728	
v/s Ratio Prot					0.03			c0.46		c0.33	0.22	
v/s Ratio Perm		0.01		c0.03			0.01			0.47		
v/c Ratio		0.07		0.27	0.26		0.02	1.00		0.98	0.27	
Uniform Delay, d1		48.9		49.9	49.8		17.8	32.5		35.3	2.8	
Progression Factor		1.00		1.00	1.00		0.71	0.86		1.09	1.06	
Incremental Delay, d2		1.1		1.2	0.9		0.0	7.7		26.6	0.2	
Delay (s)		49.9		51.1	50.7		12.6	35.7		65.1	3.2	
Level of Service		D		D	D		B	D		E	A	
Approach Delay (s)		49.9			50.7			35.6			31.7	
Approach LOS		D			D			D			C	

Intersection Summary				
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	102.2%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements

7: Cooke Boulevard & Site Driveway (East) — AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	85	30	0	70	5
Future Volume (Veh/h)	0	85	30	0	70	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	92	33	0	76	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)						
pX, platoon unblocked						
vC, conflicting volume			92		66	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		66	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	100
cM capacity (veh/h)			1515		924	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	33	81
Volume Left	0	33	76
Volume Right	92	0	5
cSH	1700	1515	933
Volume to Capacity	0.05	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.3
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements

8: Cooke Boulevard & Masonry Court — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	565	45	45	235	0	85	20	30	0	70	45
Future Volume (Veh/h)	55	565	45	45	235	0	85	20	30	0	70	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	71	724	58	58	301	0	109	26	38	0	90	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	301			782			1415	1312	753	1363	1341	301
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	301			689			1404	1288	657	1345	1320	301
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	94			93			0	80	91	100	27	92
cM capacity (veh/h)	1272			810			35	128	415	80	123	725

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	853	359	173	148
Volume Left	71	58	109	0
Volume Right	58	0	38	58
cSH	1272	810	50	182
Volume to Capacity	0.06	0.07	3.44	0.81
Queue Length 95th (m)	1.4	1.8	Err	45.0
Control Delay (s)	1.4	2.3	Err	77.6
Lane LOS	A	A	F	F
Approach Delay (s)	1.4	2.3	Err	77.6
Approach LOS			F	F

Intersection Summary				
Average Delay	1137.2			
Intersection Capacity Utilization	61.9%	ICU Level of Service		B
Analysis Period (min)	15			

Queues — Future Total 2036 - Without Improvements

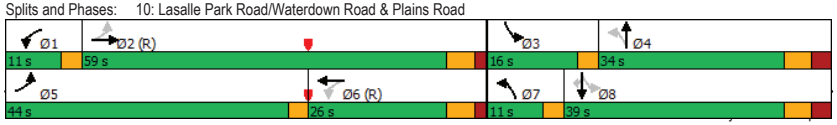
10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	770	980	85	395	100	325	265	190	220
Future Volume (vph)	770	980	85	395	100	325	265	190	220
Lane Group Flow (vph)	819	1219	90	723	106	415	282	202	234
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6	7	4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	1	6	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	9.0	27.0	9.0	34.0	9.0	34.0	34.0
Total Split (s)	44.0	59.0	11.0	26.0	11.0	34.0	16.0	39.0	39.0
Total Split (%)	36.7%	49.2%	9.2%	21.7%	9.2%	28.3%	13.3%	32.5%	32.5%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	2.0	5.0	2.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	1.25	0.78	0.45	1.09	0.25	0.98	1.12	0.40	0.41
Control Delay	155.6	31.8	26.5	100.2	24.9	83.5	119.7	36.1	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	155.6	31.8	26.5	100.2	24.9	83.5	119.7	36.1	10.4
Queue Length 50th (m)	~237.5	130.7	9.7	~91.3	16.6	101.0	~60.0	46.2	6.3
Queue Length 95th (m)	#316.2	160.3	17.9	#131.6	29.3	#167.7	#116.8	74.5	31.2
Internal Link Dist (m)		134.8		135.4		101.9		328.3	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	653	1556	206	663	434	425	252	500	569
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.25	0.78	0.44	1.09	0.24	0.98	1.12	0.40	0.41

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	770	980	165	85	395	285	100	325	65	265	190	220
Future Volume (vph)	770	980	165	85	395	285	100	325	65	265	190	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		2.0	5.0		2.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.94		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1678	3406		1676	3175		1722	1797		1615	1810	1446
Flt Permitted	0.17	1.00		0.23	1.00		0.63	1.00		0.13	1.00	1.00
Satd. Flow (perm)	307	3406		406	3175		1144	1797		227	1810	1446
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)	819	1043	176	90	420	303	106	346	69	282	202	234
RTOR Reduction (vph)	0	11	0	0	108	0	0	6	0	0	0	169
Lane Group Flow (vph)	819	1208	0	90	615	0	106	409	0	282	202	65
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	64.0	53.5		27.5	20.0		34.8	27.0		43.0	32.2	32.2
Effective Green, g (s)	65.0	54.5		29.5	21.0		36.8	28.0		44.0	33.2	33.2
Actuated g/C Ratio	0.54	0.45		0.25	0.18		0.31	0.23		0.37	0.28	0.28
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	646	1546		189	555		393	419		245	500	400
v/s Ratio Prot	c0.44	0.35		0.03	c0.19		0.02	c0.23		c0.13	0.11	
v/s Ratio Perm	0.24			0.08			0.06			0.29		0.04
v/c Ratio	1.27	0.78		0.48	1.11		0.27	0.98		1.15	0.40	0.16
Uniform Delay, d1	31.9	27.7		36.1	49.5		30.7	45.7		33.1	35.3	32.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.90	0.94	1.88
Incremental Delay, d2	132.5	4.0		1.9	71.3		0.4	37.3		103.8	0.5	0.2
Delay (s)	164.4	31.7		38.0	120.8		31.1	82.9		133.5	33.7	62.1
Level of Service	F	C		D	F		C	F		F	C	E
Approach Delay (s)		85.0			111.6			72.4			82.1	
Approach LOS		F			F			E			F	

Intersection Summary				
HCM 2000 Control Delay	88.2	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.13			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	115.3%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	95	1230	745	110
Future Volume (vph)	95	1230	745	110
Lane Group Flow (vph)	106	1367	917	205
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	10.5	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.25	0.60	0.48	0.71
Control Delay	6.4	10.5	14.1	44.7
Queue Delay	0.0	0.9	0.0	0.0
Total Delay	6.4	11.5	14.1	44.7
Queue Length 50th (m)	5.3	68.5	51.8	33.2
Queue Length 95th (m)	13.4	113.6	86.7	53.1
Internal Link Dist (m)		135.4	129.2	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	474	2272	1900	385
Starvation Cap Reductn	0	575	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.81	0.48	0.53

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



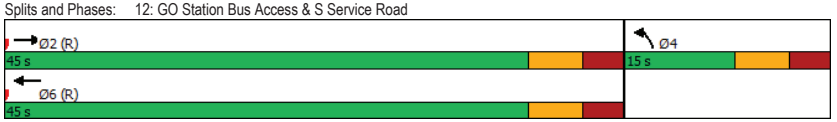
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	95	1230	745	80	110	75
Future Volume (vph)	95	1230	745	80	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3282	3239		1381	
Flt Permitted	0.25	1.00	1.00		0.97	
Satd. Flow (perm)	435	3282	3239		1381	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1367	828	89	122	83
RTOR Reduction (vph)	0	0	6	0	27	0
Lane Group Flow (vph)	106	1367	911	0	178	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	68.1	68.1	57.5		17.9	
Effective Green, g (s)	69.1	69.1	58.5		18.9	
Actuated g/C Ratio	0.69	0.69	0.58		0.19	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	403	2267	1894		261	
v/s Ratio Prot	0.02	c0.42	0.28			
v/s Ratio Perm	0.16				c0.13	
v/c Ratio	0.26	0.60	0.48		0.68	
Uniform Delay, d1	5.9	8.2	12.0		37.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.4	1.2	0.9		7.2	
Delay (s)	6.2	9.4	12.9		44.9	
Level of Service	A	A	B		D	
Approach Delay (s)		9.2	12.9		44.9	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	54.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1740	110	15
Future Volume (vph)	1740	110	15
Lane Group Flow (vph)	1907	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.59	0.04	0.12
Control Delay	3.0	1.2	24.5
Queue Delay	0.1	0.0	0.0
Total Delay	3.1	1.2	24.5
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m80.7	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3235	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	209	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.63	0.04	0.12

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1740	15	0	110	15	0
Future Volume (vph)	1740	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3477			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3477			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1891	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1906	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2630			2731	38	
v/s Ratio Prot	c0.55			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.72			0.04	0.42	
Uniform Delay, d1	3.9			1.8	28.0	
Progression Factor	1.27			0.90	1.00	
Incremental Delay, d2	0.2			0.0	7.4	
Delay (s)	5.2			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	5.2			1.7	35.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues — Future Total 2036 - Without Improvements

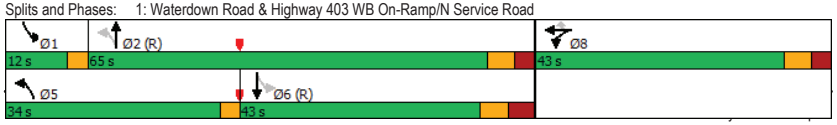
1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	280	500	220	785	875	115	720
Future Volume (vph)	280	500	220	785	875	115	720
Lane Group Flow (vph)	295	526	232	826	1142	121	916
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	43.0	43.0	43.0	34.0	65.0	12.0	43.0
Total Split (%)	35.8%	35.8%	35.8%	28.3%	54.2%	10.0%	35.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	0.0	3.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	2.0	6.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.60	0.96	0.39	1.72	0.73	0.46	0.98
Control Delay	41.3	71.5	5.9	351.8	17.3	18.9	66.7
Queue Delay	0.0	0.0	0.0	0.1	1.8	0.0	0.0
Total Delay	41.3	71.5	5.9	351.9	19.2	18.9	66.7
Queue Length 50th (m)	61.8	127.4	0.0	~284.3	131.4	11.3	116.3
Queue Length 95th (m)	92.5	#197.9	18.4	#363.7	25.2	19.6	#162.5
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	498	552	600	481	1554	271	932
Starvation Cap Reductn	0	0	0	3	251	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.95	0.39	1.73	0.88	0.45	0.98

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	280	500	220	785	875	210	115	720	150
Future Volume (vph)	0	0	0	280	500	220	785	875	210	115	720	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	2.0	6.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	1558	3080		1601	3058	
Flt Permitted				0.95	1.00	1.00	0.11	1.00		0.24	1.00	
Satd. Flow (perm)				1616	1792	1426	174	3080		405	3058	
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	0	295	526	232	826	921	221	121	758	158
RTOR Reduction (vph)	0	0	0	0	0	161	0	17	0	0	15	0
Lane Group Flow (vph)	0	0	0	295	526	71	826	1125	0	121	901	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				35.7	35.7	35.7	70.3	58.9		43.4	35.0	
Effective Green, g (s)				36.7	36.7	36.7	71.3	59.9		45.4	36.0	
Actuated g/C Ratio				0.31	0.31	0.31	0.59	0.50		0.38	0.30	
Clearance Time (s)				7.0	7.0	7.0	3.0	7.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				494	548	436	475	1537		246	917	
v/s Ratio Prot				0.18	c0.29		c0.47	0.37		0.04	c0.29	
v/s Ratio Perm						0.05	0.56			0.15		
v/c Ratio				0.60	0.96	0.16	1.74	0.73		0.49	0.98	
Uniform Delay, d1				35.4	40.9	30.4	35.3	23.7		25.1	41.7	
Progression Factor				1.00	1.00	1.00	0.79	0.64		1.00	1.00	
Incremental Delay, d2				1.9	28.2	0.2	338.4	2.1		1.5	25.9	
Delay (s)				37.3	69.1	30.6	366.2	17.4		26.6	67.6	
Level of Service				D	E	C	F	B		C	E	
Approach Delay (s)		0.0			51.7			163.8			62.8	
Approach LOS		A			D			F			E	

Intersection Summary

HCM 2000 Control Delay	108.9	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	1.20				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		15.0	
Intersection Capacity Utilization	108.7%	ICU Level of Service		G	
Analysis Period (min)	15				

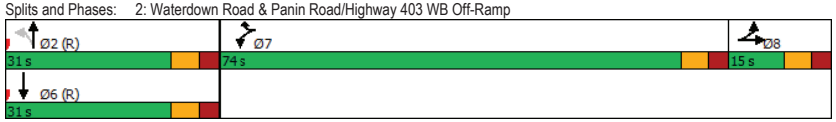
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	415	370	5	1500	1000
Future Volume (vph)	0	415	370	5	1500	1000
Lane Group Flow (vph)	6	472	420	0	1711	1136
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	74.0	74.0	31.0	31.0	31.0
Total Split (%)	12.5%	61.7%	61.7%	25.8%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.02	0.67	0.76		0.80	0.49
Control Delay	0.0	46.6	23.2		29.5	23.3
Queue Delay	0.0	0.0	0.5		5.5	0.0
Total Delay	0.0	46.6	23.7		35.0	23.3
Queue Length 50th (m)	0.0	55.8	34.6		197.6	106.9
Queue Length 95th (m)	0.0	62.9	61.5		m174.4	m119.4
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	376	1792	988		2148	2304
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	240		382	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.02	0.26	0.56		0.97	0.49

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	415	0	370	5	1500	0	0	1000	0
Future Volume (vph)	0	0	5	415	0	370	5	1500	0	0	1000	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3300			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	472	0	420	6	1705	0	0	1136	0
RTOR Reduction (vph)	0	6	0	0	0	212	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	472	0	208	0	1711	0	0	1136	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		25.8		25.8		71.6			71.6	
Effective Green, g (s)		2.6		26.8		26.8		72.6			72.6	
Actuated g/C Ratio		0.02		0.22		0.22		0.60			0.60	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		706		343		1996			2141	
v/s Ratio Prot		c0.00		c0.15		0.14					0.32	
v/s Ratio Perm								c0.52				
v/c Ratio		0.00		0.67		0.61		0.86			0.53	
Uniform Delay, d1		57.4		42.5		41.9		19.4			13.8	
Progression Factor		1.00		1.00		1.00		1.78			1.74	
Incremental Delay, d2		0.0		2.4		3.0		0.5			0.5	
Delay (s)		57.5		45.0		44.9		35.0			24.6	
Level of Service		E		D		D		D			C	
Approach Delay (s)		57.5			44.9			35.0			24.6	
Approach LOS		E			D			D			C	

Intersection Summary

HCM 2000 Control Delay	34.2	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.79				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	86.2%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Queues — Future Total 2036 - Without Improvements

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	265	95	470	50	260	1010	425	995
Future Volume (vph)	265	95	470	50	260	1010	425	995
Lane Group Flow (vph)	298	107	528	56	292	1747	478	1118
Turn Type	Split	NA	Perm	Prot	Prot	NA	pm+pt	NA
Protected Phases	4	4		3	3	2	1	6
Permitted Phases			4				6	
Detector Phase	4	4	4	3	3	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	13.0	13.0	29.0	9.0	29.0
Total Split (s)	33.0	33.0	33.0	13.0	13.0	52.0	22.0	74.0
Total Split (%)	27.5%	27.5%	27.5%	10.8%	10.8%	43.3%	18.3%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	2.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.81	0.27	1.21	0.36	0.83	1.30	1.39	0.56
Control Delay	62.3	41.4	145.3	48.6	50.3	170.8	224.7	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Total Delay	62.3	41.4	145.3	48.6	50.3	170.8	224.7	25.5
Queue Length 50th (m)	70.6	22.3	~132.3	7.6	50.1	~278.6	~146.4	122.2
Queue Length 95th (m)	#112.8	38.6	#198.4	14.6	#83.0	m#291.3	#202.4	51.6
Internal Link Dist (m)		253.6				236.1		174.0
Turn Bay Length (m)	135.0			100.0			40.0	
Base Capacity (vph)	370	392	436	156	353	1340	343	2005
Starvation Cap Reductn	0	0	0	0	0	0	0	368
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.27	1.21	0.36	0.83	1.30	1.39	0.68

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 145

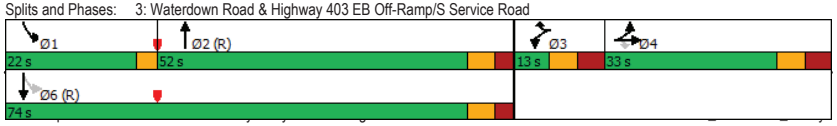
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	95	470	50	0	260	0	1010	545	425	995	0
Future Volume (vph)	265	95	470	50	0	260	0	1010	545	425	995	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0		2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	0.97		1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		0.95		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	3134		1521		3342		1678	3539	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.08	1.00	
Satd. Flow (perm)	1711	1810	1521	3134		1521		3342		147	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	298	107	528	56	0	292	0	1135	612	478	1118	0
RTOR Reduction (vph)	0	0	107	0	0	277	0	60	0	0	0	0
Lane Group Flow (vph)	298	107	421	56	0	15	0	1687	0	478	1118	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Split	NA	Perm	Prot		Prot		NA		pm+pt	NA	
Protected Phases	4	4		3		3		2		1	6	
Permitted Phases			4							6		
Actuated Green, G (s)	25.0	25.0	25.0	5.0		5.0		45.0		67.0	67.0	
Effective Green, g (s)	26.0	26.0	26.0	6.0		6.0		46.0		68.0	68.0	
Actuated g/C Ratio	0.22	0.22	0.22	0.05		0.05		0.38		0.57	0.57	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	370	392	329	156		76		1281		338	2005	
v/s Ratio Prot	0.17	0.06		c0.02		0.01		c0.50		c0.24	0.32	
v/s Ratio Perm			c0.28							0.56		
v/c Ratio	0.81	0.27	1.28	0.36		0.19		1.32		1.41	0.56	
Uniform Delay, d1	44.6	39.1	47.0	55.1		54.7		37.0		38.8	16.5	
Progression Factor	1.00	1.00	1.00	0.76		6.65		1.03		1.12	1.44	
Incremental Delay, d2	12.0	0.4	147.8	1.4		1.2		145.3		201.9	1.0	
Delay (s)	56.6	39.5	194.8	43.4		364.8		183.5		245.2	24.8	
Level of Service	E	D	F	D		F		F		F	C	
Approach Delay (s)		132.9			313.0			183.5			90.8	
Approach LOS		F			F			F			F	

Intersection Summary

HCM 2000 Control Delay	151.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		

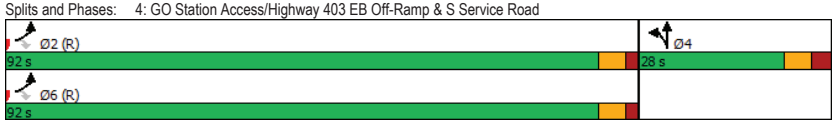
c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	930	15	30		
Future Volume (vph)	930	15	30		
Lane Group Flow (vph)	1192	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			28.0	92.0	92.0
Total Split (%)			23.3%	77%	77%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.97	0.02	0.92		
Control Delay	29.7	0.4	81.1		
Queue Delay	15.9	0.0	0.0		
Total Delay	45.6	0.4	81.1		
Queue Length 50th (m)	37.7	0.1	73.7		
Queue Length 95th (m)	235.3	0.3	#97.6		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1232	1167	333		
Starvation Cap Reductn	79	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	1.03	0.02	0.90		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	930	15	205	30	0	0
Future Volume (vph)	930	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	1192	19	263	38	0	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	1192	14	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	86.3	86.3		20.7		
Effective Green, g (s)	87.3	87.3		21.7		
Actuated g/C Ratio	0.73	0.73		0.18		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1232	1161		329		
v/s Ratio Prot	c0.70			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.97	0.01		0.91		
Uniform Delay, d1	15.0	4.5		48.2		
Progression Factor	0.62	0.20		1.00		
Incremental Delay, d2	18.5	0.0		28.8		
Delay (s)	27.8	0.9		77.0		
Level of Service	C	A		E		
Approach Delay (s)	27.4			77.0	0.0	
Approach LOS	C			E	A	

Intersection Summary

HCM 2000 Control Delay	37.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	1445	25	0	1515
Future Volume (Veh/h)	0	110	1445	25	0	1515
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	1571	27	0	1647
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.80	0.70			0.70	
vC, conflicting volume	2408	799			1598	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1115	0			984	
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	84			100	
cM capacity (veh/h)	163	759			494	

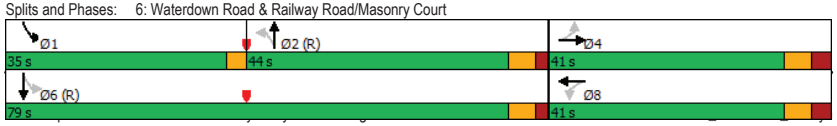
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	1047	551	824	824
Volume Left	0	0	0	0	0
Volume Right	120	0	27	0	0
cSH	759	1700	1700	1700	1700
Volume to Capacity	0.16	0.62	0.32	0.48	0.48
Queue Length 95th (m)	4.5	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.6	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		54.2%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	5	110	5	5	840	425	1080
Future Volume (vph)	10	5	110	5	5	840	425	1080
Lane Group Flow (vph)	0	25	139	791	6	1107	538	1380
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	41.0	41.0	41.0	41.0	44.0	44.0	35.0	79.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	36.7%	36.7%	29.2%	65.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.18	0.38	0.98	0.07	0.99	0.97	0.63
Control Delay		29.7	37.8	43.3	29.2	55.3	69.0	8.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		29.7	37.8	43.3	29.2	55.3	69.0	8.6
Queue Length 50th (m)		3.5	27.2	86.6	0.9	140.2	~120.0	47.7
Queue Length 95th (m)		9.6	39.9	#104.4	m1.4	m124.4	m#131.0	m53.4
Internal Link Dist (m)		95.0		120.3		324.2		93.2
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		148	389	822	90	1116	552	2196
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.17	0.36	0.96	0.07	0.99	0.97	0.63

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements

6: Waterdown Road & Railway Road/Masonry Court — PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	110	5	620	5	840	35	425	1080	10
Future Volume (vph)	10	5	5	110	5	620	5	840	35	425	1080	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196		1711	1592		1353	3414		1694	3479	
Flt Permitted		0.40		0.74	1.00		0.20	1.00		0.10	1.00	
Satd. Flow (perm)		495		1334	1592		279	3414		174	3479	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	139	6	785	6	1063	44	538	1367	13
RTOR Reduction (vph)	0	4	0	0	365	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	21	0	139	426	0	6	1104	0	538	1380	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.3		32.3	32.3		38.1	38.1		74.7	74.7	
Effective Green, g (s)		33.3		33.3	33.3		39.1	39.1		75.7	75.7	
Actuated g/C Ratio		0.28		0.28	0.28		0.33	0.33		0.63	0.63	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		137		370	441		90	1112		548	2194	
v/s Ratio Prot					c0.27			c0.32		c0.28	0.40	
v/s Ratio Perm		0.04		0.10			0.02			0.34		
v/c Ratio		0.15		0.38	0.97		0.07	0.99		0.98	0.63	
Uniform Delay, d1		32.7		35.0	42.8		27.9	40.3		35.3	13.6	
Progression Factor		1.00		1.00	1.00		0.98	0.94		1.26	0.53	
Incremental Delay, d2		0.5		0.6	33.9		0.7	17.4		28.8	1.0	
Delay (s)		33.2		35.6	76.7		28.1	55.2		73.3	8.3	
Level of Service		C		D	E		C	E		E	A	
Approach Delay (s)		33.2			70.5			55.1			26.5	
Approach LOS		C			E			E			C	

Intersection Summary				
HCM 2000 Control Delay	44.8	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	99.0%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements

7: Cooke Boulevard & Site Driveway (East) — PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	15	0	225	30
Future Volume (Veh/h)	0	50	15	0	225	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	16	0	245	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		32	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		32	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	97
cM capacity (veh/h)			1564		977	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	16	278
Volume Left	0	16	245
Volume Right	54	0	33
cSH	1700	1564	989
Volume to Capacity	0.03	0.01	0.28
Queue Length 95th (m)	0.0	0.2	9.3
Control Delay (s)	0.0	7.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.1
Approach LOS			B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	225	55	35	635	0	75	70	45	0	40	25
Future Volume (Veh/h)	185	225	55	35	635	0	75	70	45	0	40	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	226	274	67	43	774	0	91	85	55	0	49	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	
vC, conflicting volume	774			341			1674	1620	308	1717	1653	774
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	774			106			1709	1644	66	1761	1684	774
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 %	73			97			0	0	93	0	13	93
cM capacity (veh/h)	851			1245			11	59	805	0	56	402

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	567	817	231	79
Volume Left	226	43	91	0
Volume Right	67	0	55	30
cSH	851	1245	24	83
Volume to Capacity	0.27	0.03	9.55	0.95
Queue Length 95th (m)	8.6	0.9	Err	41.4
Control Delay (s)	6.4	0.9	Err	172.9
Lane LOS	A	A	F	F
Approach Delay (s)	6.4	0.9	Err	172.9
Approach LOS			F	F

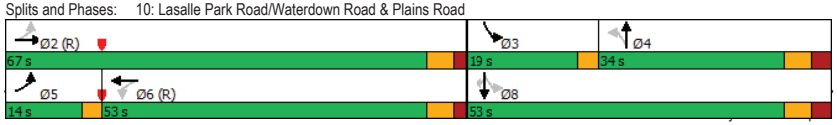
Intersection Summary					
Average Delay			1374.2		
Intersection Capacity Utilization			88.0%	ICU Level of Service	E
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	270	650	85	1220	140	245	425	315	455
Future Volume (vph)	270	650	85	1220	140	245	425	315	455
Lane Group Flow (vph)	278	758	88	1634	144	330	438	325	469
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	14.0	67.0	53.0	53.0	34.0	34.0	19.0	53.0	53.0
Total Split (%)	11.7%	55.8%	44.2%	44.2%	28.3%	28.3%	15.8%	44.2%	44.2%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	1.10	0.41	0.35	1.19	0.67	0.84	1.28	0.46	0.68
Control Delay	118.7	17.3	30.3	125.5	58.9	63.1	176.8	37.5	32.0
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	118.7	17.3	30.3	126.0	58.9	63.1	176.8	37.5	32.0
Queue Length 50th (m)	~70.7	57.4	15.0	~254.8	32.1	74.4	~110.6	78.8	86.8
Queue Length 95th (m)	#126.8	72.8	30.5	#300.2	56.1	#117.5	#177.8	108.3	92.2
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	252	1865	249	1374	234	425	343	744	716
Starvation Cap Reductn	0	0	0	191	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.41	0.35	1.38	0.62	0.78	1.28	0.44	0.66

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - Without Improvements

10: Lasalle Park Road/Waterdown Road & Plains Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	650	85	85	1220	365	140	245	75	425	315	455
Future Volume (vph)	270	650	85	85	1220	365	140	245	75	425	315	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1616	3463		1630	3379		1694	1785		1710	1900	1492
Flt Permitted	0.08	1.00		0.36	1.00		0.56	1.00		0.21	1.00	1.00
Satd. Flow (perm)	136	3463		625	3379		1006	1785		384	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	278	670	88	88	1258	376	144	253	77	438	325	469
RTOR Reduction (vph)	0	8	0	0	23	0	0	9	0	0	0	137
Lane Group Flow (vph)	278	750	0	88	1611	0	144	321	0	438	325	332
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	63.3	63.3		47.0	47.0		24.7	24.7		43.7	43.7	43.7
Effective Green, g (s)	64.3	64.3		48.0	48.0		25.7	25.7		44.7	44.7	44.7
Actuated g/C Ratio	0.54	0.54		0.40	0.40		0.21	0.21		0.37	0.37	0.37
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	249	1855		250	1351		215	382		330	707	555
v/s Ratio Prot	c0.13	0.22			c0.48			c0.18		c0.19	0.17	
v/s Ratio Perm	0.46			0.14			0.14			0.31		0.22
v/c Ratio	1.12	0.40		0.35	1.19		0.67	0.84		1.33	0.46	0.60
Uniform Delay, d1	38.1	16.5		25.1	36.0		43.3	45.2		32.0	28.5	30.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.49	1.26	1.73
Incremental Delay, d2	91.9	0.7		3.9	94.1		7.7	14.9		163.3	0.4	1.4
Delay (s)	130.0	17.2		29.0	130.1		50.9	60.0		211.0	36.4	54.1
Level of Service	F	B		C	F		D	E		F	D	D
Approach Delay (s)		47.4			124.9			57.3			105.2	
Approach LOS		D			F			E			F	

Intersection Summary				
HCM 2000 Control Delay	94.3	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.10			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	118.2%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Total 2036 - Without Improvements

11: Plains Road & Cooke Boulevard — PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	75	1085	1650	115
Future Volume (vph)	75	1085	1650	115
Lane Group Flow (vph)	77	1119	1830	207
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.41	0.46	0.86	0.70
Control Delay	17.1	7.6	22.8	48.4
Queue Delay	0.0	0.6	0.0	0.0
Total Delay	17.1	8.2	22.8	48.4
Queue Length 50th (m)	3.7	47.5	163.5	37.7
Queue Length 95th (m)	17.6	76.7	#276.3	59.0
Internal Link Dist (m)		135.9	118.9	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	267	2445	2134	408
Starvation Cap Reductn	0	857	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.70	0.86	0.51

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Plains Road & Cooke Boulevard



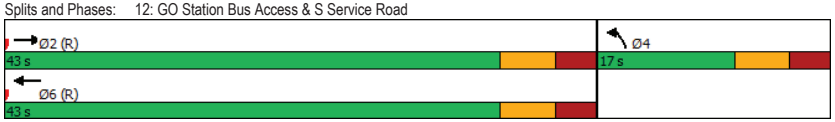
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	1085	1650	125	115	85
Future Volume (vph)	75	1085	1650	125	115	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3290		1622	
Flt Permitted	0.06	1.00	1.00		0.97	
Satd. Flow (perm)	94	3374	3290		1622	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	1119	1701	129	119	88
RTOR Reduction (vph)	0	0	4	0	27	0
Lane Group Flow (vph)	77	1119	1826	0	180	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	78.7	78.7	69.7		17.3	
Effective Green, g (s)	79.7	79.7	70.7		18.3	
Actuated g/C Ratio	0.72	0.72	0.64		0.17	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	165	2444	2114		269	
v/s Ratio Prot	c0.03	0.33	c0.56			
v/s Ratio Perm	0.31				c0.11	
v/c Ratio	0.47	0.46	0.86		0.67	
Uniform Delay, d1	16.3	6.2	15.8		43.0	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.1	0.6	5.0		6.4	
Delay (s)	18.4	6.9	20.8		49.4	
Level of Service	B	A	C		D	
Approach Delay (s)		7.6	20.8		49.4	
Approach LOS		A	C		D	

Intersection Summary				
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	79.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1045	295	15
Future Volume (vph)	1045	295	15
Lane Group Flow (vph)	1133	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.36	0.09	0.12
Control Delay	1.7	0.5	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.7	0.5	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	m38.1	m1.1	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3158	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	160	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.38	0.09	0.10

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1045	20	0	295	15	0
Future Volume (vph)	1045	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3409			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3409			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1112	21	0	314	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1132	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2568			2719	42	
v/s Ratio Prot	c0.33			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.44			0.12	0.38	
Uniform Delay, d1	2.7			2.0	27.8	
Progression Factor	1.01			0.34	1.00	
Incremental Delay, d2	0.0			0.1	5.7	
Delay (s)	2.8			0.7	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.8			0.7	33.4	
Approach LOS	A			A	C	

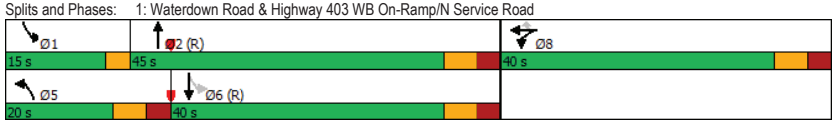
Intersection Summary			
HCM 2000 Control Delay	2.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	60	105	65	310	440	235	735
Future Volume (vph)	60	105	65	310	440	235	735
Lane Group Flow (vph)	61	107	66	316	888	240	964
Turn Type	Split	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8			6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	13.0	31.0
Total Split (s)	40.0	40.0	40.0	20.0	45.0	15.0	40.0
Total Split (%)	40.0%	40.0%	40.0%	20.0%	45.0%	15.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.32	0.51	0.26	0.63	0.47	0.47	0.61
Control Delay	42.5	48.0	9.7	45.5	9.8	7.1	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	42.5	48.0	9.7	45.5	9.8	7.1	19.6
Queue Length 50th (m)	11.4	20.6	0.0	22.8	48.2	9.5	66.6
Queue Length 95th (m)	22.9	36.0	9.7	49.8	46.7	20.3	106.2
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	490	542	539	513	1892	537	1569
Starvation Cap Reductn	0	0	0	0	167	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.20	0.12	0.62	0.51	0.45	0.61

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	105	65	310	440	430	235	735	210
Future Volume (vph)	0	0	0	60	105	65	310	440	430	235	735	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2970		1616	2986	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.32	1.00	
Satd. Flow (perm)				1442	1597	1439	2996	2970		541	2986	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	61	107	66	316	449	439	240	750	214
RTOR Reduction (vph)	0	0	0	0	0	57	0	117	0	0	19	0
Lane Group Flow (vph)	0	0	0	61	107	9	316	771	0	240	945	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8				6		
Actuated Green, G (s)				12.3	12.3	12.3	15.8	58.7		62.9	50.9	
Effective Green, g (s)				13.3	13.3	13.3	16.8	59.7		64.9	51.9	
Actuated g/C Ratio				0.13	0.13	0.13	0.17	0.60		0.65	0.52	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				191	212	191	503	1773		490	1549	
v/s Ratio Prot				0.04	c0.07		c0.11	0.26		0.06	c0.32	
v/s Ratio Perm						0.01				0.25		
v/c Ratio				0.32	0.50	0.05	0.63	0.43		0.49	0.61	
Uniform Delay, d1				39.3	40.3	37.8	38.7	11.0		7.2	16.9	
Progression Factor				1.00	1.00	1.00	1.05	1.10		1.00	1.00	
Incremental Delay, d2				1.0	1.9	0.1	2.2	0.7		0.8	1.8	
Delay (s)				40.2	42.2	37.9	42.9	12.8		8.0	18.7	
Level of Service				D	D	D	D	B		A	B	
Approach Delay (s)		0.0			40.5			20.7			16.6	
Approach LOS		A			D			C			B	

Intersection Summary

HCM 2000 Control Delay	20.6	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.60				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	59.0%	ICU Level of Service		B	
Analysis Period (min)	15				

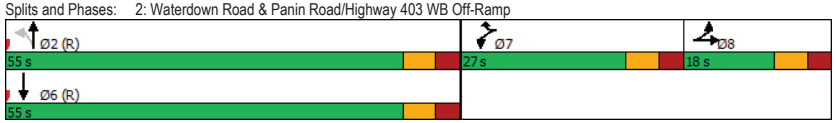
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	265	150	5	1025	795
Future Volume (vph)	0	265	150	5	1025	795
Lane Group Flow (vph)	5	288	163	0	1119	864
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	18.0	27.0	27.0	55.0	55.0	55.0
Total Split (%)	18.0%	27.0%	27.0%	55.0%	55.0%	55.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.05	0.59	0.46		0.50	0.36
Control Delay	43.0	44.3	10.2		13.9	4.1
Queue Delay	0.0	0.0	0.0		0.0	0.1
Total Delay	43.0	44.3	10.2		13.9	4.2
Queue Length 50th (m)	1.0	28.5	0.0		86.2	19.5
Queue Length 95th (m)	4.6	40.3	17.3		48.6	13.4
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	135	670	428		2252	2398
Starvation Cap Reductn	0	0	0		0	533
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.43	0.38		0.50	0.46

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	265	0	150	5	1025	0	0	795	0
Future Volume (vph)	5	0	0	265	0	150	5	1025	0	0	795	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3391			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3228			3438	
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)	5	0	0	288	0	163	5	1114	0	0	864	0
RTOR Reduction (vph)	0	0	0	0	0	138	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	288	0	25	0	1119	0	0	864	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		14.2		14.2		63.2			63.2	
Effective Green, g (s)		2.6		15.2		15.2		64.2			64.2	
Actuated g/C Ratio		0.03		0.15		0.15		0.64			0.64	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		29		485		216		2072			2207	
v/s Ratio Prot		c0.00		c0.09		0.02					0.25	
v/s Ratio Perm								c0.35				
v/c Ratio		0.17		0.59		0.11		0.54			0.39	
Uniform Delay, d1		47.6		39.5		36.6		9.8			8.6	
Progression Factor		1.00		1.00		1.00		1.55			0.50	
Incremental Delay, d2		2.8		2.0		0.2		0.7			0.4	
Delay (s)		50.5		41.5		36.8		15.9			4.7	
Level of Service		D		D		D		B			A	
Approach Delay (s)		50.5			39.8			15.9			4.7	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B		
Analysis Period (min)	15				

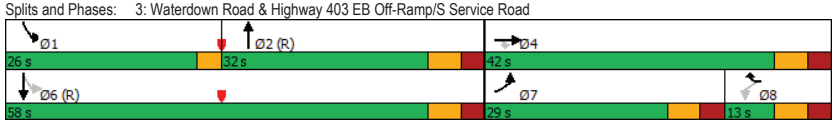
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	275	315	380	25	100	655	560	565	495
Future Volume (vph)	275	315	380	25	100	655	560	565	495
Lane Group Flow (vph)	296	339	409	27	108	704	602	608	532
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	pm+pt	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free	6	
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	6.0	6.0	8.0		6.0	8.0
Minimum Split (s)	15.0	29.0	29.0	13.0	13.0	29.0		9.0	29.0
Total Split (s)	29.0	42.0	42.0	13.0	13.0	32.0		26.0	58.0
Total Split (%)	29.0%	42.0%	42.0%	13.0%	13.0%	32.0%		26.0%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.81	0.52	0.58	0.45	0.44	0.81	0.40	0.94	0.30
Control Delay	55.3	29.3	11.1	69.3	8.6	49.7	1.2	53.4	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	29.3	11.1	69.3	8.6	49.7	1.2	53.4	17.3
Queue Length 50th (m)	56.4	53.3	16.8	5.4	0.0	56.1	0.0	103.9	36.2
Queue Length 95th (m)	#94.0	80.5	46.4	#17.3	7.4	100.9	11.5	#164.2	58.6
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	397	677	727	60	244	885	1524	645	1793
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.50	0.56	0.45	0.44	0.80	0.40	0.94	0.30

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	275	315	380	25	0	100	0	655	560	565	495	0
Future Volume (vph)	275	315	380	25	0	100	0	655	560	565	495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	1766	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	583	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	296	339	409	27	0	108	0	704	602	608	532	0
RTOR Reduction (vph)	0	0	190	0	0	100	0	0	0	0	0	0
Lane Group Flow (vph)	296	339	219	27	0	8	0	704	602	608	532	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	20.2	33.4	33.4	6.2		6.2		24.5	100.0	52.6	52.6	
Effective Green, g (s)	21.2	34.4	34.4	7.2		7.2		25.5	100.0	53.6	53.6	
Actuated g/C Ratio	0.21	0.34	0.34	0.07		0.07		0.26	1.00	0.54	0.54	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	366	647	518	60		102		868	1524	621	1791	
v/s Ratio Prot	c0.17	0.18				0.01		c0.21		c0.26	0.16	
v/s Ratio Perm			0.15	0.03					c0.40	0.27		
v/c Ratio	0.81	0.52	0.42	0.45		0.08		0.81	0.40	0.98	0.30	
Uniform Delay, d1	37.5	26.2	25.2	44.5		43.3		35.0	0.0	17.4	12.8	
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.24	1.00	1.93	1.27	
Incremental Delay, d2	12.4	0.8	0.6	5.3		0.3		6.2	0.6	29.5	0.4	
Delay (s)	49.8	27.0	25.7	49.8		43.6		49.4	0.6	63.0	16.7	
Level of Service	D	C	C	D		D		D	A	E	B	
Approach Delay (s)		33.0			44.9			26.9			41.4	
Approach LOS		C			D			C			D	

Intersection Summary

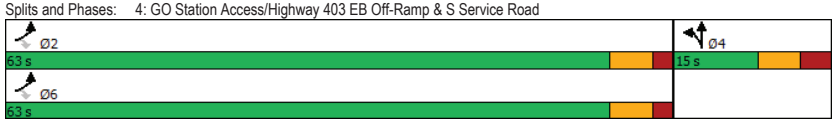
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	850	160	25		
Future Volume (vph)	850	160	25		
Lane Group Flow (vph)	895	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	63.0	63.0
Total Split (%)			19.2%	81%	81%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	Min	Min
v/c Ratio	0.77	0.12	0.15		
Control Delay	11.8	0.6	38.6		
Queue Delay	0.0	0.0	0.0		
Total Delay	11.8	0.6	38.6		
Queue Length 50th (m)	84.0	0.0	6.6		
Queue Length 95th (m)	#215.2	3.5	15.8		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1167	1410	254		
Starvation Cap Reductn	0	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.77	0.12	0.15		

Intersection Summary
Cycle Length: 78
Actuated Cycle Length: 73.1
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	850	160	10	25	0	0
Future Volume (vph)	850	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	895	168	11	26	0	0
RTOR Reduction (vph)	0	35	0	0	0	0
Lane Group Flow (vph)	895	133	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	59.2	59.2		3.8		
Effective Green, g (s)	60.2	60.2		4.8		
Actuated g/C Ratio	0.79	0.79		0.06		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1063	1264		115		
v/s Ratio Prot	c0.67			c0.02		
v/s Ratio Perm		0.08				
v/c Ratio	0.84	0.11		0.32		
Uniform Delay, d1	4.9	1.8		34.0		
Progression Factor	1.00	1.00		1.00		
Incremental Delay, d2	6.2	0.0		1.6		
Delay (s)	11.1	1.8		35.7		
Level of Service	B	A		D		
Approach Delay (s)	9.6			35.7	0.0	
Approach LOS	A			D	A	

Intersection Summary				
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	62.9%	ICU Level of Service	B	
Analysis Period (min)	15			

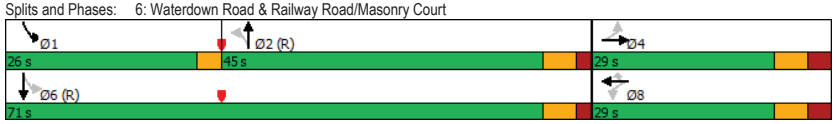
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	0	25	0	190	5	1015	355	535
Future Volume (vph)	10	0	25	0	190	5	1015	355	535
Lane Group Flow (vph)	0	22	0	28	216	6	1278	403	619
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	45.0	45.0	26.0	71.0
Total Split (%)	29.0%	29.0%	29.0%	29.0%	29.0%	45.0%	45.0%	26.0%	71.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.13		0.21	0.62	0.02	0.72	0.75	0.23
Control Delay		1.7		43.8	13.9	16.0	22.6	33.9	3.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		1.7		43.8	13.9	16.0	22.6	33.9	3.1
Queue Length 50th (m)		0.0		5.4	0.0	0.5	94.4	55.8	14.5
Queue Length 95th (m)		0.0		13.0	19.2	3.3	#169.0	86.1	17.7
Internal Link Dist (m)		95.0		120.3			324.2		353.3
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		282		295	510	336	1786	572	2651
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.08		0.09	0.42	0.02	0.72	0.70	0.23

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	25	0	190	5	1015	110	355	535	10
Future Volume (vph)	10	0	10	25	0	190	5	1015	110	355	535	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184			1641	1495	1454	3380		1728	3374	
Flt Permitted		0.83			0.74	1.00	0.42	1.00		0.12	1.00	
Satd. Flow (perm)		1009			1283	1495	639	3380		213	3374	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	28	0	216	6	1153	125	403	608	11
RTOR Reduction (vph)	0	20	0	0	0	194	0	7	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	28	22	6	1271	0	403	618	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		9.4			9.4	9.4	51.7	51.7		77.6	77.6	
Effective Green, g (s)		10.4			10.4	10.4	52.7	52.7		78.6	78.6	
Actuated g/C Ratio		0.10			0.10	0.10	0.53	0.53		0.79	0.79	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		104			133	155	336	1781		529	2651	
v/s Ratio Prot								c0.38		c0.18	0.18	
v/s Ratio Perm		0.00			c0.02	0.02	0.01			0.42		
v/c Ratio		0.02			0.21	0.14	0.02	0.71		0.76	0.23	
Uniform Delay, d1		40.2			41.0	40.8	11.3	17.9		21.9	2.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.45	0.99	
Incremental Delay, d2		0.1			0.8	0.4	0.1	2.5		6.0	0.2	
Delay (s)		40.3			41.8	41.2	11.4	20.4		37.8	3.0	
Level of Service		D			D	D	B	C		D	A	
Approach Delay (s)		40.3			41.3			20.4			16.7	
Approach LOS		D			D			C			B	

Intersection Summary

HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	420	45	15	135	0	80	0	20	0	0	0
Future Volume (Veh/h)	0	420	45	15	135	0	80	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	0	538	58	19	173	0	103	0	26	0	0	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)		144										
pX, platoon unblocked				0.94			0.94	0.94	0.94	0.94	0.94	
vC, conflicting volume	173			596			778	778	567	804	807	173
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	173			543			736	736	512	763	767	173
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			98			66	100	95	100	100	100
cM capacity (veh/h)	1416			979			307	323	534	286	310	855

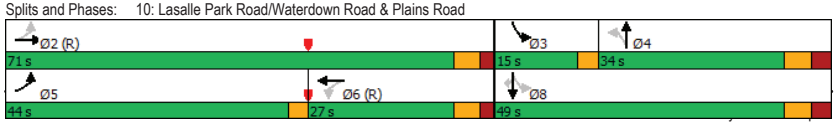
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	596	192	129	0
Volume Left	0	19	103	0
Volume Right	58	0	26	0
cSH	1416	979	336	1700
Volume to Capacity	0.00	0.02	0.38	0.00
Queue Length 95th (m)	0.0	0.5	14.0	0.0
Control Delay (s)	0.0	1.0	22.3	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	1.0	22.3	0.0
Approach LOS			C	A

Intersection Summary					
Average Delay			3.3		
Intersection Capacity Utilization			37.2%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	630	805	70	315	80	265	230	155	185
Future Volume (vph)	630	805	70	315	80	265	230	155	185
Lane Group Flow (vph)	670	1000	74	585	85	341	245	165	197
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	44.0	71.0	27.0	27.0	34.0	34.0	15.0	49.0	49.0
Total Split (%)	36.7%	59.2%	22.5%	22.5%	28.3%	28.3%	12.5%	40.8%	40.8%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.98	0.52	0.84	0.87	0.33	0.86	0.90	0.26	0.31
Control Delay	59.9	17.3	108.0	51.4	42.8	65.4	63.4	29.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	17.3	108.0	51.4	42.8	65.4	63.4	29.1	5.0
Queue Length 50th (m)	~158.4	77.2	17.8	57.9	17.5	78.4	43.0	28.7	0.0
Queue Length 95th (m)	#233.4	96.0	#46.9	#86.6	33.1	#124.3	#84.0	46.4	15.9
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	684	1922	92	693	275	424	273	648	644
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.52	0.80	0.84	0.31	0.80	0.90	0.25	0.31

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis Future Background 2026 - With Improvements
10: Lasalle Park Road/Waterdown Road & Plains Road AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	630	805	135	70	315	235	80	265	55	230	155	185
Future Volume (vph)	630	805	135	70	315	235	80	265	55	230	155	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.94		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1677	3407		1666	3170		1718	1794		1614	1810	1446
Flt Permitted	0.17	1.00		0.29	1.00		0.65	1.00		0.20	1.00	1.00
Satd. Flow (perm)	306	3407		503	3170		1181	1794		341	1810	1446
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)	670	856	144	74	335	250	85	282	59	245	165	197
RTOR Reduction (vph)	0	11	0	0	113	0	0	6	0	0	0	129
Lane Group Flow (vph)	670	989	0	74	472	0	85	335	0	245	165	68
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	66.3	66.3		20.1	20.1		25.1	25.1		40.7	40.7	40.7
Effective Green, g (s)	67.3	67.3		21.1	21.1		26.1	26.1		41.7	41.7	41.7
Actuated g/C Ratio	0.56	0.56		0.18	0.18		0.22	0.22		0.35	0.35	0.35
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	676	1910		88	557		256	390		262	628	502
v/s Ratio Prot	c0.36	0.29			c0.15			c0.19		c0.11	0.09	
v/s Ratio Perm	0.19			0.15			0.07			0.22		0.05
v/c Ratio	0.99	0.52		0.84	0.85		0.33	0.86		0.94	0.26	0.14
Uniform Delay, d1	30.9	16.3		47.8	47.9		39.6	45.2		32.4	28.1	26.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	32.2	1.0		59.2	14.8		0.8	16.8		38.1	0.2	0.1
Delay (s)	63.1	17.3		107.0	62.7		40.4	62.0		70.5	28.3	26.9
Level of Service	E	B		F	E		D	E		E	C	C
Approach Delay (s)		35.7			67.7			57.7			44.9	
Approach LOS		D			E			E			D	

Intersection Summary				
HCM 2000 Control Delay	46.4	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	99.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Queues
11: Plains Road & Cooke Boulevard Future Background 2026 - With Improvements
AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	90	1015	620	40
Future Volume (vph)	90	1015	620	40
Lane Group Flow (vph)	100	1128	756	105
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.17	0.42	0.32	0.50
Control Delay	2.9	4.4	7.0	26.3
Queue Delay	0.0	0.3	0.0	0.0
Total Delay	2.9	4.7	7.0	26.3
Queue Length 50th (m)	2.8	31.4	28.4	8.8
Queue Length 95th (m)	7.8	54.7	48.5	m20.4
Internal Link Dist (m)		135.9	131.3	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	628	2665	2375	410
Starvation Cap Reductn	0	859	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.62	0.32	0.26

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Plains Road & Cooke Boulevard



HCM Signalized Intersection Capacity Analysis Future Background 2026 - With Improvements
11: Plains Road & Cooke Boulevard AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	90	1015	620	60	40	55
Future Volume (vph)	90	1015	620	60	40	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1631	3282	3242		1405	
Flt Permitted	0.34	1.00	1.00		0.98	
Satd. Flow (perm)	587	3282	3242		1405	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1128	689	67	44	61
RTOR Reduction (vph)	0	0	4	0	55	0
Lane Group Flow (vph)	100	1128	752	0	50	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	77.6	77.6	68.9		8.4	
Effective Green, g (s)	78.6	78.6	69.9		9.4	
Actuated g/C Ratio	0.79	0.79	0.70		0.09	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	531	2579	2266		132	
v/s Ratio Prot	0.01	c0.34	0.23			
v/s Ratio Perm	0.14				c0.04	
v/c Ratio	0.19	0.44	0.33		0.38	
Uniform Delay, d1	2.6	3.5	5.9		42.5	
Progression Factor	1.00	1.00	1.00		0.92	
Incremental Delay, d2	0.2	0.5	0.4		1.7	
Delay (s)	2.7	4.0	6.3		41.1	
Level of Service	A	A	A		D	
Approach Delay (s)		3.9	6.3		41.1	
Approach LOS		A	A		D	

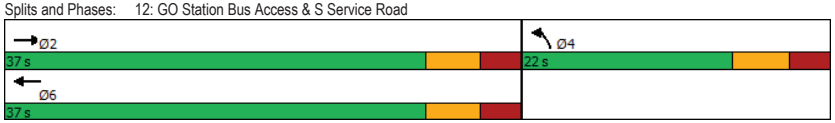
Intersection Summary				
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
12: GO Station Bus Access & S Service Road Future Background 2026 - With Improvements
AM Peak Hour

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1425	110	15
Future Volume (vph)	1425	110	15
Lane Group Flow (vph)	1565	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	37.0	37.0	22.0
Total Split (%)	62.7%	62.7%	37.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Min	Min	None
v/c Ratio	0.48	0.04	0.09
Control Delay	2.6	1.5	21.3
Queue Delay	0.0	0.0	0.0
Total Delay	2.6	1.5	21.3
Queue Length 50th (m)	0.0	0.0	1.0
Queue Length 95th (m)	75.0	4.6	7.2
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3133	3261	325
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.50	0.04	0.05

Intersection Summary
Cycle Length: 59
Actuated Cycle Length: 46.4
Natural Cycle: 50
Control Type: Semi Act-Uncoord

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1425	15	0	110	15	0
Future Volume (vph)	1425	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3471			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3471			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1549	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1564	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	36.8			36.8	1.3	
Effective Green, g (s)	37.8			37.8	2.3	
Actuated g/C Ratio	0.73			0.73	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2518			2619	39	
v/s Ratio Prot	c0.45			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.62			0.05	0.41	
Uniform Delay, d1	3.6			2.0	24.2	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.5			0.0	6.9	
Delay (s)	4.1			2.0	31.1	
Level of Service	A			A	C	
Approach Delay (s)	4.1			2.0	31.1	
Approach LOS	A			A	C	

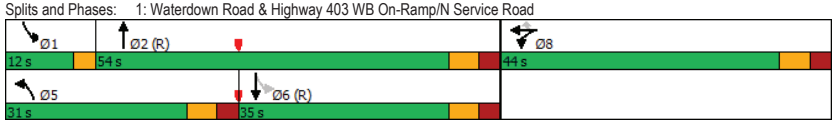
Intersection Summary			
HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	52.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	255	500	220	560	825	115	550
Future Volume (vph)	255	500	220	560	825	115	550
Lane Group Flow (vph)	268	526	232	589	1063	121	737
Turn Type	Split	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8			6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	44.0	44.0	44.0	31.0	54.0	12.0	35.0
Total Split (%)	40.0%	40.0%	40.0%	28.2%	49.1%	10.9%	31.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.51	0.90	0.37	0.88	0.74	0.44	0.82
Control Delay	33.3	55.0	5.2	50.0	28.5	18.5	44.7
Queue Delay	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Total Delay	33.3	55.0	5.2	50.0	29.1	18.5	44.7
Queue Length 50th (m)	47.2	109.2	0.0	58.8	118.1	11.6	81.5
Queue Length 95th (m)	72.9	#169.0	16.8	#93.7	125.3	20.6	#116.6
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	558	619	644	688	1437	284	897
Starvation Cap Reductn	0	0	0	0	115	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.85	0.36	0.86	0.80	0.43	0.82

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	500	220	560	825	185	115	550	150
Future Volume (vph)	0	0	0	255	500	220	560	825	185	115	550	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3084		1601	3038	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.25	1.00	
Satd. Flow (perm)				1616	1792	1426	3022	3084		429	3038	
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	0	268	526	232	589	868	195	121	579	158
RTOR Reduction (vph)	0	0	0	0	0	156	0	17	0	0	22	0
Lane Group Flow (vph)	0	0	0	268	526	76	589	1046	0	121	715	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8				6		
Actuated Green, G (s)				34.9	34.9	34.9	23.4	49.7		39.1	30.7	
Effective Green, g (s)				35.9	35.9	35.9	24.4	50.7		41.1	31.7	
Actuated g/C Ratio				0.33	0.33	0.33	0.22	0.46		0.37	0.29	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				527	584	465	670	1421		260	875	
v/s Ratio Prot				0.17	c0.29		c0.19	0.34		0.04	c0.24	
v/s Ratio Perm						0.05				0.13		
v/c Ratio				0.51	0.90	0.16	0.88	0.74		0.47	0.82	
Uniform Delay, d1				29.9	35.3	26.4	41.4	24.2		23.4	36.5	
Progression Factor				1.00	1.00	1.00	0.91	1.05		1.00	1.00	
Incremental Delay, d2				0.8	17.0	0.2	9.8	2.6		1.3	8.3	
Delay (s)				30.7	52.4	26.5	47.5	28.1		24.7	44.8	
Level of Service				C	D	C	D	C		C	D	
Approach Delay (s)		0.0			40.9			35.0			42.0	
Approach LOS		A			D			C			D	

Intersection Summary

HCM 2000 Control Delay	38.4	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	77.3%	ICU Level of Service		D	
Analysis Period (min)	15				

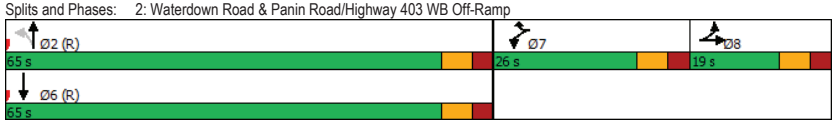
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	255	325	5	1245	805
Future Volume (vph)	0	255	325	5	1245	805
Lane Group Flow (vph)	6	290	369	0	1421	915
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	19.0	26.0	26.0	65.0	65.0	65.0
Total Split (%)	17.3%	23.6%	23.6%	59.1%	59.1%	59.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.02	0.54	0.84		0.62	0.37
Control Delay	0.2	44.9	35.9		20.2	12.8
Queue Delay	0.0	0.0	0.2		0.6	0.4
Total Delay	0.2	44.9	36.2		20.8	13.2
Queue Length 50th (m)	0.0	30.6	34.4		140.6	74.7
Queue Length 95th (m)	0.0	43.5	#78.9		85.3	46.1
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	299	610	468		2288	2452
Starvation Cap Reductn	0	0	0		448	963
Spillback Cap Reductn	0	0	5		87	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.02	0.48	0.80		0.77	0.61

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 94 (85%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	255	0	325	5	1245	0	0	805	0
Future Volume (vph)	0	0	5	255	0	325	5	1245	0	0	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3302			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	290	0	369	6	1415	0	0	915	0
RTOR Reduction (vph)	0	6	0	0	0	177	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	290	0	192	0	1421	0	0	915	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		17.8		17.8		69.6			69.6	
Effective Green, g (s)		2.6		18.8		18.8		70.6			70.6	
Actuated g/C Ratio		0.02		0.17		0.17		0.64			0.64	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		38		540		262		2119			2271	
v/s Ratio Prot		c0.00		0.09		c0.13					0.26	
v/s Ratio Perm								c0.43				
v/c Ratio		0.00		0.54		0.73		0.67			0.40	
Uniform Delay, d1		52.4		41.6		43.2		12.4			9.5	
Progression Factor		1.00		1.00		1.00		1.77			1.51	
Incremental Delay, d2		0.0		1.0		10.2		1.1			0.4	
Delay (s)		52.5		42.7		53.4		23.1			14.8	
Level of Service		D		D		D		C			B	
Approach Delay (s)		52.5			48.7			23.1			14.8	
Approach LOS		D			D			C			B	

Intersection Summary

HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.66				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D		
Analysis Period (min)	15				

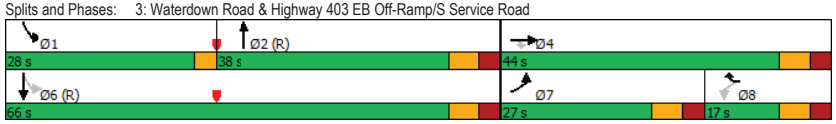
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	235	95	315	50	260	755	370	370	695
Future Volume (vph)	235	95	315	50	260	755	370	370	695
Lane Group Flow (vph)	264	107	354	56	292	848	416	416	781
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	pm+pt	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free	6	
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	6.0	6.0	8.0		6.0	8.0
Minimum Split (s)	15.0	29.0	29.0	13.0	13.0	29.0		9.0	29.0
Total Split (s)	27.0	44.0	44.0	17.0	17.0	38.0		28.0	66.0
Total Split (%)	24.5%	40.0%	40.0%	15.5%	15.5%	34.5%		25.5%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.85	0.18	0.58	0.53	0.73	0.75	0.27	0.88	0.39
Control Delay	67.7	26.6	19.9	65.9	16.8	39.4	0.4	49.4	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.7	26.6	19.9	65.9	16.8	39.4	0.4	49.4	21.6
Queue Length 50th (m)	57.6	16.7	33.9	12.2	0.0	103.2	0.0	92.7	84.0
Queue Length 95th (m)	#97.9	29.7	63.1	25.6	26.0	123.4	0.0	#113.4	72.4
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	326	625	631	117	414	1135	1568	492	1994
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.17	0.56	0.48	0.71	0.75	0.27	0.85	0.39

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	95	315	50	0	260	0	755	370	370	695	0
Future Volume (vph)	235	95	315	50	0	260	0	755	370	370	695	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	1678	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.15	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	263	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	264	107	354	56	0	292	0	848	416	416	781	0
RTOR Reduction (vph)	0	0	109	0	0	266	0	0	0	0	0	0
Lane Group Flow (vph)	264	107	245	56	0	26	0	848	416	416	781	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	19.1	35.0	35.0	8.9		8.9		34.3	110.0	61.0	61.0	
Effective Green, g (s)	20.1	36.0	36.0	9.9		9.9		35.3	110.0	62.0	62.0	
Actuated g/C Ratio	0.18	0.33	0.33	0.09		0.09		0.32	1.00	0.56	0.56	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	312	592	497	105		136		1135	1568	465	1994	
v/s Ratio Prot	c0.15	0.06				0.02		c0.24		c0.20	0.22	
v/s Ratio Perm			c0.16	0.05					0.27	0.30		
v/c Ratio	0.85	0.18	0.49	0.53		0.19		0.75	0.27	0.89	0.39	
Uniform Delay, d1	43.5	26.5	29.7	47.8		46.4		33.4	0.0	26.7	13.4	
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.02	1.00	1.33	1.51	
Incremental Delay, d2	18.6	0.1	0.8	5.1		0.7		3.9	0.4	18.3	0.5	
Delay (s)	62.1	26.6	30.5	53.0		47.0		37.9	0.4	53.8	20.8	
Level of Service	E	C	C	D		D		D	A	D	C	
Approach Delay (s)		41.4			48.0			25.5			32.3	
Approach LOS		D			D			C			C	

Intersection Summary

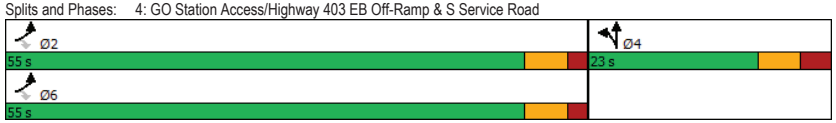
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	695	15	30		
Future Volume (vph)	695	15	30		
Lane Group Flow (vph)	891	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			23.0	55.0	55.0
Total Split (%)			29.5%	71%	71%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	Min	Min
v/c Ratio	0.89	0.02	0.71		
Control Delay	24.1	2.5	36.4		
Queue Delay	0.0	0.0	0.0		
Total Delay	24.1	2.5	36.4		
Queue Length 50th (m)	92.2	0.0	36.2		
Queue Length 95th (m)	107.4	1.7	59.9		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1319	1248	492		
Starvation Cap Reductn	2	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.68	0.02	0.61		

Intersection Summary
Cycle Length: 78
Actuated Cycle Length: 65.4
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	695	15	205	30	0	0
Future Volume (vph)	695	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	891	19	263	38	0	0
RTOR Reduction (vph)	0	8	0	0	0	0
Lane Group Flow (vph)	891	11	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	37.6	37.6		14.2		
Effective Green, g (s)	38.6	38.6		15.2		
Actuated g/C Ratio	0.60	0.60		0.23		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1009	951		426		
v/s Ratio Prot	c0.53			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.88	0.01		0.71		
Uniform Delay, d1	11.2	5.3		22.8		
Progression Factor	1.00	1.00		1.00		
Incremental Delay, d2	9.3	0.0		5.3		
Delay (s)	20.4	5.3		28.0		
Level of Service	C	A		C		
Approach Delay (s)	20.1			28.0	0.0	
Approach LOS	C			C	A	

Intersection Summary				
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	64.8	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	60.6%	ICU Level of Service	B	
Analysis Period (min)	15			

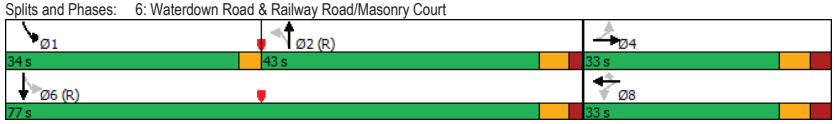
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	5	100	5	435	5	680	165	885
Future Volume (vph)	10	5	100	5	435	5	680	165	885
Lane Group Flow (vph)	0	25	0	133	551	6	905	209	1133
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	33.0	33.0	33.0	33.0	33.0	43.0	43.0	34.0	77.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	30.0%	39.1%	39.1%	30.9%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.14		0.62	0.79	0.03	0.44	0.43	0.45
Control Delay		31.1		53.7	13.7	13.8	14.0	11.5	13.9
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		31.1		53.7	13.7	13.8	14.0	11.5	13.9
Queue Length 50th (m)		3.7		28.2	6.4	0.5	52.7	21.8	90.6
Queue Length 95th (m)		9.2		38.4	16.7	2.8	78.0	35.2	91.6
Internal Link Dist (m)		95.0		120.3			324.2		353.3
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		253		317	783	216	2065	707	2545
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.10		0.42	0.70	0.03	0.44	0.30	0.45

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 72 (65%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	100	5	435	5	680	35	165	885	10
Future Volume (vph)	10	5	5	100	5	435	5	680	35	165	885	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196			1722	1599	1353	3409		1694	3473	
Flt Permitted		0.83			0.72	1.00	0.25	1.00		0.26	1.00	
Satd. Flow (perm)		1016			1295	1599	357	3409		458	3473	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	127	6	551	6	861	44	209	1120	13
RTOR Reduction (vph)	0	5	0	0	0	431	0	2	0	0	1	0
Lane Group Flow (vph)	0	20	0	0	133	120	6	903	0	209	1132	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		17.4			17.4	17.4	65.5	65.5		79.6	79.6	
Effective Green, g (s)		18.4			18.4	18.4	66.5	66.5		80.6	80.6	
Actuated g/C Ratio		0.17			0.17	0.17	0.60	0.60		0.73	0.73	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		169			216	267	215	2060		471	2544	
v/s Ratio Prot								0.26		0.05	c0.33	
v/s Ratio Perm		0.02			c0.10	0.07	0.02			0.28		
v/c Ratio		0.12			0.62	0.45	0.03	0.44		0.44	0.45	
Uniform Delay, d1		38.9			42.5	41.2	8.7	11.7		5.6	5.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.99	2.02	
Incremental Delay, d2		0.3			5.1	1.2	0.2	0.7		0.6	0.5	
Delay (s)		39.2			47.7	42.4	9.0	12.4		11.9	12.3	
Level of Service		D			D	D	A	B		B	B	
Approach Delay (s)		39.2			43.4			12.4			12.2	
Approach LOS		D			D			B			B	

Intersection Summary

HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	67.7%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	150	55	20	465	0	75	0	20	0	0	0
Future Volume (Veh/h)	0	150	55	20	465	0	75	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	183	67	24	567	0	91	0	24	0	0	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)		144										
pX, platoon unblocked				0.99			0.99	0.99	0.99	0.99	0.99	
vC, conflicting volume	567			250			832	832	216	856	865	567
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	567			233			823	823	199	847	857	567
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			98			68	100	97	100	100	100
cM capacity (veh/h)	1015			1328			281	301	804	268	288	527

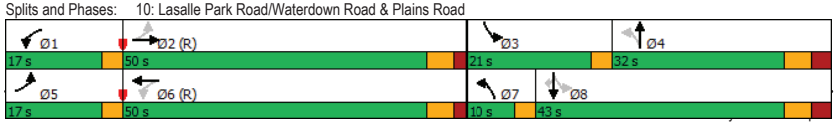
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	250	591	115	0
Volume Left	0	24	91	0
Volume Right	67	0	24	0
cSH	1015	1328	326	1700
Volume to Capacity	0.00	0.02	0.35	0.00
Queue Length 95th (m)	0.0	0.4	12.4	0.0
Control Delay (s)	0.0	0.5	22.0	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	0.5	22.0	0.0
Approach LOS			C	A

Intersection Summary				
Average Delay			3.0	
Intersection Capacity Utilization			52.2%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	225	525	70	995	115	200	360	260	370
Future Volume (vph)	225	525	70	995	115	200	360	260	370
Lane Group Flow (vph)	232	613	72	1330	119	268	371	268	381
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6	7	4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	1	6	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	9.0	27.0	9.0	34.0	9.0	34.0	34.0
Total Split (s)	17.0	50.0	17.0	50.0	10.0	32.0	21.0	43.0	43.0
Total Split (%)	14.2%	41.7%	14.2%	41.7%	8.3%	26.7%	17.5%	35.8%	35.8%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	2.0	5.0	2.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.87	0.37	0.17	0.96	0.34	0.79	0.96	0.51	0.60
Control Delay	59.4	22.1	13.8	52.0	26.9	60.6	66.5	39.5	11.4
Queue Delay	0.0	0.0	0.0	42.4	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	22.1	13.8	94.4	26.9	60.6	66.5	39.5	11.4
Queue Length 50th (m)	40.4	51.1	7.8	~182.7	18.7	60.5	69.1	55.2	13.0
Queue Length 95th (m)	#90.1	71.8	15.8	#227.7	30.9	89.4	#114.3	79.8	42.8
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	274	1636	504	1381	345	395	387	585	674
Starvation Cap Reductn	0	0	0	179	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.37	0.14	1.11	0.34	0.68	0.96	0.46	0.57

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	525	70	70	995	295	115	200	60	360	260	370
Future Volume (vph)	225	525	70	70	995	295	115	200	60	360	260	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		2.0	5.0		2.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1616	3462		1639	3380		1694	1785		1709	1900	1491
Flt Permitted	0.08	1.00		0.41	1.00		0.59	1.00		0.27	1.00	1.00
Satd. Flow (perm)	136	3462		705	3380		1059	1785		493	1900	1491
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	232	541	72	72	1026	304	119	206	62	371	268	381
RTOR Reduction (vph)	0	7	0	0	22	0	0	10	0	0	0	225
Lane Group Flow (vph)	232	606	0	72	1308	0	119	258	0	371	268	156
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	64.7	54.9		54.0	47.2		28.3	21.3		42.3	32.3	32.3
Effective Green, g (s)	65.7	55.9		56.0	48.2		30.3	22.3		43.3	33.3	33.3
Actuated g/C Ratio	0.55	0.47		0.47	0.40		0.25	0.19		0.36	0.28	0.28
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	265	1612		389	1357		309	331		370	527	413
v/s Ratio Prot	c0.11	0.17		0.01	c0.39		0.03	c0.14		c0.16	0.14	
v/s Ratio Perm	0.37			0.07			0.07			0.20		0.10
v/c Ratio	0.88	0.38		0.19	0.96		0.39	0.78		1.00	0.51	0.38
Uniform Delay, d1	35.3	20.8		17.9	35.0		36.1	46.5		33.8	36.5	35.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	25.9	0.7		0.2	17.2		0.8	11.3		47.5	0.8	0.6
Delay (s)	61.1	21.4		18.1	52.2		36.9	57.8		81.2	37.2	35.6
Level of Service	E	C		B	D		D	E		F	D	D
Approach Delay (s)		32.3			50.5			51.4			52.6	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	47.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	100.8%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	55	900	1360	75
Future Volume (vph)	55	900	1360	75
Lane Group Flow (vph)	57	928	1448	149
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.20	0.36	0.63	0.61
Control Delay	4.5	5.1	12.0	39.8
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	4.5	5.6	12.0	39.8
Queue Length 50th (m)	2.1	29.8	87.3	24.0
Queue Length 95th (m)	6.1	49.5	136.0	42.2
Internal Link Dist (m)		135.9	114.1	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	371	2570	2295	412
Starvation Cap Reductn	0	1036	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.15	0.60	0.63	0.36

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	900	1360	45	75	70
Future Volume (vph)	55	900	1360	45	75	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.93	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1687	3374	3314		1617	
Flt Permitted	0.13	1.00	1.00		0.97	
Satd. Flow (perm)	235	3374	3314		1617	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	928	1402	46	77	72
RTOR Reduction (vph)	0	0	1	0	35	0
Lane Group Flow (vph)	57	928	1447	0	114	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	82.8	82.8	74.5		13.2	
Effective Green, g (s)	83.8	83.8	75.5		14.2	
Actuated g/C Ratio	0.76	0.76	0.69		0.13	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	262	2570	2274		208	
v/s Ratio Prot	0.01	c0.28	c0.44			
v/s Ratio Perm	0.15				c0.07	
v/c Ratio	0.22	0.36	0.64		0.55	
Uniform Delay, d1	5.7	4.3	9.6		44.9	
Progression Factor	1.00	1.00	1.00		0.90	
Incremental Delay, d2	0.4	0.4	1.4		2.9	
Delay (s)	6.2	4.7	11.0		43.2	
Level of Service	A	A	B		D	
Approach Delay (s)		4.8	11.0		43.2	
Approach LOS		A	B		D	

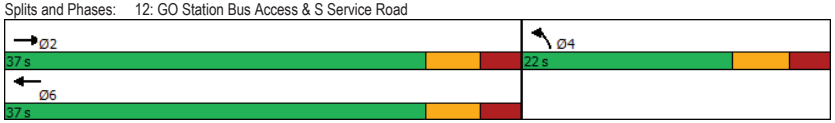
Intersection Summary				
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	635	295	15
Future Volume (vph)	635	295	15
Lane Group Flow (vph)	697	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	37.0	37.0	22.0
Total Split (%)	62.7%	62.7%	37.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Min	Min	None
v/c Ratio	0.22	0.09	0.07
Control Delay	1.9	1.7	14.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.9	1.7	14.9
Queue Length 50th (m)	0.0	0.0	0.6
Queue Length 95th (m)	23.8	10.6	5.8
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3084	3303	429
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.23	0.10	0.04

Intersection Summary
Cycle Length: 59
Actuated Cycle Length: 35.6
Natural Cycle: 50
Control Type: Semi Act-Uncoord

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	635	20	0	295	15	0
Future Volume (vph)	635	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3371			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3371			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	676	21	0	314	16	0
RTOR Reduction (vph)	3	0	0	0	0	0
Lane Group Flow (vph)	694	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	26.2			26.2	1.1	
Effective Green, g (s)	27.2			27.2	2.1	
Actuated g/C Ratio	0.66			0.66	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2220			2377	45	
v/s Ratio Prot	c0.21			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.31			0.13	0.36	
Uniform Delay, d1	3.0			2.6	18.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.1			0.0	4.8	
Delay (s)	3.1			2.7	23.7	
Level of Service	A			A	C	
Approach Delay (s)	3.1			2.7	23.7	
Approach LOS	A			A	C	

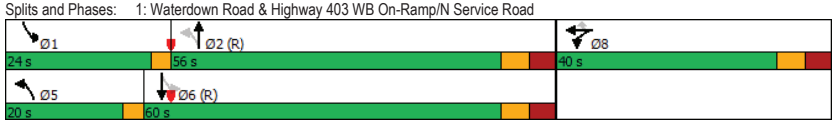
Intersection Summary			
HCM 2000 Control Delay	3.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	41.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	60	105	65	335	505	235	765
Future Volume (vph)	60	105	65	335	505	235	765
Lane Group Flow (vph)	61	107	66	342	954	240	995
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	20.0	56.0	24.0	60.0
Total Split (%)	33.3%	33.3%	33.3%	16.7%	46.7%	20.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.35	0.56	0.25	0.42	0.51	0.47	0.50
Control Delay	52.8	60.3	5.3	7.9	17.0	6.1	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	52.8	60.3	5.3	7.9	17.2	6.1	11.3
Queue Length 50th (m)	14.1	25.4	0.0	10.1	111.2	10.9	56.5
Queue Length 95th (m)	26.9	42.4	5.3	18.7	53.6	22.1	88.2
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	468	1013	1856	556	2003
Starvation Cap Reductn	0	0	0	0	178	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.14	0.34	0.57	0.43	0.50

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	105	65	335	505	430	235	765	210
Future Volume (vph)	0	0	0	60	105	65	335	505	430	235	765	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2980		1616	2988	
Flt Permitted				0.95	1.00	1.00	0.28	1.00		0.24	1.00	
Satd. Flow (perm)				1442	1597	1439	899	2980		413	2988	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	61	107	66	342	515	439	240	781	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	88	0	0	12	0
Lane Group Flow (vph)	0	0	0	61	107	8	342	866	0	240	983	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	78.9	70.2		90.6	78.9	
Effective Green, g (s)				14.4	14.4	14.4	80.9	71.2		91.6	79.9	
Actuated g/C Ratio				0.12	0.12	0.12	0.67	0.59		0.76	0.67	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	775	1768		499	1989	
v/s Ratio Prot				0.04	c0.07		0.04	0.29		c0.07	c0.33	
v/s Ratio Perm						0.01	0.26			0.29		
v/c Ratio				0.35	0.56	0.05	0.44	0.49		0.48	0.49	
Uniform Delay, d1				48.5	49.8	46.7	7.2	14.0		5.5	10.0	
Progression Factor				1.00	1.00	1.00	1.65	1.36		1.00	1.00	
Incremental Delay, d2				1.2	3.7	0.1	0.4	0.9		0.7	0.9	
Delay (s)				49.8	53.5	46.8	12.2	19.9		6.2	10.9	
Level of Service				D	D	D	B	B		A	B	
Approach Delay (s)		0.0			50.7			17.9			10.0	
Approach LOS		A			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.1	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.51				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	62.4%	ICU Level of Service		B	
Analysis Period (min)	15				

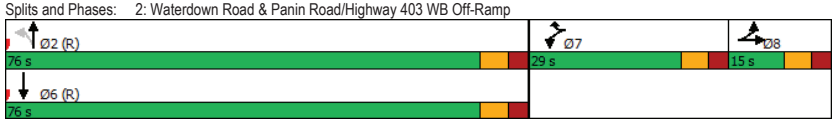
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	285	160	5	1105	825
Future Volume (vph)	0	285	160	5	1105	825
Lane Group Flow (vph)	5	310	174	0	1206	897
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	29.0	29.0	76.0	76.0	76.0
Total Split (%)	12.5%	24.2%	24.2%	63.3%	63.3%	63.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.65	0.49		0.51	0.36
Control Delay	53.4	54.5	12.4		13.0	3.8
Queue Delay	0.0	0.0	0.0		0.3	0.1
Total Delay	53.4	54.5	12.4		13.3	3.9
Queue Length 50th (m)	1.2	37.7	1.5		107.3	16.8
Queue Length 95th (m)	5.5	51.0	21.5		m62.0	31.2
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	611	408		2345	2496
Starvation Cap Reductn	0	0	0		511	470
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.51	0.43		0.66	0.44

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	285	0	160	5	1105	0	0	825	0
Future Volume (vph)	5	0	0	285	0	160	5	1105	0	0	825	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3392			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3229			3438	
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)	5	0	0	310	0	174	5	1201	0	0	897	0
RTOR Reduction (vph)	0	0	0	0	0	142	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	310	0	32	0	1206	0	0	897	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		16.9		16.9		80.5			80.5	
Effective Green, g (s)		2.6		17.9		17.9		81.5			81.5	
Actuated g/C Ratio		0.02		0.15		0.15		0.68			0.68	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		476		212		2193			2334	
v/s Ratio Prot		c0.00		c0.10		0.02					0.26	
v/s Ratio Perm								c0.37				
v/c Ratio		0.21		0.65		0.15		0.55			0.38	
Uniform Delay, d1		57.7		48.1		44.4		9.9			8.4	
Progression Factor		1.00		1.00		1.00		1.44			0.48	
Incremental Delay, d2		4.3		3.2		0.3		0.6			0.4	
Delay (s)		62.0		51.3		44.8		14.8			4.4	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			48.9			14.8			4.4	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.56				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	62.3%	ICU Level of Service		B	
Analysis Period (min)	15				

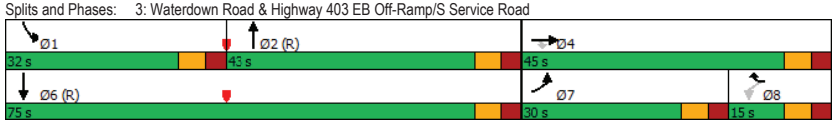
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	300	315	405	25	100	735	595	595	515
Future Volume (vph)	300	315	405	25	100	735	595	595	515
Lane Group Flow (vph)	323	339	435	27	108	790	640	640	554
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free		
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	7.0	7.0	8.0		6.0	8.0
Minimum Split (s)	15.0	21.0	21.0	15.0	15.0	29.0		13.0	29.0
Total Split (s)	30.0	45.0	45.0	15.0	15.0	43.0		32.0	75.0
Total Split (%)	25.0%	37.5%	37.5%	12.5%	12.5%	35.8%		26.7%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.89	0.54	0.61	0.45	0.43	0.76	0.42	0.88	0.29
Control Delay	72.4	36.5	13.4	76.6	9.5	45.0	0.8	58.6	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.4	36.5	13.4	76.6	9.5	45.0	0.8	58.6	13.4
Queue Length 50th (m)	77.3	66.7	22.1	6.8	0.0	61.3	0.0	74.0	34.1
Queue Length 95th (m)	#136.3	100.1	59.6	#17.6	8.0	110.5	0.0	#112.8	39.9
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	365	630	712	62	258	1074	1524	745	1929
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.54	0.61	0.44	0.42	0.74	0.42	0.86	0.29

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	315	405	25	0	100	0	735	595	595	515	0
Future Volume (vph)	300	315	405	25	0	100	0	735	595	595	515	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	3426	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	1131	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	339	435	27	0	108	0	790	640	640	554	0
RTOR Reduction (vph)	0	0	208	0	0	100	0	0	0	0	0	0
Lane Group Flow (vph)	323	339	227	27	0	8	0	790	640	640	554	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	24.3	39.0	39.0	7.7		7.7		35.5	120.0	24.5	67.0	
Effective Green, g (s)	25.3	40.0	40.0	8.7		8.7		36.5	120.0	25.5	68.0	
Actuated g/C Ratio	0.21	0.33	0.33	0.07		0.07		0.30	1.00	0.21	0.57	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	364	627	502	60		103		1035	1524	728	1894	
v/s Ratio Prot	c0.19	0.18				0.01		c0.23		c0.19	0.17	
v/s Ratio Perm			0.15	0.03					c0.42			
v/c Ratio	0.89	0.54	0.45	0.45		0.08		0.76	0.42	0.88	0.29	
Uniform Delay, d1	46.0	32.5	31.4	53.4		51.9		37.8	0.0	45.8	13.5	
Progression Factor	1.00	1.00	1.00	0.99		2.67		1.07	1.00	0.98	0.96	
Incremental Delay, d2	22.0	1.0	0.6	5.3		0.3		3.8	0.6	11.1	0.4	
Delay (s)	67.9	33.5	32.0	58.1		139.0		44.4	0.6	55.9	13.3	
Level of Service	E	C	C	E		F		D	A	E	B	
Approach Delay (s)		43.1			122.8			24.8			36.2	
Approach LOS		D			F			C			D	

Intersection Summary

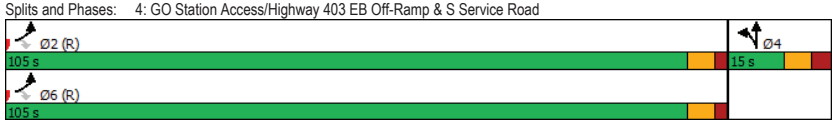
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	915	160	25		
Future Volume (vph)	915	160	25		
Lane Group Flow (vph)	963	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.80	0.12	0.27		
Control Delay	16.5	0.9	57.9		
Queue Delay	0.5	0.0	0.0		
Total Delay	17.0	0.9	57.9		
Queue Length 50th (m)	199.6	3.7	8.8		
Queue Length 95th (m)	#225.6	6.2	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	136		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.83	0.12	0.27		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	915	160	10	25	0	0
Future Volume (vph)	915	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	963	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	963	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.72			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.83	0.11		0.42		
Uniform Delay, d1	4.2	1.3		55.5		
Progression Factor	2.10	2.80		1.00		
Incremental Delay, d2	6.3	0.1		3.2		
Delay (s)	15.1	3.8		58.7		
Level of Service	B	A		E		
Approach Delay (s)	13.4			58.7	0.0	
Approach LOS	B			E	A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

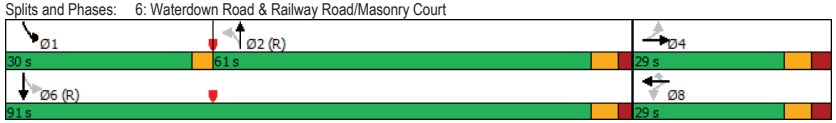
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	0	25	0	190	5	1130	355	580
Future Volume (vph)	10	0	25	0	190	5	1130	355	580
Lane Group Flow (vph)	0	22	0	28	216	6	1409	403	670
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	61.0	61.0	30.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	24.2%	50.8%	50.8%	25.0%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.16		0.25	0.66	0.02	0.74	0.77	0.24
Control Delay		2.4		55.2	16.5	15.6	24.4	43.7	1.9
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		2.4		55.2	16.5	15.6	24.4	43.7	1.9
Queue Length 50th (m)		0.0		6.7	0.0	0.6	128.1	71.4	7.2
Queue Length 95th (m)		0.2		15.4	21.1	3.4	189.4	96.0	17.6
Internal Link Dist (m)		95.0		120.3			324.2		353.3
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		237		245	461	339	1896	547	2768
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.09		0.11	0.47	0.02	0.74	0.74	0.24

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	25	0	190	5	1130	110	355	580	10
Future Volume (vph)	10	0	10	25	0	190	5	1130	110	355	580	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184			1641	1495	1454	3386		1728	3376	
Flt Permitted		0.83			0.74	1.00	0.40	1.00		0.10	1.00	
Satd. Flow (perm)		1007			1283	1495	608	3386		175	3376	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	28	0	216	6	1284	125	403	659	11
RTOR Reduction (vph)	0	20	0	0	0	197	0	5	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	28	19	6	1404	0	403	669	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		9.7			9.7	9.7	66.0	66.0		97.3	97.3	
Effective Green, g (s)		10.7			10.7	10.7	67.0	67.0		98.3	98.3	
Actuated g/C Ratio		0.09			0.09	0.09	0.56	0.56		0.82	0.82	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		89			114	133	339	1890		522	2765	
v/s Ratio Prot								c0.41		c0.19	0.20	
v/s Ratio Perm		0.00			c0.02	0.01	0.01			0.44		
v/c Ratio		0.02			0.25	0.14	0.02	0.74		0.77	0.24	
Uniform Delay, d1		49.9			50.9	50.4	11.8	20.0		29.2	2.4	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.41	0.66	
Incremental Delay, d2		0.1			1.1	0.5	0.1	2.7		6.5	0.2	
Delay (s)		50.0			52.0	50.9	11.9	22.7		47.6	1.8	
Level of Service		D			D	D	B	C		D	A	
Approach Delay (s)		50.0			51.1			22.6			19.0	
Approach LOS		D			D			C			B	

Intersection Summary

HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	420	45	15	135	0	80	0	20	0	0	0
Future Volume (Veh/h)	0	420	45	15	135	0	80	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	0	538	58	19	173	0	103	0	26	0	0	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)		144										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	173			596			778	778	567	804	807	173
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	173			551			742	742	521	770	773	173
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			98			66	100	95	100	100	100
cM capacity (veh/h)	1416			980			306	323	533	286	310	855

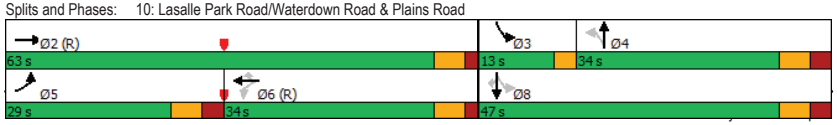
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	596	192	129	0
Volume Left	0	19	103	0
Volume Right	58	0	26	0
cSH	1416	980	335	1700
Volume to Capacity	0.00	0.02	0.38	0.00
Queue Length 95th (m)	0.0	0.5	14.1	0.0
Control Delay (s)	0.0	1.0	22.3	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	1.0	22.3	0.0
Approach LOS			C	A

Intersection Summary				
Average Delay			3.4	
Intersection Capacity Utilization			37.2%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	695	885	75	345	255	90	295	245	170	200
Future Volume (vph)	695	885	75	345	255	90	295	245	170	200
Lane Group Flow (vph)	739	1101	80	367	271	96	378	261	181	213
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	29.0	63.0	34.0	34.0	34.0	34.0	34.0	13.0	47.0	47.0
Total Split (%)	26.4%	57.3%	30.9%	30.9%	30.9%	30.9%	30.9%	11.8%	42.7%	42.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.95	0.62	0.81	0.49	0.50	0.35	0.87	0.86	0.26	0.31
Control Delay	64.0	20.5	89.8	38.9	7.4	38.1	60.1	53.6	24.6	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	20.5	89.8	38.9	7.4	38.1	60.1	53.6	24.6	4.5
Queue Length 50th (m)	~96.8	87.5	16.4	36.6	0.0	17.7	78.8	40.0	27.6	0.0
Queue Length 95th (m)	#135.0	106.7	#41.5	50.3	20.3	33.4	#127.4	#90.8	45.8	15.4
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	782	1811	119	906	592	296	464	302	699	689
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.61	0.67	0.41	0.46	0.32	0.81	0.86	0.26	0.31

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	695	885	150	75	345	255	90	295	60	245	170	200
Future Volume (vph)	695	885	150	75	345	255	90	295	60	245	170	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3255	3407		1668	3438	1488	1719	1796		1614	1810	1446
Flt Permitted	0.95	1.00		0.26	1.00	1.00	0.64	1.00		0.19	1.00	1.00
Satd. Flow (perm)	3255	3407		455	3438	1488	1164	1796		321	1810	1446
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)	739	941	160	80	367	271	96	314	64	261	181	213
RTOR Reduction (vph)	0	13	0	0	0	212	0	7	0	0	0	131
Lane Group Flow (vph)	739	1088	0	80	367	59	96	371	0	261	181	82
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	25.5	55.6		23.1	23.1	23.1	25.2	25.2		41.4	41.4	41.4
Effective Green, g (s)	26.5	56.6		24.1	24.1	24.1	26.2	26.2		42.4	42.4	42.4
Actuated g/C Ratio	0.24	0.51		0.22	0.22	0.22	0.24	0.24		0.39	0.39	0.39
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	784	1753		99	753	326	277	427		290	697	557
v/s Ratio Prot	c0.23	0.32			0.11			c0.21		c0.12	0.10	
v/s Ratio Perm				c0.18		0.04	0.08			0.23		0.06
v/c Ratio	0.94	0.62		0.81	0.49	0.18	0.35	0.87		0.90	0.26	0.15
Uniform Delay, d1	41.0	19.0		40.8	37.5	34.9	34.8	40.3		26.9	23.1	22.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	19.4	1.7		48.9	2.3	1.2	0.8	16.9		28.7	0.2	0.1
Delay (s)	60.4	20.7		89.6	39.8	36.2	35.5	57.1		55.6	23.3	22.1
Level of Service	E	C		F	D	D	D	E		E	C	C
Approach Delay (s)		36.7			44.0			52.8			35.8	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	40.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	88.6%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	90	1115	675	40
Future Volume (vph)	90	1115	675	40
Lane Group Flow (vph)	100	1239	817	105
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.18	0.46	0.34	0.50
Control Delay	2.9	4.7	7.2	28.1
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	2.9	5.1	7.2	28.1
Queue Length 50th (m)	2.8	36.3	31.5	8.5
Queue Length 95th (m)	7.8	63.1	53.6	24.0
Internal Link Dist (m)		135.9	125.3	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	599	2665	2376	410
Starvation Cap Reductn	0	811	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.67	0.34	0.26

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



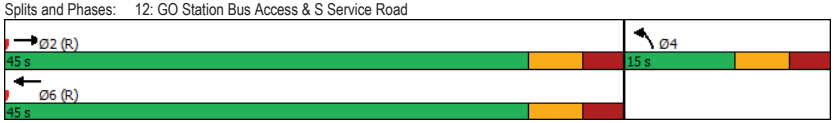
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	90	1115	675	60	40	55
Future Volume (vph)	90	1115	675	60	40	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1631	3282	3244		1405	
Flt Permitted	0.32	1.00	1.00		0.98	
Satd. Flow (perm)	545	3282	3244		1405	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1239	750	67	44	61
RTOR Reduction (vph)	0	0	4	0	55	0
Lane Group Flow (vph)	100	1239	813	0	50	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	77.6	77.6	68.9		8.4	
Effective Green, g (s)	78.6	78.6	69.9		9.4	
Actuated g/C Ratio	0.79	0.79	0.70		0.09	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	501	2579	2267		132	
v/s Ratio Prot	0.01	c0.38	0.25			
v/s Ratio Perm	0.14				c0.04	
v/c Ratio	0.20	0.48	0.36		0.38	
Uniform Delay, d1	2.6	3.7	6.0		42.5	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.6	0.4		1.8	
Delay (s)	2.8	4.3	6.5		44.4	
Level of Service	A	A	A		D	
Approach Delay (s)		4.2	6.5		44.4	
Approach LOS		A	A		D	

Intersection Summary				
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1490	110	15
Future Volume (vph)	1490	110	15
Lane Group Flow (vph)	1636	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.51	0.04	0.12
Control Delay	3.1	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	3.2	1.2	24.5
Queue Length 50th (m)	1.6	0.0	1.6
Queue Length 95th (m)	113.0	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3231	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	233	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.55	0.04	0.12

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

Splits and Phases: 12: GO Station Bus Access & S Service Road





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1490	15	0	110	15	0
Future Volume (vph)	1490	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3472			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3472			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1620	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1635	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2627			2731	38	
v/s Ratio Prot	c0.47			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.62			0.04	0.42	
Uniform Delay, d1	3.4			1.8	28.0	
Progression Factor	1.39			0.90	1.00	
Incremental Delay, d2	0.9			0.0	7.4	
Delay (s)	5.5			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	5.5			1.7	35.3	
Approach LOS	A			A	D	

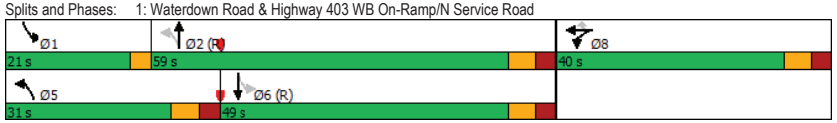
Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	255	500	220	600	835	115	620
Future Volume (vph)	255	500	220	600	835	115	620
Lane Group Flow (vph)	268	526	232	632	1074	121	811
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	31.0	59.0	21.0	49.0
Total Split (%)	33.3%	33.3%	33.3%	25.8%	49.2%	17.5%	40.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.50	0.88	0.37	0.86	0.75	0.45	0.78
Control Delay	36.9	55.5	5.9	41.2	31.9	17.7	40.5
Queue Delay	0.0	0.0	0.0	0.0	1.4	0.0	0.0
Total Delay	36.9	55.5	5.9	41.2	33.3	17.7	40.5
Queue Length 50th (m)	52.5	121.6	0.0	53.1	116.3	12.4	92.5
Queue Length 95th (m)	86.5	#209.5	19.2	85.0	94.8	18.1	112.9
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	541	600	632	812	1446	385	1109
Starvation Cap Reductn	0	0	0	0	192	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.88	0.37	0.78	0.86	0.31	0.73

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	500	220	600	835	185	115	620	150
Future Volume (vph)	0	0	0	255	500	220	600	835	185	115	620	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3085		1601	3047	
Flt Permitted				0.95	1.00	1.00	0.16	1.00		0.21	1.00	
Satd. Flow (perm)				1616	1792	1426	513	3085		355	3047	
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	0	268	526	232	632	879	195	121	653	158
RTOR Reduction (vph)	0	0	0	0	0	154	0	15	0	0	18	0
Lane Group Flow (vph)	0	0	0	268	526	78	632	1059	0	121	793	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				39.2	39.2	39.2	66.8	54.5		48.7	39.4	
Effective Green, g (s)				40.2	40.2	40.2	67.8	55.5		50.7	40.4	
Actuated g/C Ratio				0.34	0.34	0.34	0.56	0.46		0.42	0.34	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				541	600	477	737	1426		256	1025	
v/s Ratio Prot				0.17	c0.29		c0.15	0.34		0.04	0.26	
v/s Ratio Perm						0.05	c0.33			0.16		
v/c Ratio				0.50	0.88	0.16	0.86	0.74		0.47	0.77	
Uniform Delay, d1				31.8	37.6	28.1	24.8	26.4		22.1	35.7	
Progression Factor				1.00	1.00	1.00	1.49	1.14		1.00	1.00	
Incremental Delay, d2				0.7	13.6	0.2	7.2	2.5		1.4	5.7	
Delay (s)				32.5	51.1	28.2	44.1	32.7		23.4	41.4	
Level of Service				C	D	C	D	C		C	D	
Approach Delay (s)		0.0			41.1			36.9			39.1	
Approach LOS		A			D			D			D	

Intersection Summary

HCM 2000 Control Delay	38.6	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.89				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	80.4%	ICU Level of Service		D	
Analysis Period (min)	15				

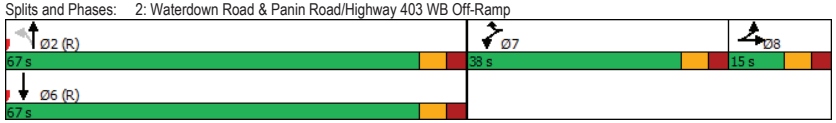
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	275	345	5	1275	875
Future Volume (vph)	0	275	345	5	1275	875
Lane Group Flow (vph)	6	313	392	0	1455	994
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	38.0	38.0	67.0	67.0	67.0
Total Split (%)	12.5%	31.7%	31.7%	55.8%	55.8%	55.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.02	0.45	0.87		0.67	0.43
Control Delay	0.2	41.8	47.2		14.8	9.9
Queue Delay	0.0	0.0	0.0		0.1	0.2
Total Delay	0.2	41.8	47.2		15.0	10.1
Queue Length 50th (m)	0.0	34.4	60.4		80.5	43.0
Queue Length 95th (m)	0.0	44.8	92.9		76.8	48.2
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	247	849	520		2168	2323
Starvation Cap Reductn	0	0	0		119	590
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.02	0.37	0.75		0.71	0.57

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	275	0	345	5	1275	0	0	875	0
Future Volume (vph)	0	0	5	275	0	345	5	1275	0	0	875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3300			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	312	0	392	6	1449	0	0	994	0
RTOR Reduction (vph)	0	6	0	0	0	116	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	313	0	276	0	1455	0	0	994	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		25.2		25.2		72.2			72.2	
Effective Green, g (s)		2.6		26.2		26.2		73.2			73.2	
Actuated g/C Ratio		0.02		0.22		0.22		0.61			0.61	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		690		335		2013			2158	
v/s Ratio Prot		c0.00		0.10		c0.18					0.28	
v/s Ratio Perm								c0.44				
v/c Ratio		0.00		0.45		0.82		0.72			0.46	
Uniform Delay, d1		57.4		40.7		44.7		16.3			12.7	
Progression Factor		1.00		1.00		1.00		0.89			0.80	
Incremental Delay, d2		0.0		0.5		15.1		1.6			0.6	
Delay (s)		57.5		41.2		59.8		16.1			10.7	
Level of Service		E		D		E		B			B	
Approach Delay (s)		57.5			51.5			16.1			10.7	
Approach LOS		E			D			B			B	

Intersection Summary

HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

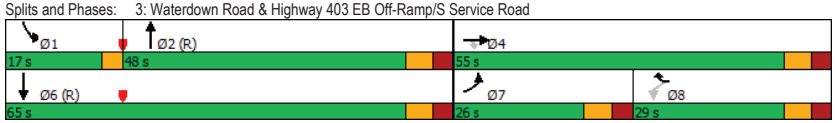
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	250	95	340	50	260	785	400	395	760
Future Volume (vph)	250	95	340	50	260	785	400	395	760
Lane Group Flow (vph)	281	107	382	56	292	882	449	444	854
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free		
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0		6.0	8.0
Minimum Split (s)	15.0	21.0	21.0	15.0	15.0	29.0		9.0	29.0
Total Split (s)	26.0	55.0	55.0	29.0	29.0	48.0		17.0	65.0
Total Split (%)	21.7%	45.8%	45.8%	24.2%	24.2%	40.0%		14.2%	54.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.83	0.16	0.62	0.44	0.74	0.77	0.29	0.68	0.45
Control Delay	67.6	26.5	27.1	79.5	47.7	33.3	0.4	53.3	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0
Total Delay	67.6	26.5	27.1	79.5	47.8	33.8	0.4	53.3	21.4
Queue Length 50th (m)	66.5	17.9	56.0	14.7	48.4	106.4	0.0	46.6	74.8
Queue Length 95th (m)	#124.5	29.5	84.4	28.4	74.4	64.1	0.0	#91.5	75.7
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	339	739	684	224	499	1238	1568	654	1915
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	6	92	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.14	0.56	0.25	0.59	0.77	0.29	0.68	0.45

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	95	340	50	0	260	0	785	400	395	760	0
Future Volume (vph)	250	95	340	50	0	260	0	785	400	395	760	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	3255	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	3255	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	281	107	382	56	0	292	0	882	449	444	854	0
RTOR Reduction (vph)	0	0	69	0	0	229	0	0	0	0	0	0
Lane Group Flow (vph)	281	107	313	56	0	63	0	882	449	444	854	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	22.8	42.0	42.0	12.2		12.2		37.9	120.0	23.1	64.0	
Effective Green, g (s)	23.8	43.0	43.0	13.2		13.2		38.9	120.0	24.1	65.0	
Actuated g/C Ratio	0.20	0.36	0.36	0.11		0.11		0.32	1.00	0.20	0.54	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	339	648	545	128		167		1147	1568	653	1916	
v/s Ratio Prot	c0.16	0.06				0.04		c0.25		c0.14	0.24	
v/s Ratio Perm			c0.21	0.05					0.29			
v/c Ratio	0.83	0.17	0.57	0.44		0.38		0.77	0.29	0.68	0.45	
Uniform Delay, d1	46.1	26.3	31.1	49.9		49.6		36.5	0.0	44.4	16.6	
Progression Factor	1.00	1.00	1.00	1.42		4.00		0.79	1.00	1.06	1.21	
Incremental Delay, d2	15.3	0.1	1.5	2.4		1.4		4.3	0.4	2.6	0.7	
Delay (s)	61.4	26.4	32.6	73.5		199.7		33.1	0.4	49.8	20.8	
Level of Service	E	C	C	E		F		C	A	D	C	
Approach Delay (s)		42.2			179.4			22.1			30.7	
Approach LOS		D			F			C			C	

Intersection Summary

HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	67.4%	ICU Level of Service	C	
Analysis Period (min)	15			

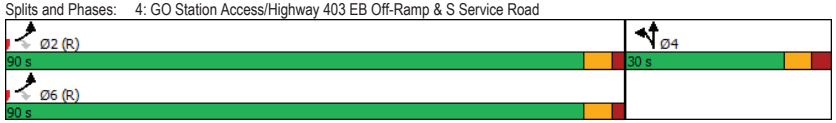
c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	750	15	30		
Future Volume (vph)	750	15	30		
Lane Group Flow (vph)	962	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			30.0	90.0	90.0
Total Split (%)			25.0%	75%	75%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.80	0.02	0.83		
Control Delay	17.0	0.9	65.6		
Queue Delay	0.3	0.0	0.0		
Total Delay	17.3	0.9	65.6		
Queue Length 50th (m)	100.7	0.2	69.9		
Queue Length 95th (m)	167.6	0.4	88.5		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1214	1150	379		
Starvation Cap Reductn	33	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.81	0.02	0.79		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	750	15	205	30	0	0
Future Volume (vph)	750	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	962	19	263	38	0	0
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	962	13	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	84.0	84.0		23.0		
Effective Green, g (s)	85.0	85.0		24.0		
Actuated g/C Ratio	0.71	0.71		0.20		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1199	1131		364		
v/s Ratio Prot	c0.57			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.80	0.01		0.83		
Uniform Delay, d1	11.8	5.1		46.0		
Progression Factor	0.86	0.39		1.00		
Incremental Delay, d2	5.7	0.0		14.2		
Delay (s)	15.9	2.1		60.2		
Level of Service	B	A		E		
Approach Delay (s)	15.6			60.2	0.0	
Approach LOS	B			E	A	

Intersection Summary

HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

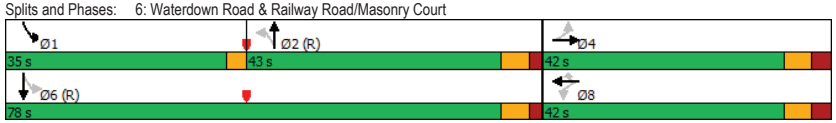
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	5	100	5	435	5	740	165	975
Future Volume (vph)	10	5	100	5	435	5	740	165	975
Lane Group Flow (vph)	0	25	0	133	551	6	981	209	1247
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	42.0	42.0	42.0	42.0	42.0	43.0	43.0	35.0	78.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.8%	35.8%	29.2%	65.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.14		0.62	0.79	0.03	0.48	0.44	0.48
Control Delay		33.7		58.1	14.3	15.4	16.0	8.4	5.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		33.7		58.1	14.3	15.4	16.0	8.4	5.1
Queue Length 50th (m)		4.1		31.1	7.5	0.6	65.5	5.4	28.6
Queue Length 95th (m)		9.6		40.8	17.0	3.1	95.6	24.8	76.8
Internal Link Dist (m)		95.0		120.3			324.2		353.3
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		309		388	840	193	2063	667	2582
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.08		0.34	0.66	0.03	0.48	0.31	0.48

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	100	5	435	5	740	35	165	975	10
Future Volume (vph)	10	5	5	100	5	435	5	740	35	165	975	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196			1722	1599	1353	3411		1694	3476	
Flt Permitted		0.83			0.72	1.00	0.22	1.00		0.23	1.00	
Satd. Flow (perm)		1018			1295	1599	319	3411		409	3476	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	127	6	551	6	937	44	209	1234	13
RTOR Reduction (vph)	0	5	0	0	0	431	0	2	0	0	1	0
Lane Group Flow (vph)	0	20	0	0	133	120	6	979	0	209	1246	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		18.8			18.8	18.8	71.6	71.6		88.2	88.2	
Effective Green, g (s)		19.8			19.8	19.8	72.6	72.6		89.2	89.2	
Actuated g/C Ratio		0.17			0.17	0.17	0.60	0.60		0.74	0.74	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		167			213	263	192	2063		460	2583	
v/s Ratio Prot								0.29		0.06	c0.36	
v/s Ratio Perm		0.02			c0.10	0.08	0.02			0.28		
v/c Ratio		0.12			0.62	0.46	0.03	0.47		0.45	0.48	
Uniform Delay, d1		42.7			46.6	45.2	9.5	13.1		6.3	6.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.21	0.64	
Incremental Delay, d2		0.3			5.6	1.3	0.3	0.8		0.7	0.6	
Delay (s)		43.0			52.2	46.5	9.8	13.9		8.3	4.5	
Level of Service		D			D	D	A	B		A	A	
Approach Delay (s)		43.0			47.6			13.9			5.1	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	69.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	150	55	20	465	0	75	0	20	0	0	0
Future Volume (Veh/h)	0	150	55	20	465	0	75	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	183	67	24	567	0	91	0	24	0	0	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)		144										
pX, platoon unblocked				0.99			0.99	0.99	0.99	0.99	0.99	
vC, conflicting volume	567			250			832	832	216	856	865	567
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	567			232			822	822	198	846	856	567
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			98			68	100	97	100	100	100
cM capacity (veh/h)	1015			1328			282	301	804	268	288	527

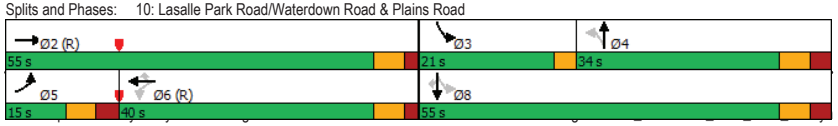
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	250	591	115	0
Volume Left	0	24	91	0
Volume Right	67	0	24	0
cSH	1015	1328	326	1700
Volume to Capacity	0.00	0.02	0.35	0.00
Queue Length 95th (m)	0.0	0.4	12.4	0.0
Control Delay (s)	0.0	0.5	22.0	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	0.5	22.0	0.0
Approach LOS			C	A

Intersection Summary					
Average Delay			3.0		
Intersection Capacity Utilization			52.2%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	245	575	75	1095	315	125	220	390	285	405
Future Volume (vph)	245	575	75	1095	315	125	220	390	285	405
Lane Group Flow (vph)	253	670	77	1129	325	129	294	402	294	418
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	15.0	55.0	40.0	40.0	40.0	34.0	34.0	21.0	55.0	55.0
Total Split (%)	13.6%	50.0%	36.4%	36.4%	36.4%	30.9%	30.9%	19.1%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.70	0.38	0.34	0.97	0.47	0.60	0.77	0.94	0.39	0.58
Control Delay	58.9	18.0	23.0	45.7	6.1	50.6	52.5	56.2	24.4	14.7
Queue Delay	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.9	18.0	23.0	49.5	6.1	50.6	52.5	56.2	24.4	14.7
Queue Length 50th (m)	28.5	46.8	13.4	~135.2	25.3	26.3	59.9	64.7	45.9	33.5
Queue Length 95th (m)	#57.0	66.7	m14.1	#179.8	12.3	45.1	86.8	#108.1	63.9	60.4
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	363	1743	224	1168	690	263	464	426	846	783
Starvation Cap Reductn	0	0	0	27	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.38	0.34	0.99	0.47	0.49	0.63	0.94	0.35	0.53

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 37 (34%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	575	75	75	1095	315	125	220	65	390	285	405
Future Volume (vph)	245	575	75	75	1095	315	125	220	65	390	285	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3134	3465		1629	3539	1507	1694	1786		1709	1900	1493
Flt Permitted	0.95	1.00		0.40	1.00	1.00	0.58	1.00		0.28	1.00	1.00
Satd. Flow (perm)	3134	3465		681	3539	1507	1035	1786		499	1900	1493
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	253	593	77	77	1129	325	129	227	67	402	294	418
RTOR Reduction (vph)	0	8	0	0	0	194	0	10	0	0	0	129
Lane Group Flow (vph)	253	662	0	77	1129	131	129	284	0	402	294	289
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	11.8	54.1		35.3	35.3	35.3	21.9	21.9		42.9	42.9	42.9
Effective Green, g (s)	12.8	55.1		36.3	36.3	36.3	22.9	22.9		43.9	43.9	43.9
Actuated g/C Ratio	0.12	0.50		0.33	0.33	0.33	0.21	0.21		0.40	0.40	0.40
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	364	1735		224	1167	497	215	371		408	758	595
v/s Ratio Prot	c0.08	0.19			c0.32			c0.16		c0.17	0.15	
v/s Ratio Perm				0.11		0.09	0.12			0.22		0.19
v/c Ratio	0.70	0.38		0.34	0.97	0.26	0.60	0.76		0.99	0.39	0.49
Uniform Delay, d1	46.7	16.9		27.8	36.3	27.0	39.4	41.0		28.1	23.5	24.6
Progression Factor	1.00	1.00		0.66	0.78	0.85	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.7	0.6		3.1	16.0	1.0	4.5	9.1		40.3	0.3	0.6
Delay (s)	52.4	17.6		21.6	44.4	23.8	43.9	50.1		68.4	23.8	25.3
Level of Service	D	B		C	D	C	D	D		E	C	C
Approach Delay (s)		27.1			38.9			48.2			40.5	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	93.1%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	55	985	1485	75
Future Volume (vph)	55	985	1485	75
Lane Group Flow (vph)	57	1015	1577	149
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.22	0.39	0.69	0.61
Control Delay	4.8	4.1	13.3	43.1
Queue Delay	0.0	0.1	0.2	0.0
Total Delay	4.8	4.3	13.5	43.1
Queue Length 50th (m)	1.4	29.2	102.1	23.5
Queue Length 95th (m)	m5.6	m49.3	159.0	42.7
Internal Link Dist (m)		135.9	121.0	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	343	2570	2297	412
Starvation Cap Reductn	0	544	0	0
Spillback Cap Reductn	0	0	165	1
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.50	0.74	0.36

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Plains Road & Cooke Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	985	1485	45	75	70
Future Volume (vph)	55	985	1485	45	75	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.93	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1687	3374	3315		1617	
Flt Permitted	0.11	1.00	1.00		0.97	
Satd. Flow (perm)	191	3374	3315		1617	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1015	1531	46	77	72
RTOR Reduction (vph)	0	0	1	0	35	0
Lane Group Flow (vph)	57	1015	1576	0	114	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	82.8	82.8	74.5		13.2	
Effective Green, g (s)	83.8	83.8	75.5		14.2	
Actuated g/C Ratio	0.76	0.76	0.69		0.13	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	231	2570	2275		208	
v/s Ratio Prot	0.01	c0.30	c0.48			
v/s Ratio Perm	0.17				c0.07	
v/c Ratio	0.25	0.39	0.69		0.55	
Uniform Delay, d1	6.9	4.5	10.3		44.9	
Progression Factor	1.08	0.76	1.00		1.00	
Incremental Delay, d2	0.4	0.4	1.8		2.9	
Delay (s)	7.9	3.8	12.1		47.8	
Level of Service	A	A	B		D	
Approach Delay (s)		4.0	12.1		47.8	
Approach LOS		A	B		D	

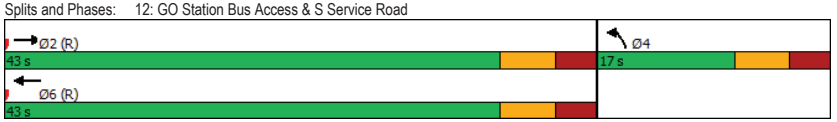
Intersection Summary				
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	690	295	15
Future Volume (vph)	690	295	15
Lane Group Flow (vph)	755	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.24	0.09	0.12
Control Delay	0.7	0.2	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	0.7	0.2	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	12.2	m1.2	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3133	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	29	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.24	0.09	0.10

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	690	20	0	295	15	0
Future Volume (vph)	690	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3379			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3379			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	734	21	0	314	16	0
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	753	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2545			2719	42	
v/s Ratio Prot	c0.22			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.30			0.12	0.38	
Uniform Delay, d1	2.3			2.0	27.8	
Progression Factor	0.41			0.15	1.00	
Incremental Delay, d2	0.3			0.1	5.7	
Delay (s)	1.2			0.4	33.4	
Level of Service	A			A	C	
Approach Delay (s)	1.2			0.4	33.4	
Approach LOS	A			A	C	

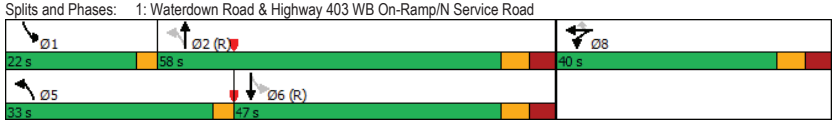
Intersection Summary			
HCM 2000 Control Delay	1.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	60	105	65	395	575	235	805
Future Volume (vph)	60	105	65	395	575	235	805
Lane Group Flow (vph)	61	107	66	403	1031	240	1035
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	33.0	58.0	22.0	47.0
Total Split (%)	33.3%	33.3%	33.3%	27.5%	48.3%	18.3%	39.2%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.35	0.56	0.25	0.48	0.53	0.52	0.55
Control Delay	52.8	60.3	5.3	8.9	11.7	7.3	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	52.8	60.3	5.3	8.9	11.9	7.3	15.2
Queue Length 50th (m)	14.1	25.4	0.0	9.2	64.4	10.9	69.2
Queue Length 95th (m)	26.9	42.4	5.3	28.6	59.5	22.1	115.4
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	468	1175	1932	521	1885
Starvation Cap Reductn	0	0	0	0	210	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.14	0.34	0.60	0.46	0.55

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	105	65	395	575	435	235	805	210
Future Volume (vph)	0	0	0	60	105	65	395	575	435	235	805	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2989		1616	2991	
Flt Permitted				0.95	1.00	1.00	0.23	1.00		0.23	1.00	
Satd. Flow (perm)				1442	1597	1439	734	2989		390	2991	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	61	107	66	403	587	444	240	821	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	75	0	0	11	0
Lane Group Flow (vph)	0	0	0	61	107	8	403	956	0	240	1024	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	87.0	73.6		88.2	74.2	
Effective Green, g (s)				14.4	14.4	14.4	89.0	74.6		90.2	75.2	
Actuated g/C Ratio				0.12	0.12	0.12	0.74	0.62		0.75	0.63	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	815	1858		446	1874	
v/s Ratio Prot				0.04	c0.07		0.06	0.32		c0.07	c0.34	
v/s Ratio Perm						0.01	0.31			0.34		
v/c Ratio				0.35	0.56	0.05	0.49	0.51		0.54	0.55	
Uniform Delay, d1				48.5	49.8	46.7	5.7	12.6		5.8	12.7	
Progression Factor				1.00	1.00	1.00	2.38	0.95		1.00	1.00	
Incremental Delay, d2				1.2	3.7	0.1	0.4	0.9		1.3	1.2	
Delay (s)				49.8	53.5	46.8	14.0	12.8		7.1	13.9	
Level of Service				D	D	D	B	B		A	B	
Approach Delay (s)		0.0			50.7			13.2			12.6	
Approach LOS		A			D			B			B	

Intersection Summary

HCM 2000 Control Delay	15.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.55				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	64.5%	ICU Level of Service		C	
Analysis Period (min)	15				

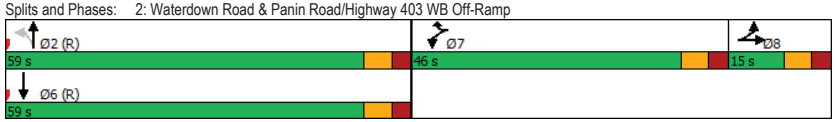
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	345	175	5	1225	865
Future Volume (vph)	0	345	175	5	1225	865
Lane Group Flow (vph)	5	375	190	0	1337	940
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	46.0	46.0	59.0	59.0	59.0
Total Split (%)	12.5%	38.3%	38.3%	49.2%	49.2%	49.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.69	0.52		0.59	0.39
Control Delay	53.4	53.1	16.6		14.3	4.3
Queue Delay	0.0	0.0	0.0		0.2	0.1
Total Delay	53.4	53.1	16.6		14.6	4.4
Queue Length 50th (m)	1.2	45.5	8.8		93.3	23.2
Queue Length 95th (m)	5.5	59.1	30.3		m64.4	15.2
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	1064	574		2274	2419
Starvation Cap Reductn	0	0	0		302	427
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.35	0.33		0.68	0.47

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	345	0	175	5	1225	0	0	865	0
Future Volume (vph)	5	0	0	345	0	175	5	1225	0	0	865	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3394			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3231			3438	
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)	5	0	0	375	0	190	5	1332	0	0	940	0
RTOR Reduction (vph)	0	0	0	0	0	124	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	375	0	66	0	1337	0	0	940	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		19.5		19.5		77.9			77.9	
Effective Green, g (s)		2.6		20.5		20.5		78.9			78.9	
Actuated g/C Ratio		0.02		0.17		0.17		0.66			0.66	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		545		243		2124			2260	
v/s Ratio Prot		c0.00		c0.12		0.05					0.27	
v/s Ratio Perm								c0.41				
v/c Ratio		0.21		0.69		0.27		0.63			0.42	
Uniform Delay, d1		57.7		46.7		43.3		12.0			9.7	
Progression Factor		1.00		1.00		1.00		1.27			0.45	
Incremental Delay, d2		4.3		3.6		0.6		0.7			0.5	
Delay (s)		62.0		50.4		43.9		16.0			4.8	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			48.2			16.0			4.8	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

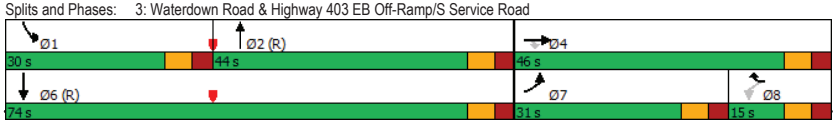
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	330	315	525	25	100	855	650	630	580
Future Volume (vph)	330	315	525	25	100	855	650	630	580
Lane Group Flow (vph)	355	339	565	27	108	919	699	677	624
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free		
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	7.0	7.0	8.0		6.0	8.0
Minimum Split (s)	15.0	21.0	21.0	15.0	15.0	29.0		13.0	29.0
Total Split (s)	31.0	46.0	46.0	15.0	15.0	44.0		30.0	74.0
Total Split (%)	25.8%	38.3%	38.3%	12.5%	12.5%	36.7%		25.0%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.94	0.53	0.83	0.45	0.43	0.89	0.46	0.96	0.33
Control Delay	81.3	35.9	31.0	72.5	7.6	62.5	1.1	77.6	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.3	35.9	31.0	72.5	7.6	62.5	1.1	77.6	14.5
Queue Length 50th (m)	88.4	68.0	74.9	6.8	0.0	104.7	0.0	86.0	43.3
Queue Length 95th (m)	#151.1	98.7	#141.3	#17.5	0.0	m109.4	m0.0	#131.4	49.6
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	376	639	683	62	258	1078	1524	703	1894
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.53	0.83	0.44	0.42	0.85	0.46	0.96	0.33

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	315	525	25	0	100	0	855	650	630	580	0
Future Volume (vph)	330	315	525	25	0	100	0	855	650	630	580	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	3426	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	1131	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	355	339	565	27	0	108	0	919	699	677	624	0
RTOR Reduction (vph)	0	0	172	0	0	100	0	0	0	0	0	0
Lane Group Flow (vph)	355	339	393	27	0	8	0	919	699	677	624	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	25.1	39.8	39.8	7.7		7.7		35.6	120.0	23.6	66.2	
Effective Green, g (s)	26.1	40.8	40.8	8.7		8.7		36.6	120.0	24.6	67.2	
Actuated g/C Ratio	0.22	0.34	0.34	0.07		0.07		0.31	1.00	0.21	0.56	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	375	639	512	60		103		1038	1524	702	1872	
v/s Ratio Prot	c0.21	0.18				0.01		c0.27		c0.20	0.19	
v/s Ratio Perm			c0.26	0.03					0.46			
v/c Ratio	0.95	0.53	0.77	0.45		0.08		0.89	0.46	0.96	0.33	
Uniform Delay, d1	46.3	31.9	35.4	53.4		51.9		39.7	0.0	47.3	14.3	
Progression Factor	1.00	1.00	1.00	0.91		1.54		1.46	1.00	1.11	0.98	
Incremental Delay, d2	32.6	0.8	6.8	5.3		0.3		4.7	0.4	24.3	0.5	
Delay (s)	78.9	32.7	42.2	53.9		80.3		62.6	0.4	77.0	14.4	
Level of Service	E	C	D	D		F		E	A	E	B	
Approach Delay (s)		50.0			75.0			35.7			47.0	
Approach LOS		D			E			D			D	

Intersection Summary

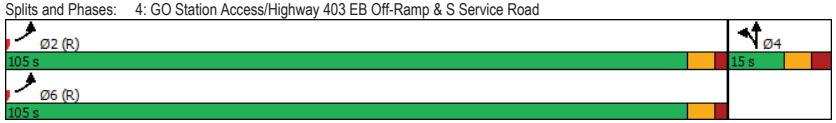
HCM 2000 Control Delay	44.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	1005	25		
Future Volume (vph)	1005	25		
Lane Group Flow (vph)	1226	37		
Turn Type	Prot	NA		
Protected Phases	2 6	4	2	6
Permitted Phases				
Detector Phase	2 6	4		
Switch Phase				
Minimum Initial (s)		8.0	8.0	8.0
Minimum Split (s)		15.0	29.0	29.0
Total Split (s)		15.0	105.0	105.0
Total Split (%)		12.5%	88%	88%
Yellow Time (s)		4.0	4.0	4.0
All-Red Time (s)		3.0	2.0	2.0
Lost Time Adjust (s)		-1.0		
Total Lost Time (s)		6.0		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode		None	C-Min	C-Min
v/c Ratio	0.51	0.25		
Control Delay	1.4	55.8		
Queue Delay	0.0	0.0		
Total Delay	1.5	55.8		
Queue Length 50th (m)	0.5	8.8		
Queue Length 95th (m)	26.8	19.8		
Internal Link Dist (m)	190.8	55.4		
Turn Bay Length (m)				
Base Capacity (vph)	2398	147		
Starvation Cap Reductn	127	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.54	0.25		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1005	160	10	25	0	0
Future Volume (vph)	1005	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0			6.0		
Lane Util. Factor	0.97			1.00		
Frt	0.98			1.00		
Flt Protected	0.96			0.99		
Satd. Flow (prot)	2658			1821		
Flt Permitted	0.96			0.99		
Satd. Flow (perm)	2658			1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1058	168	11	26	0	0
RTOR Reduction (vph)	9	0	0	0	0	0
Lane Group Flow (vph)	1217	0	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot		Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases						
Actuated Green, G (s)	101.5			5.5		
Effective Green, g (s)	102.5			6.5		
Actuated g/C Ratio	0.85			0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	2270			98		
v/s Ratio Prot	c0.46			c0.02		
v/s Ratio Perm						
v/c Ratio	0.54			0.38		
Uniform Delay, d1	2.4			54.8		
Progression Factor	0.32			1.00		
Incremental Delay, d2	0.8			2.4		
Delay (s)	1.5			57.2		
Level of Service	A			E		
Approach Delay (s)	1.5			57.2	0.0	
Approach LOS	A			E	A	

Intersection Summary			
HCM 2000 Control Delay	3.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

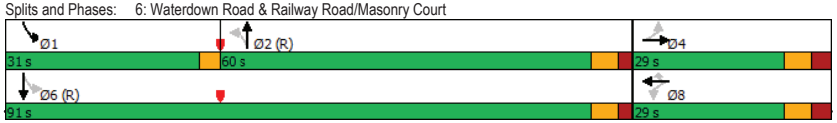
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	0	30	0	245	5	1250	485	635
Future Volume (vph)	10	0	30	0	245	5	1250	485	635
Lane Group Flow (vph)	0	22	0	34	278	6	1551	551	733
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	60.0	60.0	31.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	24.2%	50.0%	50.0%	25.8%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.15		0.28	0.71	0.02	1.00	0.85	0.27
Control Delay		2.2		55.2	16.2	13.4	52.8	48.9	2.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		2.2		55.2	16.2	13.4	52.8	48.9	2.1
Queue Length 50th (m)		0.0		8.1	0.0	0.7	213.7	115.4	6.4
Queue Length 95th (m)		0.2		17.5	23.4	m1.0	m#245.2	m#189.1	24.5
Internal Link Dist (m)		95.0		120.3			324.2		353.3
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		237		245	511	261	1557	649	2752
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.09		0.14	0.54	0.02	1.00	0.85	0.27

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	30	0	245	5	1250	115	485	635	10
Future Volume (vph)	10	0	10	30	0	245	5	1250	115	485	635	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184			1641	1495	1454	3388		1728	3379	
Flt Permitted		0.83			0.74	1.00	0.37	1.00		0.07	1.00	
Satd. Flow (perm)		1010			1283	1495	571	3388		128	3379	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	34	0	278	6	1420	131	551	722	11
RTOR Reduction (vph)	0	20	0	0	0	252	0	6	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	34	26	6	1545	0	551	732	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		10.3			10.3	10.3	54.0	54.0		96.7	96.7	
Effective Green, g (s)		11.3			11.3	11.3	55.0	55.0		97.7	97.7	
Actuated g/C Ratio		0.09			0.09	0.09	0.46	0.46		0.81	0.81	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		95			120	140	261	1552		646	2751	
v/s Ratio Prot								c0.46		c0.29	0.22	
v/s Ratio Perm		0.00			c0.03	0.02	0.01			0.41		
v/c Ratio		0.02			0.28	0.19	0.02	1.00		0.85	0.27	
Uniform Delay, d1		49.3			50.6	50.1	17.8	32.4		31.9	2.6	
Progression Factor		1.00			1.00	1.00	0.73	1.14		1.27	0.66	
Incremental Delay, d2		0.1			1.3	0.6	0.1	16.2		9.2	0.2	
Delay (s)		49.4			51.9	50.8	13.2	53.0		49.8	2.0	
Level of Service		D			D	D	B	D		D	A	
Approach Delay (s)		49.4			50.9			52.8			22.5	
Approach LOS		D			D			D			C	

Intersection Summary

HCM 2000 Control Delay	40.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	555	45	15	190	0	85	0	25	0	0	0
Future Volume (Veh/h)	0	555	45	15	190	0	85	0	25	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	0	712	58	19	244	0	109	0	32	0	0	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)		144										
pX, platoon unblocked				0.91			0.91	0.91	0.91	0.91	0.91	
vC, conflicting volume	244			770			1023	1023	741	1055	1052	244
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	244			700			977	977	668	1012	1009	244
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			98			46	100	92	100	100	100
cM capacity (veh/h)	1334			827			203	225	421	182	216	780

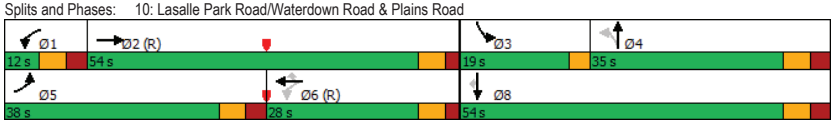
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	770	263	141	0
Volume Left	0	19	109	0
Volume Right	58	0	32	0
cSH	1334	827	230	1700
Volume to Capacity	0.00	0.02	0.61	0.00
Queue Length 95th (m)	0.0	0.6	28.8	0.0
Control Delay (s)	0.0	0.9	42.8	0.0
Lane LOS		A	E	A
Approach Delay (s)	0.0	0.9	42.8	0.0
Approach LOS			E	A

Intersection Summary				
Average Delay			5.3	
Intersection Capacity Utilization			44.8%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	770	975	85	375	275	100	325	265	190	220
Future Volume (vph)	770	975	85	375	275	100	325	265	190	220
Lane Group Flow (vph)	819	1213	90	399	293	106	415	282	202	234
Turn Type	Prot	NA	pm+pt	NA	Perm	Perm	NA	Prot	NA	Perm
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases			6		6	4				8
Detector Phase	5	2	1	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	5.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	12.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	38.0	54.0	12.0	28.0	28.0	35.0	35.0	19.0	54.0	54.0
Total Split (%)	31.7%	45.0%	10.0%	23.3%	23.3%	29.2%	29.2%	15.8%	45.0%	45.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	6.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	None	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.95	0.86	0.63	0.59	0.55	0.38	0.92	0.69	0.28	0.33
Control Delay	64.0	39.4	44.5	48.0	9.1	42.4	71.2	52.3	22.5	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	39.4	44.5	48.0	9.1	42.4	71.2	52.3	22.5	7.7
Queue Length 50th (m)	102.7	140.7	11.4	48.0	0.0	22.1	99.8	35.5	35.6	7.7
Queue Length 95th (m)	#142.2	172.5	#31.1	65.3	24.9	40.1	#163.7	52.8	60.8	37.7
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0		100.0		50.0
Base Capacity (vph)	868	1423	143	694	533	283	452	443	731	723
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.85	0.63	0.57	0.55	0.37	0.92	0.64	0.28	0.32

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	770	975	165	85	375	275	100	325	65	265	190	220
Future Volume (vph)	770	975	165	85	375	275	100	325	65	265	190	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		6.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3255	3405		1677	3438	1485	1719	1797		3134	1810	1446
Flt Permitted	0.95	1.00		0.17	1.00	1.00	0.63	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3255	3405		297	3438	1485	1142	1797		3134	1810	1446
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)	819	1037	176	90	399	293	106	346	69	282	202	234
RTOR Reduction (vph)	0	11	0	0	0	235	0	6	0	0	0	142
Lane Group Flow (vph)	819	1202	0	90	399	58	106	409	0	282	202	92
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		pm+pt	NA	Perm	Perm	NA		Prot	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases				6		6	4					8
Actuated Green, G (s)	30.8	48.3		28.1	22.8	22.8	28.6	28.6		14.8	46.4	46.4
Effective Green, g (s)	31.8	49.3		30.1	23.8	23.8	29.6	29.6		15.8	47.4	47.4
Actuated g/C Ratio	0.27	0.41		0.25	0.20	0.20	0.25	0.25		0.13	0.39	0.39
Clearance Time (s)	7.0	6.0		7.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	862	1398		146	681	294	281	443		412	714	571
v/s Ratio Prot	c0.25	c0.35		0.03	0.12			c0.23		c0.09	0.11	
v/s Ratio Perm				0.12		0.04	0.09					0.06
v/c Ratio	0.95	0.86		0.62	0.59	0.20	0.38	0.92		0.68	0.28	0.16
Uniform Delay, d1	43.3	32.2		35.9	43.6	40.1	37.5	44.1		49.7	24.7	23.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.87	0.87	2.17
Incremental Delay, d2	19.6	7.1		7.5	3.7	1.5	0.9	24.8		4.6	0.2	0.1
Delay (s)	62.9	39.3		43.5	47.3	41.6	38.4	68.9		48.0	21.6	51.0
Level of Service	E	D		D	D	D	D	E		D	C	D
Approach Delay (s)		48.8			44.7			62.7			41.6	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	86.1%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	90	1230	735	40
Future Volume (vph)	90	1230	735	40
Lane Group Flow (vph)	100	1367	884	105
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.20	0.51	0.37	0.50
Control Delay	3.0	5.1	7.5	28.1
Queue Delay	0.0	0.5	0.0	0.0
Total Delay	3.0	5.6	7.5	28.1
Queue Length 50th (m)	2.8	42.7	35.3	8.5
Queue Length 95th (m)	7.8	74.3	59.3	24.0
Internal Link Dist (m)		135.9	125.3	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	569	2665	2377	410
Starvation Cap Reductn	0	757	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.72	0.37	0.26

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



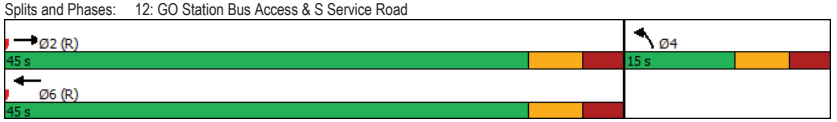
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	90	1230	735	60	40	55
Future Volume (vph)	90	1230	735	60	40	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1631	3282	3246		1405	
Flt Permitted	0.29	1.00	1.00		0.98	
Satd. Flow (perm)	502	3282	3246		1405	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1367	817	67	44	61
RTOR Reduction (vph)	0	0	3	0	55	0
Lane Group Flow (vph)	100	1367	881	0	50	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	77.6	77.6	68.9		8.4	
Effective Green, g (s)	78.6	78.6	69.9		9.4	
Actuated g/C Ratio	0.79	0.79	0.70		0.09	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	470	2579	2268		132	
v/s Ratio Prot	0.01	c0.42	0.27			
v/s Ratio Perm	0.15				c0.04	
v/c Ratio	0.21	0.53	0.39		0.38	
Uniform Delay, d1	2.7	3.9	6.2		42.5	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8	0.5		1.8	
Delay (s)	2.9	4.7	6.7		44.4	
Level of Service	A	A	A		D	
Approach Delay (s)		4.6	6.7		44.4	
Approach LOS		A	A		D	

Intersection Summary				
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	50.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1580	110	15
Future Volume (vph)	1580	110	15
Lane Group Flow (vph)	1733	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.54	0.04	0.12
Control Delay	3.5	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	3.5	1.2	24.5
Queue Length 50th (m)	2.0	0.0	1.6
Queue Length 95th (m)	m124.7	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3232	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.54	0.04	0.12

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1580	15	0	110	15	0
Future Volume (vph)	1580	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3474			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3474			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1717	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1732	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2628			2731	38	
v/s Ratio Prot	c0.50			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.66			0.04	0.42	
Uniform Delay, d1	3.5			1.8	28.0	
Progression Factor	1.47			0.90	1.00	
Incremental Delay, d2	1.0			0.0	7.4	
Delay (s)	6.2			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	6.2			1.7	35.3	
Approach LOS	A			A	D	

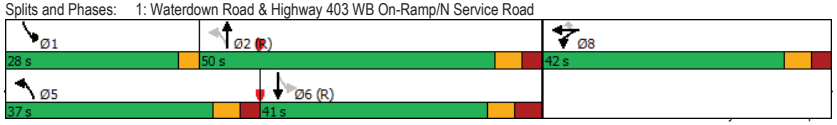
Intersection Summary			
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	255	500	220	745	860	115	700
Future Volume (vph)	255	500	220	745	860	115	700
Lane Group Flow (vph)	268	526	232	784	1105	121	895
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	42.0	42.0	42.0	37.0	50.0	28.0	41.0
Total Split (%)	35.0%	35.0%	35.0%	30.8%	41.7%	23.3%	34.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.55	0.98	0.39	0.91	0.73	0.41	0.98
Control Delay	40.5	76.3	6.1	53.4	26.6	16.7	66.0
Queue Delay	0.0	0.0	0.0	0.4	1.4	0.0	0.0
Total Delay	40.5	76.3	6.1	53.8	28.1	16.7	66.0
Queue Length 50th (m)	55.7	129.1	0.0	91.7	76.9	11.0	~118.1
Queue Length 95th (m)	84.3	#201.8	18.7	#118.5	123.0	19.1	#163.7
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	484	537	590	890	1521	489	917
Starvation Cap Reductn	0	0	0	9	228	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.98	0.39	0.89	0.85	0.25	0.98

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	500	220	745	860	190	115	700	150
Future Volume (vph)	0	0	0	255	500	220	745	860	190	115	700	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3086		1601	3056	
Flt Permitted				0.95	1.00	1.00	0.10	1.00		0.25	1.00	
Satd. Flow (perm)				1616	1792	1426	320	3086		423	3056	
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	0	268	526	232	784	905	200	121	737	158
RTOR Reduction (vph)	0	0	0	0	0	162	0	13	0	0	15	0
Lane Group Flow (vph)	0	0	0	268	526	70	784	1092	0	121	880	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				35.0	35.0	35.0	71.0	57.7		44.7	34.4	
Effective Green, g (s)				36.0	36.0	36.0	72.0	58.7		46.7	35.4	
Actuated g/C Ratio				0.30	0.30	0.30	0.60	0.49		0.39	0.29	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				484	537	427	858	1509		275	901	
v/s Ratio Prot				0.17	c0.29		c0.23	0.35		0.04	0.29	
v/s Ratio Perm						0.05	c0.32			0.13		
v/c Ratio				0.55	0.98	0.16	0.91	0.72		0.44	0.98	
Uniform Delay, d1				35.3	41.6	30.9	34.0	24.2		24.2	41.9	
Progression Factor				1.00	1.00	1.00	1.38	1.01		1.00	1.00	
Incremental Delay, d2				1.4	33.2	0.2	8.5	1.7		1.1	24.9	
Delay (s)				36.6	74.8	31.1	55.5	26.2		25.3	66.8	
Level of Service				D	E	C	E	C		C	E	
Approach Delay (s)		0.0			55.0			38.4			61.9	
Approach LOS		A			D			D			E	

Intersection Summary					
HCM 2000 Control Delay	48.8	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.97				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0		
Intersection Capacity Utilization	87.5%	ICU Level of Service	E		
Analysis Period (min)	15				

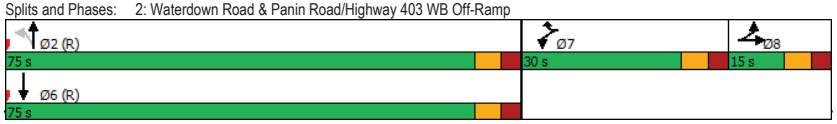
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	315	370	5	1425	955
Future Volume (vph)	0	315	370	5	1425	955
Lane Group Flow (vph)	6	358	420	0	1625	1085
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	30.0	30.0	75.0	75.0	75.0
Total Split (%)	12.5%	25.0%	25.0%	62.5%	62.5%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.03	0.41	0.81		0.82	0.51
Control Delay	0.2	38.2	41.0		14.2	9.0
Queue Delay	0.0	0.0	0.9		0.4	0.4
Total Delay	0.2	38.2	41.9		14.6	9.4
Queue Length 50th (m)	0.0	34.8	63.2		74.0	38.5
Queue Length 95th (m)	0.0	56.2	#139.1		60.3	m21.2
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	215	863	518		1985	2130
Starvation Cap Reductn	0	0	0		87	519
Spillback Cap Reductn	0	0	16		53	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.03	0.41	0.84		0.86	0.67

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	315	0	370	5	1425	0	0	955	0
Future Volume (vph)	0	0	5	315	0	370	5	1425	0	0	955	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3300			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	358	0	420	6	1619	0	0	1085	0
RTOR Reduction (vph)	0	6	0	0	0	99	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	358	0	321	0	1625	0	0	1085	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		31.8		31.8		65.6			65.6	
Effective Green, g (s)		2.6		32.8		32.8		66.6			66.6	
Actuated g/C Ratio		0.02		0.27		0.27		0.55			0.55	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		864		419		1831			1964	
v/s Ratio Prot		c0.00		0.11		c0.21					0.31	
v/s Ratio Perm								c0.49				
v/c Ratio		0.00		0.41		0.77		0.89			0.55	
Uniform Delay, d1		57.4		35.7		40.1		23.4			17.1	
Progression Factor		1.00		1.00		1.00		0.59			0.60	
Incremental Delay, d2		0.0		0.3		8.2		4.3			0.6	
Delay (s)		57.5		36.1		48.2		18.2			10.9	
Level of Service		E		D		D		B			B	
Approach Delay (s)		57.5			42.6			18.2			10.9	
Approach LOS		E			D			B			B	

Intersection Summary

HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

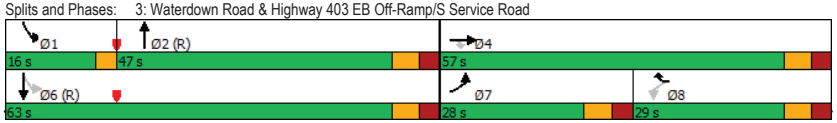
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	265	95	400	50	260	935	465	425	850
Future Volume (vph)	265	95	400	50	260	935	465	425	850
Lane Group Flow (vph)	298	107	449	56	292	1051	522	478	955
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	pm+pt	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free	6	
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0		6.0	8.0
Minimum Split (s)	15.0	21.0	21.0	15.0	15.0	29.0		9.0	29.0
Total Split (s)	28.0	57.0	57.0	29.0	29.0	47.0		16.0	63.0
Total Split (%)	23.3%	47.5%	47.5%	24.2%	24.2%	39.2%		13.3%	52.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.91	0.17	0.76	0.41	0.76	0.79	0.33	0.75	0.50
Control Delay	79.8	26.0	37.0	39.8	22.1	35.6	0.4	41.1	23.2
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0
Total Delay	79.8	26.0	37.0	39.8	22.1	36.2	0.4	41.1	23.2
Queue Length 50th (m)	73.7	18.7	86.3	6.4	17.2	72.3	0.0	45.3	71.5
Queue Length 95th (m)	#127.5	27.9	110.9	15.7	26.9	m125.0	m0.0	#72.7	99.5
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	327	769	688	224	483	1329	1568	639	1920
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	4	64	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.14	0.65	0.25	0.61	0.83	0.33	0.75	0.50

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	95	400	50	0	260	0	935	465	425	850	0
Future Volume (vph)	265	95	400	50	0	260	0	935	465	425	850	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	3255	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	354	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	298	107	449	56	0	292	0	1051	522	478	955	0
RTOR Reduction (vph)	0	0	47	0	0	210	0	0	0	0	0	0
Lane Group Flow (vph)	298	107	402	56	0	82	0	1051	522	478	955	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	22.0	41.9	41.9	12.9		12.9		44.1	120.0	64.1	64.1	
Effective Green, g (s)	23.0	42.9	42.9	13.9		13.9		45.1	120.0	65.1	65.1	
Actuated g/C Ratio	0.19	0.36	0.36	0.12		0.12		0.38	1.00	0.54	0.54	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	327	647	543	135		176		1330	1568	627	1919	
v/s Ratio Prot	c0.17	0.06				0.05		c0.30		c0.11	0.27	
v/s Ratio Perm			c0.26	0.05					0.33	0.30		
v/c Ratio	0.91	0.17	0.74	0.41		0.47		0.79	0.33	0.76	0.50	
Uniform Delay, d1	47.5	26.3	33.7	49.3		49.6		33.3	0.0	28.0	17.2	
Progression Factor	1.00	1.00	1.00	0.65		0.81		0.94	1.00	1.52	1.24	
Incremental Delay, d2	28.3	0.1	5.4	2.1		2.0		3.3	0.4	4.9	0.8	
Delay (s)	75.8	26.4	39.1	33.9		42.0		34.4	0.4	47.4	22.2	
Level of Service	E	C	D	C		D		C	A	D	C	
Approach Delay (s)		50.3			40.7			23.1			30.6	
Approach LOS		D			D			C			C	

Intersection Summary

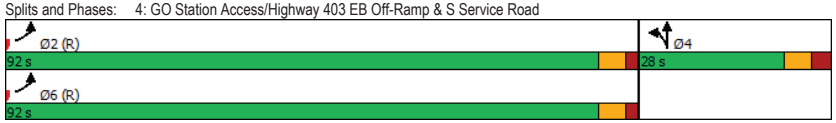
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	850	30		
Future Volume (vph)	850	30		
Lane Group Flow (vph)	1109	301		
Turn Type	Prot	NA		
Protected Phases	2 6	4	2	6
Permitted Phases				
Detector Phase	2 6	4		
Switch Phase				
Minimum Initial (s)		8.0	8.0	8.0
Minimum Split (s)		15.0	29.0	29.0
Total Split (s)		28.0	92.0	92.0
Total Split (%)		23.3%	77%	77%
Yellow Time (s)		4.0	4.0	4.0
All-Red Time (s)		3.0	2.0	2.0
Lost Time Adjust (s)		-1.0		
Total Lost Time (s)		6.0		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode		None	C-Min	C-Min
v/c Ratio	0.49	0.73		
Control Delay	9.4	53.4		
Queue Delay	0.1	0.0		
Total Delay	9.5	53.4		
Queue Length 50th (m)	64.3	69.0		
Queue Length 95th (m)	73.5	80.0		
Internal Link Dist (m)	190.8	55.4		
Turn Bay Length (m)				
Base Capacity (vph)	2393	417		
Starvation Cap Reductn	206	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.51	0.72		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	850	15	205	30	0	0
Future Volume (vph)	850	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0			6.0		
Lane Util. Factor	0.97			1.00		
Frt	1.00			1.00		
Flt Protected	0.95			0.96		
Satd. Flow (prot)	3290			1820		
Flt Permitted	0.95			0.96		
Satd. Flow (perm)	3290			1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	1090	19	263	38	0	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1108	0	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot		Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases						
Actuated Green, G (s)	80.8			26.2		
Effective Green, g (s)	81.8			27.2		
Actuated g/C Ratio	0.68			0.23		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	2242			412		
v/s Ratio Prot	c0.34			c0.17		
v/s Ratio Perm						
v/c Ratio	0.49			0.73		
Uniform Delay, d1	9.2			43.0		
Progression Factor	0.88			1.00		
Incremental Delay, d2	0.8			6.5		
Delay (s)	8.8			49.5		
Level of Service	A			D		
Approach Delay (s)	8.8			49.5	0.0	
Approach LOS	A			D	A	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

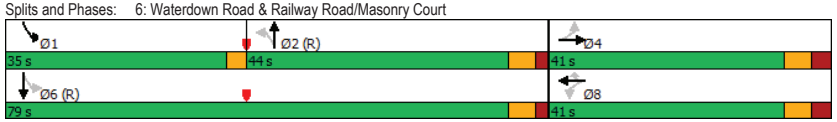
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	5	110	5	575	5	815	210	1080
Future Volume (vph)	10	5	110	5	575	5	815	210	1080
Lane Group Flow (vph)	0	25	0	145	728	6	1076	266	1380
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	41.0	41.0	41.0	41.0	41.0	44.0	44.0	35.0	79.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	36.7%	36.7%	29.2%	65.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.10		0.47	0.95	0.04	0.63	0.64	0.59
Control Delay		26.9		42.7	35.9	12.8	16.0	24.3	8.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		26.9		42.7	35.9	12.8	16.0	24.3	8.4
Queue Length 50th (m)		3.5		29.1	60.4	0.5	81.1	28.3	74.2
Queue Length 95th (m)		9.0		41.5	75.1	m1.2	128.3	47.4	77.6
Internal Link Dist (m)		95.0		120.3			324.2		353.3
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		308		378	824	136	1709	586	2336
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.08		0.38	0.88	0.04	0.63	0.45	0.59

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	110	5	575	5	815	35	210	1080	10
Future Volume (vph)	10	5	5	110	5	575	5	815	35	210	1080	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196			1726	1599	1353	3413		1694	3479	
Flt Permitted		0.85			0.72	1.00	0.19	1.00		0.16	1.00	
Satd. Flow (perm)		1043			1296	1599	273	3413		286	3479	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	139	6	728	6	1032	44	266	1367	13
RTOR Reduction (vph)	0	5	0	0	0	386	0	2	0	0	0	0
Lane Group Flow (vph)	0	20	0	0	145	342	6	1074	0	266	1380	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		27.5			27.5	27.5	59.0	59.0		79.5	79.5	
Effective Green, g (s)		28.5			28.5	28.5	60.0	60.0		80.5	80.5	
Actuated g/C Ratio		0.24			0.24	0.24	0.50	0.50		0.67	0.67	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		247			307	379	136	1706		408	2333	
v/s Ratio Prot								c0.31		c0.10	0.40	
v/s Ratio Perm		0.02			0.11	c0.21	0.02			0.34		
v/c Ratio		0.08			0.47	0.90	0.04	0.63		0.65	0.59	
Uniform Delay, d1		35.6			39.3	44.4	15.3	21.9		13.4	10.8	
Progression Factor		1.00			1.00	1.00	0.53	0.57		1.61	0.61	
Incremental Delay, d2		0.1			1.1	24.0	0.5	1.5		3.3	1.0	
Delay (s)		35.7			40.4	68.4	8.6	13.9		24.9	7.6	
Level of Service		D			D	E	A	B		C	A	
Approach Delay (s)		35.7			63.7			13.9			10.4	
Approach LOS		D			E			B			B	

Intersection Summary

HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	195	55	25	615	0	75	0	20	0	0	0
Future Volume (Veh/h)	0	195	55	25	615	0	75	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	238	67	30	750	0	91	0	24	0	0	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)		144										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	750			305			1082	1082	272	1106	1115	750
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	750			245			1061	1061	210	1086	1096	750
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			98			51	100	97	100	100	100
cM capacity (veh/h)	868			1269			186	210	765	177	200	415

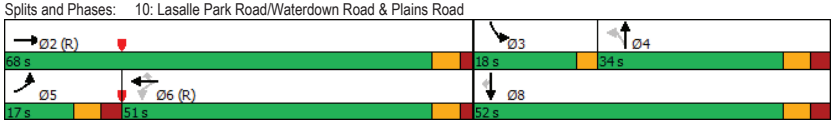
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	305	780	115	0
Volume Left	0	30	91	0
Volume Right	67	0	24	0
cSH	868	1269	221	1700
Volume to Capacity	0.00	0.02	0.52	0.00
Queue Length 95th (m)	0.0	0.6	21.6	0.0
Control Delay (s)	0.0	0.6	37.7	0.0
Lane LOS		A	E	A
Approach Delay (s)	0.0	0.6	37.7	0.0
Approach LOS			E	A

Intersection Summary				
Average Delay			4.0	
Intersection Capacity Utilization			62.7%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	270	630	85	1205	340	140	245	425	315	455
Future Volume (vph)	270	630	85	1205	340	140	245	425	315	455
Lane Group Flow (vph)	278	737	88	1242	351	144	330	438	325	469
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	Prot	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4				8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	17.0	68.0	51.0	51.0	51.0	34.0	34.0	18.0	52.0	52.0
Total Split (%)	14.2%	56.7%	42.5%	42.5%	42.5%	28.3%	28.3%	15.0%	43.3%	43.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.85	0.39	0.36	0.92	0.47	0.67	0.84	0.94	0.46	0.68
Control Delay	76.4	16.8	31.9	47.2	7.8	58.9	63.1	71.0	38.3	32.8
Queue Delay	0.0	0.0	0.0	45.9	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	76.4	16.8	31.9	93.1	8.0	58.9	63.1	71.0	38.3	32.8
Queue Length 50th (m)	35.9	54.3	15.4	152.3	10.1	32.1	74.4	59.9	78.9	46.8
Queue Length 95th (m)	#64.1	69.2	31.2	#197.0	34.2	56.1	#117.5	#94.1	107.3	125.7
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0		100.0		50.0
Base Capacity (vph)	328	1867	244	1356	755	234	425	467	728	700
Starvation Cap Reductn	0	0	0	247	73	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.39	0.36	1.12	0.51	0.62	0.78	0.94	0.45	0.67

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis Future Background 2036 - With Improvements
10: Lasalle Park Road/Waterdown Road & Plains Road PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	630	85	85	1205	340	140	245	75	425	315	455
Future Volume (vph)	270	630	85	85	1205	340	140	245	75	425	315	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3134	3461		1629	3539	1508	1694	1785		3319	1900	1492
Flt Permitted	0.95	1.00		0.37	1.00	1.00	0.56	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3134	3461		637	3539	1508	1006	1785		3319	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	278	649	88	88	1242	351	144	253	77	438	325	469
RTOR Reduction (vph)	0	9	0	0	0	177	0	9	0	0	0	131
Lane Group Flow (vph)	278	728	0	88	1242	174	144	321	0	438	325	338
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		Prot	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4					8
Actuated Green, G (s)	11.6	63.4		44.8	44.8	44.8	24.7	24.7		15.9	43.6	43.6
Effective Green, g (s)	12.6	64.4		45.8	45.8	45.8	25.7	25.7		16.9	44.6	44.6
Actuated g/C Ratio	0.10	0.54		0.38	0.38	0.38	0.21	0.21		0.14	0.37	0.37
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	329	1857		243	1350	575	215	382		467	706	554
v/s Ratio Prot	c0.09	0.21			c0.35			c0.18		c0.13	0.17	
v/s Ratio Perm				0.14		0.12	0.14					0.23
v/c Ratio	0.84	0.39		0.36	0.92	0.30	0.67	0.84		0.94	0.46	0.61
Uniform Delay, d1	52.7	16.3		26.6	35.4	25.9	43.3	45.2		51.0	28.6	30.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.87	1.27	1.65
Incremental Delay, d2	17.7	0.6		4.1	11.6	1.3	7.7	14.9		23.3	0.4	1.7
Delay (s)	70.4	16.9		30.8	47.0	27.3	50.9	60.0		67.7	36.7	52.3
Level of Service	E	B		C	D	C	D	E		E	D	D
Approach Delay (s)		31.6			42.0			57.3			53.7	
Approach LOS		C			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	44.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	89.0%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Queues
11: Plains Road & Cooke Boulevard Future Background 2036 - With Improvements
PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	55	1085	1625	80
Future Volume (vph)	55	1085	1625	80
Lane Group Flow (vph)	57	1119	1727	154
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.26	0.44	0.76	0.63
Control Delay	6.0	5.9	15.5	44.3
Queue Delay	0.0	0.6	0.0	0.0
Total Delay	6.0	6.4	15.5	44.3
Queue Length 50th (m)	2.1	40.0	124.5	25.0
Queue Length 95th (m)	6.2	65.1	194.5	44.4
Internal Link Dist (m)		135.9	121.0	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	310	2559	2283	411
Starvation Cap Reductn	0	940	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.69	0.76	0.37

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	1085	1625	50	80	70
Future Volume (vph)	55	1085	1625	50	80	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1687	3374	3315		1619	
Flt Permitted	0.08	1.00	1.00		0.97	
Satd. Flow (perm)	145	3374	3315		1619	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1119	1675	52	82	72
RTOR Reduction (vph)	0	0	1	0	33	0
Lane Group Flow (vph)	57	1119	1726	0	121	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	82.5	82.5	74.2		13.5	
Effective Green, g (s)	83.5	83.5	75.2		14.5	
Actuated g/C Ratio	0.76	0.76	0.68		0.13	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	198	2561	2266		213	
v/s Ratio Prot	0.02	c0.33	c0.52			
v/s Ratio Perm	0.20				c0.07	
v/c Ratio	0.29	0.44	0.76		0.57	
Uniform Delay, d1	9.2	4.8	11.5		44.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.8	0.5	2.5		3.5	
Delay (s)	10.0	5.3	14.0		48.3	
Level of Service	A	A	B		D	
Approach Delay (s)		5.5	14.0		48.3	
Approach LOS		A	B		D	

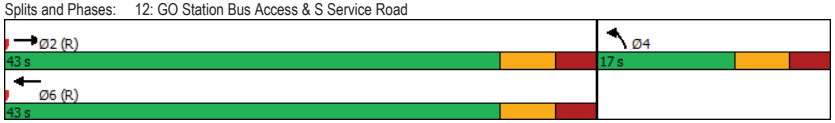
Intersection Summary				
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	65.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	965	295	15
Future Volume (vph)	965	295	15
Lane Group Flow (vph)	1048	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.33	0.09	0.12
Control Delay	1.0	1.1	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.0	1.1	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	23.5	10.2	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3155	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.33	0.09	0.10

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

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	965	20	0	295	15	0
Future Volume (vph)	965	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3404			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3404			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1027	21	0	314	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1047	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2564			2719	42	
v/s Ratio Prot	c0.31			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.41			0.12	0.38	
Uniform Delay, d1	2.6			2.0	27.8	
Progression Factor	0.51			0.79	1.00	
Incremental Delay, d2	0.4			0.1	5.7	
Delay (s)	1.8			1.7	33.4	
Level of Service	A			A	C	
Approach Delay (s)	1.8			1.7	33.4	
Approach LOS	A			A	C	

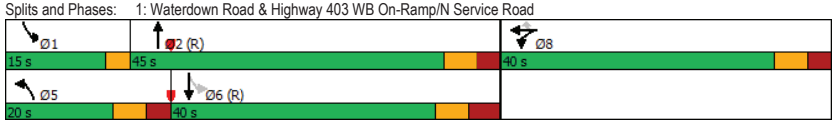
Intersection Summary			
HCM 2000 Control Delay	2.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	70	105	65	380	465	235	740
Future Volume (vph)	70	105	65	380	465	235	740
Lane Group Flow (vph)	71	107	66	388	943	240	969
Turn Type	Split	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8			6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	13.0	31.0
Total Split (s)	40.0	40.0	40.0	20.0	45.0	15.0	40.0
Total Split (%)	40.0%	40.0%	40.0%	20.0%	45.0%	15.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.37	0.51	0.25	0.64	0.50	0.49	0.67
Control Delay	44.1	48.0	7.1	42.0	10.5	8.0	23.5
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	44.1	48.0	7.1	42.0	10.6	8.0	23.5
Queue Length 50th (m)	13.4	20.6	0.0	32.0	26.6	9.5	74.8
Queue Length 95th (m)	26.0	36.0	7.7	59.2	60.1	20.3	114.6
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	490	542	546	605	1871	515	1439
Starvation Cap Reductn	0	0	0	0	159	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.20	0.12	0.64	0.55	0.47	0.67

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	70	105	65	380	465	460	235	740	210
Future Volume (vph)	0	0	0	70	105	65	380	465	460	235	740	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2969		1616	2986	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.30	1.00	
Satd. Flow (perm)				1442	1597	1439	2996	2969		516	2986	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	71	107	66	388	474	469	240	755	214
RTOR Reduction (vph)	0	0	0	0	0	57	0	121	0	0	20	0
Lane Group Flow (vph)	0	0	0	71	107	9	388	822	0	240	949	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8				6		
Actuated Green, G (s)				12.3	12.3	12.3	19.2	57.9		59.3	46.5	
Effective Green, g (s)				13.3	13.3	13.3	20.2	58.9		61.3	47.5	
Actuated g/C Ratio				0.13	0.13	0.13	0.20	0.59		0.61	0.48	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				191	212	191	605	1748		468	1418	
v/s Ratio Prot				0.05	c0.07		c0.13	0.28		0.07	c0.32	
v/s Ratio Perm						0.01				0.24		
v/c Ratio				0.37	0.50	0.05	0.64	0.47		0.51	0.67	
Uniform Delay, d1				39.5	40.3	37.8	36.6	11.7		8.8	20.2	
Progression Factor				1.00	1.00	1.00	1.04	1.08		1.00	1.00	
Incremental Delay, d2				1.2	1.9	0.1	2.0	0.8		1.0	2.5	
Delay (s)				40.8	42.2	37.9	39.9	13.4		9.7	22.7	
Level of Service				D	D	D	D	B		A	C	
Approach Delay (s)		0.0			40.6			21.1			20.1	
Approach LOS		A			D			C			C	

Intersection Summary

HCM 2000 Control Delay	22.4	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.63				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		19.0	
Intersection Capacity Utilization	60.6%	ICU Level of Service		B	
Analysis Period (min)	15				

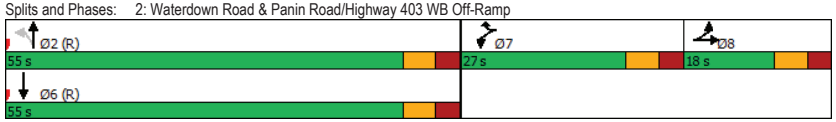
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	300	150	5	1150	810
Future Volume (vph)	0	300	150	5	1150	810
Lane Group Flow (vph)	5	326	163	0	1255	880
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	18.0	27.0	27.0	55.0	55.0	55.0
Total Split (%)	18.0%	27.0%	27.0%	55.0%	55.0%	55.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.05	0.62	0.44		0.57	0.37
Control Delay	43.0	44.0	9.6		14.7	4.2
Queue Delay	0.0	0.0	0.0		0.2	0.1
Total Delay	43.0	44.0	9.6		14.9	4.3
Queue Length 50th (m)	1.0	32.2	0.0		84.6	22.7
Queue Length 95th (m)	4.6	44.4	17.0		m42.5	15.0
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	135	670	428		2216	2358
Starvation Cap Reductn	0	0	0		246	506
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.49	0.38		0.64	0.48

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	300	0	150	5	1150	0	0	810	0
Future Volume (vph)	5	0	0	300	0	150	5	1150	0	0	810	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3393			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3230			3438	
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)	5	0	0	326	0	163	5	1250	0	0	880	0
RTOR Reduction (vph)	0	0	0	0	0	136	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	326	0	27	0	1255	0	0	880	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		15.4		15.4		62.0			62.0	
Effective Green, g (s)		2.6		16.4		16.4		63.0			63.0	
Actuated g/C Ratio		0.03		0.16		0.16		0.63			0.63	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		29		523		233		2034			2165	
v/s Ratio Prot		c0.00		c0.10		0.02					0.26	
v/s Ratio Perm								c0.39				
v/c Ratio		0.17		0.62		0.11		0.62			0.41	
Uniform Delay, d1		47.6		38.9		35.6		11.2			9.2	
Progression Factor		1.00		1.00		1.00		1.43			0.48	
Incremental Delay, d2		2.8		2.3		0.2		0.7			0.5	
Delay (s)		50.5		41.2		35.8		16.8			4.9	
Level of Service		D		D		D		B			A	
Approach Delay (s)		50.5			39.4			16.8			4.9	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

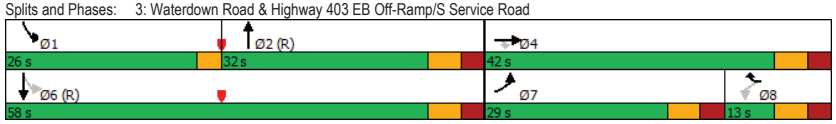
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	275	315	395	25	100	780	720	565	545
Future Volume (vph)	275	315	395	25	100	780	720	565	545
Lane Group Flow (vph)	296	339	425	27	108	839	774	608	586
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	pm+pt	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free	6	
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	6.0	6.0	8.0		6.0	8.0
Minimum Split (s)	29.0	29.0	29.0	13.0	13.0	29.0		9.0	29.0
Total Split (s)	29.0	42.0	42.0	13.0	13.0	32.0		26.0	58.0
Total Split (%)	29.0%	42.0%	42.0%	13.0%	13.0%	32.0%		26.0%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.81	0.52	0.62	0.45	0.44	0.95	0.51	0.95	0.33
Control Delay	55.3	29.3	14.8	69.3	8.6	65.1	2.6	55.4	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	29.3	14.8	69.3	8.6	65.1	2.6	55.4	18.8
Queue Length 50th (m)	56.4	53.3	26.6	5.4	0.0	85.0	6.5	108.6	46.1
Queue Length 95th (m)	#94.0	80.5	59.6	#17.3	7.4	#132.1	30.1	#163.4	66.9
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	397	677	703	60	244	885	1524	639	1793
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.50	0.60	0.45	0.44	0.95	0.51	0.95	0.33

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	275	315	395	25	0	100	0	780	720	565	545	0
Future Volume (vph)	275	315	395	25	0	100	0	780	720	565	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	1766	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	583	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	296	339	425	27	0	108	0	839	774	608	586	0
RTOR Reduction (vph)	0	0	165	0	0	100	0	0	0	0	0	0
Lane Group Flow (vph)	296	339	260	27	0	8	0	839	774	608	586	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	20.2	33.4	33.4	6.2		6.2		24.9	100.0	52.6	52.6	
Effective Green, g (s)	21.2	34.4	34.4	7.2		7.2		25.9	100.0	53.6	53.6	
Actuated g/C Ratio	0.21	0.34	0.34	0.07		0.07		0.26	1.00	0.54	0.54	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	366	647	518	60		102		882	1524	616	1791	
v/s Ratio Prot	c0.17	0.18				0.01		c0.25		c0.25	0.18	
v/s Ratio Perm			0.17	0.03					c0.51	0.28		
v/c Ratio	0.81	0.52	0.50	0.45		0.08		0.95	0.51	0.99	0.33	
Uniform Delay, d1	37.5	26.2	26.0	44.5		43.3		36.4	0.0	17.4	13.1	
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.34	1.00	1.98	1.35	
Incremental Delay, d2	12.4	0.8	0.8	5.3		0.3		16.9	0.9	31.4	0.5	
Delay (s)	49.8	27.0	26.8	49.8		43.6		65.7	0.9	65.9	18.1	
Level of Service	D	C	C	D		D		E	A	E	B	
Approach Delay (s)		33.3			44.9			34.6			42.4	
Approach LOS		C			D			C			D	

Intersection Summary

HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

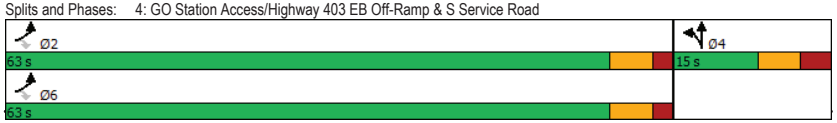
c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	1010	160	25		
Future Volume (vph)	1010	160	25		
Lane Group Flow (vph)	1063	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	63.0	63.0
Total Split (%)			19.2%	81%	81%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	Min	Min
v/c Ratio	0.91	0.12	0.19		
Control Delay	22.8	0.6	40.3		
Queue Delay	0.0	0.0	0.0		
Total Delay	22.8	0.6	40.3		
Queue Length 50th (m)	~167.0	0.0	6.6		
Queue Length 95th (m)	#282.8	3.5	15.8		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1167	1410	191		
Starvation Cap Reductn	0	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.91	0.12	0.19		

Intersection Summary
Cycle Length: 78
Actuated Cycle Length: 86.4
Natural Cycle: 90
Control Type: Semi Act-Uncoord

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

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1010	160	10	25	0	0
Future Volume (vph)	1010	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1063	168	11	26	0	0
RTOR Reduction (vph)	0	31	0	0	0	0
Lane Group Flow (vph)	1063	137	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	71.9	71.9		4.5		
Effective Green, g (s)	72.9	72.9		5.5		
Actuated g/C Ratio	0.82	0.82		0.06		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1094	1302		112		
v/s Ratio Prot	c0.79			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.97	0.11		0.33		
Uniform Delay, d1	7.3	1.7		40.2		
Progression Factor	1.00	1.00		1.00		
Incremental Delay, d2	20.6	0.0		1.7		
Delay (s)	27.9	1.7		41.9		
Level of Service	C	A		D		
Approach Delay (s)	24.3			41.9	0.0	
Approach LOS	C			D	A	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	195	1305	10	0	965
Future Volume (Veh/h)	0	195	1305	10	0	965
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	212	1418	11	0	1049
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.72	0.68			0.68	
vC, conflicting volume	1948	714			1429	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1069	0			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 %	100	71			100	
cM capacity (veh/h)	158	743			621	

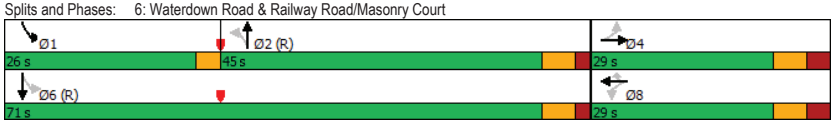
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	212	945	484	524	524
Volume Left	0	0	0	0	0
Volume Right	212	0	11	0	0
cSH	743	1700	1700	1700	1700
Volume to Capacity	0.29	0.56	0.28	0.31	0.31
Queue Length 95th (m)	9.4	0.0	0.0	0.0	0.0
Control Delay (s)	11.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.8	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		55.1%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	0	25	0	280	5	1025	420	535
Future Volume (vph)	10	0	25	0	280	5	1025	420	535
Lane Group Flow (vph)	0	22	0	28	318	6	1290	477	619
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	45.0	45.0	26.0	71.0
Total Split (%)	29.0%	29.0%	29.0%	29.0%	29.0%	45.0%	45.0%	26.0%	71.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.13		0.20	0.71	0.02	0.82	0.81	0.24
Control Delay		1.5		41.9	13.9	17.8	29.6	42.5	3.5
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		1.5		41.9	13.9	17.8	29.6	42.5	3.5
Queue Length 50th (m)		0.0		5.4	0.0	0.6	114.0	78.1	13.5
Queue Length 95th (m)		0.0		12.6	22.0	3.3	#171.7	#126.5	20.1
Internal Link Dist (m)		95.0		120.3			324.2		93.2
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		284		295	588	296	1575	586	2625
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.08		0.09	0.54	0.02	0.82	0.81	0.24

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2026 - With Improvements
6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour

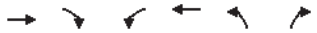


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	25	0	280	5	1025	110	420	535	10
Future Volume (vph)	10	0	10	25	0	280	5	1025	110	420	535	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184			1641	1495	1454	3380		1728	3374	
Flt Permitted		0.84			0.74	1.00	0.42	1.00		0.08	1.00	
Satd. Flow (perm)		1019			1283	1495	639	3380		153	3374	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	28	0	318	6	1165	125	477	608	11
RTOR Reduction (vph)	0	20	0	0	0	282	0	8	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	28	36	6	1282	0	477	618	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		10.2			10.2	10.2	45.4	45.4		76.8	76.8	
Effective Green, g (s)		11.2			11.2	11.2	46.4	46.4		77.8	77.8	
Actuated g/C Ratio		0.11			0.11	0.11	0.46	0.46		0.78	0.78	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		114			143	167	296	1568		582	2624	
v/s Ratio Prot								c0.38		c0.24	0.18	
v/s Ratio Perm		0.00			0.02	c0.02	0.01			0.40		
v/c Ratio		0.02			0.20	0.21	0.02	0.82		0.82	0.24	
Uniform Delay, d1		39.5			40.3	40.4	14.5	23.2		25.8	3.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.35	0.99	
Incremental Delay, d2		0.1			0.7	0.6	0.1	4.9		8.2	0.2	
Delay (s)		39.6			41.0	41.0	14.6	28.0		43.0	3.2	
Level of Service		D			D	D	B	C		D	A	
Approach Delay (s)		39.6			41.0			28.0			20.5	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	75.4%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2026 - With Improvements
7: Cooke Boulevard & Site Driveway (East) — AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	85	30	0	70	5
Future Volume (Veh/h)	0	85	30	0	70	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	92	33	0	76	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)						
pX, platoon unblocked						
vC, conflicting volume			92		66	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		66	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	100
cM capacity (veh/h)			1515		924	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	33	81
Volume Left	0	33	76
Volume Right	92	0	5
cSH	1700	1515	933
Volume to Capacity	0.05	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.3
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Future Total 2026 - With Improvements
8: Cooke Boulevard & Masonry Court — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	430	45	45	180	0	80	20	25	0	70	45
Future Volume (Veh/h)	55	430	45	45	180	0	80	20	25	0	70	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	71	551	58	58	231	0	103	26	32	0	90	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	231			609			1172	1069	580	1114	1098	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			531			1143	1031	499	1080	1063	231
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	95			94			0	86	94	100	51	93
cM capacity (veh/h)	1349			962			84	192	529	140	184	793

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	680	289	161	148
Volume Left	71	58	103	0
Volume Right	58	0	32	58
cSH	1349	962	114	264
Volume to Capacity	0.05	0.06	1.42	0.56
Queue Length 95th (m)	1.3	1.5	90.2	25.2
Control Delay (s)	1.4	2.3	300.7	34.8
Lane LOS	A	A	F	D
Approach Delay (s)	1.4	2.3	300.7	34.8
Approach LOS			F	D

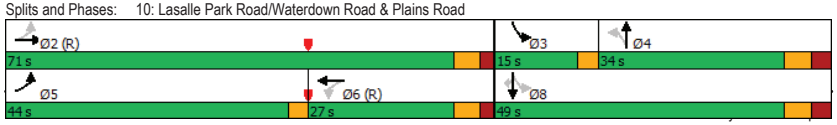
Intersection Summary					
Average Delay			43.2		
Intersection Capacity Utilization			53.0%	ICU Level of Service	A
Analysis Period (min)			15		

Queues — Future Total 2026 - With Improvements
10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	630	810	70	335	80	265	230	155	185
Future Volume (vph)	630	810	70	335	80	265	230	155	185
Lane Group Flow (vph)	670	1006	74	617	85	341	245	165	197
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6		4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	6	6	4	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	44.0	71.0	27.0	27.0	34.0	34.0	15.0	49.0	49.0
Total Split (%)	36.7%	59.2%	22.5%	22.5%	28.3%	28.3%	12.5%	40.8%	40.8%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.99	0.52	0.83	0.91	0.33	0.86	0.90	0.26	0.31
Control Delay	61.7	17.3	106.2	55.9	42.8	65.4	64.1	29.2	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	17.3	106.2	55.9	42.8	65.4	64.1	29.2	5.0
Queue Length 50th (m)	~159.0	77.8	17.8	63.2	17.5	78.4	43.0	28.7	0.0
Queue Length 95th (m)	#234.0	96.6	#47.0	#96.3	33.1	#124.3	#84.0	46.4	15.9
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	680	1927	91	692	275	424	272	648	644
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.52	0.81	0.89	0.31	0.80	0.90	0.25	0.31

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	630	810	135	70	335	245	80	265	55	230	155	185
Future Volume (vph)	630	810	135	70	335	245	80	265	55	230	155	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0		6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.94		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1677	3408		1666	3173		1718	1794		1614	1810	1446
Flt Permitted	0.17	1.00		0.28	1.00		0.65	1.00		0.20	1.00	1.00
Satd. Flow (perm)	300	3408		500	3173		1181	1794		341	1810	1446
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)	670	862	144	74	356	261	85	282	59	245	165	197
RTOR Reduction (vph)	0	11	0	0	111	0	0	6	0	0	0	129
Lane Group Flow (vph)	670	995	0	74	506	0	85	335	0	245	165	68
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	66.4	66.4		20.5	20.5		25.1	25.1		40.6	40.6	40.6
Effective Green, g (s)	67.4	67.4		21.5	21.5		26.1	26.1		41.6	41.6	41.6
Actuated g/C Ratio	0.56	0.56		0.18	0.18		0.22	0.22		0.35	0.35	0.35
Clearance Time (s)	3.0	6.0		6.0	6.0		7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	672	1914		89	568		256	390		261	627	501
v/s Ratio Prot	c0.36	0.29			c0.16			c0.19		c0.11	0.09	
v/s Ratio Perm	0.19			0.15			0.07			0.22		0.05
v/c Ratio	1.00	0.52		0.83	0.89		0.33	0.86		0.94	0.26	0.14
Uniform Delay, d1	31.2	16.3		47.5	48.1		39.6	45.2		32.6	28.2	26.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	33.7	1.0		57.0	18.8		0.8	16.8		38.9	0.2	0.1
Delay (s)	64.9	17.3		104.5	66.9		40.4	62.0		71.5	28.4	27.0
Level of Service	E	B		F	E		D	E		E	C	C
Approach Delay (s)		36.3			70.9			57.7			45.4	
Approach LOS		D			E			E			D	

Intersection Summary				
HCM 2000 Control Delay	47.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	99.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	95	1015	630	110
Future Volume (vph)	95	1015	630	110
Lane Group Flow (vph)	106	1128	789	205
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.22	0.50	0.42	0.71
Control Delay	6.0	9.0	13.1	44.9
Queue Delay	0.0	0.5	0.0	0.0
Total Delay	6.0	9.6	13.1	44.9
Queue Length 50th (m)	5.3	50.3	41.9	33.8
Queue Length 95th (m)	13.4	83.7	71.1	m51.7
Internal Link Dist (m)		135.9	119.8	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	525	2272	1899	385
Starvation Cap Reductn	0	652	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.70	0.42	0.53

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Plains Road & Cooke Boulevard



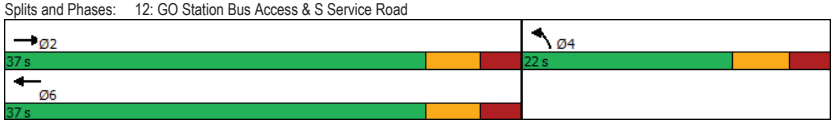
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	95	1015	630	80	110	75
Future Volume (vph)	95	1015	630	80	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.98		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3282	3234		1381	
Flt Permitted	0.30	1.00	1.00		0.97	
Satd. Flow (perm)	522	3282	3234		1381	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1128	700	89	122	83
RTOR Reduction (vph)	0	0	8	0	27	0
Lane Group Flow (vph)	106	1128	781	0	178	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	68.1	68.1	57.5		17.9	
Effective Green, g (s)	69.1	69.1	58.5		18.9	
Actuated g/C Ratio	0.69	0.69	0.58		0.19	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	456	2267	1891		261	
v/s Ratio Prot	0.02	c0.34	0.24			
v/s Ratio Perm	0.14				c0.13	
v/c Ratio	0.23	0.50	0.41		0.68	
Uniform Delay, d1	5.5	7.3	11.4		37.8	
Progression Factor	1.00	1.00	1.00		1.01	
Incremental Delay, d2	0.3	0.8	0.7		7.1	
Delay (s)	5.8	8.1	12.0		45.2	
Level of Service	A	A	B		D	
Approach Delay (s)		7.9	12.0		45.2	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	49.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1585	110	15
Future Volume (vph)	1585	110	15
Lane Group Flow (vph)	1739	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	37.0	37.0	22.0
Total Split (%)	62.7%	62.7%	37.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Min	Min	None
v/c Ratio	0.54	0.04	0.10
Control Delay	3.0	1.5	23.2
Queue Delay	0.0	0.0	0.0
Total Delay	3.0	1.5	23.2
Queue Length 50th (m)	0.0	0.0	1.3
Queue Length 95th (m)	92.3	4.6	7.2
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3247	3373	287
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.54	0.04	0.06

Intersection Summary
Cycle Length: 59
Actuated Cycle Length: 51.4
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1585	15	0	110	15	0
Future Volume (vph)	1585	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3474			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3474			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1723	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1738	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	41.7			41.7	1.4	
Effective Green, g (s)	42.7			42.7	2.4	
Actuated g/C Ratio	0.75			0.75	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2597			2699	37	
v/s Ratio Prot	c0.50			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.67			0.04	0.43	
Uniform Delay, d1	3.6			1.9	26.7	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.7			0.0	7.9	
Delay (s)	4.3			1.9	34.6	
Level of Service	A			A	C	
Approach Delay (s)	4.3			1.9	34.6	
Approach LOS	A			A	C	

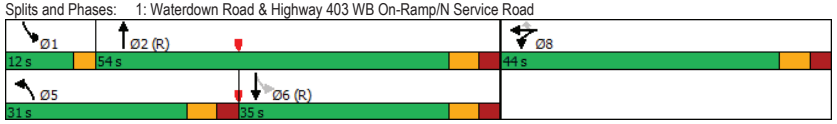
Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	57.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	280	500	220	600	840	115	570
Future Volume (vph)	280	500	220	600	840	115	570
Lane Group Flow (vph)	295	526	232	632	1100	121	758
Turn Type	Split	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8			6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	44.0	44.0	44.0	31.0	54.0	12.0	35.0
Total Split (%)	40.0%	40.0%	40.0%	28.2%	49.1%	10.9%	31.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.56	0.90	0.37	0.91	0.76	0.46	0.87
Control Delay	34.7	55.0	5.2	53.3	27.6	19.2	48.8
Queue Delay	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Total Delay	34.7	55.0	5.2	53.3	28.4	19.2	48.8
Queue Length 50th (m)	53.0	109.2	0.0	61.9	123.4	11.6	84.8
Queue Length 95th (m)	80.9	#169.0	16.8	#105.6	120.4	20.6	#122.5
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	558	619	644	698	1438	274	873
Starvation Cap Reductn	0	0	0	0	117	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.85	0.36	0.91	0.83	0.44	0.87

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	280	500	220	600	840	205	115	570	150
Future Volume (vph)	0	0	0	280	500	220	600	840	205	115	570	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3079		1601	3041	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.24	1.00	
Satd. Flow (perm)				1616	1792	1426	3022	3079		406	3041	
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	0	295	526	232	632	884	216	121	600	158
RTOR Reduction (vph)	0	0	0	0	0	156	0	19	0	0	21	0
Lane Group Flow (vph)	0	0	0	295	526	76	632	1081	0	121	737	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8				6		
Actuated Green, G (s)				34.9	34.9	34.9	24.3	49.7		38.2	29.8	
Effective Green, g (s)				35.9	35.9	35.9	25.3	50.7		40.2	30.8	
Actuated g/C Ratio				0.33	0.33	0.33	0.23	0.46		0.37	0.28	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				527	584	465	695	1419		250	851	
v/s Ratio Prot				0.18	c0.29		c0.21	0.35		0.04	c0.24	
v/s Ratio Perm						0.05				0.14		
v/c Ratio				0.56	0.90	0.16	0.91	0.76		0.48	0.87	
Uniform Delay, d1				30.5	35.3	26.4	41.2	24.6		24.0	37.6	
Progression Factor				1.00	1.00	1.00	0.93	0.99		1.00	1.00	
Incremental Delay, d2				1.3	17.0	0.2	11.9	2.8		1.5	11.5	
Delay (s)				31.8	52.4	26.5	50.4	27.2		25.5	49.1	
Level of Service				C	D	C	D	C		C	D	
Approach Delay (s)		0.0			40.9			35.7			45.9	
Approach LOS		A			D			D			D	

Intersection Summary

HCM 2000 Control Delay	39.6	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.89				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	79.0%	ICU Level of Service		D	
Analysis Period (min)	15				

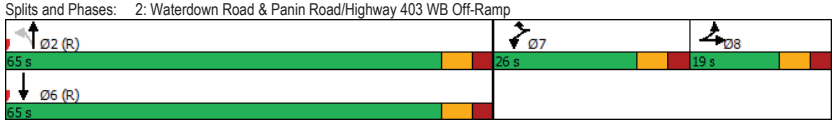
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	355	325	5	1320	850
Future Volume (vph)	0	355	325	5	1320	850
Lane Group Flow (vph)	6	403	369	0	1506	966
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	19.0	26.0	26.0	65.0	65.0	65.0
Total Split (%)	17.3%	23.6%	23.6%	59.1%	59.1%	59.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.03	0.69	0.82		0.67	0.40
Control Delay	0.2	48.3	33.8		21.7	12.2
Queue Delay	0.0	0.0	0.2		0.6	0.5
Total Delay	0.2	48.3	34.0		22.3	12.7
Queue Length 50th (m)	0.0	44.0	35.8		134.3	68.0
Queue Length 95th (m)	0.0	60.0	#81.3		96.9	50.0
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	290	623	468		2242	2403
Starvation Cap Reductn	0	0	0		352	879
Spillback Cap Reductn	0	0	4		79	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.02	0.65	0.80		0.80	0.63

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 94 (85%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	355	0	325	5	1320	0	0	850	0
Future Volume (vph)	0	0	5	355	0	325	5	1320	0	0	850	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3302			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	403	0	369	6	1500	0	0	966	0
RTOR Reduction (vph)	0	6	0	0	0	169	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	403	0	200	0	1506	0	0	966	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		19.3		19.3		68.1			68.1	
Effective Green, g (s)		2.6		20.3		20.3		69.1			69.1	
Actuated g/C Ratio		0.02		0.18		0.18		0.63			0.63	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		38		583		283		2074			2223	
v/s Ratio Prot		c0.00		0.13		c0.13					0.27	
v/s Ratio Perm								c0.46				
v/c Ratio		0.00		0.69		0.71		0.73			0.43	
Uniform Delay, d1		52.4		41.9		42.1		14.0			10.5	
Progression Factor		1.00		1.00		1.00		1.70			1.33	
Incremental Delay, d2		0.0		3.5		7.8		1.4			0.4	
Delay (s)		52.5		45.5		49.9		25.1			14.3	
Level of Service		D		D		D		C			B	
Approach Delay (s)		52.5			47.6			25.1			14.3	
Approach LOS		D			D			C			B	

Intersection Summary

HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

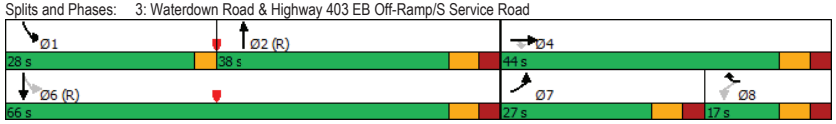
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	235	95	385	50	260	830	450	370	840
Future Volume (vph)	235	95	385	50	260	830	450	370	840
Lane Group Flow (vph)	264	107	433	56	292	933	506	416	944
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	pm+pt	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free	6	
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	6.0	6.0	8.0		6.0	8.0
Minimum Split (s)	15.0	29.0	29.0	13.0	13.0	29.0		9.0	29.0
Total Split (s)	27.0	44.0	44.0	17.0	17.0	38.0		28.0	66.0
Total Split (%)	24.5%	40.0%	40.0%	15.5%	15.5%	34.5%		25.5%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.85	0.18	0.76	0.53	0.73	0.82	0.32	0.93	0.47
Control Delay	67.7	26.6	33.8	65.9	16.8	35.1	0.4	58.7	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.7	26.6	33.8	65.9	16.8	35.1	0.4	58.7	23.4
Queue Length 50th (m)	57.6	16.7	64.7	12.2	0.0	110.5	0.0	94.7	104.4
Queue Length 95th (m)	#97.9	29.7	102.8	25.6	26.0	#145.2	0.0	#125.3	88.7
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	326	625	596	117	414	1139	1568	467	1994
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.17	0.73	0.48	0.71	0.82	0.32	0.89	0.47

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	95	385	50	0	260	0	830	450	370	840	0
Future Volume (vph)	235	95	385	50	0	260	0	830	450	370	840	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	1678	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.11	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	194	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	264	107	433	56	0	292	0	933	506	416	944	0
RTOR Reduction (vph)	0	0	73	0	0	266	0	0	0	0	0	0
Lane Group Flow (vph)	264	107	360	56	0	26	0	933	506	416	944	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	19.1	35.0	35.0	8.9		8.9		34.4	110.0	61.0	61.0	
Effective Green, g (s)	20.1	36.0	36.0	9.9		9.9		35.4	110.0	62.0	62.0	
Actuated g/C Ratio	0.18	0.33	0.33	0.09		0.09		0.32	1.00	0.56	0.56	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	312	592	497	105		136		1138	1568	441	1994	
v/s Ratio Prot	0.15	0.06				0.02		c0.26		c0.21	0.27	
v/s Ratio Perm			c0.24	0.05					0.32	0.32		
v/c Ratio	0.85	0.18	0.73	0.53		0.19		0.82	0.32	0.94	0.47	
Uniform Delay, d1	43.5	26.5	32.6	47.8		46.4		34.4	0.0	31.4	14.3	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.82	1.00	1.14	1.53	
Incremental Delay, d2	18.6	0.1	5.2	5.1		0.7		5.4	0.4	26.8	0.7	
Delay (s)	62.1	26.6	37.8	53.0		47.0		33.6	0.4	62.6	22.6	
Level of Service	E	C	D	D		D		C	A	E	C	
Approach Delay (s)		44.3			48.0			21.9			34.8	
Approach LOS		D			D			C			C	

Intersection Summary

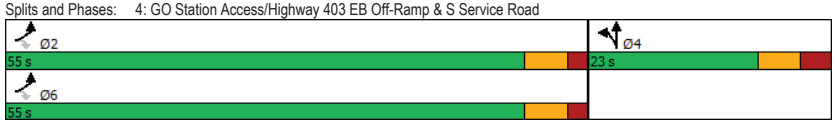
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	775	15	30		
Future Volume (vph)	775	15	30		
Lane Group Flow (vph)	994	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			23.0	55.0	55.0
Total Split (%)			29.5%	71%	71%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	Min	Min
v/c Ratio	0.94	0.02	0.76		
Control Delay	29.9	2.5	42.3		
Queue Delay	0.1	0.0	0.0		
Total Delay	30.0	2.5	42.3		
Queue Length 50th (m)	117.9	0.0	44.1		
Queue Length 95th (m)	135.2	1.7	59.9		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1194	1132	436		
Starvation Cap Reductn	8	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.84	0.02	0.69		

Intersection Summary
Cycle Length: 78
Actuated Cycle Length: 72.1
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	775	15	205	30	0	0
Future Volume (vph)	775	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	994	19	263	38	0	0
RTOR Reduction (vph)	0	7	0	0	0	0
Lane Group Flow (vph)	994	12	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	44.3	44.3		14.6		
Effective Green, g (s)	45.3	45.3		15.6		
Actuated g/C Ratio	0.63	0.63		0.22		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1067	1006		394		
v/s Ratio Prot	c0.59			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.93	0.01		0.76		
Uniform Delay, d1	11.9	5.0		26.4		
Progression Factor	1.00	1.00		1.00		
Incremental Delay, d2	14.0	0.0		8.5		
Delay (s)	25.9	5.0		35.0		
Level of Service	C	A		C		
Approach Delay (s)	25.5			35.0	0.0	
Approach LOS	C			C	A	

Intersection Summary				
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	71.9	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	65.0%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	1170	25	0	1275
Future Volume (Veh/h)	0	110	1170	25	0	1275
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	1272	27	0	1386
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.89	0.81			0.81	
vC, conflicting volume	1978	650			1299	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1062	91			895	
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	84			100	
cM capacity (veh/h)	196	772			620	

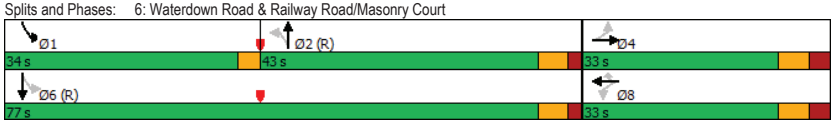
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	848	451	693	693
Volume Left	0	0	0	0	0
Volume Right	120	0	27	0	0
cSH	772	1700	1700	1700	1700
Volume to Capacity	0.16	0.50	0.27	0.41	0.41
Queue Length 95th (m)	4.4	0.0	0.0	0.0	0.0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.5	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		46.6%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	5	100	5	480	5	705	380	885
Future Volume (vph)	10	5	100	5	480	5	705	380	885
Lane Group Flow (vph)	0	25	0	133	608	6	936	481	1133
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	33.0	33.0	33.0	33.0	33.0	43.0	43.0	34.0	77.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	30.0%	39.1%	39.1%	30.9%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.14		0.60	0.87	0.04	0.62	0.79	0.45
Control Delay		30.4		51.9	21.2	24.4	27.9	27.6	14.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		30.4		51.9	21.2	24.4	27.9	27.6	14.3
Queue Length 50th (m)		3.7		28.2	18.8	0.8	84.6	71.8	84.0
Queue Length 95th (m)		9.2		38.4	32.0	3.6	103.6	91.3	88.0
Internal Link Dist (m)		95.0		120.3			324.2		93.2
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		254		317	781	158	1515	653	2528
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.10		0.42	0.78	0.04	0.62	0.74	0.45

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 72 (65%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2026 - With Improvements
6: Waterdown Road & Railway Road/Masonry Court — PM Peak Hour

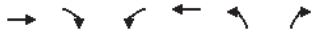


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	100	5	480	5	705	35	380	885	10
Future Volume (vph)	10	5	5	100	5	480	5	705	35	380	885	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196			1722	1599	1353	3410		1694	3473	
Flt Permitted		0.83			0.72	1.00	0.25	1.00		0.18	1.00	
Satd. Flow (perm)		1018			1295	1599	357	3410		330	3473	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	127	6	608	6	892	44	481	1120	13
RTOR Reduction (vph)	0	5	0	0	0	427	0	3	0	0	1	0
Lane Group Flow (vph)	0	20	0	0	133	181	6	933	0	481	1132	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		17.9			17.9	17.9	47.8	47.8		79.1	79.1	
Effective Green, g (s)		18.9			18.9	18.9	48.8	48.8		80.1	80.1	
Actuated g/C Ratio		0.17			0.17	0.17	0.44	0.44		0.73	0.73	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		174			222	274	158	1512		603	2528	
v/s Ratio Prot								c0.27		c0.21	0.33	
v/s Ratio Perm		0.02			0.10	c0.11	0.02			0.37		
v/c Ratio		0.12			0.60	0.66	0.04	0.62		0.80	0.45	
Uniform Delay, d1		38.5			42.1	42.6	17.3	23.4		19.1	6.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.20	1.99	
Incremental Delay, d2		0.3			4.3	5.9	0.4	1.9		6.6	0.5	
Delay (s)		38.8			46.4	48.5	17.8	25.3		29.5	12.5	
Level of Service		D			D	D	B	C		C	B	
Approach Delay (s)		38.8			48.1			25.3			17.6	
Approach LOS		D			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	71.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2026 - With Improvements
7: Cooke Boulevard & Site Driveway (East) — PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	15	0	225	30
Future Volume (Veh/h)	0	50	15	0	225	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	16	0	245	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		32	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		32	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	97
cM capacity (veh/h)			1564		977	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	16	278
Volume Left	0	16	245
Volume Right	54	0	33
cSH	1700	1564	989
Volume to Capacity	0.03	0.01	0.28
Queue Length 95th (m)	0.0	0.2	9.3
Control Delay (s)	0.0	7.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.1
Approach LOS			B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Future Total 2026 - With Improvements
8: Cooke Boulevard & Masonry Court — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	180	55	30	485	0	75	70	45	0	40	25
Future Volume (Veh/h)	185	180	55	30	485	0	75	70	45	0	40	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	226	220	67	37	591	0	91	85	55	0	49	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	591			287			1425	1370	254	1468	1404	591
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	591			150			1417	1356	113	1464	1393	591
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 %	77			97			0	16	93	100	49	94
cM capacity (veh/h)	995			1297			47	102	819	23	96	511

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	513	628	231	79
Volume Left	226	37	91	0
Volume Right	67	0	55	30
cSH	995	1297	82	139
Volume to Capacity	0.23	0.03	2.83	0.57
Queue Length 95th (m)	7.0	0.7	180.1	22.8
Control Delay (s)	5.7	0.8	934.1	60.2
Lane LOS	A	A	F	F
Approach Delay (s)	5.7	0.8	934.1	60.2
Approach LOS			F	F

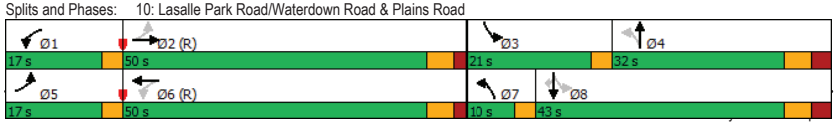
Intersection Summary				
Average Delay			154.4	
Intersection Capacity Utilization			77.5%	ICU Level of Service
Analysis Period (min)			15	

Queues — Future Total 2026 - With Improvements
10: Lasalle Park Road/Waterdown Road & Plains Road — PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	225	545	70	1010	115	200	360	260	370
Future Volume (vph)	225	545	70	1010	115	200	360	260	370
Lane Group Flow (vph)	232	634	72	1371	119	268	371	268	381
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6	7	4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	1	6	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	9.0	27.0	9.0	34.0	9.0	34.0	34.0
Total Split (s)	17.0	50.0	17.0	50.0	10.0	32.0	21.0	43.0	43.0
Total Split (%)	14.2%	41.7%	14.2%	41.7%	8.3%	26.7%	17.5%	35.8%	35.8%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	2.0	5.0	2.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.87	0.39	0.17	0.99	0.34	0.79	0.96	0.51	0.60
Control Delay	59.4	22.4	13.9	58.6	26.9	60.6	66.5	39.5	11.4
Queue Delay	0.0	0.0	0.0	37.3	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	22.4	13.9	95.9	26.9	60.6	66.5	39.5	11.4
Queue Length 50th (m)	40.4	53.4	7.8	~194.0	18.7	60.5	69.1	55.2	13.0
Queue Length 95th (m)	#90.1	74.7	15.8	#239.3	30.9	89.4	#114.3	79.8	42.8
Internal Link Dist (m)		134.8		135.1		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	274	1638	495	1378	345	395	387	585	674
Starvation Cap Reductn	0	0	0	172	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.39	0.15	1.14	0.34	0.68	0.96	0.46	0.57

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	545	70	70	1010	320	115	200	60	360	260	370
Future Volume (vph)	225	545	70	70	1010	320	115	200	60	360	260	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		2.0	5.0		2.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.96		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1616	3465		1639	3372		1694	1785		1709	1900	1491
Flt Permitted	0.08	1.00		0.40	1.00		0.59	1.00		0.27	1.00	1.00
Satd. Flow (perm)	136	3465		682	3372		1059	1785		493	1900	1491
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	232	562	72	72	1041	330	119	206	62	371	268	381
RTOR Reduction (vph)	0	7	0	0	24	0	0	10	0	0	0	225
Lane Group Flow (vph)	232	627	0	72	1347	0	119	258	0	371	268	156
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	64.7	54.9		54.0	47.2		28.3	21.3		42.3	32.3	32.3
Effective Green, g (s)	65.7	55.9		56.0	48.2		30.3	22.3		43.3	33.3	33.3
Actuated g/C Ratio	0.55	0.47		0.47	0.40		0.25	0.19		0.36	0.28	0.28
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	265	1614		380	1354		309	331		370	527	413
v/s Ratio Prot	c0.11	0.18		0.01	c0.40		0.03	c0.14		c0.16	0.14	
v/s Ratio Perm	0.37			0.08			0.07			0.20		0.10
v/c Ratio	0.88	0.39		0.19	0.99		0.39	0.78		1.00	0.51	0.38
Uniform Delay, d1	35.6	20.9		17.9	35.8		36.1	46.5		33.8	36.5	35.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	25.9	0.7		0.2	23.3		0.8	11.3		47.5	0.8	0.6
Delay (s)	61.4	21.6		18.1	59.0		36.9	57.8		81.2	37.2	35.6
Level of Service	E	C		B	E		D	E		F	D	D
Approach Delay (s)		32.3			57.0			51.4			52.6	
Approach LOS		C			E			D			D	

Intersection Summary				
HCM 2000 Control Delay	49.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	102.1%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	75	900	1385	110
Future Volume (vph)	75	900	1385	110
Lane Group Flow (vph)	77	928	1552	201
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.32	0.38	0.72	0.69
Control Delay	7.6	6.7	16.9	44.2
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	7.6	7.1	16.9	44.2
Queue Length 50th (m)	3.6	35.8	114.6	36.7
Queue Length 95th (m)	9.4	58.4	183.6	m51.0
Internal Link Dist (m)		135.1	120.0	317.3
Turn Bay Length (m)	60.0			
Base Capacity (vph)	317	2457	2147	408
Starvation Cap Reductn	0	944	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.24	0.61	0.72	0.49

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Plains Road & Cooke Boulevard



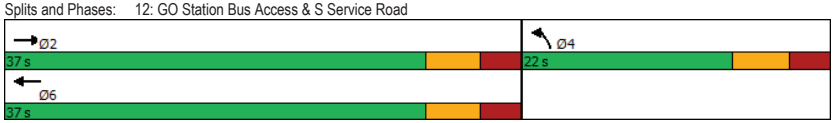
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	900	1385	120	110	85
Future Volume (vph)	75	900	1385	120	110	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3284		1621	
Flt Permitted	0.10	1.00	1.00		0.97	
Satd. Flow (perm)	173	3374	3284		1621	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	928	1428	124	113	88
RTOR Reduction (vph)	0	0	4	0	28	0
Lane Group Flow (vph)	77	928	1548	0	173	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	79.1	79.1	70.2		16.9	
Effective Green, g (s)	80.1	80.1	71.2		17.9	
Actuated g/C Ratio	0.73	0.73	0.65		0.16	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	217	2456	2125		263	
v/s Ratio Prot	0.02	c0.28	c0.47			
v/s Ratio Perm	0.24				c0.11	
v/c Ratio	0.35	0.38	0.73		0.66	
Uniform Delay, d1	9.2	5.6	12.9		43.2	
Progression Factor	1.00	1.00	1.00		0.90	
Incremental Delay, d2	1.0	0.4	2.2		5.8	
Delay (s)	10.2	6.1	15.2		44.6	
Level of Service	B	A	B		D	
Approach Delay (s)		6.4	15.2		44.6	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	71.8%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	715	295	15
Future Volume (vph)	715	295	15
Lane Group Flow (vph)	782	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	37.0	37.0	22.0
Total Split (%)	62.7%	62.7%	37.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	Min	Min	None
v/c Ratio	0.25	0.09	0.07
Control Delay	1.9	1.6	15.3
Queue Delay	0.0	0.0	0.0
Total Delay	1.9	1.6	15.3
Queue Length 50th (m)	0.0	0.0	0.6
Queue Length 95th (m)	27.6	10.6	5.9
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3082	3289	425
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.25	0.10	0.04

Intersection Summary
Cycle Length: 59
Actuated Cycle Length: 36.1
Natural Cycle: 50
Control Type: Semi Act-Uncoord

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	715	20	0	295	15	0
Future Volume (vph)	715	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3382			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3382			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	761	21	0	314	16	0
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	780	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	26.7			26.7	1.1	
Effective Green, g (s)	27.7			27.7	2.1	
Actuated g/C Ratio	0.66			0.66	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2241			2392	45	
v/s Ratio Prot	c0.23			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.35			0.13	0.36	
Uniform Delay, d1	3.1			2.6	19.2	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.1			0.0	4.8	
Delay (s)	3.2			2.6	24.0	
Level of Service	A			A	C	
Approach Delay (s)	3.2			2.6	24.0	
Approach LOS	A			A	C	

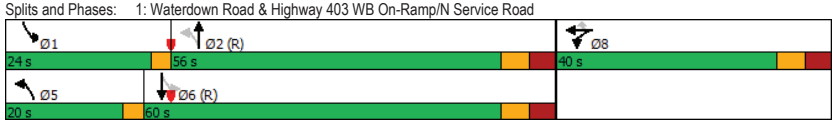
Intersection Summary			
HCM 2000 Control Delay	3.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	41.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	70	105	65	405	530	235	770
Future Volume (vph)	70	105	65	405	530	235	770
Lane Group Flow (vph)	71	107	66	413	1010	240	1000
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	20.0	56.0	24.0	60.0
Total Split (%)	33.3%	33.3%	33.3%	16.7%	46.7%	20.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.41	0.56	0.25	0.50	0.55	0.48	0.51
Control Delay	54.8	60.3	5.3	8.6	17.8	6.5	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	54.8	60.3	5.3	8.6	18.0	6.5	12.1
Queue Length 50th (m)	16.5	25.4	0.0	15.5	44.8	10.9	58.1
Queue Length 95th (m)	30.4	42.4	5.3	28.2	66.1	22.1	95.0
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	468	999	1851	535	1977
Starvation Cap Reductn	0	0	0	0	197	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.24	0.14	0.41	0.61	0.45	0.51

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	70	105	65	405	530	460	235	770	210
Future Volume (vph)	0	0	0	70	105	65	405	530	460	235	770	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2979		1616	2988	
Flt Permitted				0.95	1.00	1.00	0.28	1.00		0.22	1.00	
Satd. Flow (perm)				1442	1597	1439	877	2979		380	2988	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	71	107	66	413	541	469	240	786	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	90	0	0	13	0
Lane Group Flow (vph)	0	0	0	71	107	8	413	920	0	240	987	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	79.7	70.0		90.6	77.9	
Effective Green, g (s)				14.4	14.4	14.4	81.7	71.0		91.6	78.9	
Actuated g/C Ratio				0.12	0.12	0.12	0.68	0.59		0.76	0.66	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	786	1762		481	1964	
v/s Ratio Prot				0.05	c0.07		c0.05	0.31		c0.08	0.33	
v/s Ratio Perm						0.01	c0.31			0.30		
v/c Ratio				0.41	0.56	0.05	0.53	0.52		0.50	0.50	
Uniform Delay, d1				48.9	49.8	46.7	7.1	14.5		5.9	10.5	
Progression Factor				1.00	1.00	1.00	1.70	1.36		1.00	1.00	
Incremental Delay, d2				1.6	3.7	0.1	0.5	0.9		0.8	0.9	
Delay (s)				50.5	53.5	46.8	12.6	20.6		6.8	11.4	
Level of Service				D	D	D	B	C		A	B	
Approach Delay (s)		0.0			50.8			18.3			10.5	
Approach LOS		A			D			B			B	

Intersection Summary

HCM 2000 Control Delay	17.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	64.1%	ICU Level of Service		C	
Analysis Period (min)	15				

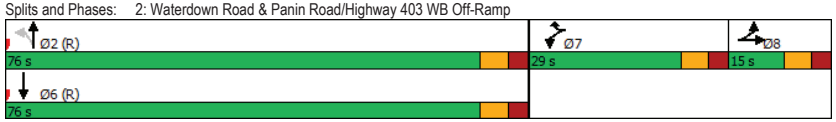
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	320	160	5	1230	840
Future Volume (vph)	0	320	160	5	1230	840
Lane Group Flow (vph)	5	348	174	0	1342	913
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	29.0	29.0	76.0	76.0	76.0
Total Split (%)	12.5%	24.2%	24.2%	63.3%	63.3%	63.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.68	0.49		0.58	0.37
Control Delay	53.4	54.2	14.9		12.5	4.6
Queue Delay	0.0	0.0	0.0		0.4	0.1
Total Delay	53.4	54.2	14.9		12.9	4.7
Queue Length 50th (m)	1.2	42.4	5.4		100.1	15.3
Queue Length 95th (m)	5.5	55.9	25.9		m45.1	75.9
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	616	395		2314	2462
Starvation Cap Reductn	0	0	0		432	493
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.56	0.44		0.71	0.46

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	320	0	160	5	1230	0	0	840	0
Future Volume (vph)	5	0	0	320	0	160	5	1230	0	0	840	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3394			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3231			3438	
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)	5	0	0	348	0	174	5	1337	0	0	913	0
RTOR Reduction (vph)	0	0	0	0	0	125	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	348	0	49	0	1342	0	0	913	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		18.2		18.2		79.2			79.2	
Effective Green, g (s)		2.6		19.2		19.2		80.2			80.2	
Actuated g/C Ratio		0.02		0.16		0.16		0.67			0.67	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		510		228		2159			2297	
v/s Ratio Prot		c0.00		c0.11		0.03					0.27	
v/s Ratio Perm								c0.42				
v/c Ratio		0.21		0.68		0.21		0.62			0.40	
Uniform Delay, d1		57.7		47.5		43.8		11.3			9.0	
Progression Factor		1.00		1.00		1.00		1.19			0.53	
Incremental Delay, d2		4.3		3.8		0.5		0.7			0.5	
Delay (s)		62.0		51.3		44.3		14.2			5.3	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			49.0			14.2			5.3	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

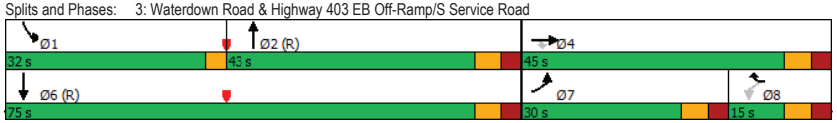
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	300	315	420	25	100	860	755	595	565
Future Volume (vph)	300	315	420	25	100	860	755	595	565
Lane Group Flow (vph)	323	339	452	27	108	925	812	640	608
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free		
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	7.0	7.0	8.0		6.0	8.0
Minimum Split (s)	15.0	21.0	21.0	15.0	15.0	29.0		13.0	29.0
Total Split (s)	30.0	45.0	45.0	15.0	15.0	43.0		32.0	75.0
Total Split (%)	25.0%	37.5%	37.5%	12.5%	12.5%	35.8%		26.7%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.92	0.55	0.67	0.45	0.49	0.82	0.53	0.82	0.32
Control Delay	79.4	37.5	18.4	76.4	14.8	53.7	2.4	49.3	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.4	37.5	18.4	76.4	14.8	53.7	2.4	49.3	13.2
Queue Length 50th (m)	79.4	69.0	36.7	6.8	0.0	99.5	6.8	68.2	37.2
Queue Length 95th (m)	#136.3	100.1	76.5	#17.6	12.6	#136.6	m17.2	107.4	32.4
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	351	615	679	62	224	1125	1524	856	1929
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.55	0.67	0.44	0.48	0.82	0.53	0.75	0.32

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	315	420	25	0	100	0	860	755	595	565	0
Future Volume (vph)	300	315	420	25	0	100	0	860	755	595	565	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	3426	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	1131	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	339	452	27	0	108	0	925	812	640	608	0
RTOR Reduction (vph)	0	0	186	0	0	100	0	0	0	0	0	0
Lane Group Flow (vph)	323	339	266	27	0	8	0	925	812	640	608	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	23.4	38.0	38.0	7.6		7.6		38.6	120.0	26.4	68.0	
Effective Green, g (s)	24.4	39.0	39.0	8.6		8.6		39.6	120.0	27.4	69.0	
Actuated g/C Ratio	0.20	0.32	0.32	0.07		0.07		0.33	1.00	0.23	0.58	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	351	611	489	60		102		1123	1524	782	1922	
v/s Ratio Prot	c0.19	0.18				0.01		c0.27		c0.19	0.18	
v/s Ratio Perm			0.18	0.03					c0.53			
v/c Ratio	0.92	0.55	0.54	0.45		0.08		0.82	0.53	0.82	0.32	
Uniform Delay, d1	46.8	33.4	33.2	53.4		52.0		37.0	0.0	43.9	13.2	
Progression Factor	1.00	1.00	1.00	0.98		1.11		1.30	1.00	0.92	0.95	
Incremental Delay, d2	28.7	1.1	1.2	5.3		0.3		4.9	0.9	6.2	0.4	
Delay (s)	75.5	34.4	34.4	57.8		58.3		52.9	0.9	46.8	13.0	
Level of Service	E	C	C	E		E		D	A	D	B	
Approach Delay (s)		46.4			58.2			28.6			30.3	
Approach LOS		D			E			C			C	

Intersection Summary

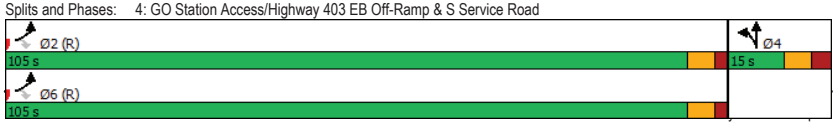
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	1075	160	25		
Future Volume (vph)	1075	160	25		
Lane Group Flow (vph)	1132	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.94	0.12	0.27		
Control Delay	28.6	0.6	57.9		
Queue Delay	4.7	0.0	0.0		
Total Delay	33.3	0.6	57.9		
Queue Length 50th (m)	~207.9	0.1	8.8		
Queue Length 95th (m)	#373.6	5.2	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	136		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.98	0.12	0.27		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1075	160	10	25	0	0
Future Volume (vph)	1075	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1132	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	1132	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.84			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.98	0.11		0.42		
Uniform Delay, d1	7.5	1.3		55.5		
Progression Factor	2.00	1.78		1.00		
Incremental Delay, d2	20.1	0.1		3.2		
Delay (s)	35.1	2.4		58.7		
Level of Service	D	A		E		
Approach Delay (s)	30.9			58.7	0.0	
Approach LOS	C			E	A	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	195	1420	10	0	1010
Future Volume (Veh/h)	0	195	1420	10	0	1010
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	212	1543	11	0	1098
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.68	0.64			0.64	
vC, conflicting volume	2098	777			1554	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1151	0			729	
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	69			100	
cM capacity (veh/h)	131	695			563	

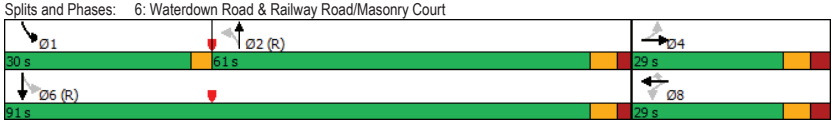
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	212	1029	525	549	549
Volume Left	0	0	0	0	0
Volume Right	212	0	11	0	0
cSH	695	1700	1700	1700	1700
Volume to Capacity	0.31	0.61	0.31	0.32	0.32
Queue Length 95th (m)	10.3	0.0	0.0	0.0	0.0
Control Delay (s)	12.4	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.4	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		58.3%	ICU Level of Service B
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	0	25	0	280	5	1140	420	580
Future Volume (vph)	10	0	25	0	280	5	1140	420	580
Lane Group Flow (vph)	0	22	0	28	318	6	1420	477	670
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	61.0	61.0	30.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	24.2%	50.8%	50.8%	25.0%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.15		0.23	0.74	0.02	0.86	0.80	0.24
Control Delay		2.2		52.9	16.2	17.4	33.7	51.3	2.5
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		2.2		52.9	16.2	17.4	33.7	51.3	2.5
Queue Length 50th (m)		0.0		6.7	0.0	0.7	155.2	99.3	7.3
Queue Length 95th (m)		0.2		15.0	24.7	3.4	192.2	#151.1	28.3
Internal Link Dist (m)		95.0		120.3			324.2		93.2
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		239		245	543	296	1656	596	2745
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.09		0.11	0.59	0.02	0.86	0.80	0.24

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2031 - With Improvements
6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour

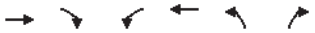


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	25	0	280	5	1140	110	420	580	10
Future Volume (vph)	10	0	10	25	0	280	5	1140	110	420	580	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184			1641	1495	1454	3386		1728	3376	
Flt Permitted		0.84			0.74	1.00	0.40	1.00		0.07	1.00	
Satd. Flow (perm)		1016			1283	1495	608	3386		120	3376	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	28	0	318	6	1295	125	477	659	11
RTOR Reduction (vph)	0	20	0	0	0	288	0	6	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	28	30	6	1414	0	477	669	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		10.5			10.5	10.5	57.5	57.5		96.5	96.5	
Effective Green, g (s)		11.5			11.5	11.5	58.5	58.5		97.5	97.5	
Actuated g/C Ratio		0.10			0.10	0.10	0.49	0.49		0.81	0.81	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		97			122	143	296	1650		593	2743	
v/s Ratio Prot								c0.42		c0.25	0.20	
v/s Ratio Perm		0.00			c0.02	0.02	0.01			0.40		
v/c Ratio		0.02			0.23	0.21	0.02	0.86		0.80	0.24	
Uniform Delay, d1		49.2			50.2	50.1	15.9	27.1		31.9	2.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.41	0.79	
Incremental Delay, d2		0.1			1.0	0.7	0.1	6.0		7.2	0.2	
Delay (s)		49.2			51.1	50.8	16.0	33.1		52.1	2.3	
Level of Service		D			D	D	B	C		D	A	
Approach Delay (s)		49.2			50.8			33.0			23.0	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	78.6%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2031 - With Improvements
7: Cooke Boulevard & Site Driveway (East) — AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	85	30	0	70	5
Future Volume (Veh/h)	0	85	30	0	70	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	92	33	0	76	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)						
pX, platoon unblocked						
vC, conflicting volume			92		66	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		66	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	100
cM capacity (veh/h)			1515		924	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	33	81
Volume Left	0	33	76
Volume Right	92	0	5
cSH	1700	1515	933
Volume to Capacity	0.05	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.3
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	430	45	45	180	0	80	20	25	0	70	45
Future Volume (Veh/h)	55	430	45	45	180	0	80	20	25	0	70	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	71	551	58	58	231	0	103	26	32	0	90	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	231			609			1172	1069	580	1114	1098	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			544			1148	1037	513	1086	1069	231
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	95			94			0	87	94	100	51	93
cM capacity (veh/h)	1349			965			85	193	527	141	185	793

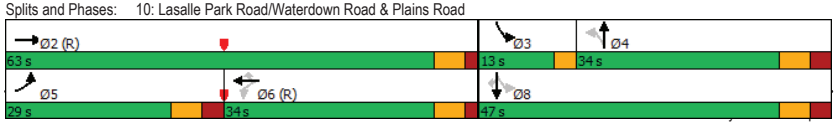
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	680	289	161	148
Volume Left	71	58	103	0
Volume Right	58	0	32	58
cSH	1349	965	115	265
Volume to Capacity	0.05	0.06	1.40	0.56
Queue Length 95th (m)	1.3	1.5	89.5	25.0
Control Delay (s)	1.4	2.3	295.2	34.5
Lane LOS	A	A	F	D
Approach Delay (s)	1.4	2.3	295.2	34.5
Approach LOS			F	D

Intersection Summary					
Average Delay			42.5		
Intersection Capacity Utilization			53.0%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	695	890	75	365	265	90	295	245	170	200
Future Volume (vph)	695	890	75	365	265	90	295	245	170	200
Lane Group Flow (vph)	739	1107	80	388	282	96	378	261	181	213
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	29.0	63.0	34.0	34.0	34.0	34.0	34.0	13.0	47.0	47.0
Total Split (%)	26.4%	57.3%	30.9%	30.9%	30.9%	30.9%	30.9%	11.8%	42.7%	42.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.95	0.63	0.81	0.51	0.52	0.35	0.87	0.87	0.26	0.31
Control Delay	64.0	20.5	89.8	39.4	7.9	38.1	60.1	53.9	24.6	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	20.5	89.8	39.4	7.9	38.1	60.1	53.9	24.6	4.5
Queue Length 50th (m)	~96.8	88.0	16.4	38.9	0.9	17.7	78.8	40.1	27.7	0.0
Queue Length 95th (m)	#135.0	107.4	#41.6	53.3	22.1	33.4	#127.4	#90.8	45.8	15.4
Internal Link Dist (m)		134.8		135.5			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	782	1811	119	906	596	296	464	301	698	688
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.61	0.67	0.43	0.47	0.32	0.81	0.87	0.26	0.31

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis — Future Total 2031 - With Improvements
10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	695	890	150	75	365	265	90	295	60	245	170	200
Future Volume (vph)	695	890	150	75	365	265	90	295	60	245	170	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3255	3408		1668	3438	1488	1719	1796		1614	1810	1446
Flt Permitted	0.95	1.00		0.26	1.00	1.00	0.64	1.00		0.19	1.00	1.00
Satd. Flow (perm)	3255	3408		452	3438	1488	1164	1796		321	1810	1446
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)	739	947	160	80	388	282	96	314	64	261	181	213
RTOR Reduction (vph)	0	13	0	0	0	216	0	7	0	0	0	131
Lane Group Flow (vph)	739	1094	0	80	388	66	96	371	0	261	181	82
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	25.5	55.6		23.1	23.1	23.1	25.2	25.2		41.4	41.4	41.4
Effective Green, g (s)	26.5	56.6		24.1	24.1	24.1	26.2	26.2		42.4	42.4	42.4
Actuated g/C Ratio	0.24	0.51		0.22	0.22	0.22	0.24	0.24		0.39	0.39	0.39
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	784	1753		99	753	326	277	427		290	697	557
v/s Ratio Prot	c0.23	0.32			0.11			c0.21		c0.12	0.10	
v/s Ratio Perm				c0.18		0.04	0.08			0.23		0.06
v/c Ratio	0.94	0.62		0.81	0.52	0.20	0.35	0.87		0.90	0.26	0.15
Uniform Delay, d1	41.0	19.1		40.8	37.8	35.1	34.8	40.3		26.9	23.1	22.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	19.4	1.7		48.9	2.5	1.4	0.8	16.9		28.7	0.2	0.1
Delay (s)	60.4	20.8		89.6	40.3	36.5	35.5	57.1		55.6	23.3	22.1
Level of Service	E	C		F	D	D	D	E		E	C	C
Approach Delay (s)		36.7			44.1			52.8			35.8	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	88.6%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Total 2031 - With Improvements
11: Plains Road & Cooke Boulevard — AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	95	1115	685	110
Future Volume (vph)	95	1115	685	110
Lane Group Flow (vph)	106	1239	850	205
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.24	0.55	0.45	0.71
Control Delay	6.2	9.7	13.6	44.7
Queue Delay	0.0	0.7	0.0	0.0
Total Delay	6.2	10.4	13.6	44.7
Queue Length 50th (m)	5.3	58.3	46.5	33.2
Queue Length 95th (m)	13.4	96.5	78.4	53.1
Internal Link Dist (m)		135.5	123.7	313.8
Turn Bay Length (m)	60.0			
Base Capacity (vph)	500	2272	1899	385
Starvation Cap Reductn	0	616	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.21	0.75	0.45	0.53

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



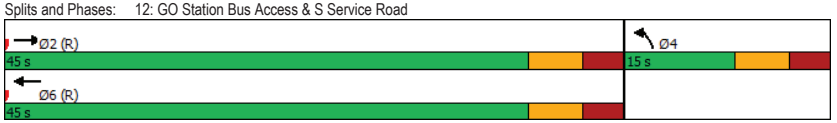
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	95	1115	685	80	110	75
Future Volume (vph)	95	1115	685	80	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.98		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3282	3236		1381	
Flt Permitted	0.28	1.00	1.00		0.97	
Satd. Flow (perm)	479	3282	3236		1381	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1239	761	89	122	83
RTOR Reduction (vph)	0	0	7	0	27	0
Lane Group Flow (vph)	106	1239	843	0	178	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	68.1	68.1	57.5		17.9	
Effective Green, g (s)	69.1	69.1	58.5		18.9	
Actuated g/C Ratio	0.69	0.69	0.58		0.19	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	430	2267	1893		261	
v/s Ratio Prot	0.02	c0.38	0.26			
v/s Ratio Perm	0.15				c0.13	
v/c Ratio	0.25	0.55	0.45		0.68	
Uniform Delay, d1	5.7	7.7	11.6		37.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	1.0	0.8		7.2	
Delay (s)	6.0	8.6	12.4		44.9	
Level of Service	A	A	B		D	
Approach Delay (s)		8.4	12.4		44.9	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	51.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1650	110	15
Future Volume (vph)	1650	110	15
Lane Group Flow (vph)	1809	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.56	0.04	0.12
Control Delay	3.8	1.2	24.5
Queue Delay	0.1	0.0	0.0
Total Delay	3.8	1.2	24.5
Queue Length 50th (m)	3.9	0.0	1.6
Queue Length 95th (m)	133.6	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3233	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	239	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.60	0.04	0.12

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

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1650	15	0	110	15	0
Future Volume (vph)	1650	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3475			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3475			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1793	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1808	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2629			2731	38	
v/s Ratio Prot	c0.52			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.69			0.04	0.42	
Uniform Delay, d1	3.7			1.8	28.0	
Progression Factor	1.47			0.90	1.00	
Incremental Delay, d2	1.2			0.0	7.4	
Delay (s)	6.6			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	6.6			1.7	35.3	
Approach LOS	A			A	D	

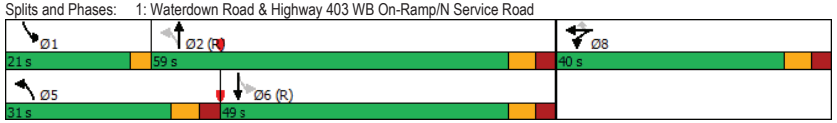
Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	280	500	220	640	850	115	640
Future Volume (vph)	280	500	220	640	850	115	640
Lane Group Flow (vph)	295	526	232	674	1111	121	832
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	31.0	59.0	21.0	49.0
Total Split (%)	33.3%	33.3%	33.3%	25.8%	49.2%	17.5%	40.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.56	0.89	0.37	0.90	0.76	0.46	0.81
Control Delay	39.2	58.5	6.0	45.8	31.9	17.9	42.3
Queue Delay	0.0	0.0	0.0	0.0	1.9	0.0	0.0
Total Delay	39.2	58.5	6.0	45.8	33.8	17.9	42.3
Queue Length 50th (m)	60.3	124.2	0.0	56.9	120.4	11.9	97.1
Queue Length 95th (m)	96.1	#209.5	19.2	93.6	97.1	18.1	117.0
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	530	588	624	801	1460	378	1109
Starvation Cap Reductn	0	0	0	0	202	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.89	0.37	0.84	0.88	0.32	0.75

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	280	500	220	640	850	205	115	640	150
Future Volume (vph)	0	0	0	280	500	220	640	850	205	115	640	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3080		1601	3050	
Flt Permitted				0.95	1.00	1.00	0.15	1.00		0.20	1.00	
Satd. Flow (perm)				1616	1792	1426	473	3080		341	3050	
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	0	295	526	232	674	895	216	121	674	158
RTOR Reduction (vph)	0	0	0	0	0	156	0	16	0	0	17	0
Lane Group Flow (vph)	0	0	0	295	526	76	674	1095	0	121	815	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				38.4	38.4	38.4	67.6	55.2		48.3	38.9	
Effective Green, g (s)				39.4	39.4	39.4	68.6	56.2		50.3	39.9	
Actuated g/C Ratio				0.33	0.33	0.33	0.57	0.47		0.42	0.33	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				530	588	468	752	1442		252	1014	
v/s Ratio Prot				0.18	c0.29		c0.17	0.36		0.04	0.27	
v/s Ratio Perm						0.05	c0.34			0.16		
v/c Ratio				0.56	0.89	0.16	0.90	0.76		0.48	0.80	
Uniform Delay, d1				33.1	38.3	28.6	28.0	26.3		22.3	36.5	
Progression Factor				1.00	1.00	1.00	1.42	1.15		1.00	1.00	
Incremental Delay, d2				1.3	16.0	0.2	9.5	2.6		1.4	6.7	
Delay (s)				34.4	54.3	28.8	49.4	32.7		23.7	43.2	
Level of Service				C	D	C	D	C		C	D	
Approach Delay (s)		0.0			43.1			39.0			40.7	
Approach LOS		A			D			D			D	

Intersection Summary

HCM 2000 Control Delay	40.6	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.92				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	82.1%	ICU Level of Service		E	
Analysis Period (min)	15				

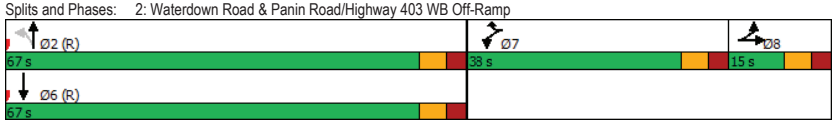
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	375	345	5	1350	920
Future Volume (vph)	0	375	345	5	1350	920
Lane Group Flow (vph)	6	426	392	0	1540	1045
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	38.0	38.0	67.0	67.0	67.0
Total Split (%)	12.5%	31.7%	31.7%	55.8%	55.8%	55.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.03	0.61	0.87		0.71	0.45
Control Delay	0.2	45.2	47.4		15.2	10.4
Queue Delay	0.0	0.0	0.0		0.1	0.2
Total Delay	0.2	45.2	47.4		15.2	10.7
Queue Length 50th (m)	0.0	48.1	60.7		73.1	46.7
Queue Length 95th (m)	0.0	61.0	94.1		76.8	52.4
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	215	843	515		2159	2313
Starvation Cap Reductn	0	0	0		40	536
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.03	0.51	0.76		0.73	0.59

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	375	0	345	5	1350	0	0	920	0
Future Volume (vph)	0	0	5	375	0	345	5	1350	0	0	920	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3300			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	426	0	392	6	1534	0	0	1045	0
RTOR Reduction (vph)	0	6	0	0	0	112	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	426	0	280	0	1540	0	0	1045	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		25.5		25.5		71.9			71.9	
Effective Green, g (s)		2.6		26.5		26.5		72.9			72.9	
Actuated g/C Ratio		0.02		0.22		0.22		0.61			0.61	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		698		339		2004			2149	
v/s Ratio Prot		c0.00		0.13		c0.18					0.30	
v/s Ratio Perm								c0.47				
v/c Ratio		0.00		0.61		0.83		0.77			0.49	
Uniform Delay, d1		57.4		42.1		44.5		17.3			13.1	
Progression Factor		1.00		1.00		1.00		0.85			0.82	
Incremental Delay, d2		0.0		1.6		15.0		1.8			0.6	
Delay (s)		57.5		43.7		59.5		16.6			11.4	
Level of Service		E		D		E		B			B	
Approach Delay (s)		57.5			51.3			16.6			11.4	
Approach LOS		E			D			B			B	

Intersection Summary

HCM 2000 Control Delay	23.4	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.76				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	80.5%	ICU Level of Service		D	
Analysis Period (min)	15				

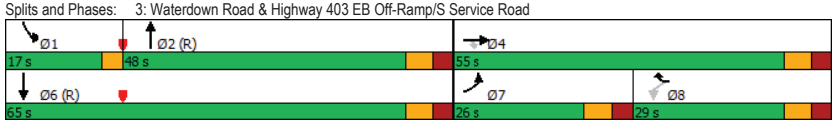
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	250	95	410	50	260	860	480	395	905
Future Volume (vph)	250	95	410	50	260	860	480	395	905
Lane Group Flow (vph)	281	107	461	56	292	966	539	444	1017
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free		
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0		6.0	8.0
Minimum Split (s)	12.0	29.0	29.0	29.0	29.0	29.0		9.0	29.0
Total Split (s)	26.0	55.0	55.0	29.0	29.0	48.0		17.0	65.0
Total Split (%)	21.7%	45.8%	45.8%	24.2%	24.2%	40.0%		14.2%	54.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.88	0.17	0.79	0.40	0.72	0.81	0.34	0.72	0.53
Control Delay	76.3	26.3	39.5	72.2	47.6	39.0	0.5	53.2	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	0.2
Total Delay	76.3	26.3	39.5	72.2	47.7	40.0	0.5	53.2	21.9
Queue Length 50th (m)	68.9	18.7	91.8	14.7	50.4	67.4	0.0	47.3	74.7
Queue Length 95th (m)	#124.5	28.6	119.1	28.3	75.5	113.6	0.0	#99.0	93.2
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	319	739	660	224	494	1238	1568	620	1921
Starvation Cap Reductn	0	0	0	0	0	0	0	0	241
Spillback Cap Reductn	0	0	0	0	6	93	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.14	0.70	0.25	0.60	0.84	0.34	0.72	0.61

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	95	410	50	0	260	0	860	480	395	905	0
Future Volume (vph)	250	95	410	50	0	260	0	860	480	395	905	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	3255	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	3255	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	281	107	461	56	0	292	0	966	539	444	1017	0
RTOR Reduction (vph)	0	0	43	0	0	221	0	0	0	0	0	0
Lane Group Flow (vph)	281	107	418	56	0	71	0	966	539	444	1017	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	21.4	41.9	41.9	13.5		13.5		39.2	120.0	21.9	64.1	
Effective Green, g (s)	22.4	42.9	42.9	14.5		14.5		40.2	120.0	22.9	65.1	
Actuated g/C Ratio	0.19	0.36	0.36	0.12		0.12		0.34	1.00	0.19	0.54	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	319	647	543	141		183		1185	1568	621	1919	
v/s Ratio Prot	0.16	0.06				0.05		c0.27		c0.14	0.29	
v/s Ratio Perm			c0.27	0.05					0.34			
v/c Ratio	0.88	0.17	0.77	0.40		0.39		0.82	0.34	0.71	0.53	
Uniform Delay, d1	47.5	26.3	34.2	48.7		48.7		36.5	0.0	45.5	17.6	
Progression Factor	1.00	1.00	1.00	1.37		4.01		0.93	1.00	1.00	1.13	
Incremental Delay, d2	23.5	0.1	6.5	1.8		1.4		5.0	0.5	3.5	0.9	
Delay (s)	71.0	26.4	40.7	68.6		196.4		39.0	0.5	49.2	20.9	
Level of Service	E	C	D	E		F		D	A	D	C	
Approach Delay (s)		48.9			175.8			25.2			29.5	
Approach LOS		D			F			C			C	

Intersection Summary

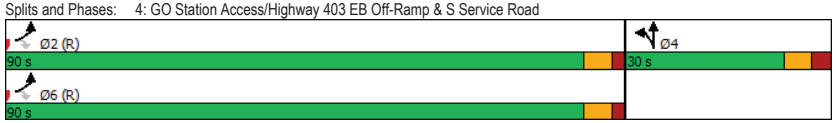
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	830	15	30		
Future Volume (vph)	830	15	30		
Lane Group Flow (vph)	1064	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			30.0	90.0	90.0
Total Split (%)			25.0%	75%	75%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.88	0.02	0.85		
Control Delay	23.3	1.7	68.7		
Queue Delay	0.9	0.0	0.0		
Total Delay	24.2	1.7	68.7		
Queue Length 50th (m)	189.1	0.0	70.3		
Queue Length 95th (m)	203.4	0.6	88.5		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1214	1150	371		
Starvation Cap Reductn	36	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.90	0.02	0.81		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	830	15	205	30	0	0
Future Volume (vph)	830	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	1064	19	263	38	0	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	1064	14	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	84.6	84.6		22.4		
Effective Green, g (s)	85.6	85.6		23.4		
Actuated g/C Ratio	0.71	0.71		0.19		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1208	1139		354		
v/s Ratio Prot	c0.63			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.88	0.01		0.85		
Uniform Delay, d1	13.3	5.0		46.6		
Progression Factor	0.93	0.76		1.00		
Incremental Delay, d2	9.3	0.0		17.4		
Delay (s)	21.7	3.8		64.0		
Level of Service	C	A		E		
Approach Delay (s)	21.3			64.0	0.0	
Approach LOS	C			E	A	

Intersection Summary			
HCM 2000 Control Delay	30.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	1230	25	0	1365
Future Volume (Veh/h)	0	110	1230	25	0	1365
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	1337	27	0	1484
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.87	0.78			0.78	
vC, conflicting volume	2092	682			1364	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1006	18			895	
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	85			100	
cM capacity (veh/h)	210	826			596	

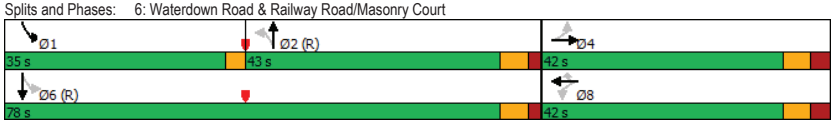
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	891	473	742	742
Volume Left	0	0	0	0	0
Volume Right	120	0	27	0	0
cSH	826	1700	1700	1700	1700
Volume to Capacity	0.15	0.52	0.28	0.44	0.44
Queue Length 95th (m)	4.1	0.0	0.0	0.0	0.0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.1	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		48.3%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	5	100	5	480	5	765	380	975
Future Volume (vph)	10	5	100	5	480	5	765	380	975
Lane Group Flow (vph)	0	25	0	133	608	6	1012	481	1247
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	42.0	42.0	42.0	42.0	42.0	43.0	43.0	35.0	78.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.8%	35.8%	29.2%	65.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.13		0.57	0.86	0.04	0.68	0.81	0.49
Control Delay		31.0		52.7	20.2	28.2	32.7	36.7	6.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		31.0		52.7	20.2	28.2	32.7	36.7	6.0
Queue Length 50th (m)		4.1		31.1	20.7	0.9	105.1	71.2	32.5
Queue Length 95th (m)		8.9		37.9	29.9	4.0	130.0	110.0	77.5
Internal Link Dist (m)		95.0		120.3			324.2		93.2
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		312		388	840	138	1484	617	2531
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.08		0.34	0.72	0.04	0.68	0.78	0.49

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2031 - With Improvements
6: Waterdown Road & Railway Road/Masonry Court — PM Peak Hour

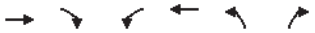


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	100	5	480	5	765	35	380	975	10
Future Volume (vph)	10	5	5	100	5	480	5	765	35	380	975	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196			1722	1599	1353	3412		1694	3476	
Flt Permitted		0.84			0.72	1.00	0.22	1.00		0.15	1.00	
Satd. Flow (perm)		1026			1295	1599	319	3412		267	3476	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	127	6	608	6	968	44	481	1234	13
RTOR Reduction (vph)	0	5	0	0	0	422	0	2	0	0	1	0
Lane Group Flow (vph)	0	20	0	0	133	186	6	1010	0	481	1246	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		20.6			20.6	20.6	51.1	51.1		86.4	86.4	
Effective Green, g (s)		21.6			21.6	21.6	52.1	52.1		87.4	87.4	
Actuated g/C Ratio		0.18			0.18	0.18	0.43	0.43		0.73	0.73	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		184			233	287	138	1481		590	2531	
v/s Ratio Prot								c0.30		c0.23	0.36	
v/s Ratio Perm		0.02			0.10	c0.12	0.02			0.37		
v/c Ratio		0.11			0.57	0.65	0.04	0.68		0.82	0.49	
Uniform Delay, d1		41.2			45.0	45.7	19.6	27.3		24.9	6.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.25	0.65	
Incremental Delay, d2		0.3			3.4	5.0	0.6	2.6		7.6	0.6	
Delay (s)		41.4			48.3	50.6	20.2	29.8		38.7	5.1	
Level of Service		D			D	D	C	C		D	A	
Approach Delay (s)		41.4			50.2			29.8			14.5	
Approach LOS		D			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	72.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2031 - With Improvements
7: Cooke Boulevard & Site Driveway (East) — PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	15	0	225	30
Future Volume (Veh/h)	0	50	15	0	225	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	16	0	245	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		32	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		32	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	97
cM capacity (veh/h)			1564		977	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	16	278
Volume Left	0	16	245
Volume Right	54	0	33
cSH	1700	1564	989
Volume to Capacity	0.03	0.01	0.28
Queue Length 95th (m)	0.0	0.2	9.3
Control Delay (s)	0.0	7.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.1
Approach LOS			B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	180	55	30	485	0	75	70	45	0	40	25
Future Volume (Veh/h)	185	180	55	30	485	0	75	70	45	0	40	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	226	220	67	37	591	0	91	85	55	0	49	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	591			287			1425	1370	254	1468	1404	591
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	591			149			1416	1356	112	1464	1393	591
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 %	77			97			0	16	93	100	49	94
cM capacity (veh/h)	995			1297			47	102	819	22	96	511

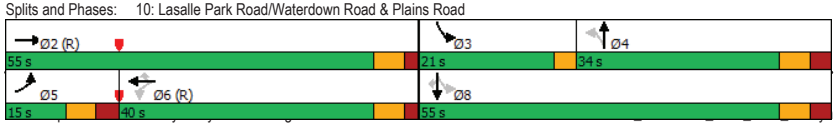
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	513	628	231	79
Volume Left	226	37	91	0
Volume Right	67	0	55	30
cSH	995	1297	82	139
Volume to Capacity	0.23	0.03	2.83	0.57
Queue Length 95th (m)	7.0	0.7	180.1	22.8
Control Delay (s)	5.7	0.8	935.6	60.2
Lane LOS	A	A	F	F
Approach Delay (s)	5.7	0.8	935.6	60.2
Approach LOS			F	F

Intersection Summary					
Average Delay			154.6		
Intersection Capacity Utilization			77.5%	ICU Level of Service	D
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	245	595	75	1110	340	125	220	390	285	405
Future Volume (vph)	245	595	75	1110	340	125	220	390	285	405
Lane Group Flow (vph)	253	690	77	1144	351	129	294	402	294	418
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	15.0	55.0	40.0	40.0	40.0	34.0	34.0	21.0	55.0	55.0
Total Split (%)	13.6%	50.0%	36.4%	36.4%	36.4%	30.9%	30.9%	19.1%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.70	0.40	0.35	0.98	0.50	0.60	0.77	0.94	0.39	0.58
Control Delay	58.9	18.2	46.7	62.1	18.4	50.6	52.5	56.2	24.4	14.7
Queue Delay	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.9	18.2	46.7	67.6	18.4	50.6	52.5	56.2	24.4	14.7
Queue Length 50th (m)	28.5	48.6	14.1	~119.2	21.9	26.3	59.9	64.7	45.9	33.5
Queue Length 95th (m)	#57.0	68.9	m22.7	#183.6	m59.3	45.1	86.8	#108.1	63.9	60.4
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	363	1743	220	1168	703	263	464	426	846	783
Starvation Cap Reductn	0	0	0	30	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.40	0.35	1.01	0.50	0.49	0.63	0.94	0.35	0.53

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis — Future Total 2031 - With Improvements

10: Lasalle Park Road/Waterdown Road & Plains Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	595	75	75	1110	340	125	220	65	390	285	405
Future Volume (vph)	245	595	75	75	1110	340	125	220	65	390	285	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3134	3467		1630	3539	1507	1694	1786		1709	1900	1493
Flt Permitted	0.95	1.00		0.39	1.00	1.00	0.58	1.00		0.28	1.00	1.00
Satd. Flow (perm)	3134	3467		668	3539	1507	1035	1786		499	1900	1493
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	253	613	77	77	1144	351	129	227	67	402	294	418
RTOR Reduction (vph)	0	8	0	0	0	206	0	10	0	0	0	129
Lane Group Flow (vph)	253	682	0	77	1144	145	129	284	0	402	294	289
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	11.8	54.1		35.3	35.3	35.3	21.9	21.9		42.9	42.9	42.9
Effective Green, g (s)	12.8	55.1		36.3	36.3	36.3	22.9	22.9		43.9	43.9	43.9
Actuated g/C Ratio	0.12	0.50		0.33	0.33	0.33	0.21	0.21		0.40	0.40	0.40
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	364	1736		220	1167	497	215	371		408	758	595
v/s Ratio Prot	c0.08	0.20			c0.32			c0.16		c0.17	0.15	
v/s Ratio Perm				0.12		0.10	0.12			0.22		0.19
v/c Ratio	0.70	0.39		0.35	0.98	0.29	0.60	0.76		0.99	0.39	0.49
Uniform Delay, d1	46.7	17.1		27.9	36.5	27.3	39.4	41.0		28.1	23.5	24.6
Progression Factor	1.00	1.00		1.46	1.25	3.18	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.7	0.7		2.7	16.6	0.9	4.5	9.1		40.3	0.3	0.6
Delay (s)	52.4	17.7		43.5	62.2	87.7	43.9	50.1		68.4	23.8	25.3
Level of Service	D	B		D	E	F	D	D		E	C	C
Approach Delay (s)		27.0			67.0			48.2			40.5	
Approach LOS		C			E			D			D	

Intersection Summary				
HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	93.5%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Total 2031 - With Improvements

11: Plains Road & Cooke Boulevard — PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	75	985	1510	110
Future Volume (vph)	75	985	1510	110
Lane Group Flow (vph)	77	1015	1681	201
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.36	0.41	0.78	0.69
Control Delay	8.1	7.0	19.0	47.9
Queue Delay	0.0	0.3	0.3	1.5
Total Delay	8.1	7.3	19.3	49.4
Queue Length 50th (m)	2.3	62.1	134.2	36.2
Queue Length 95th (m)	m6.5	m84.5	#235.6	57.3
Internal Link Dist (m)		135.9	112.1	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	292	2457	2148	408
Starvation Cap Reductn	0	775	0	0
Spillback Cap Reductn	0	0	102	87
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.26	0.60	0.82	0.63

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Plains Road & Cooke Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	985	1510	120	110	85
Future Volume (vph)	75	985	1510	120	110	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3288		1621	
Flt Permitted	0.08	1.00	1.00		0.97	
Satd. Flow (perm)	134	3374	3288		1621	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	1015	1557	124	113	88
RTOR Reduction (vph)	0	0	4	0	28	0
Lane Group Flow (vph)	77	1015	1677	0	173	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	79.1	79.1	70.1		16.9	
Effective Green, g (s)	80.1	80.1	71.1		17.9	
Actuated g/C Ratio	0.73	0.73	0.65		0.16	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	192	2456	2125		263	
v/s Ratio Prot	0.03	c0.30	c0.51			
v/s Ratio Perm	0.27				c0.11	
v/c Ratio	0.40	0.41	0.79		0.66	
Uniform Delay, d1	11.7	5.8	14.0		43.2	
Progression Factor	0.91	1.02	1.00		1.00	
Incremental Delay, d2	1.1	0.4	3.1		5.9	
Delay (s)	11.8	6.4	17.1		49.1	
Level of Service	B	A	B		D	
Approach Delay (s)		6.7	17.1		49.1	
Approach LOS		A	B		D	

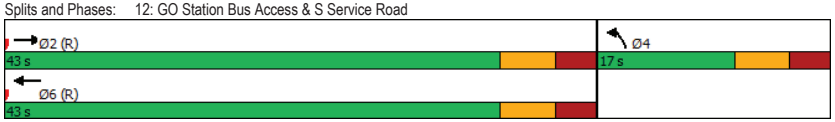
Intersection Summary				
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	75.3%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	770	295	15
Future Volume (vph)	770	295	15
Lane Group Flow (vph)	840	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.27	0.09	0.12
Control Delay	0.6	0.2	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	0.6	0.2	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	10.3	m1.2	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3139	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	143	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.28	0.09	0.10

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	770	20	0	295	15	0
Future Volume (vph)	770	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3388			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3388			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	819	21	0	314	16	0
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	838	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2552			2719	42	
v/s Ratio Prot	c0.25			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.33			0.12	0.38	
Uniform Delay, d1	2.4			2.0	27.8	
Progression Factor	0.30			0.15	1.00	
Incremental Delay, d2	0.3			0.1	5.7	
Delay (s)	1.0			0.4	33.4	
Level of Service	A			A	C	
Approach Delay (s)	1.0			0.4	33.4	
Approach LOS	A			A	C	

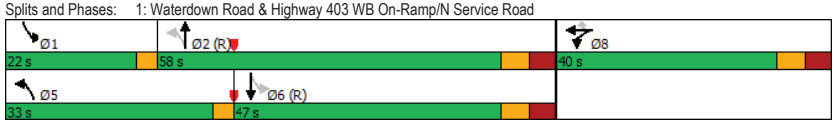
Intersection Summary			
HCM 2000 Control Delay	1.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	70	105	65	465	600	235	810
Future Volume (vph)	70	105	65	465	600	235	810
Lane Group Flow (vph)	71	107	66	474	1086	240	1041
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	33.0	58.0	22.0	47.0
Total Split (%)	33.3%	33.3%	33.3%	27.5%	48.3%	18.3%	39.2%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.41	0.56	0.25	0.54	0.57	0.53	0.57
Control Delay	54.8	60.3	5.3	14.1	16.0	8.0	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	54.8	60.3	5.3	14.1	16.2	8.0	17.2
Queue Length 50th (m)	16.5	25.4	0.0	25.1	51.5	10.9	75.0
Queue Length 95th (m)	30.4	42.4	5.3	43.9	56.6	22.1	123.9
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	468	1151	1915	506	1818
Starvation Cap Reductn	0	0	0	0	222	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.24	0.14	0.41	0.64	0.47	0.57

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	70	105	65	465	600	465	235	810	210
Future Volume (vph)	0	0	0	70	105	65	465	600	465	235	810	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2987		1616	2991	
Flt Permitted				0.95	1.00	1.00	0.22	1.00		0.22	1.00	
Satd. Flow (perm)				1442	1597	1439	690	2987		366	2991	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	71	107	66	474	612	474	240	827	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	78	0	0	11	0
Lane Group Flow (vph)	0	0	0	71	107	8	474	1008	0	240	1030	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	88.9	72.8		86.3	71.5	
Effective Green, g (s)				14.4	14.4	14.4	90.9	73.8		88.3	72.5	
Actuated g/C Ratio				0.12	0.12	0.12	0.76	0.61		0.74	0.60	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	851	1837		433	1807	
v/s Ratio Prot				0.05	c0.07		c0.08	0.34		0.07	c0.34	
v/s Ratio Perm						0.01	0.34			0.33		
v/c Ratio				0.41	0.56	0.05	0.56	0.55		0.55	0.57	
Uniform Delay, d1				48.9	49.8	46.7	6.3	13.4		6.5	14.3	
Progression Factor				1.00	1.00	1.00	4.01	1.22		1.00	1.00	
Incremental Delay, d2				1.6	3.7	0.1	0.6	0.9		1.5	1.3	
Delay (s)				50.5	53.5	46.8	25.8	17.3		8.0	15.6	
Level of Service				D	D	D	C	B		A	B	
Approach Delay (s)		0.0			50.8			19.9			14.2	
Approach LOS		A			D			B			B	

Intersection Summary

HCM 2000 Control Delay	20.0	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.56				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	66.2%	ICU Level of Service		C	
Analysis Period (min)	15				

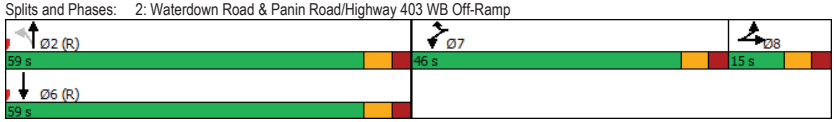
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	380	175	5	1350	880
Future Volume (vph)	0	380	175	5	1350	880
Lane Group Flow (vph)	5	413	190	0	1472	957
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	46.0	46.0	59.0	59.0	59.0
Total Split (%)	12.5%	38.3%	38.3%	49.2%	49.2%	49.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.70	0.50		0.66	0.40
Control Delay	53.4	52.2	16.6		12.6	3.4
Queue Delay	0.0	0.0	0.0		0.1	0.1
Total Delay	53.4	52.2	16.6		12.7	3.5
Queue Length 50th (m)	1.2	50.0	9.7		67.6	13.5
Queue Length 95th (m)	5.5	63.3	30.7		m64.2	17.3
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	1064	571		2231	2373
Starvation Cap Reductn	0	0	0		68	411
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.39	0.33		0.68	0.49

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	380	0	175	5	1350	0	0	880	0
Future Volume (vph)	5	0	0	380	0	175	5	1350	0	0	880	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3395			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3232			3438	
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)	5	0	0	413	0	190	5	1467	0	0	957	0
RTOR Reduction (vph)	0	0	0	0	0	117	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	413	0	73	0	1472	0	0	957	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		21.1		21.1		76.3			76.3	
Effective Green, g (s)		2.6		22.1		22.1		77.3			77.3	
Actuated g/C Ratio		0.02		0.18		0.18		0.64			0.64	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		588		262		2081			2214	
v/s Ratio Prot		c0.00		c0.13		0.05					0.28	
v/s Ratio Perm								c0.46				
v/c Ratio		0.21		0.70		0.28		0.71			0.43	
Uniform Delay, d1		57.7		45.9		42.1		14.0			10.5	
Progression Factor		1.00		1.00		1.00		0.94			0.32	
Incremental Delay, d2		4.3		3.8		0.6		0.7			0.5	
Delay (s)		62.0		49.7		42.7		13.9			3.9	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			47.5			13.9			3.9	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

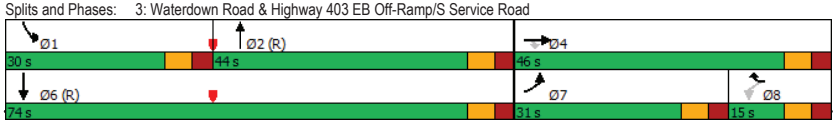
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	330	315	540	25	100	980	810	630	630
Future Volume (vph)	330	315	540	25	100	980	810	630	630
Lane Group Flow (vph)	355	339	581	27	108	1054	871	677	677
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free		
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	7.0	7.0	8.0		6.0	8.0
Minimum Split (s)	15.0	21.0	21.0	15.0	15.0	29.0		13.0	29.0
Total Split (s)	31.0	46.0	46.0	15.0	15.0	44.0		30.0	74.0
Total Split (%)	25.8%	38.3%	38.3%	12.5%	12.5%	36.7%		25.0%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.99	0.55	0.89	0.45	0.43	0.98	0.57	0.97	0.36
Control Delay	91.9	36.7	40.4	75.9	8.3	69.6	3.3	77.7	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.9	36.7	40.4	75.9	8.3	69.6	3.3	77.7	12.5
Queue Length 50th (m)	88.4	68.0	89.4	6.2	0.0	122.4	7.4	90.5	42.1
Queue Length 95th (m)	#151.1	98.7	#161.3	#18.6	3.7 m	#133.8	m11.4	#131.3	59.1
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	360	627	655	62	258	1078	1524	695	1904
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.54	0.89	0.44	0.42	0.98	0.57	0.97	0.36

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	315	540	25	0	100	0	980	810	630	630	0
Future Volume (vph)	330	315	540	25	0	100	0	980	810	630	630	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	3426	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	1131	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	355	339	581	27	0	108	0	1054	871	677	677	0
RTOR Reduction (vph)	0	0	153	0	0	100	0	0	0	0	0	0
Lane Group Flow (vph)	355	339	428	27	0	8	0	1054	871	677	677	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	24.0	38.6	38.6	7.6		7.6		37.0	120.0	23.4	67.4	
Effective Green, g (s)	25.0	39.6	39.6	8.6		8.6		38.0	120.0	24.4	68.4	
Actuated g/C Ratio	0.21	0.33	0.33	0.07		0.07		0.32	1.00	0.20	0.57	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	360	620	497	60		102		1078	1524	696	1905	
v/s Ratio Prot	c0.21	0.18				0.01		c0.31		c0.20	0.20	
v/s Ratio Perm			c0.28	0.03					0.57			
v/c Ratio	0.99	0.55	0.86	0.45		0.08		0.98	0.57	0.97	0.36	
Uniform Delay, d1	47.3	32.9	37.6	53.4		52.0		40.6	0.0	47.5	13.9	
Progression Factor	1.00	1.00	1.00	0.97		1.92		1.35	1.00	1.06	0.85	
Incremental Delay, d2	43.3	1.0	14.1	5.3		0.3		15.6	0.9	26.2	0.5	
Delay (s)	90.7	33.9	51.7	57.4		100.2		70.3	0.9	76.5	12.4	
Level of Service	F	C	D	E		F		E	A	E	B	
Approach Delay (s)		57.8			91.6			38.9			44.4	
Approach LOS		E			F			D			D	

Intersection Summary

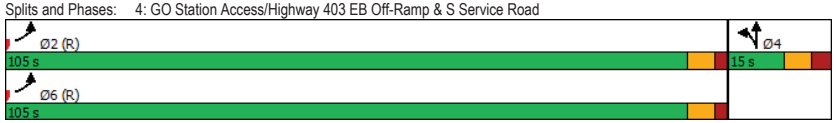
HCM 2000 Control Delay	47.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	1165	25		
Future Volume (vph)	1165	25		
Lane Group Flow (vph)	1394	37		
Turn Type	Prot	NA		
Protected Phases	2 6	4	2	6
Permitted Phases				
Detector Phase	2 6	4		
Switch Phase				
Minimum Initial (s)		8.0	8.0	8.0
Minimum Split (s)		15.0	29.0	29.0
Total Split (s)		15.0	105.0	105.0
Total Split (%)		12.5%	88%	88%
Yellow Time (s)		4.0	4.0	4.0
All-Red Time (s)		3.0	2.0	2.0
Lost Time Adjust (s)		-1.0		
Total Lost Time (s)		6.0		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode		None	C-Min	C-Min
v/c Ratio	0.59	0.25		
Control Delay	1.1	55.8		
Queue Delay	0.0	0.0		
Total Delay	1.1	55.8		
Queue Length 50th (m)	2.6	8.8		
Queue Length 95th (m)	0.0	19.8		
Internal Link Dist (m)	190.8	55.4		
Turn Bay Length (m)				
Base Capacity (vph)	2392	147		
Starvation Cap Reductn	31	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.59	0.25		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1165	160	10	25	0	0
Future Volume (vph)	1165	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0			6.0		
Lane Util. Factor	0.97			1.00		
Frt	0.98			1.00		
Flt Protected	0.96			0.99		
Satd. Flow (prot)	2652			1821		
Flt Permitted	0.96			0.99		
Satd. Flow (perm)	2652			1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1226	168	11	26	0	0
RTOR Reduction (vph)	8	0	0	0	0	0
Lane Group Flow (vph)	1386	0	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot		Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases						
Actuated Green, G (s)	101.5			5.5		
Effective Green, g (s)	102.5			6.5		
Actuated g/C Ratio	0.85			0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	2265			98		
v/s Ratio Prot	c0.52			c0.02		
v/s Ratio Perm						
v/c Ratio	0.61			0.38		
Uniform Delay, d1	2.7			54.8		
Progression Factor	0.09			1.00		
Incremental Delay, d2	1.0			2.4		
Delay (s)	1.2			57.2		
Level of Service	A			E		
Approach Delay (s)	1.2			57.2	0.0	
Approach LOS	A			E	A	

Intersection Summary			
HCM 2000 Control Delay	2.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	195	1595	10	0	1195
Future Volume (Veh/h)	0	195	1595	10	0	1195
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	212	1734	11	0	1299
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.60	0.56			0.56	
vC, conflicting volume	2389	872			1745	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1284	0			748	
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	65			100	
cM capacity (veh/h)	96	608			485	

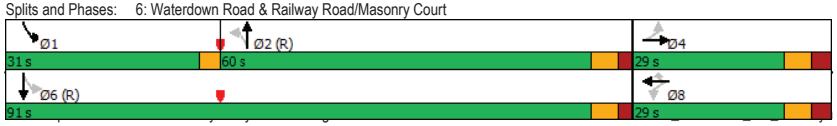
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	212	1156	589	650	650
Volume Left	0	0	0	0	0
Volume Right	212	0	11	0	0
cSH	608	1700	1700	1700	1700
Volume to Capacity	0.35	0.68	0.35	0.38	0.38
Queue Length 95th (m)	12.5	0.0	0.0	0.0	0.0
Control Delay (s)	14.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.1	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		63.1%	ICU Level of Service B
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	0	30	0	335	5	1260	550	635
Future Volume (vph)	10	0	30	0	335	5	1260	550	635
Lane Group Flow (vph)	0	22	0	34	381	6	1563	625	733
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	60.0	60.0	31.0	91.0
Total Split (%)	24.2%	24.2%	24.2%	24.2%	24.2%	50.0%	50.0%	25.8%	75.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.14		0.26	0.77	0.02	1.00	0.98	0.27
Control Delay		2.0		52.7	16.0	13.4	54.6	68.6	2.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		2.0		52.7	16.0	13.4	54.6	68.6	2.3
Queue Length 50th (m)		0.0		8.1	0.0	0.7	~216.9	141.9	5.8
Queue Length 95th (m)		0.2		17.0	26.0	m1.0	m#248.6	m#232.1	m27.6
Internal Link Dist (m)		95.0		120.3			324.2		93.2
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		239		245	594	261	1557	636	2727
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.09		0.14	0.64	0.02	1.00	0.98	0.27

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - With Improvements
6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour

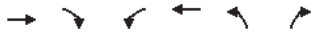


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	30	0	335	5	1260	115	550	635	10
Future Volume (vph)	10	0	10	30	0	335	5	1260	115	550	635	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184			1641	1495	1454	3388		1728	3379	
Flt Permitted		0.84			0.74	1.00	0.37	1.00		0.07	1.00	
Satd. Flow (perm)		1019			1283	1495	571	3388		128	3379	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	34	0	381	6	1432	131	625	722	11
RTOR Reduction (vph)	0	20	0	0	0	342	0	5	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	34	39	6	1558	0	625	732	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.2			11.2	11.2	54.0	54.0		95.8	95.8	
Effective Green, g (s)		12.2			12.2	12.2	55.0	55.0		96.8	96.8	
Actuated g/C Ratio		0.10			0.10	0.10	0.46	0.46		0.81	0.81	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		103			130	151	261	1552		633	2725	
v/s Ratio Prot								c0.46		c0.33	0.22	
v/s Ratio Perm		0.00			c0.03	0.03	0.01			0.47		
v/c Ratio		0.02			0.26	0.26	0.02	1.00		0.99	0.27	
Uniform Delay, d1		48.5			49.7	49.7	17.8	32.5		35.4	2.9	
Progression Factor		1.00			1.00	1.00	0.73	1.13		1.25	0.64	
Incremental Delay, d2		0.1			1.1	0.9	0.1	18.1		29.2	0.2	
Delay (s)		48.6			50.8	50.6	13.1	54.9		73.5	2.0	
Level of Service		D			D	D	B	D		E	A	
Approach Delay (s)		48.6			50.6			54.8			34.9	
Approach LOS		D			D			D			C	

Intersection Summary				
HCM 2000 Control Delay	46.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	89.3%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2036 - With Improvements
7: Cooke Boulevard & Site Driveway (East) — AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	85	30	0	70	5
Future Volume (Veh/h)	0	85	30	0	70	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	92	33	0	76	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)						
pX, platoon unblocked						
vC, conflicting volume			92		66	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		66	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	100
cM capacity (veh/h)			1515		924	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	33	81
Volume Left	0	33	76
Volume Right	92	0	5
cSH	1700	1515	933
Volume to Capacity	0.05	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.3
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	565	45	45	235	0	85	20	30	0	70	45
Future Volume (Veh/h)	55	565	45	45	235	0	85	20	30	0	70	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	71	724	58	58	301	0	109	26	38	0	90	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	301			782			1415	1312	753	1363	1341	301
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	301			689			1404	1288	656	1345	1320	301
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	94			93			0	80	91	100	27	92
cM capacity (veh/h)	1272			810			35	128	415	80	123	725

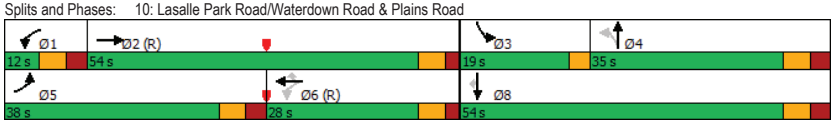
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	853	359	173	148
Volume Left	71	58	109	0
Volume Right	58	0	38	58
cSH	1272	810	50	182
Volume to Capacity	0.06	0.07	3.45	0.81
Queue Length 95th (m)	1.4	1.8	Err	45.0
Control Delay (s)	1.4	2.3	Err	77.6
Lane LOS	A	A	F	F
Approach Delay (s)	1.4	2.3	Err	77.6
Approach LOS			F	F

Intersection Summary				
Average Delay	1137.2			
Intersection Capacity Utilization	61.9%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	770	980	85	395	285	100	325	265	190	220
Future Volume (vph)	770	980	85	395	285	100	325	265	190	220
Lane Group Flow (vph)	819	1219	90	420	303	106	415	282	202	234
Turn Type	Prot	NA	pm+pt	NA	Perm	Perm	NA	Prot	NA	Perm
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases			6		6	4				8
Detector Phase	5	2	1	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	5.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	12.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	38.0	54.0	12.0	28.0	28.0	35.0	35.0	19.0	54.0	54.0
Total Split (%)	31.7%	45.0%	10.0%	23.3%	23.3%	29.2%	29.2%	15.8%	45.0%	45.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	6.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	None	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.95	0.86	0.62	0.62	0.56	0.38	0.93	0.69	0.28	0.33
Control Delay	64.0	39.6	44.4	48.8	9.1	42.4	71.4	51.4	22.4	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	39.6	44.4	48.8	9.1	42.4	71.4	51.4	22.4	7.7
Queue Length 50th (m)	102.7	141.9	11.4	50.9	0.0	22.1	99.8	35.6	35.0	7.0
Queue Length 95th (m)	#142.2	174.1	#31.1	68.9	25.5	40.1	#163.7	51.3	61.4	38.4
Internal Link Dist (m)		134.8		135.5			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0		100.0		50.0
Base Capacity (vph)	868	1423	144	694	541	282	451	443	730	722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.86	0.63	0.61	0.56	0.38	0.92	0.64	0.28	0.32

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - With Improvements

10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	770	980	165	85	395	285	100	325	65	265	190	220
Future Volume (vph)	770	980	165	85	395	285	100	325	65	265	190	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		6.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3255	3406		1677	3438	1485	1719	1797		3134	1810	1446
Flt Permitted	0.95	1.00		0.17	1.00	1.00	0.63	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3255	3406		297	3438	1485	1142	1797		3134	1810	1446
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)	819	1043	176	90	420	303	106	346	69	282	202	234
RTOR Reduction (vph)	0	11	0	0	0	243	0	6	0	0	0	142
Lane Group Flow (vph)	819	1208	0	90	420	60	106	409	0	282	202	92
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		pm+pt	NA	Perm	Perm	NA		Prot	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases				6		6	4					8
Actuated Green, G (s)	30.8	48.3		28.1	22.8	22.8	28.6	28.6		14.8	46.4	46.4
Effective Green, g (s)	31.8	49.3		30.1	23.8	23.8	29.6	29.6		15.8	47.4	47.4
Actuated g/C Ratio	0.27	0.41		0.25	0.20	0.20	0.25	0.25		0.13	0.39	0.39
Clearance Time (s)	7.0	6.0		7.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	862	1399		146	681	294	281	443		412	714	571
v/s Ratio Prot	c0.25	c0.35		0.03	0.12			c0.23		c0.09	0.11	
v/s Ratio Perm				0.12		0.04	0.09					0.06
v/c Ratio	0.95	0.86		0.62	0.62	0.20	0.38	0.92		0.68	0.28	0.16
Uniform Delay, d1	43.3	32.3		36.0	43.9	40.2	37.5	44.1		49.7	24.7	23.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.86	0.86	2.16
Incremental Delay, d2	19.6	7.3		7.5	4.2	1.6	0.9	24.8		4.6	0.2	0.1
Delay (s)	62.9	39.5		43.5	48.1	41.8	38.4	68.9		47.1	21.5	50.8
Level of Service	E	D		D	D	D	D	E		D	C	D
Approach Delay (s)		48.9			45.2			62.7			41.1	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	48.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	86.1%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Total 2036 - With Improvements

11: Plains Road & Cooke Boulevard — AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	95	1230	745	110
Future Volume (vph)	95	1230	745	110
Lane Group Flow (vph)	106	1367	917	205
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.25	0.60	0.48	0.71
Control Delay	6.4	10.5	14.1	44.7
Queue Delay	0.0	0.9	0.0	0.0
Total Delay	6.4	11.5	14.1	44.7
Queue Length 50th (m)	5.3	68.5	51.8	33.2
Queue Length 95th (m)	13.4	113.6	86.7	53.1
Internal Link Dist (m)		135.5	123.7	313.8
Turn Bay Length (m)	60.0			
Base Capacity (vph)	474	2272	1900	385
Starvation Cap Reductn	0	575	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.81	0.48	0.53

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



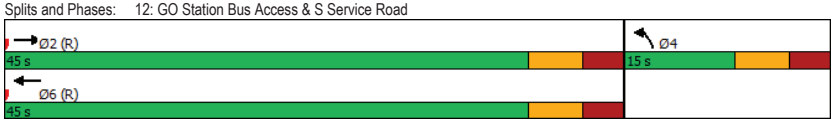
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	95	1230	745	80	110	75
Future Volume (vph)	95	1230	745	80	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3282	3239		1381	
Flt Permitted	0.25	1.00	1.00		0.97	
Satd. Flow (perm)	435	3282	3239		1381	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1367	828	89	122	83
RTOR Reduction (vph)	0	0	6	0	27	0
Lane Group Flow (vph)	106	1367	911	0	178	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	68.1	68.1	57.5		17.9	
Effective Green, g (s)	69.1	69.1	58.5		18.9	
Actuated g/C Ratio	0.69	0.69	0.58		0.19	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	403	2267	1894		261	
v/s Ratio Prot	0.02	c0.42	0.28			
v/s Ratio Perm	0.16				c0.13	
v/c Ratio	0.26	0.60	0.48		0.68	
Uniform Delay, d1	5.9	8.2	12.0		37.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.4	1.2	0.9		7.2	
Delay (s)	6.2	9.4	12.9		44.9	
Level of Service	A	A	B		D	
Approach Delay (s)		9.2	12.9		44.9	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1740	110	15
Future Volume (vph)	1740	110	15
Lane Group Flow (vph)	1907	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.59	0.04	0.12
Control Delay	4.3	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	4.3	1.2	24.5
Queue Length 50th (m)	5.3	0.0	1.6
Queue Length 95th (m)	m145.7	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3235	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.59	0.04	0.12

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1740	15	0	110	15	0
Future Volume (vph)	1740	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3477			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3477			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1891	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1906	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2630			2731	38	
v/s Ratio Prot	c0.55			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.72			0.04	0.42	
Uniform Delay, d1	3.9			1.8	28.0	
Progression Factor	1.62			0.90	1.00	
Incremental Delay, d2	1.2			0.0	7.4	
Delay (s)	7.6			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	7.6			1.7	35.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues — Future Total 2036 - With Improvements

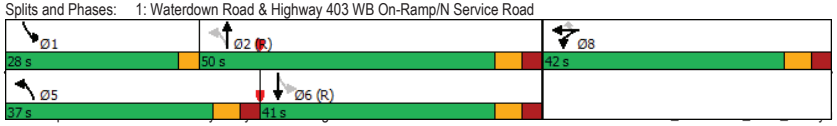
1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	280	500	220	785	875	115	720
Future Volume (vph)	280	500	220	785	875	115	720
Lane Group Flow (vph)	295	526	232	826	1142	121	916
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	42.0	42.0	42.0	37.0	50.0	28.0	41.0
Total Split (%)	35.0%	35.0%	35.0%	30.8%	41.7%	23.3%	34.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.61	0.98	0.39	0.95	0.75	0.43	0.99
Control Delay	42.4	76.3	6.1	56.2	31.8	17.3	69.7
Queue Delay	0.0	0.0	0.0	0.8	2.0	0.0	0.0
Total Delay	42.4	76.3	6.1	57.0	33.8	17.3	69.7
Queue Length 50th (m)	62.6	129.1	0.0	98.6	91.8	11.0	~119.7
Queue Length 95th (m)	93.7	#201.8	18.7 m	#131.7	126.0	19.1	#166.0
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	484	537	590	884	1517	478	922
Starvation Cap Reductn	0	0	0	8	228	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.98	0.39	0.94	0.89	0.25	0.99

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - With Improvements

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	280	500	220	785	875	210	115	720	150
Future Volume (vph)	0	0	0	280	500	220	785	875	210	115	720	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3080		1601	3058	
Flt Permitted				0.95	1.00	1.00	0.10	1.00		0.24	1.00	
Satd. Flow (perm)				1616	1792	1426	306	3080		398	3058	
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	0	295	526	232	826	921	221	121	758	158
RTOR Reduction (vph)	0	0	0	0	0	162	0	14	0	0	15	0
Lane Group Flow (vph)	0	0	0	295	526	70	826	1128	0	121	901	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				35.0	35.0	35.0	71.0	57.6		45.0	34.6	
Effective Green, g (s)				36.0	36.0	36.0	72.0	58.6		47.0	35.6	
Actuated g/C Ratio				0.30	0.30	0.30	0.60	0.49		0.39	0.30	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				484	537	427	871	1504		270	907	
v/s Ratio Prot				0.18	c0.29		c0.24	0.37		0.04	0.29	
v/s Ratio Perm						0.05	c0.33			0.13		
v/c Ratio				0.61	0.98	0.16	0.95	0.75		0.45	0.99	
Uniform Delay, d1				36.0	41.6	30.9	35.2	24.8		24.0	42.1	
Progression Factor				1.00	1.00	1.00	1.32	1.19		1.00	1.00	
Incremental Delay, d2				2.2	33.2	0.2	11.5	1.8		1.2	28.4	
Delay (s)				38.2	74.8	31.1	58.1	31.3		25.2	70.5	
Level of Service				D	E	C	E	C		C	E	
Approach Delay (s)		0.0			54.9			42.5			65.2	
Approach LOS		A			D			D			E	

Intersection Summary

HCM 2000 Control Delay	51.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		

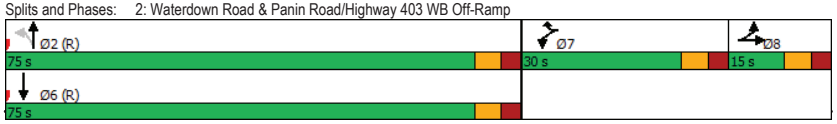
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	415	370	5	1500	1000
Future Volume (vph)	0	415	370	5	1500	1000
Lane Group Flow (vph)	6	472	420	0	1711	1136
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	30.0	30.0	75.0	75.0	75.0
Total Split (%)	12.5%	25.0%	25.0%	62.5%	62.5%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.03	0.57	0.84		0.85	0.52
Control Delay	0.2	42.4	45.0		14.0	8.8
Queue Delay	0.0	0.0	4.5		1.0	0.5
Total Delay	0.2	42.4	49.4		15.0	9.2
Queue Length 50th (m)	0.0	49.5	66.3		77.1	37.0
Queue Length 95th (m)	0.0	74.4	#140.8		m237.8	m25.0
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	215	833	501		2016	2164
Starvation Cap Reductn	0	0	0		117	520
Spillback Cap Reductn	0	0	40		56	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.03	0.57	0.91		0.90	0.69

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	415	0	370	5	1500	0	0	1000	0
Future Volume (vph)	0	0	5	415	0	370	5	1500	0	0	1000	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3299			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	472	0	420	6	1705	0	0	1136	0
RTOR Reduction (vph)	0	6	0	0	0	97	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	472	0	323	0	1711	0	0	1136	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		30.6		30.6		66.8			66.8	
Effective Green, g (s)		2.6		31.6		31.6		67.8			67.8	
Actuated g/C Ratio		0.02		0.26		0.26		0.56			0.56	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		833		404		1863			1999	
v/s Ratio Prot		c0.00		0.15		c0.21					0.32	
v/s Ratio Perm								c0.52				
v/c Ratio		0.00		0.57		0.80		0.92			0.57	
Uniform Delay, d1		57.4		38.3		41.2		23.6			16.7	
Progression Factor		1.00		1.00		1.00		0.59			0.60	
Incremental Delay, d2		0.0		0.9		10.6		4.3			0.6	
Delay (s)		57.5		39.2		51.8		18.2			10.7	
Level of Service		E		D		D		B			B	
Approach Delay (s)		57.5			45.1			18.2			10.7	
Approach LOS		E			D			B			B	

Intersection Summary

HCM 2000 Control Delay	22.4	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.86				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	86.2%	ICU Level of Service		E	
Analysis Period (min)	15				

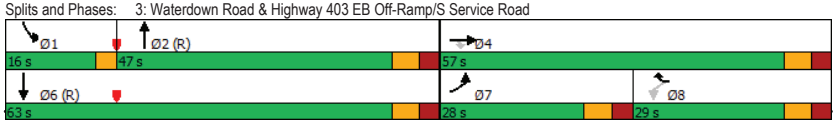
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	265	95	470	50	260	1010	545	425	995
Future Volume (vph)	265	95	470	50	260	1010	545	425	995
Lane Group Flow (vph)	298	107	528	56	292	1135	612	478	1118
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free		
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0		6.0	8.0
Minimum Split (s)	15.0	29.0	29.0	29.0	29.0	29.0		9.0	29.0
Total Split (s)	28.0	57.0	57.0	29.0	29.0	47.0		16.0	63.0
Total Split (%)	23.3%	47.5%	47.5%	24.2%	24.2%	39.2%		13.3%	52.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.94	0.16	0.87	0.35	0.71	0.95	0.39	0.85	0.60
Control Delay	87.0	24.4	46.1	37.5	20.3	54.8	0.3	65.4	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.1	10.5	0.0	0.0	0.2
Total Delay	87.0	24.4	46.1	37.5	20.4	65.3	0.3	65.4	25.0
Queue Length 50th (m)	73.7	17.3	107.0	3.8	0.1	122.0	0.0	65.2	94.6
Queue Length 95th (m)	#127.5	27.7	143.4	20.3	43.3	m128.4	m0.0	#112.9	118.4
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0			15.0	40.0	
Base Capacity (vph)	316	769	683	224	480	1209	1568	560	1866
Starvation Cap Reductn	0	0	0	0	0	0	0	0	162
Spillback Cap Reductn	0	0	0	0	5	81	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.14	0.77	0.25	0.61	1.01	0.39	0.85	0.66

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	95	470	50	0	260	0	1010	545	425	995	0
Future Volume (vph)	265	95	470	50	0	260	0	1010	545	425	995	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	3255	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	3255	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	298	107	528	56	0	292	0	1135	612	478	1118	0
RTOR Reduction (vph)	0	0	40	0	0	202	0	0	0	0	0	0
Lane Group Flow (vph)	298	107	488	56	0	90	0	1135	612	478	1118	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	21.2	43.7	43.7	15.5		15.5		39.6	120.0	19.7	62.3	
Effective Green, g (s)	22.2	44.7	44.7	16.5		16.5		40.6	120.0	20.7	63.3	
Actuated g/C Ratio	0.18	0.37	0.37	0.14		0.14		0.34	1.00	0.17	0.53	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	316	674	566	160		209		1197	1568	561	1866	
v/s Ratio Prot	0.17	0.06				0.06		c0.32		c0.15	0.32	
v/s Ratio Perm			c0.32	0.05					0.39			
v/c Ratio	0.94	0.16	0.86	0.35		0.43		0.95	0.39	0.85	0.60	
Uniform Delay, d1	48.3	25.1	34.8	46.9		47.4		38.7	0.0	48.2	19.6	
Progression Factor	1.00	1.00	1.00	0.71		0.94		1.18	1.00	1.06	1.14	
Incremental Delay, d2	35.7	0.1	12.8	1.3		1.4		9.3	0.3	10.4	1.2	
Delay (s)	83.9	25.2	47.6	34.5		46.2		55.0	0.3	61.7	23.5	
Level of Service	F	C	D	C		D		D	A	E	C	
Approach Delay (s)		56.6			44.4			35.8			34.9	
Approach LOS		E			D			D			C	

Intersection Summary

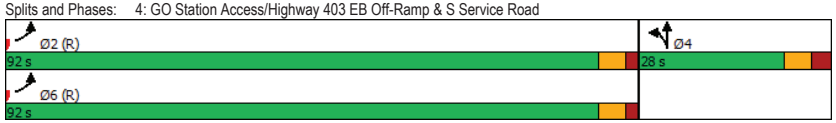
HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	930	30		
Future Volume (vph)	930	30		
Lane Group Flow (vph)	1211	301		
Turn Type	Prot	NA		
Protected Phases	2 6	4	2	6
Permitted Phases				
Detector Phase	2 6	4		
Switch Phase				
Minimum Initial (s)		8.0	8.0	8.0
Minimum Split (s)		15.0	29.0	29.0
Total Split (s)		28.0	92.0	92.0
Total Split (%)		23.3%	77%	77%
Yellow Time (s)		4.0	4.0	4.0
All-Red Time (s)		3.0	2.0	2.0
Lost Time Adjust (s)		-1.0		
Total Lost Time (s)		6.0		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode		None	C-Min	C-Min
v/c Ratio	0.54	0.73		
Control Delay	6.2	53.4		
Queue Delay	0.1	0.0		
Total Delay	6.3	53.4		
Queue Length 50th (m)	28.8	69.0		
Queue Length 95th (m)	69.4	80.0		
Internal Link Dist (m)	190.8	55.4		
Turn Bay Length (m)				
Base Capacity (vph)	2395	417		
Starvation Cap Reductn	211	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.55	0.72		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	930	15	205	30	0	0
Future Volume (vph)	930	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0			6.0		
Lane Util. Factor	0.97			1.00		
Frt	1.00			1.00		
Flt Protected	0.95			0.96		
Satd. Flow (prot)	3291			1820		
Flt Permitted	0.95			0.96		
Satd. Flow (perm)	3291			1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	1192	19	263	38	0	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1210	0	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot		Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases						
Actuated Green, G (s)	80.8			26.2		
Effective Green, g (s)	81.8			27.2		
Actuated g/C Ratio	0.68			0.23		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	2243			412		
v/s Ratio Prot	c0.37			c0.17		
v/s Ratio Perm						
v/c Ratio	0.54			0.73		
Uniform Delay, d1	9.6			43.0		
Progression Factor	0.51			1.00		
Incremental Delay, d2	0.9			6.5		
Delay (s)	5.8			49.5		
Level of Service	A			D		
Approach Delay (s)	5.8			49.5	0.0	
Approach LOS	A			D	A	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	1445	25	0	1515
Future Volume (Veh/h)	0	110	1445	25	0	1515
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	1571	27	0	1647
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.81	0.70			0.70	
vC, conflicting volume	2408	799			1598	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1034	0			983	
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	84			100	
cM capacity (veh/h)	186	758			494	

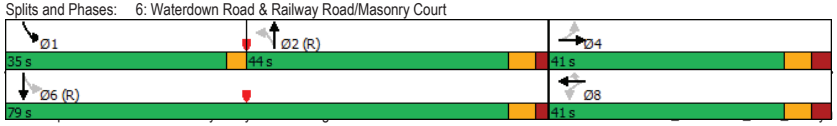
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	1047	551	824	824
Volume Left	0	0	0	0	0
Volume Right	120	0	27	0	0
cSH	758	1700	1700	1700	1700
Volume to Capacity	0.16	0.62	0.32	0.48	0.48
Queue Length 95th (m)	4.5	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		54.2%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	5	110	5	620	5	840	425	1080
Future Volume (vph)	10	5	110	5	620	5	840	425	1080
Lane Group Flow (vph)	0	25	0	145	785	6	1107	538	1380
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	41.0	41.0	41.0	41.0	41.0	44.0	44.0	35.0	79.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	36.7%	36.7%	29.2%	65.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0		6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?						Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.09		0.41	0.98	0.07	0.98	0.98	0.62
Control Delay		26.3		38.8	42.0	19.2	51.5	70.5	10.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		26.3		38.8	42.0	19.2	51.5	70.5	10.8
Queue Length 50th (m)		3.4		28.7	83.5	0.8	153.5	~127.1	65.8
Queue Length 95th (m)		9.0		41.5	99.3	m1.4	#141.5	#153.0	79.7
Internal Link Dist (m)		95.0		120.3			324.2		93.2
Turn Bay Length (m)						35.0		45.0	
Base Capacity (vph)		311		378	824	91	1129	551	2209
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.08		0.38	0.95	0.07	0.98	0.98	0.62

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - With Improvements
6: Waterdown Road & Railway Road/Masonry Court — PM Peak Hour

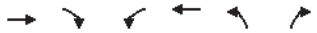


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	110	5	620	5	840	35	425	1080	10
Future Volume (vph)	10	5	5	110	5	620	5	840	35	425	1080	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196			1726	1599	1353	3414		1694	3479	
Flt Permitted		0.86			0.72	1.00	0.20	1.00		0.10	1.00	
Satd. Flow (perm)		1052			1296	1599	279	3414		171	3479	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	139	6	785	6	1063	44	538	1367	13
RTOR Reduction (vph)	0	4	0	0	0	367	0	3	0	0	0	0
Lane Group Flow (vph)	0	21	0	0	145	418	6	1104	0	538	1380	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		31.8			31.8	31.8	38.6	38.6		75.2	75.2	
Effective Green, g (s)		32.8			32.8	32.8	39.6	39.6		76.2	76.2	
Actuated g/C Ratio		0.27			0.27	0.27	0.33	0.33		0.64	0.64	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		287			354	437	92	1126		547	2209	
v/s Ratio Prot								c0.32		c0.28	0.40	
v/s Ratio Perm		0.02			0.11	c0.26	0.02			0.34		
v/c Ratio		0.07			0.41	0.96	0.07	0.98		0.98	0.62	
Uniform Delay, d1		32.3			35.7	42.9	27.5	39.8		35.3	13.2	
Progression Factor		1.00			1.00	1.00	0.62	0.75		1.23	0.69	
Incremental Delay, d2		0.1			0.8	31.8	1.1	20.4		31.0	1.1	
Delay (s)		32.4			36.5	74.7	18.2	50.5		74.5	10.3	
Level of Service		C			D	E	B	D		E	B	
Approach Delay (s)		32.4			68.7			50.3			28.3	
Approach LOS		C			E			D			C	

Intersection Summary				
HCM 2000 Control Delay	43.9	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.97			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	83.6%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2036 - With Improvements
7: Cooke Boulevard & Site Driveway (East) — PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	15	0	225	30
Future Volume (Veh/h)	0	50	15	0	225	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	16	0	245	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		32	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		32	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	97
cM capacity (veh/h)			1564		977	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	16	278
Volume Left	0	16	245
Volume Right	54	0	33
cSH	1700	1564	989
Volume to Capacity	0.03	0.01	0.28
Queue Length 95th (m)	0.0	0.2	9.3
Control Delay (s)	0.0	7.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.1
Approach LOS			B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	225	55	35	635	0	75	70	45	0	40	25
Future Volume (Veh/h)	185	225	55	35	635	0	75	70	45	0	40	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	226	274	67	43	774	0	91	85	55	0	49	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	
vC, conflicting volume	774			341			1674	1620	308	1717	1653	774
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	774			109			1709	1643	69	1760	1684	774
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 %	73			97			0	0	93	0	13	93
cM capacity (veh/h)	851			1245			11	60	803	0	56	402

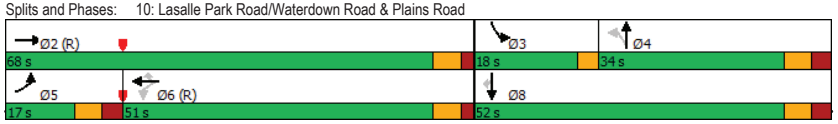
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	567	817	231	79
Volume Left	226	43	91	0
Volume Right	67	0	55	30
cSH	851	1245	25	84
Volume to Capacity	0.27	0.03	9.43	0.95
Queue Length 95th (m)	8.6	0.9	Err	41.3
Control Delay (s)	6.4	0.9	Err	171.9
Lane LOS	A	A	F	F
Approach Delay (s)	6.4	0.9	Err	171.9
Approach LOS			F	F

Intersection Summary				
Average Delay	1374.1			
Intersection Capacity Utilization	88.0%	ICU Level of Service	E	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	270	650	85	1220	365	140	245	425	315	455
Future Volume (vph)	270	650	85	1220	365	140	245	425	315	455
Lane Group Flow (vph)	278	758	88	1258	376	144	330	438	325	469
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	Prot	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4				8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	17.0	68.0	51.0	51.0	51.0	34.0	34.0	18.0	52.0	52.0
Total Split (%)	14.2%	56.7%	42.5%	42.5%	42.5%	28.3%	28.3%	15.0%	43.3%	43.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.85	0.40	0.37	0.93	0.49	0.67	0.84	0.95	0.46	0.69
Control Delay	76.4	17.0	40.6	49.0	16.2	58.9	63.1	70.1	37.4	33.3
Queue Delay	0.0	0.0	0.0	23.3	0.3	0.0	0.0	0.0	0.0	0.0
Total Delay	76.4	17.0	40.6	72.2	16.5	58.9	63.1	70.1	37.4	33.3
Queue Length 50th (m)	35.9	56.3	15.4	116.4	24.5	32.1	74.4	59.9	79.0	87.2
Queue Length 95th (m)	#64.1	71.4	m23.2	#197.1	m55.8	56.1	#117.5	#93.2	107.3	117.0
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0		100.0		50.0
Base Capacity (vph)	328	1872	239	1356	765	234	425	463	728	700
Starvation Cap Reductn	0	0	0	152	87	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.40	0.37	1.04	0.55	0.62	0.78	0.95	0.45	0.67

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis — Future Total 2036 - With Improvements

10: Lasalle Park Road/Waterdown Road & Plains Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	650	85	85	1220	365	140	245	75	425	315	455
Future Volume (vph)	270	650	85	85	1220	365	140	245	75	425	315	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3134	3463		1630	3539	1508	1694	1785		3319	1900	1492
Flt Permitted	0.95	1.00		0.36	1.00	1.00	0.56	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3134	3463		625	3539	1508	1006	1785		3319	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	278	670	88	88	1258	376	144	253	77	438	325	469
RTOR Reduction (vph)	0	8	0	0	0	188	0	9	0	0	0	131
Lane Group Flow (vph)	278	750	0	88	1258	188	144	321	0	438	325	338
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		Prot	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4					8
Actuated Green, G (s)	11.6	63.5		44.9	44.9	44.9	24.7	24.7		15.8	43.5	43.5
Effective Green, g (s)	12.6	64.5		45.9	45.9	45.9	25.7	25.7		16.8	44.5	44.5
Actuated g/C Ratio	0.10	0.54		0.38	0.38	0.38	0.21	0.21		0.14	0.37	0.37
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	329	1861		239	1353	576	215	382		464	704	553
v/s Ratio Prot	c0.09	0.22			c0.36			c0.18		c0.13	0.17	
v/s Ratio Perm				0.14		0.12	0.14					0.23
v/c Ratio	0.84	0.40		0.37	0.93	0.33	0.67	0.84		0.94	0.46	0.61
Uniform Delay, d1	52.7	16.4		26.6	35.5	26.1	43.3	45.2		51.1	28.7	30.7
Progression Factor	1.00	1.00		1.37	1.16	2.53	1.00	1.00		0.83	1.24	1.68
Incremental Delay, d2	17.7	0.7		2.4	7.7	0.8	7.7	14.9		24.2	0.4	1.6
Delay (s)	70.4	17.0		38.8	48.9	67.0	50.9	60.0		66.7	35.8	53.3
Level of Service	E	B		D	D	E	D	E		E	D	D
Approach Delay (s)		31.4			52.4			57.3			53.4	
Approach LOS		C			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	48.3	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	89.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Total 2036 - With Improvements

11: Plains Road & Cooke Boulevard — PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	75	1085	1650	115
Future Volume (vph)	75	1085	1650	115
Lane Group Flow (vph)	77	1119	1830	207
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	88.0	72.0	32.0
Total Split (%)	13.3%	73.3%	60.0%	26.7%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.42	0.45	0.84	0.72
Control Delay	16.4	4.7	21.6	65.0
Queue Delay	0.0	0.3	0.5	2.4
Total Delay	16.4	5.0	22.1	67.4
Queue Length 50th (m)	2.7	51.4	170.4	44.9
Queue Length 95th (m)	m11.7	m75.2	#286.2	m60.4
Internal Link Dist (m)		135.9	112.1	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	255	2489	2191	373
Starvation Cap Reductn	0	623	0	0
Spillback Cap Reductn	0	0	94	79
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.30	0.60	0.87	0.70

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 23 (19%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Plains Road & Cooke Boulevard



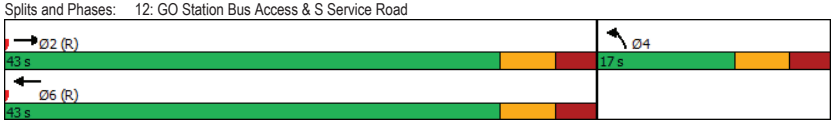
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	1085	1650	125	115	85
Future Volume (vph)	75	1085	1650	125	115	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3289		1622	
Flt Permitted	0.06	1.00	1.00		0.97	
Satd. Flow (perm)	100	3374	3289		1622	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	1119	1701	129	119	88
RTOR Reduction (vph)	0	0	3	0	23	0
Lane Group Flow (vph)	77	1119	1827	0	184	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	87.5	87.5	78.2		18.5	
Effective Green, g (s)	88.5	88.5	79.2		19.5	
Actuated g/C Ratio	0.74	0.74	0.66		0.16	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	166	2488	2170		263	
v/s Ratio Prot	c0.03	0.33	c0.56			
v/s Ratio Perm	0.31				c0.11	
v/c Ratio	0.46	0.45	0.84		0.70	
Uniform Delay, d1	16.4	6.2	15.6		47.5	
Progression Factor	1.22	0.62	1.00		1.26	
Incremental Delay, d2	1.6	0.5	4.2		7.6	
Delay (s)	21.5	4.3	19.8		67.3	
Level of Service	C	A	B		E	
Approach Delay (s)		5.4	19.8		67.3	
Approach LOS		A	B		E	

Intersection Summary				
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	79.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1045	295	15
Future Volume (vph)	1045	295	15
Lane Group Flow (vph)	1133	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.36	0.09	0.12
Control Delay	1.4	1.7	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.4	1.7	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	15.6	17.9	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3158	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.36	0.09	0.10

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

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1045	20	0	295	15	0
Future Volume (vph)	1045	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3409			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3409			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1112	21	0	314	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1132	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2568			2719	42	
v/s Ratio Prot	c0.33			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.44			0.12	0.38	
Uniform Delay, d1	2.7			2.0	27.8	
Progression Factor	0.67			1.30	1.00	
Incremental Delay, d2	0.5			0.1	5.7	
Delay (s)	2.3			2.7	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.3			2.7	33.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	2.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	150	20	465	75	0	
Future Volume (vph)	150	20	465	75	0	
Lane Group Flow (vph)	250	0	591	0	115	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	76.0	76.0	76.0	24.0	24.0	24.0
Total Split (%)	76.0%	76.0%	76.0%	24.0%	24.0%	24%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.22		0.48		0.35	
Control Delay	4.9		7.8		15.5	
Queue Delay	0.0		0.0		0.0	
Total Delay	4.9		7.8		15.5	
Queue Length 50th (m)	6.9		25.5		5.7	
Queue Length 95th (m)	15.6		47.3		15.9	
Internal Link Dist (m)	120.3		85.4		319.9	
Turn Bay Length (m)						
Base Capacity (vph)	1683		1868		599	
Starvation Cap Reductn	0		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.15		0.32		0.19	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 44.8
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Future Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.96			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1682			1896			1665				
Flt Permitted		1.00			0.98			0.77				
Satd. Flow (perm)		1682			1868			1334				
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)	0	183	67	24	567	0	91	0	24	0	0	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	232	0	0	591	0	0	88	0	0	0	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.1			27.1			7.0				
Effective Green, g (s)		28.1			28.1			8.0				
Actuated g/C Ratio		0.61			0.61			0.17				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1025			1138			231				
v/s Ratio Prot		0.14										
v/s Ratio Perm					c0.32			c0.07				
v/c Ratio		0.23			0.52			0.38				
Uniform Delay, d1		4.1			5.1			16.9				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.1			0.4			1.0				
Delay (s)		4.2			5.5			17.9				
Level of Service		A			A			B				
Approach Delay (s)		4.2			5.5			17.9			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	55.7%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	150	20	465	75	0	
Future Volume (vph)	150	20	465	75	0	
Lane Group Flow (vph)	250	0	591	0	115	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	76.0	76.0	76.0	24.0	24.0	24.0
Total Split (%)	76.0%	76.0%	76.0%	24.0%	24.0%	24%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.22		0.48		0.35	
Control Delay	4.9		7.8		15.5	
Queue Delay	0.0		0.0		0.0	
Total Delay	4.9		7.8		15.5	
Queue Length 50th (m)	6.9		25.5		5.7	
Queue Length 95th (m)	15.6		47.3		15.9	
Internal Link Dist (m)	120.3		85.4		319.9	
Turn Bay Length (m)						
Base Capacity (vph)	1683		1868		599	
Starvation Cap Reductn	0		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.15		0.32		0.19	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 44.8
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Future Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.96			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1682			1896			1665				
Flt Permitted		1.00			0.98			0.77				
Satd. Flow (perm)		1682			1868			1334				
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)	0	183	67	24	567	0	91	0	24	0	0	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	232	0	0	591	0	0	88	0	0	0	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.1			27.1			7.0				
Effective Green, g (s)		28.1			28.1			8.0				
Actuated g/C Ratio		0.61			0.61			0.17				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1025			1138			231				
v/s Ratio Prot		0.14										
v/s Ratio Perm					c0.32			c0.07				
v/c Ratio		0.23			0.52			0.38				
Uniform Delay, d1		4.1			5.1			16.9				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.1			0.4			1.0				
Delay (s)		4.2			5.5			17.9				
Level of Service		A			A			B				
Approach Delay (s)		4.2			5.5			17.9			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	55.7%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	195	25	615	75	0	
Future Volume (vph)	195	25	615	75	0	
Lane Group Flow (vph)	305	0	780	0	115	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	25.0	25.0	25.0
Total Split (s)	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	25.0%	25.0%	25%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.25		0.59		0.38	
Control Delay	4.8		8.8		20.2	
Queue Delay	0.0		0.0		0.0	
Total Delay	4.8		8.8		20.2	
Queue Length 50th (m)	10.0		41.9		7.1	
Queue Length 95th (m)	21.1		75.9		20.7	
Internal Link Dist (m)	120.3		85.4		319.9	
Turn Bay Length (m)						
Base Capacity (vph)	1716		1862		536	
Starvation Cap Reductn	0		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.18		0.42		0.21	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 54
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	195	55	25	615	0	75	0	20	0	0	0
Future Volume (vph)	0	195	55	25	615	0	75	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.97			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1719			1896			1665				
Flt Permitted		1.00			0.98			0.77				
Satd. Flow (perm)		1719			1865			1334				
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)	0	238	67	30	750	0	91	0	24	0	0	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	294	0	0	780	0	0	87	0	0	0	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		35.6			35.6			7.7				
Effective Green, g (s)		36.6			36.6			8.7				
Actuated g/C Ratio		0.66			0.66			0.16				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1137			1234			209				
v/s Ratio Prot		0.17										
v/s Ratio Perm					c0.42			c0.07				
v/c Ratio		0.26			0.63			0.42				
Uniform Delay, d1		3.8			5.4			21.0				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.1			1.1			1.3				
Delay (s)		3.9			6.5			22.4				
Level of Service		A			A			C				
Approach Delay (s)		3.9			6.5			22.4			0.0	
Approach LOS		A			A			C			A	

Intersection Summary					
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.59				
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	66.5%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	425	15	135	80	0	
Future Volume (vph)	425	15	135	80	0	
Lane Group Flow (vph)	603	0	192	0	129	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	25.0%	25.0%	25%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.52		0.16		0.38	
Control Delay	8.4		5.6		16.8	
Queue Delay	0.0		0.0		0.0	
Total Delay	8.4		5.6		16.8	
Queue Length 50th (m)	27.1		6.6		6.5	
Queue Length 95th (m)	47.7		13.9		17.9	
Internal Link Dist (m)	120.3		85.4		319.9	
Turn Bay Length (m)						
Base Capacity (vph)	1760		1775		627	
Starvation Cap Reductn	18		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.35		0.11		0.21	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 46
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Future Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.99			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1760			1891			1696				
Flt Permitted		1.00			0.93			0.77				
Satd. Flow (perm)		1760			1774			1356				
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	0	545	58	19	173	0	103	0	26	0	0	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	598	0	0	192	0	0	102	0	0	0	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.9			27.9			7.4				
Effective Green, g (s)		28.9			28.9			8.4				
Actuated g/C Ratio		0.61			0.61			0.18				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1075			1083			240				
v/s Ratio Prot		c0.34										
v/s Ratio Perm					0.11			c0.08				
v/c Ratio		0.56			0.18			0.42				
Uniform Delay, d1		5.4			4.0			17.3				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.6			0.1			1.2				
Delay (s)		6.0			4.1			18.5				
Level of Service		A			A			B				
Approach Delay (s)		6.0			4.1			18.5			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	425	15	135	80	0	
Future Volume (vph)	425	15	135	80	0	
Lane Group Flow (vph)	603	0	192	0	129	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	25.0	25.0	25.0
Total Split (s)	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	25.0%	25.0%	25%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.52		0.16		0.38	
Control Delay	8.4		5.6		16.8	
Queue Delay	0.0		0.0		0.0	
Total Delay	8.4		5.6		16.8	
Queue Length 50th (m)	27.1		6.6		6.5	
Queue Length 95th (m)	47.7		13.9		17.9	
Internal Link Dist (m)	120.3		85.4		319.9	
Turn Bay Length (m)						
Base Capacity (vph)	1760		1775		627	
Starvation Cap Reductn	18		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.35		0.11		0.21	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 46
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Future Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.99			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1760			1891			1696				
Flt Permitted		1.00			0.93			0.77				
Satd. Flow (perm)		1760			1774			1356				
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	0	545	58	19	173	0	103	0	26	0	0	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	598	0	0	192	0	0	102	0	0	0	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.9			27.9			7.4				
Effective Green, g (s)		28.9			28.9			8.4				
Actuated g/C Ratio		0.61			0.61			0.18				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1075			1083			240				
v/s Ratio Prot		c0.34										
v/s Ratio Perm					0.11			c0.08				
v/c Ratio		0.56			0.18			0.42				
Uniform Delay, d1		5.4			4.0			17.3				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.6			0.1			1.2				
Delay (s)		6.0			4.1			18.5				
Level of Service		A			A			B				
Approach Delay (s)		6.0			4.1			18.5			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	425	15	135	80	0	
Future Volume (vph)	425	15	135	80	0	
Lane Group Flow (vph)	603	0	192	0	129	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	25.0	25.0	25.0
Total Split (s)	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	25.0%	25.0%	25%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.52		0.16		0.38	
Control Delay	8.4		5.6		16.8	
Queue Delay	0.0		0.0		0.0	
Total Delay	8.4		5.6		16.8	
Queue Length 50th (m)	27.1		6.6		6.5	
Queue Length 95th (m)	47.7		13.9		17.9	
Internal Link Dist (m)	120.3		85.4		319.9	
Turn Bay Length (m)						
Base Capacity (vph)	1760		1775		627	
Starvation Cap Reductn	18		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.35		0.11		0.21	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 46
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Future Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.99			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1760			1891			1696				
Flt Permitted		1.00			0.93			0.77				
Satd. Flow (perm)		1760			1774			1356				
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	0	545	58	19	173	0	103	0	26	0	0	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	598	0	0	192	0	0	102	0	0	0	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.9			27.9			7.4				
Effective Green, g (s)		28.9			28.9			8.4				
Actuated g/C Ratio		0.61			0.61			0.18				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1075			1083			240				
v/s Ratio Prot		c0.34										
v/s Ratio Perm					0.11			c0.08				
v/c Ratio		0.56			0.18			0.42				
Uniform Delay, d1		5.4			4.0			17.3				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.6			0.1			1.2				
Delay (s)		6.0			4.1			18.5				
Level of Service		A			A			B				
Approach Delay (s)		6.0			4.1			18.5			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	55	435	45	180	80	20	70
Future Volume (vph)	55	435	45	180	80	20	70
Lane Group Flow (vph)	0	687	0	289	0	161	148
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	6	6	8	8	4
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	74.0	74.0	74.0	74.0	26.0	26.0	26.0
Total Split (%)	74.0%	74.0%	74.0%	74.0%	26.0%	26.0%	26.0%
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)		-1.0		-1.0		-1.0	-1.0
Total Lost Time (s)		5.0		5.0		5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
v/c Ratio		0.73		0.33		0.49	0.32
Control Delay		14.8		8.1		24.6	18.2
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		14.8		8.1		24.6	18.2
Queue Length 50th (m)		44.4		13.8		12.9	9.7
Queue Length 95th (m)		77.3		27.5		31.0	24.6
Internal Link Dist (m)		120.3		85.4		319.9	101.9
Turn Bay Length (m)							
Base Capacity (vph)		1626		1506		514	708
Starvation Cap Reductn		46		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.43		0.19		0.31	0.21

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 56
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	435	45	45	180	0	80	20	25	0	70	45
Future Volume (vph)	55	435	45	45	180	0	80	20	25	0	70	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.97			0.95	
Flt Protected		0.99			0.99			0.97			1.00	
Satd. Flow (prot)		1765			1881			1725			1745	
Flt Permitted		0.94			0.81			0.72			1.00	
Satd. Flow (perm)		1663			1541			1281			1745	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	71	558	58	58	231	0	103	26	32	0	90	58
RTOR Reduction (vph)	0	5	0	0	0	0	0	8	0	0	22	0
Lane Group Flow (vph)	0	682	0	0	289	0	0	153	0	0	126	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		30.4			30.4			12.9			12.9	
Effective Green, g (s)		31.4			31.4			13.9			13.9	
Actuated g/C Ratio		0.57			0.57			0.25			0.25	
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)		944			874			321			438	
v/s Ratio Prot											0.07	
v/s Ratio Perm		c0.41			0.19			c0.12				
v/c Ratio		0.72			0.33			0.48			0.29	
Uniform Delay, d1		8.8			6.4			17.6			16.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.8			0.2			1.1			0.4	
Delay (s)		11.5			6.6			18.7			17.1	
Level of Service		B			A			B			B	
Approach Delay (s)		11.5			6.6			18.7			17.1	
Approach LOS		B			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	54.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	250	591	115
v/c Ratio	0.22	0.48	0.35
Control Delay	4.9	7.8	15.5
Queue Delay	0.0	0.0	0.0
Total Delay	4.9	7.8	15.5
Queue Length 50th (m)	6.9	25.5	5.7
Queue Length 95th (m)	15.6	47.3	15.9
Internal Link Dist (m)	120.3	85.4	319.9
Turn Bay Length (m)			
Base Capacity (vph)	1683	1868	599
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.15	0.32	0.19

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Future Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.96			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1682			1896			1665				
Flt Permitted		1.00			0.98			0.77				
Satd. Flow (perm)		1682			1868			1334				
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)	0	183	67	24	567	0	91	0	24	0	0	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	232	0	0	591	0	0	88	0	0	0	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.1			27.1			7.0				
Effective Green, g (s)		28.1			28.1			8.0				
Actuated g/C Ratio		0.61			0.61			0.17				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1025			1138			231				
v/s Ratio Prot		0.14										
v/s Ratio Perm					c0.32			c0.07				
v/c Ratio		0.23			0.52			0.38				
Uniform Delay, d1		4.1			5.1			16.9				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.1			0.4			1.0				
Delay (s)		4.2			5.5			17.9				
Level of Service		A			A			B				
Approach Delay (s)		4.2			5.5			17.9			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	55.7%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	55	435	45	180	80	20	70
Future Volume (vph)	55	435	45	180	80	20	70
Lane Group Flow (vph)	0	687	0	289	0	161	148
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	6	6	8	8	4
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	74.0	74.0	74.0	74.0	26.0	26.0	26.0
Total Split (%)	74.0%	74.0%	74.0%	74.0%	26.0%	26.0%	26.0%
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)		-1.0		-1.0		-1.0	-1.0
Total Lost Time (s)		5.0		5.0		5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
v/c Ratio		0.73		0.33		0.49	0.32
Control Delay		14.8		8.1		24.6	18.2
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		14.8		8.1		24.6	18.2
Queue Length 50th (m)		44.4		13.8		12.9	9.7
Queue Length 95th (m)		77.3		27.5		31.0	24.6
Internal Link Dist (m)		120.3		85.4		319.9	101.9
Turn Bay Length (m)							
Base Capacity (vph)		1626		1506		514	708
Starvation Cap Reductn		46		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.43		0.19		0.31	0.21

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 56
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	435	45	45	180	0	80	20	25	0	70	45
Future Volume (vph)	55	435	45	45	180	0	80	20	25	0	70	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.97			0.95	
Flt Protected		0.99			0.99			0.97			1.00	
Satd. Flow (prot)		1765			1881			1725			1745	
Flt Permitted		0.94			0.81			0.72			1.00	
Satd. Flow (perm)		1663			1541			1281			1745	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	71	558	58	58	231	0	103	26	32	0	90	58
RTOR Reduction (vph)	0	5	0	0	0	0	0	8	0	0	22	0
Lane Group Flow (vph)	0	682	0	0	289	0	0	153	0	0	126	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		30.4			30.4			12.9			12.9	
Effective Green, g (s)		31.4			31.4			13.9			13.9	
Actuated g/C Ratio		0.57			0.57			0.25			0.25	
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)		944			874			321			438	
v/s Ratio Prot											0.07	
v/s Ratio Perm		c0.41			0.19			c0.12				
v/c Ratio		0.72			0.33			0.48			0.29	
Uniform Delay, d1		8.8			6.4			17.6			16.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.8			0.2			1.1			0.4	
Delay (s)		11.5			6.6			18.7			17.1	
Level of Service		B			A			B			B	
Approach Delay (s)		11.5			6.6			18.7			17.1	
Approach LOS		B			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	54.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	513	628	231	79
v/c Ratio	0.82	0.58	0.64	0.18
Control Delay	22.4	10.2	35.3	19.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.4	10.2	35.3	19.9
Queue Length 50th (m)	45.1	44.3	23.3	4.9
Queue Length 95th (m)	72.5	61.0	#67.8	19.2
Internal Link Dist (m)	120.3	85.4	319.9	101.9
Turn Bay Length (m)				
Base Capacity (vph)	955	1687	455	568
Starvation Cap Reductn	19	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.55	0.37	0.51	0.14

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	180	55	30	485	0	75	70	45	0	40	25
Future Volume (vph)	185	180	55	30	485	0	75	70	45	0	40	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.97			0.95	
Flt Protected		0.98			1.00			0.98			1.00	
Satd. Flow (prot)		1751			1894			1716			1803	
Flt Permitted		0.57			0.95			0.84			1.00	
Satd. Flow (perm)		1025			1813			1464			1803	
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)	226	220	67	37	591	0	91	85	55	0	49	30
RTOR Reduction (vph)	0	7	0	0	0	0	0	11	0	0	20	0
Lane Group Flow (vph)	0	506	0	0	628	0	0	220	0	0	59	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		39.3			39.3			15.0			15.0	
Effective Green, g (s)		40.3			40.3			16.0			16.0	
Actuated g/C Ratio		0.61			0.61			0.24			0.24	
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)		623			1102			353			435	
v/s Ratio Prot											0.03	
v/s Ratio Perm		c0.49			0.35			c0.15				
v/c Ratio		0.81			0.57			0.62			0.13	
Uniform Delay, d1		10.1			7.8			22.5			19.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		7.9			0.7			3.4			0.1	
Delay (s)		18.0			8.5			25.9			19.9	
Level of Service		B			A			C			B	
Approach Delay (s)		18.0			8.5			25.9			19.9	
Approach LOS		B			A			C			B	

Intersection Summary

HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	55	565	45	235	85	20	70
Future Volume (vph)	55	565	45	235	85	20	70
Lane Group Flow (vph)	0	853	0	359	0	173	148
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	6	6	8	8	4
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	71.0	71.0	71.0	71.0	29.0	29.0	29.0
Total Split (%)	71.0%	71.0%	71.0%	71.0%	29.0%	29.0%	29.0%
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)		-1.0		-1.0		-1.0	-1.0
Total Lost Time (s)		5.0		5.0		5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
v/c Ratio		0.83		0.38		0.57	0.35
Control Delay		18.9		8.3		33.7	23.9
Queue Delay		0.2		0.0		0.0	0.0
Total Delay		19.1		8.3		33.7	23.9
Queue Length 50th (m)		76.2		20.8		18.4	12.6
Queue Length 95th (m)		117.2		36.7		42.3	31.0
Internal Link Dist (m)		120.3		85.4		319.9	101.9
Turn Bay Length (m)							
Base Capacity (vph)		1475		1351		485	667
Starvation Cap Reductn		138		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.64		0.27		0.36	0.22

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 70.4
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	565	45	45	235	0	85	20	30	0	70	45
Future Volume (vph)	55	565	45	45	235	0	85	20	30	0	70	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.97			0.95	
Flt Protected		1.00			0.99			0.97			1.00	
Satd. Flow (prot)		1770			1885			1722			1745	
Flt Permitted		0.94			0.81			0.72			1.00	
Satd. Flow (perm)		1672			1533			1284			1745	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	71	724	58	58	301	0	109	26	38	0	90	58
RTOR Reduction (vph)	0	3	0	0	0	0	0	10	0	0	24	0
Lane Group Flow (vph)	0	850	0	0	359	0	0	163	0	0	124	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		42.3			42.3			15.1			15.1	
Effective Green, g (s)		43.3			43.3			16.1			16.1	
Actuated g/C Ratio		0.62			0.62			0.23			0.23	
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)		1043			956			297			404	
v/s Ratio Prot											0.07	
v/s Ratio Perm		c0.51			0.23			c0.13				
v/c Ratio		0.81			0.38			0.55			0.31	
Uniform Delay, d1		10.0			6.4			23.5			22.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		5.0			0.2			2.1			0.4	
Delay (s)		15.0			6.7			25.5			22.5	
Level of Service		B			A			C			C	
Approach Delay (s)		15.0			6.7			25.5			22.5	
Approach LOS		B			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.74				
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	567	817	231	79
v/c Ratio	0.90	0.68	0.73	0.20
Control Delay	31.2	11.8	47.2	23.8
Queue Delay	0.2	0.0	0.0	0.0
Total Delay	31.4	11.8	47.2	23.8
Queue Length 50th (m)	73.2	79.6	37.2	7.6
Queue Length 95th (m)	112.8	95.8	#65.9	19.1
Internal Link Dist (m)	120.3	85.4	319.9	101.9
Turn Bay Length (m)				
Base Capacity (vph)	787	1506	382	479
Starvation Cap Reductn	18	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.74	0.54	0.60	0.16

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	225	55	35	635	0	75	70	45	0	40	25
Future Volume (vph)	185	225	55	35	635	0	75	70	45	0	40	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.97			0.95	
Flt Protected		0.98			1.00			0.98			1.00	
Satd. Flow (prot)		1764			1895			1716			1803	
Flt Permitted		0.52			0.95			0.84			1.00	
Satd. Flow (perm)		942			1809			1464			1803	
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)	226	274	67	43	774	0	91	85	55	0	49	30
RTOR Reduction (vph)	0	5	0	0	0	0	0	11	0	0	22	0
Lane Group Flow (vph)	0	562	0	0	817	0	0	220	0	0	57	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		54.2			54.2			16.3			16.3	
Effective Green, g (s)		55.2			55.2			17.3			17.3	
Actuated g/C Ratio		0.67			0.67			0.21			0.21	
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)		630			1210			306			378	
v/s Ratio Prot											0.03	
v/s Ratio Perm		c0.60			0.45			c0.15				
v/c Ratio		0.89			0.68			0.72			0.15	
Uniform Delay, d1		11.2			8.2			30.3			26.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		14.8			1.5			7.8			0.2	
Delay (s)		26.0			9.7			38.2			26.8	
Level of Service		C			A			D			C	
Approach Delay (s)		26.0			9.7			38.2			26.8	
Approach LOS		C			A			D			C	

Intersection Summary					
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.85				
Actuated Cycle Length (s)	82.5	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	90.5%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

Queues
8: Cooke Boulevard & Masonry Court

Future Background 2026 - With Improvements
AM Peak Hour

Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	603	192	129
v/c Ratio	0.52	0.16	0.38
Control Delay	8.5	5.7	16.6
Queue Delay	0.0	0.0	0.0
Total Delay	8.5	5.7	16.6
Queue Length 50th (m)	27.4	6.6	6.5
Queue Length 95th (m)	48.6	14.2	17.8
Internal Link Dist (m)	120.3	85.4	315.6
Turn Bay Length (m)			
Base Capacity (vph)	1760	1775	687
Starvation Cap Reductn	17	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.35	0.11	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Cooke Boulevard & Masonry Court

Future Background 2026 - With Improvements
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Future Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.99			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1760			1891			1696				
Flt Permitted		1.00			0.93			0.77				
Satd. Flow (perm)		1760			1774			1356				
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	0	545	58	19	173	0	103	0	26	0	0	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	598	0	0	192	0	0	102	0	0	0	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.8			27.8			7.5				
Effective Green, g (s)		28.8			28.8			8.5				
Actuated g/C Ratio		0.61			0.61			0.18				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1071			1080			243				
v/s Ratio Prot		c0.34										
v/s Ratio Perm					0.11			c0.08				
v/c Ratio		0.56			0.18			0.42				
Uniform Delay, d1		5.5			4.1			17.2				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.6			0.1			1.2				
Delay (s)		6.1			4.1			18.4				
Level of Service		A			A			B				
Approach Delay (s)		6.1			4.1			18.4			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	150	20	465	75	0	
Future Volume (vph)	150	20	465	75	0	
Lane Group Flow (vph)	250	0	591	0	115	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	25.0%	25.0%	25%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.22		0.48		0.35	
Control Delay	4.9		7.8		15.4	
Queue Delay	0.0		0.0		0.0	
Total Delay	4.9		7.8		15.4	
Queue Length 50th (m)	7.0		25.5		5.7	
Queue Length 95th (m)	15.8		47.5		15.9	
Internal Link Dist (m)	120.3		85.4		319.9	
Turn Bay Length (m)						
Base Capacity (vph)	1683		1868		629	
Starvation Cap Reductn	0		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.15		0.32		0.18	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 44.8
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Future Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.96			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1682			1896			1665				
Flt Permitted		1.00			0.98			0.77				
Satd. Flow (perm)		1682			1868			1334				
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)	0	183	67	24	567	0	91	0	24	0	0	0
RTOR Reduction (vph)	0	17	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	233	0	0	591	0	0	88	0	0	0	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.1			27.1			7.0				
Effective Green, g (s)		28.1			28.1			8.0				
Actuated g/C Ratio		0.61			0.61			0.17				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1025			1138			231				
v/s Ratio Prot		0.14										
v/s Ratio Perm					c0.32			c0.07				
v/c Ratio		0.23			0.52			0.38				
Uniform Delay, d1		4.1			5.1			16.9				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.1			0.4			1.0				
Delay (s)		4.2			5.5			17.9				
Level of Service		A			A			B				
Approach Delay (s)		4.2			5.5			17.9			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	55.7%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	425	15	135	80	0	
Future Volume (vph)	425	15	135	80	0	
Lane Group Flow (vph)	603	0	192	0	129	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	25.0%	25.0%	25%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.52		0.16		0.38	
Control Delay	8.4		5.6		16.8	
Queue Delay	0.0		0.0		0.0	
Total Delay	8.4		5.6		16.8	
Queue Length 50th (m)	27.1		6.6		6.5	
Queue Length 95th (m)	47.7		13.9		17.9	
Internal Link Dist (m)	120.3		85.4		313.3	
Turn Bay Length (m)						
Base Capacity (vph)	1760		1775		627	
Starvation Cap Reductn	18		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.35		0.11		0.21	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 46
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Future Volume (vph)	0	425	45	15	135	0	80	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.99			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1760			1891			1696				
Flt Permitted		1.00			0.93			0.77				
Satd. Flow (perm)		1760			1774			1356				
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	0	545	58	19	173	0	103	0	26	0	0	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	598	0	0	192	0	0	102	0	0	0	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.9			27.9			7.4				
Effective Green, g (s)		28.9			28.9			8.4				
Actuated g/C Ratio		0.61			0.61			0.18				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1075			1083			240				
v/s Ratio Prot		c0.34										
v/s Ratio Perm					0.11			c0.08				
v/c Ratio		0.56			0.18			0.42				
Uniform Delay, d1		5.4			4.0			17.3				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.6			0.1			1.2				
Delay (s)		6.0			4.1			18.5				
Level of Service		A			A			B				
Approach Delay (s)		6.0			4.1			18.5			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	150	20	465	75	0	
Future Volume (vph)	150	20	465	75	0	
Lane Group Flow (vph)	250	0	591	0	115	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	25.0%	25.0%	25%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.22		0.48		0.35	
Control Delay	4.9		7.8		15.4	
Queue Delay	0.0		0.0		0.0	
Total Delay	4.9		7.8		15.4	
Queue Length 50th (m)	7.0		25.5		5.7	
Queue Length 95th (m)	15.8		47.5		15.9	
Internal Link Dist (m)	120.3		85.4		319.9	
Turn Bay Length (m)						
Base Capacity (vph)	1683		1868		629	
Starvation Cap Reductn	0		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.15		0.32		0.18	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 44.8
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Future Volume (vph)	0	150	55	20	465	0	75	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.96			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1682			1896			1665				
Flt Permitted		1.00			0.98			0.77				
Satd. Flow (perm)		1682			1868			1334				
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)	0	183	67	24	567	0	91	0	24	0	0	0
RTOR Reduction (vph)	0	17	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	233	0	0	591	0	0	88	0	0	0	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.1			27.1			7.0				
Effective Green, g (s)		28.1			28.1			8.0				
Actuated g/C Ratio		0.61			0.61			0.17				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1025			1138			231				
v/s Ratio Prot		0.14										
v/s Ratio Perm					c0.32			c0.07				
v/c Ratio		0.23			0.52			0.38				
Uniform Delay, d1		4.1			5.1			16.9				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.1			0.4			1.0				
Delay (s)		4.2			5.5			17.9				
Level of Service		A			A			B				
Approach Delay (s)		4.2			5.5			17.9			0.0	
Approach LOS		A			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	55.7%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	555	15	190	85	0	
Future Volume (vph)	555	15	190	85	0	
Lane Group Flow (vph)	770	0	263	0	141	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	25.0%	25.0%	25%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.62		0.21		0.44	
Control Delay	10.0		5.5		22.3	
Queue Delay	0.0		0.0		0.0	
Total Delay	10.0		5.5		22.3	
Queue Length 50th (m)	44.3		10.2		9.2	
Queue Length 95th (m)	76.3		20.7		25.3	
Internal Link Dist (m)	120.3		85.4		313.3	
Turn Bay Length (m)						
Base Capacity (vph)	1732		1749		544	
Starvation Cap Reductn	71		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.46		0.15		0.26	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 55.2
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	555	45	15	190	0	85	0	25	0	0	0
Future Volume (vph)	0	555	45	15	190	0	85	0	25	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.99			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1767			1893			1695				
Flt Permitted		1.00			0.94			0.77				
Satd. Flow (perm)		1767			1784			1363				
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	0	712	58	19	244	0	109	0	32	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	767	0	0	263	0	0	114	0	0	0	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		35.8			35.8			8.5				
Effective Green, g (s)		36.8			36.8			9.5				
Actuated g/C Ratio		0.65			0.65			0.17				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1154			1166			229				
v/s Ratio Prot		c0.43										
v/s Ratio Perm					0.15			c0.08				
v/c Ratio		0.66			0.23			0.50				
Uniform Delay, d1		6.0			4.0			21.2				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		1.5			0.1			1.7				
Delay (s)		7.4			4.1			22.9				
Level of Service		A			A			C				
Approach Delay (s)		7.4			4.1			22.9			0.0	
Approach LOS		A			A			C			A	

Intersection Summary					
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.63				
Actuated Cycle Length (s)	56.3	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	Ø4
Lane Configurations						
Traffic Volume (vph)	195	25	615	75	0	
Future Volume (vph)	195	25	615	75	0	
Lane Group Flow (vph)	305	0	780	0	115	
Turn Type	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		8	4
Permitted Phases		6		8		
Detector Phase	2	6	6	8	8	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	25.0%	25.0%	25%
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)	-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	None	None	None
v/c Ratio	0.25		0.59		0.38	
Control Delay	4.8		8.8		20.2	
Queue Delay	0.0		0.0		0.0	
Total Delay	4.8		8.8		20.2	
Queue Length 50th (m)	10.0		41.9		7.1	
Queue Length 95th (m)	21.1		75.9		20.7	
Internal Link Dist (m)	120.3		85.4		319.9	
Turn Bay Length (m)						
Base Capacity (vph)	1716		1862		536	
Starvation Cap Reductn	0		0		0	
Spillback Cap Reductn	0		0		0	
Storage Cap Reductn	0		0		0	
Reduced v/c Ratio	0.18		0.42		0.21	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 54
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	195	55	25	615	0	75	0	20	0	0	0
Future Volume (vph)	0	195	55	25	615	0	75	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.97			1.00			0.97				
Flt Protected		1.00			1.00			0.96				
Satd. Flow (prot)		1719			1896			1665				
Flt Permitted		1.00			0.98			0.77				
Satd. Flow (perm)		1719			1865			1334				
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)	0	238	67	30	750	0	91	0	24	0	0	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	294	0	0	780	0	0	87	0	0	0	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		35.6			35.6			7.7				
Effective Green, g (s)		36.6			36.6			8.7				
Actuated g/C Ratio		0.66			0.66			0.16				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1137			1234			209				
v/s Ratio Prot		0.17										
v/s Ratio Perm					c0.42			c0.07				
v/c Ratio		0.26			0.63			0.42				
Uniform Delay, d1		3.8			5.4			21.0				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.1			1.1			1.3				
Delay (s)		3.9			6.5			22.4				
Level of Service		A			A			C				
Approach Delay (s)		3.9			6.5			22.4			0.0	
Approach LOS		A			A			C			A	

Intersection Summary					
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.59				
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	66.5%	ICU Level of Service	C		
Analysis Period (min)	15				

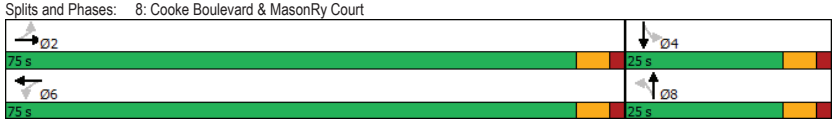
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	185	180	30	485	75	70	40
Future Volume (vph)	185	180	30	485	75	70	40
Lane Group Flow (vph)	0	513	0	628	0	231	79
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	6	6	8	8	4
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25.0%
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)		-1.0		-1.0		-1.0	-1.0
Total Lost Time (s)		5.0		5.0		5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
v/c Ratio		0.82		0.57		0.65	0.18
Control Delay		22.4		10.2		35.6	19.7
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		22.4		10.2		35.6	19.7
Queue Length 50th (m)		44.8		43.9		24.1	5.0
Queue Length 95th (m)		75.7		63.4		#65.9	19.1
Internal Link Dist (m)		120.3		85.4		319.9	101.9
Turn Bay Length (m)							
Base Capacity (vph)		941		1663		474	592
Starvation Cap Reductn		19		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.56		0.38		0.49	0.13

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 68.2
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Cooke Boulevard & MasonRy Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	180	55	30	485	0	75	70	45	0	40	25
Future Volume (vph)	185	180	55	30	485	0	75	70	45	0	40	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.97			0.95	
Flt Protected		0.98			1.00			0.98			1.00	
Satd. Flow (prot)		1751			1894			1716			1803	
Flt Permitted		0.57			0.95			0.84			1.00	
Satd. Flow (perm)		1025			1813			1464			1803	
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)	226	220	67	37	591	0	91	85	55	0	49	30
RTOR Reduction (vph)	0	7	0	0	0	0	0	11	0	0	21	0
Lane Group Flow (vph)	0	506	0	0	628	0	0	220	0	0	58	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		40.1			40.1			15.1			15.1	
Effective Green, g (s)		41.1			41.1			16.1			16.1	
Actuated g/C Ratio		0.61			0.61			0.24			0.24	
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)		626			1108			350			431	
v/s Ratio Prot											0.03	
v/s Ratio Perm		c0.49			0.35			c0.15				
v/c Ratio		0.81			0.57			0.63			0.13	
Uniform Delay, d1		10.0			7.8			22.9			20.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		7.6			0.7			3.5			0.1	
Delay (s)		17.6			8.4			26.4			20.2	
Level of Service		B			A			C			C	
Approach Delay (s)		17.6			8.4			26.4			20.2	
Approach LOS		B			A			C			C	

Intersection Summary

HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	55	435	45	180	80	20	70
Future Volume (vph)	55	435	45	180	80	20	70
Lane Group Flow (vph)	0	687	0	289	0	161	148
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	6	6	8	8	4
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25.0%
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)		-1.0		-1.0		-1.0	-1.0
Total Lost Time (s)		5.0		5.0		5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
v/c Ratio		0.73		0.33		0.49	0.32
Control Delay		14.9		8.1		24.3	18.0
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		14.9		8.1		24.3	18.0
Queue Length 50th (m)		45.3		14.1		13.1	9.8
Queue Length 95th (m)		74.8		26.5		30.7	24.1
Internal Link Dist (m)		120.3		85.4		319.9	101.9
Turn Bay Length (m)							
Base Capacity (vph)		1638		1518		488	673
Starvation Cap Reductn		43		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.43		0.19		0.33	0.22

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 55.9
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	435	45	45	180	0	80	20	25	0	70	45
Future Volume (vph)	55	435	45	45	180	0	80	20	25	0	70	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.97			0.95	
Flt Protected		0.99			0.99			0.97			1.00	
Satd. Flow (prot)		1765			1881			1725			1745	
Flt Permitted		0.94			0.81			0.72			1.00	
Satd. Flow (perm)		1662			1540			1281			1745	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	71	558	58	58	231	0	103	26	32	0	90	58
RTOR Reduction (vph)	0	5	0	0	0	0	0	8	0	0	22	0
Lane Group Flow (vph)	0	682	0	0	289	0	0	153	0	0	126	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		30.3			30.3			13.0			13.0	
Effective Green, g (s)		31.3			31.3			14.0			14.0	
Actuated g/C Ratio		0.57			0.57			0.25			0.25	
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)		940			871			324			441	
v/s Ratio Prot											0.07	
v/s Ratio Perm		c0.41			0.19			c0.12				
v/c Ratio		0.73			0.33			0.47			0.29	
Uniform Delay, d1		8.8			6.4			17.5			16.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.8			0.2			1.1			0.4	
Delay (s)		11.7			6.6			18.6			17.0	
Level of Service		B			A			B			B	
Approach Delay (s)		11.7			6.6			18.6			17.0	
Approach LOS		B			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.65				
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	185	180	30	485	75	70	40
Future Volume (vph)	185	180	30	485	75	70	40
Lane Group Flow (vph)	0	513	0	628	0	231	79
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	6	6	8	8	4
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25.0%
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)		-1.0		-1.0		-1.0	-1.0
Total Lost Time (s)		5.0		5.0		5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
v/c Ratio		0.82		0.57		0.65	0.18
Control Delay		22.4		10.2		35.6	19.7
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		22.4		10.2		35.6	19.7
Queue Length 50th (m)		44.8		43.9		24.1	5.0
Queue Length 95th (m)		75.7		63.4		#65.9	19.1
Internal Link Dist (m)		120.3		85.4		315.8	101.9
Turn Bay Length (m)							
Base Capacity (vph)		941		1663		474	592
Starvation Cap Reductn		19		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.56		0.38		0.49	0.13

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 68.2
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	180	55	30	485	0	75	70	45	0	40	25
Future Volume (vph)	185	180	55	30	485	0	75	70	45	0	40	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.97			0.95	
Flt Protected		0.98			1.00			0.98			1.00	
Satd. Flow (prot)		1751			1894			1716			1803	
Flt Permitted		0.57			0.95			0.84			1.00	
Satd. Flow (perm)		1025			1813			1464			1803	
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)	226	220	67	37	591	0	91	85	55	0	49	30
RTOR Reduction (vph)	0	7	0	0	0	0	0	11	0	0	21	0
Lane Group Flow (vph)	0	506	0	0	628	0	0	220	0	0	58	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		40.1			40.1			15.1			15.1	
Effective Green, g (s)		41.1			41.1			16.1			16.1	
Actuated g/C Ratio		0.61			0.61			0.24			0.24	
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)		626			1108			350			431	
v/s Ratio Prot											0.03	
v/s Ratio Perm		c0.49			0.35			c0.15				
v/c Ratio		0.81			0.57			0.63			0.13	
Uniform Delay, d1		10.0			7.8			22.9			20.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		7.6			0.7			3.5			0.1	
Delay (s)		17.6			8.4			26.4			20.2	
Level of Service		B			A			C			C	
Approach Delay (s)		17.6			8.4			26.4			20.2	
Approach LOS		B			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.76				
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	80.0%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	55	565	45	235	85	20	70
Future Volume (vph)	55	565	45	235	85	20	70
Lane Group Flow (vph)	0	853	0	359	0	173	148
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	6	6	8	8	4
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25.0%
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)		-1.0		-1.0		-1.0	-1.0
Total Lost Time (s)		5.0		5.0		5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
v/c Ratio		0.82		0.38		0.58	0.36
Control Delay		17.7		7.8		34.9	24.9
Queue Delay		0.2		0.0		0.0	0.0
Total Delay		17.9		7.8		34.9	24.9
Queue Length 50th (m)		78.4		21.4		18.8	13.1
Queue Length 95th (m)		100.8		31.6		44.2	33.0
Internal Link Dist (m)		120.3		85.4		319.9	101.9
Turn Bay Length (m)							
Base Capacity (vph)		1527		1398		401	553
Starvation Cap Reductn		151		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.62		0.26		0.43	0.27

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 70.3
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	565	45	45	235	0	85	20	30	0	70	45
Future Volume (vph)	55	565	45	45	235	0	85	20	30	0	70	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.97			0.95	
Flt Protected		1.00			0.99			0.97			1.00	
Satd. Flow (prot)		1770			1885			1722			1745	
Flt Permitted		0.94			0.81			0.72			1.00	
Satd. Flow (perm)		1672			1533			1284			1745	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	71	724	58	58	301	0	109	26	38	0	90	58
RTOR Reduction (vph)	0	3	0	0	0	0	0	10	0	0	22	0
Lane Group Flow (vph)	0	850	0	0	359	0	0	163	0	0	126	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		42.6			42.6			14.8			14.8	
Effective Green, g (s)		43.6			43.6			15.8			15.8	
Actuated g/C Ratio		0.63			0.63			0.23			0.23	
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)		1050			963			292			397	
v/s Ratio Prot											0.07	
v/s Ratio Perm		c0.51			0.23			c0.13				
v/c Ratio		0.81			0.37			0.56			0.32	
Uniform Delay, d1		9.8			6.3			23.7			22.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		4.7			0.2			2.3			0.5	
Delay (s)		14.4			6.5			26.0			22.8	
Level of Service		B			A			C			C	
Approach Delay (s)		14.4			6.5			26.0			22.8	
Approach LOS		B			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.74				
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	185	225	35	635	75	70	40
Future Volume (vph)	185	225	35	635	75	70	40
Lane Group Flow (vph)	0	567	0	817	0	231	79
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	6	6	8	8	4
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	75.0	75.0	75.0	75.0	25.0	25.0	25.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25.0%
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)		-1.0		-1.0		-1.0	-1.0
Total Lost Time (s)		5.0		5.0		5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Max	Max	Max	Max	Max	Max	Max
v/c Ratio		0.85		0.65		0.76	0.21
Control Delay		26.2		11.2		53.2	24.4
Queue Delay		2.9		0.0		0.0	0.0
Total Delay		29.0		11.2		53.2	24.4
Queue Length 50th (m)		73.2		79.6		42.2	8.6
Queue Length 95th (m)		112.8		96.0		#65.9	19.1
Internal Link Dist (m)		120.3		85.4		315.8	101.9
Turn Bay Length (m)							
Base Capacity (vph)		664		1264		303	383
Starvation Cap Reductn		40		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.91		0.65		0.76	0.21

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	225	55	35	635	0	75	70	45	0	40	25
Future Volume (vph)	185	225	55	35	635	0	75	70	45	0	40	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.97			0.95	
Flt Protected		0.98			1.00			0.98			1.00	
Satd. Flow (prot)		1764			1895			1716			1803	
Flt Permitted		0.52			0.95			0.84			1.00	
Satd. Flow (perm)		942			1806			1464			1803	
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)	226	274	67	43	774	0	91	85	55	0	49	30
RTOR Reduction (vph)	0	5	0	0	0	0	0	11	0	0	22	0
Lane Group Flow (vph)	0	562	0	0	817	0	0	220	0	0	57	0
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	5%	0%	13%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		69.0			69.0			19.0			19.0	
Effective Green, g (s)		70.0			70.0			20.0			20.0	
Actuated g/C Ratio		0.70			0.70			0.20			0.20	
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)		659			1264			292			360	
v/s Ratio Prot											0.03	
v/s Ratio Perm		c0.60			0.45			c0.15				
v/c Ratio		0.85			0.65			0.75			0.16	
Uniform Delay, d1		11.2			8.2			37.7			33.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		13.2			2.6			16.4			0.9	
Delay (s)		24.4			10.8			54.0			34.0	
Level of Service		C			B			D			C	
Approach Delay (s)		24.4			10.8			54.0			34.0	
Approach LOS		C			B			D			C	

Intersection Summary

HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	55	435	45	180	80	20	70
Future Volume (vph)	55	435	45	180	80	20	70
Lane Group Flow (vph)	0	687	0	289	0	161	148
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	6	6	8	8	4
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (s)	73.0	73.0	73.0	73.0	27.0	27.0	27.0
Total Split (%)	73.0%	73.0%	73.0%	73.0%	27.0%	27.0%	27.0%
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)		-1.0		-1.0		-1.0	-1.0
Total Lost Time (s)		5.0		5.0		5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
v/c Ratio		0.63		0.29		0.47	0.31
Control Delay		12.0		7.6		24.3	18.1
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		12.0		7.6		24.3	18.1
Queue Length 50th (m)		44.1		13.7		12.8	9.5
Queue Length 95th (m)		79.7		28.3		31.6	24.7
Internal Link Dist (m)		120.3		85.4		319.9	101.9
Turn Bay Length (m)							
Base Capacity (vph)		1615		1500		569	782
Starvation Cap Reductn		49		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.44		0.19		0.28	0.19

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 54.9
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Cooke Boulevard & Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	435	45	45	180	0	80	20	25	0	70	45
Future Volume (vph)	55	435	45	45	180	0	80	20	25	0	70	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.97			0.95	
Flt Protected		0.99			0.99			0.97			1.00	
Satd. Flow (prot)		1765			1881			1725			1745	
Flt Permitted		0.94			0.81			0.72			1.00	
Satd. Flow (perm)		1664			1547			1281			1745	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	71	558	58	58	231	0	103	26	32	0	90	58
RTOR Reduction (vph)	0	4	0	0	0	0	0	9	0	0	24	0
Lane Group Flow (vph)	0	683	0	0	289	0	0	152	0	0	124	0
Heavy Vehicles (%)	0%	6%	12%	0%	0%	25%	6%	0%	0%	0%	0%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		33.1			33.1			10.5			10.5	
Effective Green, g (s)		34.1			34.1			11.5			11.5	
Actuated g/C Ratio		0.61			0.61			0.21			0.21	
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)		1020			948			264			360	
v/s Ratio Prot											0.07	
v/s Ratio Perm		c0.41			0.19			c0.12				
v/c Ratio		0.67			0.30			0.58			0.35	
Uniform Delay, d1		7.1			5.1			19.9			18.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.7			0.2			3.0			0.6	
Delay (s)		8.7			5.3			22.9			19.4	
Level of Service		A			A			C			B	
Approach Delay (s)		8.7			5.3			22.9			19.4	
Approach LOS		A			A			C			B	

Intersection Summary					
HCM 2000 Control Delay		11.0	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.65			
Actuated Cycle Length (s)		55.6	Sum of lost time (s)		10.0
Intersection Capacity Utilization		54.9%	ICU Level of Service		A
Analysis Period (min)		15			

c Critical Lane Group

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	61	107	66	255	888	240	959
v/c Ratio	0.32	0.51	0.22	0.34	0.50	0.45	0.54
Control Delay	42.5	48.0	2.6	3.4	3.1	5.8	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	42.5	48.0	2.6	3.4	3.2	5.8	13.7
Queue Length 50th (m)	11.4	20.6	0.0	1.0	0.0	9.5	53.4
Queue Length 95th (m)	22.9	36.0	1.9	8.0	14.6	20.3	87.0
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	490	542	568	939	1779	616	1792
Starvation Cap Reductn	0	0	0	0	140	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.20	0.12	0.27	0.54	0.39	0.54

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	105	65	250	440	430	235	730	210
Future Volume (vph)	0	0	0	60	105	65	250	440	430	235	730	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2970		1616	2985	
Flt Permitted				0.95	1.00	1.00	0.26	1.00		0.26	1.00	
Satd. Flow (perm)				1442	1597	1439	830	2970		438	2985	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	61	107	66	255	449	439	240	745	214
RTOR Reduction (vph)	0	0	0	0	0	57	0	110	0	0	16	0
Lane Group Flow (vph)	0	0	0	61	107	9	255	779	0	240	943	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				12.3	12.3	12.3	63.5	55.2		73.7	58.4	
Effective Green, g (s)				13.3	13.3	13.3	65.5	56.2		74.7	59.4	
Actuated g/C Ratio				0.13	0.13	0.13	0.66	0.56		0.75	0.59	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				191	212	191	745	1669		521	1773	
v/s Ratio Prot				0.04	c0.07		0.03	0.26		c0.08	c0.32	
v/s Ratio Perm						0.01	0.19			0.27		
v/c Ratio				0.32	0.50	0.05	0.34	0.47		0.46	0.53	
Uniform Delay, d1				39.3	40.3	37.8	6.8	13.0		4.9	12.0	
Progression Factor				1.00	1.00	1.00	0.47	0.21		1.00	1.00	
Incremental Delay, d2				1.0	1.9	0.1	0.3	0.9		0.6	1.1	
Delay (s)				40.2	42.2	37.9	3.4	3.5		5.6	13.2	
Level of Service				D	D	D	A	A		A	B	
Approach Delay (s)		0.0			40.5			3.5			11.7	
Approach LOS		A			D			A			B	

Intersection Summary

HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	5	234	163	1054	859
v/c Ratio	0.05	0.54	0.49	0.46	0.35
Control Delay	43.0	44.7	11.4	5.1	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.1
Total Delay	43.0	44.7	11.4	5.1	3.7
Queue Length 50th (m)	1.0	23.2	0.0	4.6	18.8
Queue Length 95th (m)	4.6	34.3	17.8	123.7	13.1
Internal Link Dist (m)	106.5			174.0	121.9
Turn Bay Length (m)		145.0	115.0		
Base Capacity (vph)	101	543	377	2304	2456
Starvation Cap Reductn	0	0	0	0	407
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.43	0.43	0.46	0.42

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	215	0	150	5	965	0	0	790	0
Future Volume (vph)	5	0	0	215	0	150	5	965	0	0	790	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3391			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3227			3438	
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)	5	0	0	234	0	163	5	1049	0	0	859	0
RTOR Reduction (vph)	0	0	0	0	0	141	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	234	0	22	0	1054	0	0	859	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		12.6		12.6		64.8			64.8	
Effective Green, g (s)		2.6		13.6		13.6		65.8			65.8	
Actuated g/C Ratio		0.03		0.14		0.14		0.66			0.66	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		29		434		193		2123			2262	
v/s Ratio Prot		c0.00		c0.07		0.02					0.25	
v/s Ratio Perm								c0.33				
v/c Ratio		0.17		0.54		0.11		0.50			0.38	
Uniform Delay, d1		47.6		40.3		37.9		8.7			7.8	
Progression Factor		1.00		1.00		1.00		0.63			0.50	
Incremental Delay, d2		2.8		1.3		0.3		0.5			0.4	
Delay (s)		50.5		41.6		38.2		6.0			4.3	
Level of Service		D		D		D		A			A	
Approach Delay (s)		50.5			40.2			6.0			4.3	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	57.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Queues — Future Background 2026 - Without Metrolinx

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	296	339	263	27	108	640	581	608	473
v/c Ratio	0.80	0.48	0.36	0.36	0.40	0.84	0.38	0.97	0.28
Control Delay	53.4	25.9	4.0	56.4	7.2	38.2	0.8	53.6	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	25.9	4.0	56.4	7.2	38.2	0.8	53.6	14.2
Queue Length 50th (m)	56.2	49.8	0.0	5.2	0.0	65.4	0.0	~116.8	30.1
Queue Length 95th (m)	#87.3	75.0	15.4	14.4	7.2	#92.1	0.1	#170.3	47.2
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	414	752	760	76	269	783	1524	625	1683
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.45	0.35	0.36	0.40	0.82	0.38	0.97	0.28

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis — Future Background 2026 - Without Metrolinx

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	275	315	245	25	0	100	0	595	540	565	440	0
Future Volume (vph)	275	315	245	25	0	100	0	595	540	565	440	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	7.0		7.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	1766	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	583	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	296	339	263	27	0	108	0	640	581	608	473	0
RTOR Reduction (vph)	0	0	164	0	0	98	0	0	0	0	0	0
Lane Group Flow (vph)	296	339	99	27	0	10	0	640	581	608	473	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	20.5	36.6	36.6	8.1		8.1		21.3	100.0	49.4	49.4	
Effective Green, g (s)	21.5	37.6	37.6	9.1		9.1		22.3	100.0	50.4	50.4	
Actuated g/C Ratio	0.22	0.38	0.38	0.09		0.09		0.22	1.00	0.50	0.50	
Clearance Time (s)	7.0	7.0	7.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	371	707	566	76		129		759	1524	602	1684	
v/s Ratio Prot	c0.17	0.18				0.01		c0.19		c0.26	0.14	
v/s Ratio Perm			0.07	0.03					c0.38	0.25		
v/c Ratio	0.80	0.48	0.17	0.36		0.08		0.84	0.38	1.01	0.28	
Uniform Delay, d1	37.2	23.8	20.8	42.7		41.6		37.2	0.0	19.3	14.3	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.75	1.00	1.28	0.92	
Incremental Delay, d2	11.3	0.5	0.1	2.8		0.3		9.6	0.6	38.2	0.4	
Delay (s)	48.5	24.3	21.0	45.5		41.9		37.7	0.6	63.0	13.6	
Level of Service	D	C	C	D		D		D	A	E	B	
Approach Delay (s)		31.3			42.6			20.1			41.4	
Approach LOS		C			D			C			D	

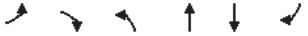
Intersection Summary				
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.0	
Intersection Capacity Utilization	83.0%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	EBL	EBR	NBT
Lane Group Flow (vph)	874	168	37
v/c Ratio	0.72	0.12	0.27
Control Delay	9.7	0.4	57.4
Queue Delay	0.3	0.0	0.0
Total Delay	10.0	0.4	57.4
Queue Length 50th (m)	78.2	0.0	8.8
Queue Length 95th (m)	200.6	2.7	20.3
Internal Link Dist (m)	190.8		55.4
Turn Bay Length (m)			
Base Capacity (vph)	1208	1454	139
Starvation Cap Reductn	51	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.76	0.12	0.27

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	830	160	10	25	0	0
Future Volume (vph)	830	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	874	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	874	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.0	102.0		5.0		
Effective Green, g (s)	103.0	103.0		6.0		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1151	1370		91		
v/s Ratio Prot	c0.65			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.76	0.11		0.41		
Uniform Delay, d1	3.5	1.3		55.3		
Progression Factor	1.41	1.08		1.00		
Incremental Delay, d2	4.2	0.1		2.9		
Delay (s)	9.1	1.6		58.2		
Level of Service	A	A		E		
Approach Delay (s)	7.9			58.2	0.0	
Approach LOS	A			E	A	

Intersection Summary				
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	61.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	23	125	6	1267	188	619
v/c Ratio	0.16	0.20	0.26	0.01	0.57	0.45	0.23
Control Delay	2.4	45.5	1.3	7.8	11.3	11.6	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	45.5	1.3	7.8	11.3	11.6	7.4
Queue Length 50th (m)	0.0	4.4	0.0	0.4	65.3	18.3	40.0
Queue Length 95th (m)	0.0	12.0	0.0	2.1	99.0	27.1	22.4
Internal Link Dist (m)	95.0		120.3		324.2		353.3
Turn Bay Length (m)		25.0		35.0		45.0	
Base Capacity (vph)	249	285	629	416	2216	544	2681
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.08	0.20	0.01	0.57	0.35	0.23

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	20	0	110	5	1015	100	165	535	10
Future Volume (vph)	10	0	10	20	0	110	5	1015	100	165	535	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184		1586	1495		1454	3385		1728	3374	
Flt Permitted		0.72		0.74	1.00		0.42	1.00		0.16	1.00	
Satd. Flow (perm)		869		1241	1495		639	3385		296	3374	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	23	0	125	6	1153	114	188	608	11
RTOR Reduction (vph)	0	20	0	0	113	0	0	5	0	0	1	0
Lane Group Flow (vph)	0	2	0	23	12	0	6	1262	0	188	618	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.5		8.5	8.5		64.3	64.3		78.5	78.5	
Effective Green, g (s)		9.5		9.5	9.5		65.3	65.3		79.5	79.5	
Actuated g/C Ratio		0.10		0.10	0.10		0.65	0.65		0.80	0.80	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		82		117	142		417	2210		410	2682	
v/s Ratio Prot					0.01			c0.37		c0.06	0.18	
v/s Ratio Perm		0.00		c0.02			0.01			0.31		
v/c Ratio		0.03		0.20	0.08		0.01	0.57		0.46	0.23	
Uniform Delay, d1		41.1		41.7	41.3		6.1	9.6		5.2	2.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		4.50	2.73	
Incremental Delay, d2		0.1		0.8	0.3		0.1	1.1		0.8	0.2	
Delay (s)		41.2		42.6	41.5		6.1	10.7		24.3	7.2	
Level of Service		D		D	D		A	B		C	A	
Approach Delay (s)		41.2			41.7			10.7			11.2	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	60.7%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2026 - Without Metrolinx
8: Cooke Boulevard & Masonry Court AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	225	40	10	50	0	80	0	15	0	0	0
Future Volume (Veh/h)	0	225	40	10	50	0	80	0	15	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	0	288	51	13	64	0	103	0	19	0	0	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)		144										
pX, platoon unblocked												
vC, conflicting volume	64			339			404	404	314	422	429	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			339			404	404	314	422	429	64
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			99			81	100	97	100	100	100
cM capacity (veh/h)	1551			1231			546	533	732	527	516	984

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	339	77	122	0
Volume Left	0	13	103	0
Volume Right	51	0	19	0
cSH	1551	1231	568	1700
Volume to Capacity	0.00	0.01	0.21	0.00
Queue Length 95th (m)	0.0	0.3	6.5	0.0
Control Delay (s)	0.0	1.4	13.1	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	1.4	13.1	0.0
Approach LOS			B	A

Intersection Summary					
Average Delay	3.2				
Intersection Capacity Utilization	26.3%	ICU Level of Service		A	
Analysis Period (min)	15				

Queues Future Background 2026 - Without Metrolinx
10: Lasalle Park Road/Waterdown Road & Plains Road AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	660	1000	74	335	250	85	341	245	165	191
v/c Ratio	0.59	0.52	0.44	0.29	0.38	0.32	0.83	0.95	0.27	0.31
Control Delay	16.1	15.5	40.6	28.7	5.5	37.9	56.3	77.7	28.2	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	15.5	40.6	28.7	5.5	37.9	56.3	77.7	28.2	5.2
Queue Length 50th (m)	39.4	65.1	12.6	28.3	0.0	15.8	70.4	~48.9	27.6	0.0
Queue Length 95th (m)	53.2	84.9	31.3	44.7	19.0	30.1	#103.7	#100.8	44.6	15.7
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	1364	1941	167	1141	661	300	463	258	616	618
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.52	0.44	0.29	0.38	0.28	0.74	0.95	0.27	0.31

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis — Future Background 2026 - Without Metrolinx

10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	620	805	135	70	315	235	80	265	55	230	155	180
Future Volume (vph)	620	805	135	70	315	235	80	265	55	230	155	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3238	3408		1667	3438	1491	1719	1795		1614	1810	1446
Flt Permitted	0.43	1.00		0.29	1.00	1.00	0.65	1.00		0.23	1.00	1.00
Satd. Flow (perm)	1478	3408		503	3438	1491	1181	1795		386	1810	1446
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)	660	856	144	74	335	250	85	282	59	245	165	191
RTOR Reduction (vph)	0	12	0	0	0	167	0	7	0	0	0	126
Lane Group Flow (vph)	660	988	0	74	335	83	85	334	0	245	165	65
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	60.8	60.8		35.5	35.5	35.5	23.9	23.9		36.2	36.2	36.2
Effective Green, g (s)	61.8	61.8		36.5	36.5	36.5	24.9	24.9		37.2	37.2	37.2
Actuated g/C Ratio	0.56	0.56		0.33	0.33	0.33	0.23	0.23		0.34	0.34	0.34
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1139	1914		166	1140	494	267	406		245	612	489
v/s Ratio Prot	c0.10	0.29			0.10			c0.19		c0.09	0.09	
v/s Ratio Perm	c0.22			0.15		0.06	0.07			0.24		0.04
v/c Ratio	0.58	0.52		0.45	0.29	0.17	0.32	0.82		1.00	0.27	0.13
Uniform Delay, d1	13.8	14.9		28.8	27.2	26.0	35.5	40.5		33.1	26.5	25.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	1.0		8.4	0.7	0.7	0.7	12.6		57.5	0.2	0.1
Delay (s)	14.6	15.9		37.3	27.9	26.7	36.2	53.1		90.6	26.7	25.3
Level of Service	B	B		D	C	C	D	D		F	C	C
Approach Delay (s)		15.3			28.5			49.7			52.3	
Approach LOS		B			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	84.3%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Background 2026 - Without Metrolinx

11: Plains Road & Cooke Boulevard — AM Peak Hour



Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	100	1128	750	105
v/c Ratio	0.17	0.42	0.32	0.50
Control Delay	2.8	4.4	7.0	25.5
Queue Delay	0.0	0.3	0.0	0.0
Total Delay	2.8	4.7	7.0	25.5
Queue Length 50th (m)	2.8	31.4	28.2	9.0
Queue Length 95th (m)	7.8	54.7	48.2	m23.6
Internal Link Dist (m)		135.9	131.3	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	631	2665	2376	410
Starvation Cap Reductn	0	859	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.62	0.32	0.26

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



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	90	1015	620	55	40	55
Future Volume (vph)	90	1015	620	55	40	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1631	3282	3244		1405	
Flt Permitted	0.34	1.00	1.00		0.98	
Satd. Flow (perm)	591	3282	3244		1405	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1128	689	61	44	61
RTOR Reduction (vph)	0	0	4	0	55	0
Lane Group Flow (vph)	100	1128	746	0	50	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	77.6	77.6	68.9		8.4	
Effective Green, g (s)	78.6	78.6	69.9		9.4	
Actuated g/C Ratio	0.79	0.79	0.70		0.09	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	534	2579	2267		132	
v/s Ratio Prot	0.01	c0.34	0.23			
v/s Ratio Perm	0.13				c0.04	
v/c Ratio	0.19	0.44	0.33		0.38	
Uniform Delay, d1	2.6	3.5	5.9		42.5	
Progression Factor	1.00	1.00	1.00		0.87	
Incremental Delay, d2	0.2	0.5	0.4		1.8	
Delay (s)	2.7	4.0	6.3		38.8	
Level of Service	A	A	A		D	
Approach Delay (s)		3.9	6.3		38.8	
Approach LOS		A	A		D	

Intersection Summary				
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	44.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	1543	120	16
v/c Ratio	0.48	0.04	0.12
Control Delay	2.6	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	2.6	1.2	24.5
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	68.6	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3226	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	62	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.49	0.04	0.12

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1405	15	0	110	15	0
Future Volume (vph)	1405	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3470			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3470			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1527	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1542	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2625			2731	38	
v/s Ratio Prot	c0.44			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.59			0.04	0.42	
Uniform Delay, d1	3.2			1.8	28.0	
Progression Factor	1.00			0.90	1.00	
Incremental Delay, d2	1.0			0.0	7.4	
Delay (s)	4.2			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	4.2			1.7	35.3	
Approach LOS	A			A	D	

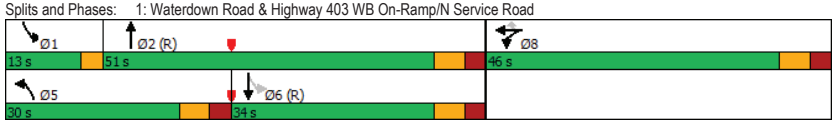
Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	255	500	220	405	820	115	550
Future Volume (vph)	255	500	220	405	820	115	550
Lane Group Flow (vph)	268	526	232	426	1058	121	737
Turn Type	Split	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8			6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	46.0	46.0	46.0	30.0	51.0	13.0	34.0
Total Split (%)	41.8%	41.8%	41.8%	27.3%	46.4%	11.8%	30.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.49	0.87	0.37	0.74	0.76	0.44	0.77
Control Delay	31.9	50.5	4.9	45.9	31.6	18.8	40.9
Queue Delay	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Total Delay	31.9	50.5	4.9	45.9	32.3	18.8	40.9
Queue Length 50th (m)	45.7	105.9	0.0	49.5	120.8	12.2	80.1
Queue Length 95th (m)	70.7	#161.3	16.3	65.7	144.8	21.7	#120.3
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	587	651	666	659	1393	288	960
Starvation Cap Reductn	0	0	0	0	114	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.81	0.35	0.65	0.83	0.42	0.77

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	500	220	405	820	185	115	550	150
Future Volume (vph)	0	0	0	255	500	220	405	820	185	115	550	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3084		1601	3038	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.22	1.00	
Satd. Flow (perm)				1616	1792	1426	3022	3084		373	3038	
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	0	268	526	232	426	863	195	121	579	158
RTOR Reduction (vph)	0	0	0	0	0	154	0	17	0	0	21	0
Lane Group Flow (vph)	0	0	0	268	526	78	426	1041	0	121	716	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8				6		
Actuated Green, G (s)				36.0	36.0	36.0	20.0	48.1		41.9	33.0	
Effective Green, g (s)				37.0	37.0	37.0	21.0	49.1		43.9	34.0	
Actuated g/C Ratio				0.34	0.34	0.34	0.19	0.45		0.40	0.31	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				543	602	479	576	1376		259	939	
v/s Ratio Prot				0.17	c0.29		c0.14	c0.34		0.04	0.24	
v/s Ratio Perm						0.05				0.14		
v/c Ratio				0.49	0.87	0.16	0.74	0.76		0.47	0.76	
Uniform Delay, d1				29.0	34.3	25.6	41.9	25.5		21.7	34.4	
Progression Factor				1.00	1.00	1.00	0.94	1.08		1.00	1.00	
Incremental Delay, d2				0.7	13.3	0.2	4.0	3.2		1.3	5.8	
Delay (s)				29.8	47.6	25.8	43.4	30.8		23.1	40.2	
Level of Service				C	D	C	D	C		C	D	
Approach Delay (s)		0.0			38.0			34.4			37.8	
Approach LOS		A			D			C			D	

Intersection Summary

HCM 2000 Control Delay	36.4	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.83				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	74.6%	ICU Level of Service		D	
Analysis Period (min)	15				

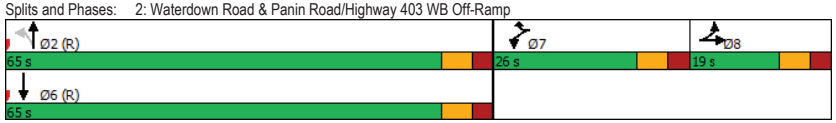
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	235	325	5	1090	805
Future Volume (vph)	0	235	325	5	1090	805
Lane Group Flow (vph)	6	267	369	0	1245	915
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	19.0	26.0	26.0	65.0	65.0	65.0
Total Split (%)	17.3%	23.6%	23.6%	59.1%	59.1%	59.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.02	0.51	0.83		0.54	0.37
Control Delay	0.2	44.2	32.3		16.5	12.7
Queue Delay	0.0	0.0	0.3		0.5	0.4
Total Delay	0.2	44.2	32.6		17.0	13.2
Queue Length 50th (m)	0.0	28.4	31.1		132.3	86.1
Queue Length 95th (m)	0.0	38.6	62.4		75.4	46.5
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	304	616	482		2300	2465
Starvation Cap Reductn	0	0	0		552	951
Spillback Cap Reductn	0	0	8		128	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.02	0.43	0.78		0.71	0.60

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 94 (85%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	235	0	325	5	1090	0	0	805	0
Future Volume (vph)	0	0	5	235	0	325	5	1090	0	0	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3300			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	267	0	369	6	1239	0	0	915	0
RTOR Reduction (vph)	0	6	0	0	0	190	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	267	0	179	0	1245	0	0	915	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		17.4		17.4		70.0			70.0	
Effective Green, g (s)		2.6		18.4		18.4		71.0			71.0	
Actuated g/C Ratio		0.02		0.17		0.17		0.65			0.65	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		38		529		256		2130			2284	
v/s Ratio Prot		c0.00		0.08		c0.12					0.26	
v/s Ratio Perm								c0.38				
v/c Ratio		0.00		0.50		0.70		0.58			0.40	
Uniform Delay, d1		52.4		41.7		43.2		11.1			9.3	
Progression Factor		1.00		1.00		1.00		1.56			1.48	
Incremental Delay, d2		0.0		0.8		8.1		0.9			0.4	
Delay (s)		52.5		42.4		51.3		18.3			14.2	
Level of Service		D		D		D		B			B	
Approach Delay (s)		52.5			47.6			18.3			14.2	
Approach LOS		D			D			B			B	

Intersection Summary

HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

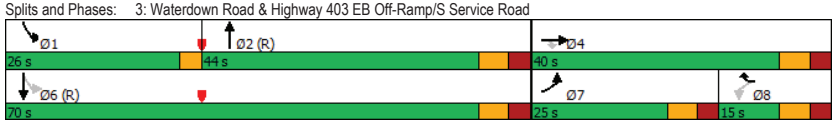
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	235	95	270	50	260	600	305	370	675
Future Volume (vph)	235	95	270	50	260	600	305	370	675
Lane Group Flow (vph)	264	107	303	56	292	674	343	416	758
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	pm+pt	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free	6	
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0		6.0	8.0
Minimum Split (s)	15.0	21.0	21.0	15.0	15.0	29.0		9.0	29.0
Total Split (s)	25.0	40.0	40.0	15.0	15.0	44.0		26.0	70.0
Total Split (%)	22.7%	36.4%	36.4%	13.6%	13.6%	40.0%		23.6%	63.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.74	0.17	0.46	0.54	0.73	0.58	0.22	0.85	0.40
Control Delay	54.0	24.9	11.9	68.4	17.3	38.1	0.3	43.4	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	24.9	11.9	68.4	17.3	38.1	0.3	43.4	23.3
Queue Length 50th (m)	54.8	15.5	16.1	12.1	0.0	82.7	0.0	91.2	86.6
Queue Length 95th (m)	#89.8	29.6	41.4	#30.2	#32.0	91.3	0.0	#87.2	65.3
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	360	640	662	103	400	1295	1568	523	2066
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.17	0.46	0.54	0.73	0.52	0.22	0.80	0.37

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	95	270	50	0	260	0	600	305	370	675	0
Future Volume (vph)	235	95	270	50	0	260	0	600	305	370	675	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	1678	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.25	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	440	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	264	107	303	56	0	292	0	674	343	416	758	0
RTOR Reduction (vph)	0	0	125	0	0	266	0	0	0	0	0	0
Lane Group Flow (vph)	264	107	178	56	0	26	0	674	343	416	758	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	21.9	37.7	37.7	8.8		8.8		35.2	110.0	58.3	58.3	
Effective Green, g (s)	22.9	38.7	38.7	9.8		9.8		36.2	110.0	59.3	59.3	
Actuated g/C Ratio	0.21	0.35	0.35	0.09		0.09		0.33	1.00	0.54	0.54	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	356	636	535	104		135		1164	1568	474	1907	
v/s Ratio Prot	c0.15	0.06				0.02		c0.19		c0.17	0.21	
v/s Ratio Perm			0.12	c0.05					0.22	0.30		
v/c Ratio	0.74	0.17	0.33	0.54		0.19		0.58	0.22	0.88	0.40	
Uniform Delay, d1	40.8	24.6	26.2	47.9		46.4		30.6	0.0	17.8	14.9	
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.13	1.00	1.72	1.48	
Incremental Delay, d2	8.1	0.1	0.4	5.3		0.7		1.9	0.3	15.8	0.6	
Delay (s)	48.9	24.7	26.5	53.2		47.1		36.4	0.3	46.4	22.6	
Level of Service	D	C	C	D		D		D	A	D	C	
Approach Delay (s)		35.0			48.1			24.2			31.0	
Approach LOS		C			D			C			C	

Intersection Summary

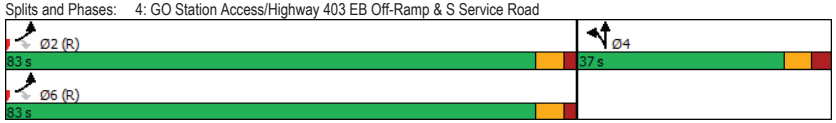
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	635	15	30		
Future Volume (vph)	635	15	30		
Lane Group Flow (vph)	814	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			37.0	83.0	83.0
Total Split (%)			30.8%	69%	69%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.69	0.02	0.78		
Control Delay	16.8	2.1	58.8		
Queue Delay	0.3	0.0	0.0		
Total Delay	17.1	2.1	58.8		
Queue Length 50th (m)	108.1	0.0	70.5		
Queue Length 95th (m)	148.8	0.9	81.6		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1180	1118	470		
Starvation Cap Reductn	70	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.73	0.02	0.64		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	635	15	205	30	0	0
Future Volume (vph)	635	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	814	19	263	38	0	0
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	814	13	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	82.6	82.6		24.4		
Effective Green, g (s)	83.6	83.6		25.4		
Actuated g/C Ratio	0.70	0.70		0.21		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1180	1112		385		
v/s Ratio Prot	c0.48			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.69	0.01		0.78		
Uniform Delay, d1	10.6	5.6		44.7		
Progression Factor	1.11	0.71		1.00		
Incremental Delay, d2	3.2	0.0		9.9		
Delay (s)	15.0	4.0		54.6		
Level of Service	B	A		D		
Approach Delay (s)	14.8			54.6	0.0	
Approach LOS	B			D	A	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

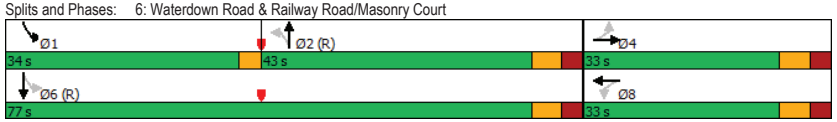
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	5	95	5	5	680	100	885
Future Volume (vph)	10	5	95	5	5	680	100	885
Lane Group Flow (vph)	0	25	120	284	6	899	127	1133
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	36.0	36.0	11.0	36.0
Total Split (s)	33.0	33.0	33.0	33.0	43.0	43.0	34.0	77.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	39.1%	39.1%	30.9%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	2.0	6.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.32	0.61	0.61	0.03	0.41	0.26	0.44
Control Delay		43.5	56.5	11.0	13.0	14.9	8.5	13.8
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		43.5	56.5	11.0	13.0	14.9	8.5	13.8
Queue Length 50th (m)		3.9	25.7	1.2	0.0	66.4	9.9	99.2
Queue Length 95th (m)		10.3	36.7	13.7	m1.2	82.7	23.2	89.3
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		127	327	597	228	2186	730	2583
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.20	0.37	0.48	0.03	0.41	0.17	0.44

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 72 (65%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	95	5	220	5	680	30	100	885	10
Future Volume (vph)	10	5	5	95	5	220	5	680	30	100	885	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		6.0	6.0		2.0	6.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196		1711	1581		1353	3413		1694	3473	
Flt Permitted		0.41		0.74	1.00		0.25	1.00		0.27	1.00	
Satd. Flow (perm)		500		1334	1581		357	3413		486	3473	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	120	6	278	6	861	38	127	1120	13
RTOR Reduction (vph)	0	5	0	0	237	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	20	0	120	47	0	6	898	0	127	1132	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.2		15.2	15.2		69.4	69.4		80.8	80.8	
Effective Green, g (s)		16.2		16.2	16.2		70.4	70.4		81.8	81.8	
Actuated g/C Ratio		0.15		0.15	0.15		0.64	0.64		0.74	0.74	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0		3.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		73		196	232		228	2184		464	2582	
v/s Ratio Prot					0.03			0.26		0.02	c0.33	
v/s Ratio Perm		0.04		c0.09			0.02			0.18		
v/c Ratio		0.27		0.61	0.20		0.03	0.41		0.27	0.44	
Uniform Delay, d1		41.7		44.0	41.2		7.3	9.7		4.5	5.4	
Progression Factor		1.00		1.00	1.00		1.34	1.39		2.05	2.24	
Incremental Delay, d2		2.0		5.6	0.4		0.1	0.4		0.3	0.5	
Delay (s)		43.7		49.5	41.7		9.9	13.8		9.5	12.5	
Level of Service		D		D	D		A	B		A	B	
Approach Delay (s)		43.7			44.0			13.8			12.2	
Approach LOS		D			D			B			B	

Intersection Summary

HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.48				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0		
Intersection Capacity Utilization	60.3%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2026 - Without Metrolinx
8: Cooke Boulevard & Masonry Court/Masonrry Court

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	80	55	15	240	0	75	0	15	0	0	0
Future Volume (Veh/h)	0	80	55	15	240	0	75	0	15	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	98	67	18	293	0	91	0	18	0	0	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)		144										
pX, platoon unblocked												
vC, conflicting volume	293			165			460	460	132	478	494	293
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			165			460	460	132	478	494	293
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			82	100	98	100	100	100
cM capacity (veh/h)	1280			1426			501	494	889	486	473	751

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	165	311	109	0
Volume Left	0	18	91	0
Volume Right	67	0	18	0
cSH	1280	1426	540	1700
Volume to Capacity	0.00	0.01	0.20	0.00
Queue Length 95th (m)	0.0	0.3	6.0	0.0
Control Delay (s)	0.0	0.5	13.3	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	0.5	13.3	0.0
Approach LOS			B	A

Intersection Summary				
Average Delay			2.8	
Intersection Capacity Utilization			36.1%	ICU Level of Service
Analysis Period (min)			15	

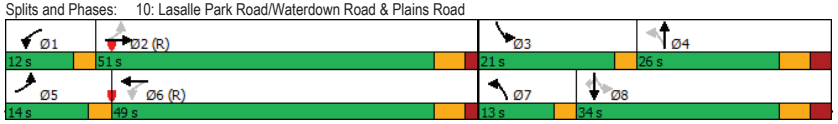
Queues
10: Lasalle Park Road/Waterdown Road & Plains Road

Future Background 2026 - Without Metrolinx
PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	220	525	70	990	115	200	360	260	360
Future Volume (vph)	220	525	70	990	115	200	360	260	360
Lane Group Flow (vph)	227	613	72	1325	119	268	371	268	371
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6	7	4	3	8	
Permitted Phases	2		6		4		8		8
Detector Phase	5	2	1	6	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	9.0	27.0	9.0	27.0	9.0	34.0	9.0	34.0	34.0
Total Split (s)	14.0	51.0	12.0	49.0	13.0	26.0	21.0	34.0	34.0
Total Split (%)	12.7%	46.4%	10.9%	44.5%	11.8%	23.6%	19.1%	30.9%	30.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.0	2.0	5.0	2.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.92	0.39	0.17	0.96	0.31	0.84	0.92	0.55	0.64
Control Delay	66.7	21.1	13.4	40.1	23.9	65.1	48.8	29.0	11.6
Queue Delay	0.0	0.0	0.0	4.4	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	21.1	13.4	44.5	23.9	65.1	48.8	29.0	11.6
Queue Length 50th (m)	35.5	48.0	4.9	148.7	16.8	56.1	75.2	56.6	43.8
Queue Length 95th (m)	#84.5	64.6	m15.5	#136.4	29.8	#98.3	#107.1	59.4	3.8
Internal Link Dist (m)		134.8		135.9		101.9		324.2	
Turn Bay Length (m)	60.0		50.0		50.0				50.0
Base Capacity (vph)	248	1579	437	1387	391	334	404	486	585
Starvation Cap Reductn	0	0	0	44	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.39	0.16	0.99	0.30	0.80	0.92	0.55	0.63

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



HCM Signalized Intersection Capacity Analysis — Future Background 2026 - Without Metrolinx

10: Lasalle Park Road/Waterdown Road & Plains Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	525	70	70	990	295	115	200	60	360	260	360
Future Volume (vph)	220	525	70	70	990	295	115	200	60	360	260	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		2.0	5.0		2.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1616	3463		1640	3380		1694	1785		1709	1900	1490
Flt Permitted	0.09	1.00		0.39	1.00		0.59	1.00		0.26	1.00	1.00
Satd. Flow (perm)	147	3463		671	3380		1059	1785		466	1900	1490
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	227	541	72	72	1021	304	119	206	62	371	268	371
RTOR Reduction (vph)	0	9	0	0	25	0	0	10	0	0	0	204
Lane Group Flow (vph)	227	604	0	72	1300	0	119	258	0	371	268	167
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	57.7	48.3		49.7	43.3		27.3	18.1		39.3	27.1	27.1
Effective Green, g (s)	58.7	49.3		51.7	44.3		29.3	19.1		40.3	28.1	28.1
Actuated g/C Ratio	0.53	0.45		0.47	0.40		0.27	0.17		0.37	0.26	0.26
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	244	1552		380	1361		340	309		387	485	380
v/s Ratio Prot	c0.10	0.17		0.01	c0.38		0.03	c0.14		c0.17	0.14	
v/s Ratio Perm	0.39			0.08			0.06			0.18		0.11
v/c Ratio	0.93	0.39		0.19	0.96		0.35	0.84		0.96	0.55	0.44
Uniform Delay, d1	31.7	20.3		16.2	31.9		31.8	43.9		29.3	35.5	34.3
Progression Factor	1.00	1.00		1.09	0.84		1.00	1.00		0.77	0.69	0.67
Incremental Delay, d2	39.0	0.7		0.2	13.4		0.6	17.4		32.9	1.3	0.7
Delay (s)	70.7	21.0		17.8	40.2		32.5	61.3		55.6	25.7	23.6
Level of Service	E	C		B	D		C	E		E	C	C
Approach Delay (s)		34.4			39.0			52.5			35.9	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	38.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	100.4%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Background 2026 - Without Metrolinx

11: Plains Road & Cooke Boulevard — PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	55	900	1355	70
Future Volume (vph)	55	900	1355	70
Lane Group Flow (vph)	57	928	1443	144
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.20	0.36	0.62	0.60
Control Delay	4.4	5.3	11.6	37.0
Queue Delay	0.0	0.1	0.2	0.0
Total Delay	4.4	5.5	11.8	37.0
Queue Length 50th (m)	3.2	43.7	85.3	22.0
Queue Length 95th (m)	m3.3	m24.2	132.3	39.6
Internal Link Dist (m)		135.9	114.1	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	376	2584	2309	414
Starvation Cap Reductn	0	610	0	0
Spillback Cap Reductn	0	0	202	2
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.15	0.47	0.68	0.35

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Plains Road & Cooke Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	900	1355	45	70	70
Future Volume (vph)	55	900	1355	45	70	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.93	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1687	3374	3314		1615	
Flt Permitted	0.13	1.00	1.00		0.98	
Satd. Flow (perm)	240	3374	3314		1615	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	928	1397	46	72	72
RTOR Reduction (vph)	0	0	1	0	38	0
Lane Group Flow (vph)	57	928	1442	0	106	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	83.3	83.3	75.1		12.7	
Effective Green, g (s)	84.3	84.3	76.1		13.7	
Actuated g/C Ratio	0.77	0.77	0.69		0.12	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	265	2585	2292		201	
v/s Ratio Prot	0.01	c0.28	c0.44			
v/s Ratio Perm	0.15				c0.07	
v/c Ratio	0.22	0.36	0.63		0.53	
Uniform Delay, d1	5.5	4.1	9.2		45.1	
Progression Factor	1.13	1.10	1.00		0.85	
Incremental Delay, d2	0.3	0.3	1.3		2.5	
Delay (s)	6.5	4.9	10.6		40.7	
Level of Service	A	A	B		D	
Approach Delay (s)		5.0	10.6		40.7	
Approach LOS		A	B		D	

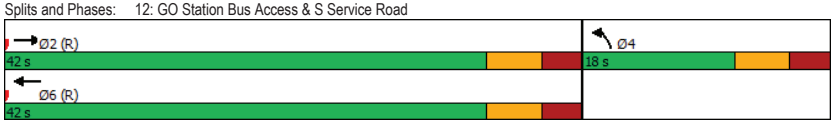
Intersection Summary				
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	63.9%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	850	295	15
Future Volume (vph)	850	295	15
Lane Group Flow (vph)	925	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	42.0	42.0	18.0
Total Split (%)	70.0%	70.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.29	0.09	0.12
Control Delay	1.9	0.7	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.9	0.7	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	33.6	6.3	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3148	3345	180
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	48	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.30	0.09	0.09

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

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	850	20	0	295	15	0
Future Volume (vph)	850	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3396			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3396			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	904	21	0	314	16	0
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	923	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2558			2719	42	
v/s Ratio Prot	c0.27			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.36			0.12	0.38	
Uniform Delay, d1	2.5			2.0	27.8	
Progression Factor	1.00			0.49	1.00	
Incremental Delay, d2	0.4			0.1	5.7	
Delay (s)	2.9			1.1	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.9			1.1	33.4	
Approach LOS	A			A	C	

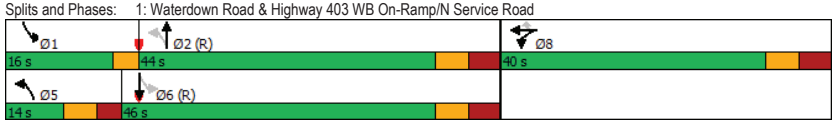
Intersection Summary			
HCM 2000 Control Delay	2.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	60	105	65	275	505	235	760
Future Volume (vph)	60	105	65	275	505	235	760
Lane Group Flow (vph)	61	107	66	281	954	240	990
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	14.0	44.0	16.0	46.0
Total Split (%)	40.0%	40.0%	40.0%	14.0%	44.0%	16.0%	46.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	3.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	6.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.32	0.51	0.22	0.39	0.55	0.48	0.57
Control Delay	42.5	48.0	1.6	11.1	19.5	6.7	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	42.5	48.0	1.6	11.1	19.6	6.7	15.3
Queue Length 50th (m)	11.4	20.6	0.0	11.0	90.3	10.1	59.8
Queue Length 95th (m)	22.9	36.0	0.0	23.8	64.2	21.3	94.1
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	475	527	562	717	1747	508	1731
Starvation Cap Reductn	0	0	0	0	107	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.20	0.12	0.39	0.58	0.47	0.57

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 48 (48%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	105	65	275	505	430	235	760	210
Future Volume (vph)	0	0	0	60	105	65	275	505	430	235	760	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	6.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2980		1616	2987	
Flt Permitted				0.95	1.00	1.00	0.25	1.00		0.23	1.00	
Satd. Flow (perm)				1442	1597	1439	780	2980		399	2987	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	61	107	66	281	515	439	240	776	214
RTOR Reduction (vph)	0	0	0	0	0	57	0	110	0	0	18	0
Lane Group Flow (vph)	0	0	0	61	107	9	281	844	0	240	972	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				12.3	12.3	12.3	62.3	53.9		71.1	56.3	
Effective Green, g (s)				13.3	13.3	13.3	64.3	54.9		72.7	57.3	
Actuated g/C Ratio				0.13	0.13	0.13	0.64	0.55		0.73	0.57	
Clearance Time (s)				8.0	8.0	8.0	7.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				191	212	191	709	1636		482	1711	
v/s Ratio Prot				0.04	c0.07		0.04	0.28		c0.08	c0.33	
v/s Ratio Perm						0.01	0.22			0.28		
v/c Ratio				0.32	0.50	0.05	0.40	0.52		0.50	0.57	
Uniform Delay, d1				39.3	40.3	37.8	7.5	14.2		5.8	13.5	
Progression Factor				1.00	1.00	1.00	1.94	1.60		1.00	1.00	
Incremental Delay, d2				1.0	1.9	0.1	0.3	1.0		0.8	1.4	
Delay (s)				40.2	42.2	37.9	14.9	23.7		6.7	14.9	
Level of Service				D	D	D	B	C		A	B	
Approach Delay (s)		0.0			40.5			21.7			13.3	
Approach LOS		A			D			C			B	

Intersection Summary

HCM 2000 Control Delay	19.5	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.59				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	62.4%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

Queues — Future Background 2031 - Without Metrolinx

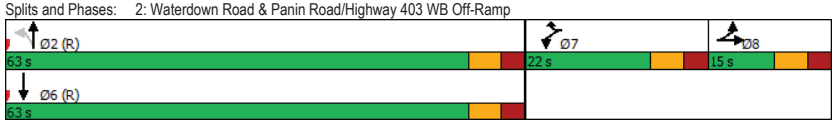
2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp — AM Peak Hour

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	235	160	5	1045	820
Future Volume (vph)	0	235	160	5	1045	820
Lane Group Flow (vph)	5	255	174	0	1141	891
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	22.0	22.0	63.0	63.0	63.0
Total Split (%)	15.0%	22.0%	22.0%	63.0%	63.0%	63.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.05	0.56	0.50		0.50	0.37
Control Delay	43.0	44.6	10.9		11.3	3.3
Queue Delay	0.0	0.0	0.0		0.0	0.1
Total Delay	43.0	44.6	10.9		11.3	3.4
Queue Length 50th (m)	1.0	25.3	0.0		79.8	15.3
Queue Length 95th (m)	4.6	36.7	18.2		41.0	13.2
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	101	522	379		2299	2447
Starvation Cap Reductn	0	0	0		0	429
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.49	0.46		0.50	0.44

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 55 (55%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis — Future Background 2031 - Without Metrolinx

2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	235	0	160	5	1045	0	0	820	0
Future Volume (vph)	5	0	0	235	0	160	5	1045	0	0	820	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3392			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3228			3438	
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)	5	0	0	255	0	174	5	1136	0	0	891	0
RTOR Reduction (vph)	0	0	0	0	0	149	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	255	0	25	0	1141	0	0	891	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		13.2		13.2		64.2			64.2	
Effective Green, g (s)		2.6		14.2		14.2		65.2			65.2	
Actuated g/C Ratio		0.03		0.14		0.14		0.65			0.65	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		29		453		202		2104			2241	
v/s Ratio Prot		c0.00		c0.08		0.02					0.26	
v/s Ratio Perm								c0.35				
v/c Ratio		0.17		0.56		0.12		0.54			0.40	
Uniform Delay, d1		47.6		40.0		37.5		9.4			8.2	
Progression Factor		1.00		1.00		1.00		1.33			0.42	
Incremental Delay, d2		2.8		1.6		0.3		0.6			0.5	
Delay (s)		50.5		41.6		37.7		13.1			3.9	
Level of Service		D		D		D		B			A	
Approach Delay (s)		50.5			40.0			13.1			3.9	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	14.5	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	60.6%	ICU Level of Service		B	
Analysis Period (min)	15				

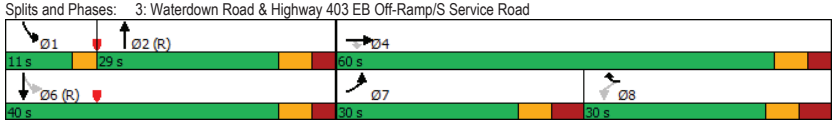
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	300	315	270	25	100	675	575	595	460
Future Volume (vph)	300	315	270	25	100	675	575	595	460
Lane Group Flow (vph)	323	339	290	27	108	726	618	640	495
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	pm+pt	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free	6	
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0		6.0	8.0
Minimum Split (s)	30.0	29.0	29.0	30.0	30.0	29.0		9.0	29.0
Total Split (s)	30.0	60.0	60.0	30.0	30.0	29.0		11.0	40.0
Total Split (%)	30.0%	60.0%	60.0%	30.0%	30.0%	29.0%		11.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	4.0	3.0	3.0	4.0	4.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	7.0	6.0	6.0	7.0	7.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.86	0.45	0.41	0.30	0.36	0.83	0.41	0.62	0.31
Control Delay	59.8	23.1	10.2	49.4	5.0	35.5	0.7	21.0	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.8	23.1	10.2	49.4	5.0	35.5	0.7	21.0	16.6
Queue Length 50th (m)	62.7	49.1	16.7	5.2	0.0	75.2	0.0	32.4	27.2
Queue Length 95th (m)	#107.3	67.6	34.5	13.5	4.7	#109.4	0.0	67.2	48.3
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	397	1015	887	192	454	870	1524	1040	1588
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.33	0.33	0.14	0.24	0.83	0.41	0.62	0.31

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 54 (54%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	315	270	25	0	100	0	675	575	595	460	0
Future Volume (vph)	300	315	270	25	0	100	0	675	575	595	460	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	6.0	6.0	7.0		7.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	3426	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	1131	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	339	290	27	0	108	0	726	618	640	495	0
RTOR Reduction (vph)	0	0	96	0	0	96	0	0	0	0	0	0
Lane Group Flow (vph)	323	339	194	27	0	12	0	726	618	640	495	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	20.8	39.5	39.5	9.7		9.7		24.5	100.0	46.5	46.5	
Effective Green, g (s)	21.8	40.5	40.5	10.7		10.7		25.5	100.0	47.5	47.5	
Actuated g/C Ratio	0.22	0.40	0.40	0.11		0.11		0.26	1.00	0.48	0.48	
Clearance Time (s)	8.0	7.0	7.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	376	761	610	89		152		868	1524	996	1587	
v/s Ratio Prot	c0.19	0.18				0.01		c0.21		c0.13	0.15	
v/s Ratio Perm			0.13	0.03					c0.41	0.18		
v/c Ratio	0.86	0.45	0.32	0.30		0.08		0.84	0.41	0.64	0.31	
Uniform Delay, d1	37.6	21.6	20.3	41.2		40.2		35.3	0.0	16.9	16.2	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.74	1.00	1.21	0.95	
Incremental Delay, d2	17.4	0.4	0.3	1.9		0.2		7.7	0.6	1.3	0.5	
Delay (s)	55.0	22.0	20.6	43.1		40.4		33.8	0.6	21.9	15.8	
Level of Service	E	C	C	D		D		C	A	C	B	
Approach Delay (s)		32.8			41.0			18.5			19.2	
Approach LOS		C			D			B			B	

Intersection Summary

HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

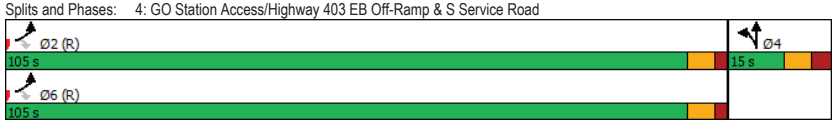
c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	895	160	25		
Future Volume (vph)	895	160	25		
Lane Group Flow (vph)	942	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.78	0.12	0.27		
Control Delay	11.8	0.5	57.9		
Queue Delay	0.4	0.0	0.0		
Total Delay	12.2	0.5	57.9		
Queue Length 50th (m)	98.9	0.0	8.8		
Queue Length 95th (m)	219.6	3.7	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	136		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.81	0.12	0.27		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	895	160	10	25	0	0
Future Volume (vph)	895	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	942	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	942	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.70			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.82	0.11		0.42		
Uniform Delay, d1	3.9	1.3		55.5		
Progression Factor	1.35	1.37		1.00		
Incremental Delay, d2	5.7	0.1		3.2		
Delay (s)	11.0	1.9		58.7		
Level of Service	B	A		E		
Approach Delay (s)	9.6			58.7	0.0	
Approach LOS	A			E	A	

Intersection Summary

HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues — Future Background 2031 - Without Metrolinx

6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	0	20	0	5	1130	165	580
Future Volume (vph)	10	0	20	0	5	1130	165	580
Lane Group Flow (vph)	0	22	23	125	6	1398	188	670
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	29.0	29.0	29.0	29.0	55.0	55.0	16.0	71.0
Total Split (%)	29.0%	29.0%	29.0%	29.0%	55.0%	55.0%	16.0%	71.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.16	0.20	0.34	0.02	0.64	0.49	0.25
Control Delay		2.4	45.5	2.4	8.0	12.9	11.7	5.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		2.4	45.5	2.4	8.0	12.9	11.7	5.2
Queue Length 50th (m)		0.0	4.4	0.0	0.4	79.2	14.0	31.6
Queue Length 95th (m)		0.0	12.0	0.0	2.1	118.5	25.0	12.6
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		249	285	540	392	2194	415	2685
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.09	0.08	0.23	0.02	0.64	0.45	0.25

Intersection Summary

Cycle Length: 100

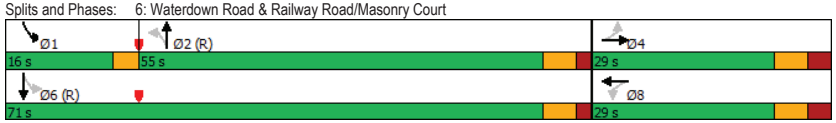
Actuated Cycle Length: 100

Offset: 22 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



HCM Signalized Intersection Capacity Analysis — Future Background 2031 - Without Metrolinx

6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	20	0	110	5	1130	100	165	580	10
Future Volume (vph)	10	0	10	20	0	110	5	1130	100	165	580	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184		1586	1495		1454	3390		1728	3376	
Flt Permitted		0.72		0.74	1.00		0.40	1.00		0.13	1.00	
Satd. Flow (perm)		869		1241	1495		608	3390		237	3376	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	23	0	125	6	1284	114	188	659	11
RTOR Reduction (vph)	0	20	0	0	113	0	0	5	0	0	1	0
Lane Group Flow (vph)	0	2	0	23	12	0	6	1393	0	188	669	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.5		8.5	8.5		63.6	63.6		78.5	78.5	
Effective Green, g (s)		9.5		9.5	9.5		64.6	64.6		79.5	79.5	
Actuated g/C Ratio		0.10		0.10	0.10		0.65	0.65		0.80	0.80	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		82		117	142		392	2189		380	2683	
v/s Ratio Prot					0.01			c0.41		c0.06	0.20	
v/s Ratio Perm		0.00		c0.02			0.01			0.33		
v/c Ratio		0.03		0.20	0.08		0.02	0.64		0.49	0.25	
Uniform Delay, d1		41.1		41.7	41.3		6.3	10.6		7.3	2.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.89	1.86	
Incremental Delay, d2		0.1		0.8	0.3		0.1	1.4		1.0	0.2	
Delay (s)		41.2		42.6	41.5		6.4	12.1		14.8	5.1	
Level of Service		D		D	D		A	B		B	A	
Approach Delay (s)		41.2			41.7			12.0			7.2	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	12.4	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.56				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	63.9%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2031 - Without Metrolinx
8: Cooke Boulevard & Masonry Court AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	225	40	10	50	0	80	0	15	0	0	0
Future Volume (Veh/h)	0	225	40	10	50	0	80	0	15	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	0	288	51	13	64	0	103	0	19	0	0	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)		144										
pX, platoon unblocked												
vC, conflicting volume	64			339			404	404	314	422	429	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			339			404	404	314	422	429	64
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			99			81	100	97	100	100	100
cM capacity (veh/h)	1551			1231			546	533	732	527	516	984

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	339	77	122	0
Volume Left	0	13	103	0
Volume Right	51	0	19	0
cSH	1551	1231	568	1700
Volume to Capacity	0.00	0.01	0.21	0.00
Queue Length 95th (m)	0.0	0.3	6.5	0.0
Control Delay (s)	0.0	1.4	13.1	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	1.4	13.1	0.0
Approach LOS			B	A

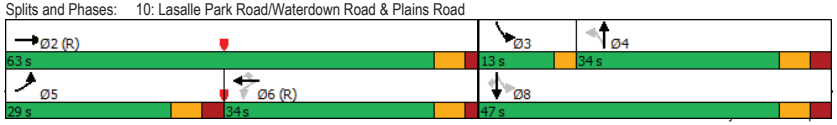
Intersection Summary					
Average Delay			3.2		
Intersection Capacity Utilization			26.3%	ICU Level of Service	A
Analysis Period (min)			15		

Queues Future Background 2031 - Without Metrolinx
10: Lasalle Park Road/Waterdown Road & Plains Road AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	685	885	75	345	255	90	295	245	170	195
Future Volume (vph)	685	885	75	345	255	90	295	245	170	195
Lane Group Flow (vph)	729	1101	80	367	271	96	378	261	181	207
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	29.0	63.0	34.0	34.0	34.0	34.0	34.0	13.0	47.0	47.0
Total Split (%)	26.4%	57.3%	30.9%	30.9%	30.9%	30.9%	30.9%	11.8%	42.7%	42.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.94	0.62	0.80	0.48	0.50	0.35	0.87	0.86	0.26	0.30
Control Delay	64.0	20.5	87.4	38.6	7.4	38.1	60.1	53.6	24.6	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	20.5	87.4	38.6	7.4	38.1	60.1	53.6	24.6	4.5
Queue Length 50th (m)	~94.4	87.5	16.4	36.6	0.0	17.7	78.8	40.0	27.6	0.0
Queue Length 95th (m)	#132.3	106.7	#41.5	50.3	20.3	33.4	#127.4	#90.8	45.8	15.2
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	773	1811	119	906	592	296	464	302	699	685
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.61	0.67	0.41	0.46	0.32	0.81	0.86	0.26	0.30

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	685	885	150	75	345	255	90	295	60	245	170	195
Future Volume (vph)	685	885	150	75	345	255	90	295	60	245	170	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3255	3407		1668	3438	1488	1719	1796		1614	1810	1446
Flt Permitted	0.95	1.00		0.26	1.00	1.00	0.64	1.00		0.19	1.00	1.00
Satd. Flow (perm)	3255	3407		455	3438	1488	1164	1796		321	1810	1446
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)	729	941	160	80	367	271	96	314	64	261	181	207
RTOR Reduction (vph)	0	13	0	0	0	211	0	7	0	0	0	127
Lane Group Flow (vph)	729	1088	0	80	367	60	96	371	0	261	181	80
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	25.1	55.6		23.5	23.5	23.5	25.2	25.2		41.4	41.4	41.4
Effective Green, g (s)	26.1	56.6		24.5	24.5	24.5	26.2	26.2		42.4	42.4	42.4
Actuated g/C Ratio	0.24	0.51		0.22	0.22	0.22	0.24	0.24		0.39	0.39	0.39
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	772	1753		101	765	331	277	427		290	697	557
v/s Ratio Prot	c0.22	0.32			0.11			c0.21		c0.12	0.10	
v/s Ratio Perm				c0.18		0.04	0.08			0.23		0.06
v/c Ratio	0.94	0.62		0.79	0.48	0.18	0.35	0.87		0.90	0.26	0.14
Uniform Delay, d1	41.2	19.0		40.3	37.2	34.6	34.8	40.3		26.9	23.1	22.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	19.9	1.7		45.6	2.1	1.2	0.8	16.9		28.7	0.2	0.1
Delay (s)	61.1	20.7		86.0	39.4	35.8	35.5	57.1		55.6	23.3	22.1
Level of Service	E	C		F	D	D	D	E		E	C	C
Approach Delay (s)		36.8			43.2			52.8			35.9	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	40.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	88.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	90	1115	675	40
Future Volume (vph)	90	1115	675	40
Lane Group Flow (vph)	100	1239	811	105
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.18	0.46	0.34	0.50
Control Delay	2.9	4.7	7.2	25.8
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	2.9	5.1	7.2	25.8
Queue Length 50th (m)	2.8	36.3	31.3	8.1
Queue Length 95th (m)	7.8	63.1	53.2	m22.5
Internal Link Dist (m)		135.9	125.3	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	601	2665	2377	410
Starvation Cap Reductn	0	811	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.67	0.34	0.26

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Plains Road & Cooke Boulevard



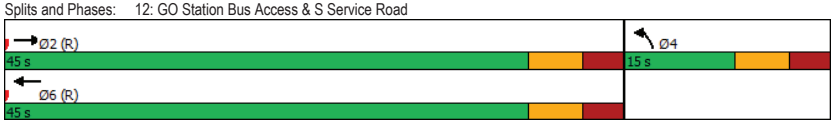
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	90	1115	675	55	40	55
Future Volume (vph)	90	1115	675	55	40	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1631	3282	3246		1405	
Flt Permitted	0.32	1.00	1.00		0.98	
Satd. Flow (perm)	549	3282	3246		1405	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1239	750	61	44	61
RTOR Reduction (vph)	0	0	3	0	55	0
Lane Group Flow (vph)	100	1239	808	0	50	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	77.6	77.6	68.9		8.4	
Effective Green, g (s)	78.6	78.6	69.9		9.4	
Actuated g/C Ratio	0.79	0.79	0.70		0.09	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	504	2579	2268		132	
v/s Ratio Prot	0.01	c0.38	0.25			
v/s Ratio Perm	0.14				c0.04	
v/c Ratio	0.20	0.48	0.36		0.38	
Uniform Delay, d1	2.6	3.7	6.0		42.5	
Progression Factor	1.00	1.00	1.00		0.89	
Incremental Delay, d2	0.2	0.6	0.4		1.8	
Delay (s)	2.8	4.3	6.5		39.4	
Level of Service	A	A	A		D	
Approach Delay (s)		4.2	6.5		39.4	
Approach LOS		A	A		D	

Intersection Summary				
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	47.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1470	110	15
Future Volume (vph)	1470	110	15
Lane Group Flow (vph)	1614	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.50	0.04	0.12
Control Delay	2.7	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	2.7	1.2	24.5
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	74.7	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3230	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	76	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.51	0.04	0.12

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

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1470	15	0	110	15	0
Future Volume (vph)	1470	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3472			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3472			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1598	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1613	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2627			2731	38	
v/s Ratio Prot	c0.46			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.61			0.04	0.42	
Uniform Delay, d1	3.3			1.8	28.0	
Progression Factor	1.00			0.90	1.00	
Incremental Delay, d2	1.1			0.0	7.4	
Delay (s)	4.4			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	4.4			1.7	35.3	
Approach LOS	A			A	D	

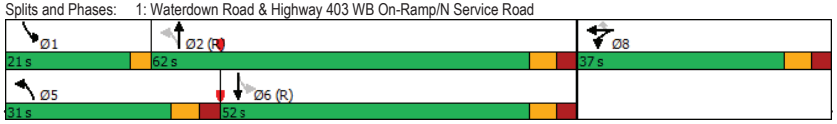
Intersection Summary			
HCM 2000 Control Delay	4.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	255	500	220	445	830	115	620
Future Volume (vph)	255	500	220	445	830	115	620
Lane Group Flow (vph)	268	526	232	468	1069	121	811
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	37.0	37.0	37.0	31.0	62.0	21.0	52.0
Total Split (%)	30.8%	30.8%	30.8%	25.8%	51.7%	17.5%	43.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	6.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.47	0.83	0.36	0.72	0.77	0.47	0.72
Control Delay	35.3	50.1	5.7	29.7	26.6	17.8	35.5
Queue Delay	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Total Delay	35.3	50.1	5.7	29.7	27.3	17.8	35.5
Queue Length 50th (m)	51.3	118.8	0.0	38.7	94.3	12.9	87.6
Queue Length 95th (m)	85.9	#207.2	19.0	m52.4	79.0	18.4	103.6
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	568	630	651	824	1471	373	1200
Starvation Cap Reductn	0	0	0	0	140	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.83	0.36	0.57	0.80	0.32	0.68

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	500	220	445	830	185	115	620	150
Future Volume (vph)	0	0	0	255	500	220	445	830	185	115	620	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3085		1601	3047	
Flt Permitted				0.95	1.00	1.00	0.18	1.00		0.18	1.00	
Satd. Flow (perm)				1616	1792	1426	571	3085		302	3047	
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	0	268	526	232	468	874	195	121	653	158
RTOR Reduction (vph)	0	0	0	0	0	150	0	17	0	0	18	0
Lane Group Flow (vph)	0	0	0	268	526	82	468	1052	0	121	793	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				41.2	41.2	41.2	64.8	52.4		51.9	42.5	
Effective Green, g (s)				42.2	42.2	42.2	65.8	53.4		53.9	43.5	
Actuated g/C Ratio				0.35	0.35	0.35	0.55	0.44		0.45	0.36	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				568	630	501	646	1372		248	1104	
v/s Ratio Prot				0.17	c0.29		c0.10	c0.34		0.04	0.26	
v/s Ratio Perm						0.06	0.30			0.18		
v/c Ratio				0.47	0.83	0.16	0.72	0.77		0.49	0.72	
Uniform Delay, d1				30.2	35.7	26.8	18.6	28.1		20.9	33.0	
Progression Factor				1.00	1.00	1.00	1.63	0.86		1.00	1.00	
Incremental Delay, d2				0.6	9.3	0.2	3.2	3.3		1.5	4.0	
Delay (s)				30.9	45.0	26.9	33.5	27.4		22.4	37.0	
Level of Service				C	D	C	C	C		C	D	
Approach Delay (s)		0.0			37.2			29.3			35.1	
Approach LOS		A			D			C			D	

Intersection Summary

HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues — Future Background 2031 - Without Metrolinx

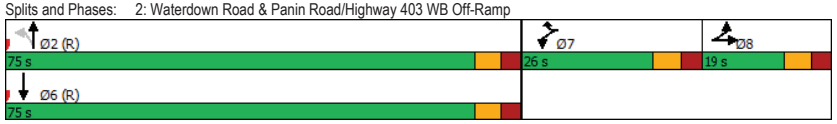
2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp — PM Peak Hour

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	255	345	5	1120	875
Future Volume (vph)	0	255	345	5	1120	875
Lane Group Flow (vph)	6	290	392	0	1279	994
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	19.0	26.0	26.0	75.0	75.0	75.0
Total Split (%)	15.8%	21.7%	21.7%	62.5%	62.5%	62.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.03	0.48	0.85		0.57	0.41
Control Delay	0.2	45.3	38.1		10.4	7.9
Queue Delay	0.0	0.0	0.0		0.1	0.3
Total Delay	0.2	45.3	38.1		10.5	8.2
Queue Length 50th (m)	0.0	32.2	43.9		66.8	44.4
Queue Length 95th (m)	0.0	45.4	#89.4		66.0	41.4
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	276	637	477		2260	2425
Starvation Cap Reductn	0	0	0		182	686
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.02	0.46	0.82		0.62	0.57

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis — Future Background 2031 - Without Metrolinx

2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	255	0	345	5	1120	0	0	875	0
Future Volume (vph)	0	0	5	255	0	345	5	1120	0	0	875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3299			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	290	0	392	6	1273	0	0	994	0
RTOR Reduction (vph)	0	6	0	0	0	171	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	290	0	221	0	1279	0	0	994	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		21.9		21.9		75.5			75.5	
Effective Green, g (s)		2.6		22.9		22.9		76.5			76.5	
Actuated g/C Ratio		0.02		0.19		0.19		0.64			0.64	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		35		603		293		2103			2256	
v/s Ratio Prot		c0.00		0.09		c0.14					0.28	
v/s Ratio Perm								c0.39				
v/c Ratio		0.00		0.48		0.76		0.61			0.44	
Uniform Delay, d1		57.4		43.3		45.9		12.9			11.0	
Progression Factor		1.00		1.00		1.00		0.83			0.77	
Incremental Delay, d2		0.0		0.6		10.5		1.1			0.5	
Delay (s)		57.5		43.9		56.4		11.8			9.0	
Level of Service		E		D		E		B			A	
Approach Delay (s)		57.5			51.1			11.8			9.0	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

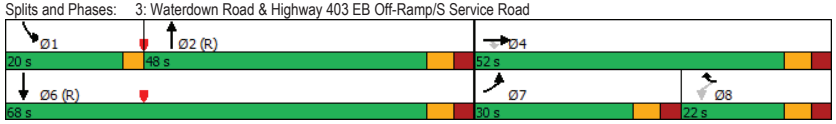
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	250	95	295	50	260	630	335	395	740
Future Volume (vph)	250	95	295	50	260	630	335	395	740
Lane Group Flow (vph)	281	107	331	56	292	708	376	444	831
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free		
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0		6.0	8.0
Minimum Split (s)	15.0	21.0	21.0	15.0	15.0	29.0		9.0	29.0
Total Split (s)	30.0	52.0	52.0	22.0	22.0	48.0		20.0	68.0
Total Split (%)	25.0%	43.3%	43.3%	18.3%	18.3%	40.0%		16.7%	56.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.78	0.16	0.52	0.47	0.70	0.58	0.24	0.79	0.44
Control Delay	59.5	24.8	19.9	88.0	45.7	28.6	0.3	54.1	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.5	24.8	19.9	88.0	45.8	28.7	0.3	54.1	23.8
Queue Length 50th (m)	65.3	17.5	38.1	14.7	52.4	79.4	0.0	51.2	87.6
Queue Length 95th (m)	94.0	27.8	59.9	28.6	75.5	99.9	0.0	#88.4	74.2
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	378	719	681	156	455	1325	1568	565	1948
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	1	22	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.15	0.49	0.36	0.64	0.54	0.24	0.79	0.43

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	95	295	50	0	260	0	630	335	395	740	0
Future Volume (vph)	250	95	295	50	0	260	0	630	335	395	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	3255	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	3255	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	281	107	331	56	0	292	0	708	376	444	831	0
RTOR Reduction (vph)	0	0	81	0	0	262	0	0	0	0	0	0
Lane Group Flow (vph)	281	107	250	56	0	30	0	708	376	444	831	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	24.4	42.7	42.7	11.3		11.3		40.5	120.0	19.8	63.3	
Effective Green, g (s)	25.4	43.7	43.7	12.3		12.3		41.5	120.0	20.8	64.3	
Actuated g/C Ratio	0.21	0.36	0.36	0.10		0.10		0.35	1.00	0.17	0.54	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	362	659	553	119		155		1223	1568	564	1896	
v/s Ratio Prot	c0.16	0.06				0.02		c0.20		c0.14	0.23	
v/s Ratio Perm			c0.16	0.05					0.24			
v/c Ratio	0.78	0.16	0.45	0.47		0.19		0.58	0.24	0.79	0.44	
Uniform Delay, d1	44.6	25.8	29.0	50.8		49.3		32.1	0.0	47.5	16.9	
Progression Factor	1.00	1.00	1.00	1.50		6.34		0.79	1.00	0.92	1.28	
Incremental Delay, d2	10.0	0.1	0.6	2.9		0.6		1.8	0.3	6.7	0.7	
Delay (s)	54.6	25.9	29.6	78.9		313.3		27.3	0.3	50.4	22.3	
Level of Service	D	C	C	E		F		C	A	D	C	
Approach Delay (s)		38.8			275.6			18.0			32.1	
Approach LOS		D			F			B			C	

Intersection Summary

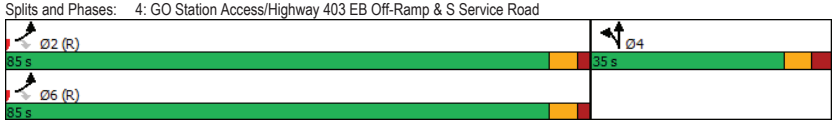
HCM 2000 Control Delay	53.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	690	15	30		
Future Volume (vph)	690	15	30		
Lane Group Flow (vph)	885	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			35.0	85.0	85.0
Total Split (%)			29.2%	71%	71%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.75	0.02	0.80		
Control Delay	14.9	1.1	60.7		
Queue Delay	0.4	0.0	0.0		
Total Delay	15.3	1.1	60.7		
Queue Length 50th (m)	76.6	0.3	70.6		
Queue Length 95th (m)	42.0	0.5	83.6		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1186	1124	439		
Starvation Cap Reductn	64	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.79	0.02	0.69		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	690	15	205	30	0	0
Future Volume (vph)	690	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	885	19	263	38	0	0
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	885	13	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	83.0	83.0		24.0		
Effective Green, g (s)	84.0	84.0		25.0		
Actuated g/C Ratio	0.70	0.70		0.21		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1185	1117		379		
v/s Ratio Prot	c0.52			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.75	0.01		0.79		
Uniform Delay, d1	11.3	5.4		45.1		
Progression Factor	0.83	0.37		1.00		
Incremental Delay, d2	4.2	0.0		10.9		
Delay (s)	13.5	2.0		56.0		
Level of Service	B	A		E		
Approach Delay (s)	13.3			56.0	0.0	
Approach LOS	B			E	A	

Intersection Summary				
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	60.3%	ICU Level of Service	B	
Analysis Period (min)	15			

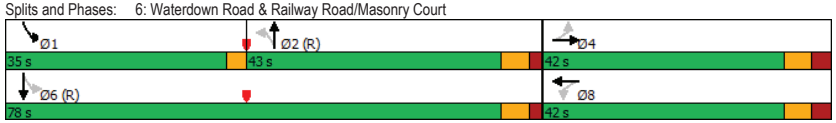
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	5	90	5	5	740	100	975
Future Volume (vph)	10	5	90	5	5	740	100	975
Lane Group Flow (vph)	0	25	114	284	6	975	127	1247
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	42.0	42.0	42.0	42.0	43.0	43.0	35.0	78.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.8%	35.8%	29.2%	65.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.40	0.62	0.62	0.03	0.43	0.28	0.47
Control Delay		55.6	62.2	11.8	9.6	10.7	4.5	4.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		55.6	62.2	11.8	9.6	10.7	4.5	4.6
Queue Length 50th (m)		4.3	27.0	1.3	0.5	51.7	3.0	29.5
Queue Length 95th (m)		11.3	38.2	13.9	2.3	70.8	14.8	71.5
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		129	400	668	213	2284	695	2674
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.19	0.28	0.43	0.03	0.43	0.18	0.47

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	90	5	220	5	740	30	100	975	10
Future Volume (vph)	10	5	5	90	5	220	5	740	30	100	975	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196		1711	1581		1353	3415		1694	3476	
Flt Permitted		0.34		0.74	1.00		0.22	1.00		0.25	1.00	
Satd. Flow (perm)		416		1334	1581		319	3415		442	3476	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	114	6	278	6	937	38	127	1234	13
RTOR Reduction (vph)	0	5	0	0	240	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	20	0	114	44	0	6	974	0	127	1247	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.6		15.6	15.6		79.3	79.3		91.4	91.4	
Effective Green, g (s)		16.6		16.6	16.6		80.3	80.3		92.4	92.4	
Actuated g/C Ratio		0.14		0.14	0.14		0.67	0.67		0.77	0.77	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		57		184	218		213	2285		445	2676	
v/s Ratio Prot					0.03			0.29		0.02	c0.36	
v/s Ratio Perm		0.05		c0.09			0.02			0.20		
v/c Ratio		0.35		0.62	0.20		0.03	0.43		0.29	0.47	
Uniform Delay, d1		46.8		48.7	45.8		6.7	9.2		4.3	4.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00		0.92	0.73	
Incremental Delay, d2		3.7		6.1	0.5		0.2	0.6		0.3	0.5	
Delay (s)		50.5		54.8	46.3		6.9	9.8		4.3	4.2	
Level of Service		D		D	D		A	A		A	A	
Approach Delay (s)		50.5			48.7			9.8			4.2	
Approach LOS		D			D			A			A	

Intersection Summary

HCM 2000 Control Delay	13.0	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.50				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	61.1%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	80	55	15	240	0	75	0	15	0	0	0
Future Volume (Veh/h)	0	80	55	15	240	0	75	0	15	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	98	67	18	293	0	91	0	18	0	0	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)		144										
pX, platoon unblocked												
vC, conflicting volume	293			165			460	460	132	478	494	293
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			165			460	460	132	478	494	293
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			82	100	98	100	100	100
cM capacity (veh/h)	1280			1426			501	494	889	486	473	751

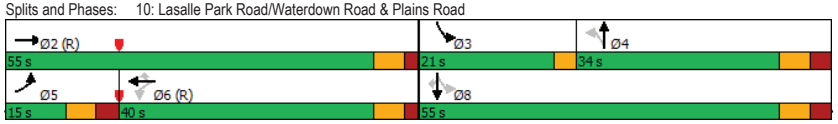
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	165	311	109	0
Volume Left	0	18	91	0
Volume Right	67	0	18	0
cSH	1280	1426	540	1700
Volume to Capacity	0.00	0.01	0.20	0.00
Queue Length 95th (m)	0.0	0.3	6.0	0.0
Control Delay (s)	0.0	0.5	13.3	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	0.5	13.3	0.0
Approach LOS			B	A

Intersection Summary				
Average Delay			2.8	
Intersection Capacity Utilization			36.1%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	240	575	75	1090	315	125	220	390	285	400
Future Volume (vph)	240	575	75	1090	315	125	220	390	285	400
Lane Group Flow (vph)	247	670	77	1124	325	129	294	402	294	412
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	15.0	55.0	40.0	40.0	40.0	34.0	34.0	21.0	55.0	55.0
Total Split (%)	13.6%	50.0%	36.4%	36.4%	36.4%	30.9%	30.9%	19.1%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.70	0.38	0.34	0.95	0.47	0.60	0.77	0.94	0.39	0.57
Control Delay	59.3	18.0	22.7	43.4	6.1	50.6	52.5	56.2	24.4	14.3
Queue Delay	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	18.0	22.7	46.3	6.1	50.6	52.5	56.2	24.4	14.3
Queue Length 50th (m)	27.8	46.8	13.5	133.5	26.8	26.3	59.9	64.7	45.9	32.2
Queue Length 95th (m)	#55.3	66.7	m14.2	#178.6	13.4	45.1	86.8	#108.1	63.9	58.8
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	353	1743	226	1179	694	263	464	426	846	783
Starvation Cap Reductn	0	0	0	27	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.38	0.34	0.98	0.47	0.49	0.63	0.94	0.35	0.53

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 37 (34%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	575	75	75	1090	315	125	220	65	390	285	400
Future Volume (vph)	240	575	75	75	1090	315	125	220	65	390	285	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3134	3465		1629	3539	1507	1694	1786		1709	1900	1493
Flt Permitted	0.95	1.00		0.40	1.00	1.00	0.58	1.00		0.28	1.00	1.00
Satd. Flow (perm)	3134	3465		681	3539	1507	1035	1786		499	1900	1493
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	247	593	77	77	1124	325	129	227	67	402	294	412
RTOR Reduction (vph)	0	8	0	0	0	193	0	10	0	0	0	129
Lane Group Flow (vph)	247	662	0	77	1124	132	129	284	0	402	294	283
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	11.4	54.1		35.7	35.7	35.7	21.9	21.9		42.9	42.9	42.9
Effective Green, g (s)	12.4	55.1		36.7	36.7	36.7	22.9	22.9		43.9	43.9	43.9
Actuated g/C Ratio	0.11	0.50		0.33	0.33	0.33	0.21	0.21		0.40	0.40	0.40
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	353	1735		227	1180	502	215	371		408	758	595
v/s Ratio Prot	c0.08	0.19			c0.32			c0.16		c0.17	0.15	
v/s Ratio Perm				0.11		0.09	0.12			0.22		0.19
v/c Ratio	0.70	0.38		0.34	0.95	0.26	0.60	0.76		0.99	0.39	0.48
Uniform Delay, d1	47.0	16.9		27.5	35.8	26.8	39.4	41.0		28.1	23.5	24.5
Progression Factor	1.00	1.00		0.66	0.78	0.86	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.0	0.6		3.0	13.8	0.9	4.5	9.1		40.3	0.3	0.6
Delay (s)	53.0	17.6		21.2	41.7	24.0	43.9	50.1		68.4	23.8	25.1
Level of Service	D	B		C	D	C	D	D		E	C	C
Approach Delay (s)		27.1			36.9			48.2			40.5	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	92.8%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	55	985	1480	70
Future Volume (vph)	55	985	1480	70
Lane Group Flow (vph)	57	1015	1572	144
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.22	0.39	0.68	0.60
Control Delay	4.6	3.9	12.8	41.7
Queue Delay	0.0	0.1	0.2	0.0
Total Delay	4.6	4.1	13.0	41.7
Queue Length 50th (m)	1.2	25.4	99.7	21.7
Queue Length 95th (m)	m5.4	m48.5	155.1	40.6
Internal Link Dist (m)		135.9	121.0	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	346	2584	2311	414
Starvation Cap Reductn	0	560	0	0
Spillback Cap Reductn	0	0	156	1
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.50	0.73	0.35

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Plains Road & Cooke Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	985	1480	45	70	70
Future Volume (vph)	55	985	1480	45	70	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.93	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1687	3374	3315		1615	
Flt Permitted	0.11	1.00	1.00		0.98	
Satd. Flow (perm)	195	3374	3315		1615	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1015	1526	46	72	72
RTOR Reduction (vph)	0	0	1	0	38	0
Lane Group Flow (vph)	57	1015	1571	0	106	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	83.3	83.3	75.1		12.7	
Effective Green, g (s)	84.3	84.3	76.1		13.7	
Actuated g/C Ratio	0.77	0.77	0.69		0.12	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	233	2585	2293		201	
v/s Ratio Prot	0.01	c0.30	c0.47			
v/s Ratio Perm	0.17				c0.07	
v/c Ratio	0.24	0.39	0.69		0.53	
Uniform Delay, d1	6.6	4.3	9.9		45.1	
Progression Factor	1.06	0.75	1.00		1.00	
Incremental Delay, d2	0.4	0.4	1.7		2.5	
Delay (s)	7.4	3.6	11.6		47.6	
Level of Service	A	A	B		D	
Approach Delay (s)		3.8	11.6		47.6	
Approach LOS		A	B		D	

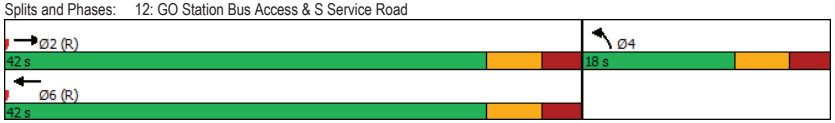
Intersection Summary				
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	63.9%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	905	295	15
Future Volume (vph)	905	295	15
Lane Group Flow (vph)	984	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	42.0	42.0	18.0
Total Split (%)	70.0%	70.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.31	0.09	0.12
Control Delay	1.7	0.6	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.7	0.6	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	19.4	4.1	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3152	3345	180
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	36	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.32	0.09	0.09

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

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	905	20	0	295	15	0
Future Volume (vph)	905	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3400			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3400			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	963	21	0	314	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	983	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2561			2719	42	
v/s Ratio Prot	c0.29			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.38			0.12	0.38	
Uniform Delay, d1	2.6			2.0	27.8	
Progression Factor	0.94			0.43	1.00	
Incremental Delay, d2	0.4			0.1	5.7	
Delay (s)	2.8			0.9	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.8			0.9	33.4	
Approach LOS	A			A	C	

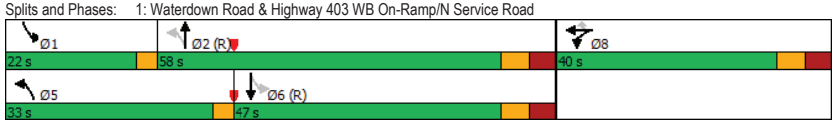
Intersection Summary			
HCM 2000 Control Delay	2.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	60	105	65	300	575	235	800
Future Volume (vph)	60	105	65	300	575	235	800
Lane Group Flow (vph)	61	107	66	306	1026	240	1030
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	10.0	31.0	10.0	31.0
Total Split (s)	40.0	40.0	40.0	33.0	58.0	22.0	47.0
Total Split (%)	33.3%	33.3%	33.3%	27.5%	48.3%	18.3%	39.2%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	2.0	7.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.35	0.56	0.25	0.38	0.53	0.52	0.52
Control Delay	52.8	60.3	5.3	5.0	11.8	7.2	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	52.8	60.3	5.3	5.0	11.9	7.2	13.0
Queue Length 50th (m)	14.1	25.4	0.0	1.4	76.7	10.9	61.9
Queue Length 95th (m)	26.9	42.4	5.3	16.9	60.6	22.1	104.3
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	468	1206	1930	518	1962
Starvation Cap Reductn	0	0	0	0	160	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.14	0.25	0.58	0.46	0.52

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	105	65	300	575	430	235	800	210
Future Volume (vph)	0	0	0	60	105	65	300	575	430	235	800	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	2.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2990		1616	2990	
Flt Permitted				0.95	1.00	1.00	0.25	1.00		0.23	1.00	
Satd. Flow (perm)				1442	1597	1439	793	2990		385	2990	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	61	107	66	306	587	439	240	816	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	74	0	0	10	0
Lane Group Flow (vph)	0	0	0	61	107	8	306	952	0	240	1020	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	83.8	73.5		90.6	77.3	
Effective Green, g (s)				14.4	14.4	14.4	85.8	74.5		91.6	78.3	
Actuated g/C Ratio				0.12	0.12	0.12	0.71	0.62		0.76	0.65	
Clearance Time (s)				8.0	8.0	8.0	3.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	774	1856		448	1950	
v/s Ratio Prot				0.04	c0.07		0.04	0.32		c0.07	c0.34	
v/s Ratio Perm						0.01	0.25			0.34		
v/c Ratio				0.35	0.56	0.05	0.40	0.51		0.54	0.52	
Uniform Delay, d1				48.5	49.8	46.7	5.8	12.7		5.7	11.0	
Progression Factor				1.00	1.00	1.00	1.19	0.95		1.00	1.00	
Incremental Delay, d2				1.2	3.7	0.1	0.3	0.9		1.2	1.0	
Delay (s)				49.8	53.5	46.8	7.1	12.8		7.0	12.0	
Level of Service				D	D	D	A	B		A	B	
Approach Delay (s)		0.0			50.7			11.5			11.1	
Approach LOS		A			D			B			B	

Intersection Summary

HCM 2000 Control Delay	14.5	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	64.4%	ICU Level of Service		C	
Analysis Period (min)	15				

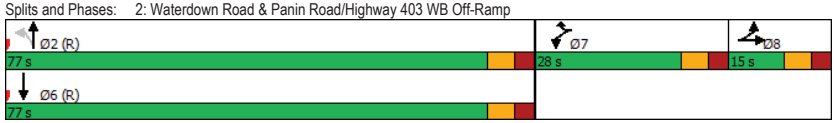
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	260	175	5	1125	860
Future Volume (vph)	0	260	175	5	1125	860
Lane Group Flow (vph)	5	283	190	0	1228	935
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	28.0	28.0	77.0	77.0	77.0
Total Split (%)	12.5%	23.3%	23.3%	64.2%	64.2%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.06	0.63	0.56		0.52	0.37
Control Delay	53.4	54.8	16.5		11.1	4.0
Queue Delay	0.0	0.0	0.0		0.3	0.1
Total Delay	53.4	54.8	16.5		11.4	4.1
Queue Length 50th (m)	1.2	34.5	5.5		94.8	26.5
Queue Length 95th (m)	5.5	47.5	27.6		64.4	14.8
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	84	585	396		2373	2525
Starvation Cap Reductn	0	0	0		501	466
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.48	0.48		0.66	0.45

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	260	0	175	5	1125	0	0	860	0
Future Volume (vph)	5	0	0	260	0	175	5	1125	0	0	860	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3393			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3229			3438	
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)	5	0	0	283	0	190	5	1223	0	0	935	0
RTOR Reduction (vph)	0	0	0	0	0	142	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	283	0	48	0	1228	0	0	935	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		15.9		15.9		81.5			81.5	
Effective Green, g (s)		2.6		16.9		16.9		82.5			82.5	
Actuated g/C Ratio		0.02		0.14		0.14		0.69			0.69	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		449		200		2219			2363	
v/s Ratio Prot		c0.00		c0.09		0.03					0.27	
v/s Ratio Perm								c0.38				
v/c Ratio		0.21		0.63		0.24		0.55			0.40	
Uniform Delay, d1		57.7		48.6		45.8		9.5			8.0	
Progression Factor		1.00		1.00		1.00		1.28			0.52	
Incremental Delay, d2		4.3		2.9		0.6		0.6			0.4	
Delay (s)		62.0		51.5		46.5		12.8			4.6	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			49.5			12.8			4.6	
Approach LOS		E			D			B			A	

Intersection Summary

HCM 2000 Control Delay	16.5	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.56				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	63.7%	ICU Level of Service		B	
Analysis Period (min)	15				

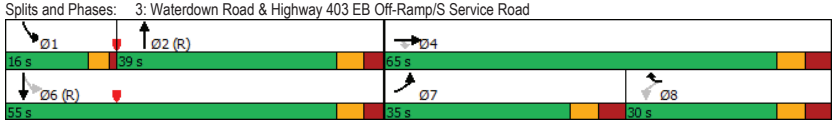
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	330	315	300	25	100	755	615	630	490
Future Volume (vph)	330	315	300	25	100	755	615	630	490
Lane Group Flow (vph)	355	339	323	27	108	812	661	677	527
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	pm+pt	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free	6	
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0		6.0	8.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	29.0		10.0	29.0
Total Split (s)	35.0	65.0	65.0	30.0	30.0	39.0		16.0	55.0
Total Split (%)	29.2%	54.2%	54.2%	25.0%	25.0%	32.5%		13.3%	45.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	3.0		1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0		3.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.90	0.48	0.46	0.35	0.41	0.76	0.43	0.68	0.31
Control Delay	71.7	30.2	11.8	62.4	10.0	37.1	1.0	22.9	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	30.2	11.8	62.4	10.0	37.1	1.0	22.9	16.7
Queue Length 50th (m)	85.4	63.3	20.4	6.7	0.0	96.2	0.0	42.7	35.2
Queue Length 95th (m)	#140.0	85.0	43.3	14.1	11.1	#119.9	0.9	60.8	40.5
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	406	909	832	160	390	1074	1524	1002	1712
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.37	0.39	0.17	0.28	0.76	0.43	0.68	0.31

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	315	300	25	0	100	0	755	615	630	490	0
Future Volume (vph)	330	315	300	25	0	100	0	755	615	630	490	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	7.0	7.0	7.0	7.0		7.0		6.0	3.0	3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	3426	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	1131	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	355	339	323	27	0	108	0	812	661	677	527	0
RTOR Reduction (vph)	0	0	125	0	0	98	0	0	0	0	0	0
Lane Group Flow (vph)	355	339	198	27	0	10	0	812	661	677	527	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	26.4	44.6	44.6	10.2		10.2		36.8	120.0	60.4	60.4	
Effective Green, g (s)	27.4	45.6	45.6	11.2		11.2		37.8	120.0	61.4	61.4	
Actuated g/C Ratio	0.23	0.38	0.38	0.09		0.09		0.31	1.00	0.51	0.51	
Clearance Time (s)	8.0	8.0	8.0	8.0		8.0		7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	394	714	572	78		133		1072	1524	972	1710	
v/s Ratio Prot	c0.21	0.18				0.01		c0.24		c0.12	0.16	
v/s Ratio Perm			0.13	0.03					c0.43	0.24		
v/c Ratio	0.90	0.47	0.35	0.35		0.08		0.76	0.43	0.70	0.31	
Uniform Delay, d1	45.0	28.1	26.6	51.0		49.7		37.0	0.0	17.8	17.0	
Progression Factor	1.00	1.00	1.00	1.00		1.71		0.85	1.00	1.17	0.92	
Incremental Delay, d2	23.0	0.5	0.4	2.7		0.2		4.3	0.8	2.1	0.4	
Delay (s)	68.0	28.6	26.9	53.5		85.1		35.7	0.8	22.9	16.1	
Level of Service	E	C	C	D		F		D	A	C	B	
Approach Delay (s)		41.8			78.8			20.0			19.9	
Approach LOS		D			E			C			B	

Intersection Summary

HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

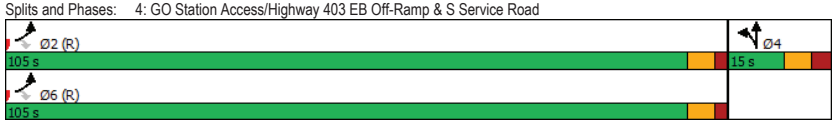
c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	970	160	25		
Future Volume (vph)	970	160	25		
Lane Group Flow (vph)	1021	168	37		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			15.0	105.0	105.0
Total Split (%)			12.5%	88%	88%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.85	0.12	0.27		
Control Delay	15.3	0.6	57.9		
Queue Delay	0.9	0.0	0.0		
Total Delay	16.2	0.6	57.9		
Queue Length 50th (m)	126.6	0.0	8.8		
Queue Length 95th (m)	#257.4	5.7	20.3		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1208	1454	136		
Starvation Cap Reductn	51	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.88	0.12	0.27		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	970	160	10	25	0	0
Future Volume (vph)	970	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1021	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	1021	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.76			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.88	0.11		0.42		
Uniform Delay, d1	4.9	1.3		55.5		
Progression Factor	1.29	1.77		1.00		
Incremental Delay, d2	8.8	0.1		3.2		
Delay (s)	15.2	2.4		58.7		
Level of Service	B	A		E		
Approach Delay (s)	13.4			58.7	0.0	
Approach LOS	B			E	A	

Intersection Summary

HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

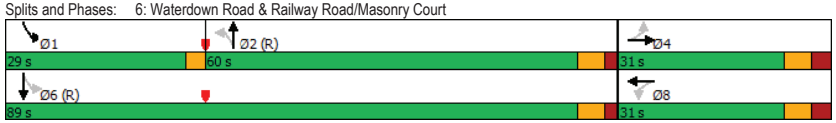
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	0	20	0	5	1130	165	580
Future Volume (vph)	10	0	20	0	5	1130	165	580
Lane Group Flow (vph)	0	22	23	125	6	1398	188	670
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	31.0	31.0	31.0	31.0	60.0	60.0	29.0	89.0
Total Split (%)	25.8%	25.8%	25.8%	25.8%	50.0%	50.0%	24.2%	74.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.20	0.23	0.27	0.01	0.60	0.48	0.24
Control Delay		4.1	56.8	1.4	7.6	11.6	15.9	1.8
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		4.1	56.8	1.4	7.6	11.6	15.9	1.8
Queue Length 50th (m)		0.0	5.5	0.0	0.4	83.7	8.1	8.3
Queue Length 95th (m)		0.2	13.8	0.0	2.2	124.4	29.2	18.3
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		195	258	605	420	2346	548	2793
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.11	0.09	0.21	0.01	0.60	0.34	0.24

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	20	0	110	5	1130	100	165	580	10
Future Volume (vph)	10	0	10	20	0	110	5	1130	100	165	580	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184		1586	1495		1454	3390		1728	3376	
Flt Permitted		0.60		0.74	1.00		0.40	1.00		0.14	1.00	
Satd. Flow (perm)		730		1241	1495		608	3390		256	3376	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	23	0	125	6	1284	114	188	659	11
RTOR Reduction (vph)	0	20	0	0	115	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	2	0	23	10	0	6	1395	0	188	669	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.8		8.8	8.8		81.9	81.9		98.2	98.2	
Effective Green, g (s)		9.8		9.8	9.8		82.9	82.9		99.2	99.2	
Actuated g/C Ratio		0.08		0.08	0.08		0.69	0.69		0.83	0.83	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		59		101	122		420	2341		387	2790	
v/s Ratio Prot					0.01			c0.41		c0.06	0.20	
v/s Ratio Perm		0.00		c0.02			0.01			0.34		
v/c Ratio		0.03		0.23	0.08		0.01	0.60		0.49	0.24	
Uniform Delay, d1		50.7		51.6	50.9		5.8	9.7		6.6	2.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00		4.17	0.71	
Incremental Delay, d2		0.2		1.2	0.3		0.1	1.1		0.9	0.2	
Delay (s)		50.9		52.7	51.2		5.9	10.9		28.6	1.8	
Level of Service		D		D	D		A	B		C	A	
Approach Delay (s)		50.9			51.5			10.9			7.7	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	63.9%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Future Background 2036 - Without Metrolinx
8: Cooke Boulevard & Masonry Court AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	225	40	10	50	0	80	0	15	0	0	0
Future Volume (Veh/h)	0	225	40	10	50	0	80	0	15	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	0	288	51	13	64	0	103	0	19	0	0	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)		144										
pX, platoon unblocked												
vC, conflicting volume	64			339			404	404	314	422	429	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			339			404	404	314	422	429	64
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			99			81	100	97	100	100	100
cM capacity (veh/h)	1551			1231			546	533	732	527	516	984

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	339	77	122	0
Volume Left	0	13	103	0
Volume Right	51	0	19	0
cSH	1551	1231	568	1700
Volume to Capacity	0.00	0.01	0.21	0.00
Queue Length 95th (m)	0.0	0.3	6.5	0.0
Control Delay (s)	0.0	1.4	13.1	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	1.4	13.1	0.0
Approach LOS			B	A

Intersection Summary					
Average Delay			3.2		
Intersection Capacity Utilization			26.3%	ICU Level of Service	A
Analysis Period (min)			15		

Queues Future Background 2036 - Without Metrolinx
10: Lasalle Park Road/Waterdown Road & Plains Road AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	755	975	85	375	275	100	325	265	190	215
Future Volume (vph)	755	975	85	375	275	100	325	265	190	215
Lane Group Flow (vph)	803	1213	90	399	293	106	415	282	202	229
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	29.0	59.0	30.0	30.0	30.0	34.0	34.0	17.0	51.0	51.0
Total Split (%)	26.4%	53.6%	27.3%	27.3%	27.3%	30.9%	30.9%	15.5%	46.4%	46.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	1.14	0.71	0.98	0.51	0.52	0.38	0.92	0.95	0.28	0.32
Control Delay	120.5	24.1	133.2	39.9	7.7	38.5	66.3	68.3	23.2	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	120.5	24.1	133.2	39.9	7.7	38.5	66.3	68.3	23.2	4.0
Queue Length 50th (m)	~112.4	107.7	20.3	41.6	0.0	19.7	89.0	44.5	29.8	0.0
Queue Length 95th (m)	#151.2	134.3	#54.0	57.6	22.8	36.8	#147.1	#98.2	47.6	14.9
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	703	1707	92	781	564	290	464	296	740	726
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.14	0.71	0.98	0.51	0.52	0.37	0.89	0.95	0.27	0.32

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	755	975	165	85	375	275	100	325	65	265	190	215
Future Volume (vph)	755	975	165	85	375	275	100	325	65	265	190	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3255	3407		1670	3438	1489	1720	1797		1615	1810	1446
Flt Permitted	0.95	1.00		0.23	1.00	1.00	0.63	1.00		0.15	1.00	1.00
Satd. Flow (perm)	3255	3407		407	3438	1489	1142	1797		254	1810	1446
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)	803	1037	176	90	399	293	106	346	69	282	202	229
RTOR Reduction (vph)	0	12	0	0	0	226	0	7	0	0	0	137
Lane Group Flow (vph)	803	1201	0	90	399	67	106	408	0	282	202	92
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	22.8	53.8		24.0	24.0	24.0	26.2	26.2		43.2	43.2	43.2
Effective Green, g (s)	23.8	54.8		25.0	25.0	25.0	27.2	27.2		44.2	44.2	44.2
Actuated g/C Ratio	0.22	0.50		0.23	0.23	0.23	0.25	0.25		0.40	0.40	0.40
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	704	1697		92	781	338	282	444		287	727	581
v/s Ratio Prot	c0.25	0.35			0.12			c0.23		c0.13	0.11	
v/s Ratio Perm				c0.22		0.04	0.09			0.26		0.06
v/c Ratio	1.14	0.71		0.98	0.51	0.20	0.38	0.92		0.98	0.28	0.16
Uniform Delay, d1	43.1	21.4		42.2	37.2	34.4	34.4	40.3		28.9	22.2	21.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	79.7	2.5		88.0	2.4	1.3	0.8	23.9		48.0	0.2	0.1
Delay (s)	122.8	23.9		130.3	39.5	35.7	35.2	64.2		76.9	22.4	21.1
Level of Service	F	C		F	D	D	D	E		E	C	C
Approach Delay (s)		63.3			48.5			58.3			43.5	
Approach LOS		E			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	56.3	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.00			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	92.8%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	90	1230	735	40
Future Volume (vph)	90	1230	735	40
Lane Group Flow (vph)	100	1367	878	105
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	15.0	68.0	53.0	32.0
Total Split (%)	15.0%	68.0%	53.0%	32.0%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.19	0.51	0.37	0.50
Control Delay	3.0	5.1	7.5	28.1
Queue Delay	0.0	0.5	0.0	0.0
Total Delay	3.0	5.6	7.5	28.1
Queue Length 50th (m)	2.8	42.7	35.0	8.5
Queue Length 95th (m)	7.8	74.3	59.0	24.0
Internal Link Dist (m)		135.9	125.3	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	571	2665	2379	410
Starvation Cap Reductn	0	757	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.72	0.37	0.26

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	90	1230	735	55	40	55
Future Volume (vph)	90	1230	735	55	40	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1631	3282	3248		1405	
Flt Permitted	0.29	1.00	1.00		0.98	
Satd. Flow (perm)	506	3282	3248		1405	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1367	817	61	44	61
RTOR Reduction (vph)	0	0	3	0	55	0
Lane Group Flow (vph)	100	1367	875	0	50	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	77.6	77.6	68.9		8.4	
Effective Green, g (s)	78.6	78.6	69.9		9.4	
Actuated g/C Ratio	0.79	0.79	0.70		0.09	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	473	2579	2270		132	
v/s Ratio Prot	0.01	c0.42	0.27			
v/s Ratio Perm	0.15				c0.04	
v/c Ratio	0.21	0.53	0.39		0.38	
Uniform Delay, d1	2.7	3.9	6.2		42.5	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8	0.5		1.8	
Delay (s)	2.9	4.7	6.7		44.4	
Level of Service	A	A	A		D	
Approach Delay (s)		4.6	6.7		44.4	
Approach LOS		A	A		D	

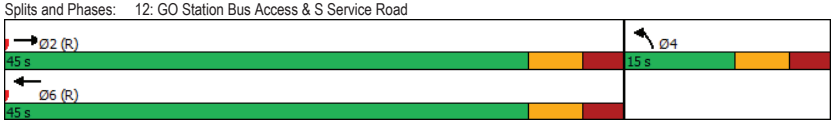
Intersection Summary				
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	50.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1545	110	15
Future Volume (vph)	1545	110	15
Lane Group Flow (vph)	1695	120	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	45.0	45.0	15.0
Total Split (%)	75.0%	75.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.52	0.04	0.12
Control Delay	2.9	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	2.9	1.2	24.5
Queue Length 50th (m)	0.3	0.0	1.6
Queue Length 95th (m)	119.6	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3232	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	104	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.54	0.04	0.12

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 12: GO Station Bus Access & S Service Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1545	15	0	110	15	0
Future Volume (vph)	1545	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3473			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3473			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1679	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1694	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2627			2731	38	
v/s Ratio Prot	c0.49			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.64			0.04	0.42	
Uniform Delay, d1	3.5			1.8	28.0	
Progression Factor	1.18			0.90	1.00	
Incremental Delay, d2	1.1			0.0	7.4	
Delay (s)	5.2			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	5.2			1.7	35.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues — Future Background 2036 - Without Metrolinx

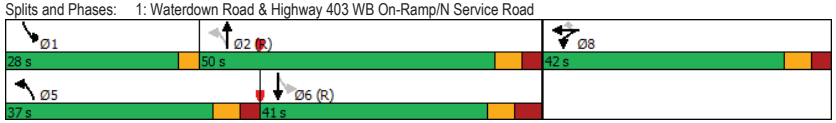
1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	255	500	220	490	855	115	700
Future Volume (vph)	255	500	220	490	855	115	700
Lane Group Flow (vph)	268	526	232	516	1095	121	895
Turn Type	Split	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		5	2	1	6
Permitted Phases			8	2		6	
Detector Phase	8	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	40.0	40.0	40.0	14.0	31.0	10.0	31.0
Total Split (s)	42.0	42.0	42.0	37.0	50.0	28.0	41.0
Total Split (%)	35.0%	35.0%	35.0%	30.8%	41.7%	23.3%	34.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	0.0	4.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	2.0	7.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Min	None	C-Min
v/c Ratio	0.55	0.98	0.39	0.70	0.72	0.41	0.79
Control Delay	40.5	76.3	6.1	20.6	27.6	15.2	39.8
Queue Delay	0.0	0.0	0.0	0.0	5.4	0.0	0.0
Total Delay	40.5	76.3	6.1	20.6	33.0	15.2	39.8
Queue Length 50th (m)	55.7	129.1	0.0	31.1	105.5	11.0	100.8
Queue Length 95th (m)	84.3	#201.8	18.7	49.4	145.8	19.1	#152.4
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	484	537	590	951	1521	484	1138
Starvation Cap Reductn	0	0	0	0	362	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.98	0.39	0.54	0.94	0.25	0.79

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road



HCM Signalized Intersection Capacity Analysis — Future Background 2036 - Without Metrolinx

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	500	220	490	855	185	115	700	150
Future Volume (vph)	0	0	0	255	500	220	490	855	185	115	700	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3087		1601	3056	
Flt Permitted				0.95	1.00	1.00	0.16	1.00		0.21	1.00	
Satd. Flow (perm)				1616	1792	1426	499	3087		347	3056	
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	0	268	526	232	516	900	195	121	737	158
RTOR Reduction (vph)	0	0	0	0	0	162	0	12	0	0	13	0
Lane Group Flow (vph)	0	0	0	268	526	70	516	1083	0	121	882	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				35.0	35.0	35.0	71.0	57.7		53.4	43.1	
Effective Green, g (s)				36.0	36.0	36.0	72.0	58.7		55.4	44.1	
Actuated g/C Ratio				0.30	0.30	0.30	0.60	0.49		0.46	0.37	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				484	537	427	738	1510		278	1123	
v/s Ratio Prot				0.17	c0.29		c0.12	c0.35		0.04	c0.29	
v/s Ratio Perm						0.05	0.30			0.16		
v/c Ratio				0.55	0.98	0.16	0.70	0.72		0.44	0.79	
Uniform Delay, d1				35.3	41.6	30.9	18.1	24.1		19.3	33.7	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.4	33.2	0.2	2.9	3.0		1.1	5.5	
Delay (s)				36.6	74.8	31.1	21.0	27.1		20.4	39.3	
Level of Service				D	E	C	C	C		C	D	
Approach Delay (s)		0.0			55.0			25.1			37.0	
Approach LOS		A			D			C			D	

Intersection Summary

HCM 2000 Control Delay	36.8	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.85				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		19.0	
Intersection Capacity Utilization	80.3%	ICU Level of Service		D	
Analysis Period (min)	15				

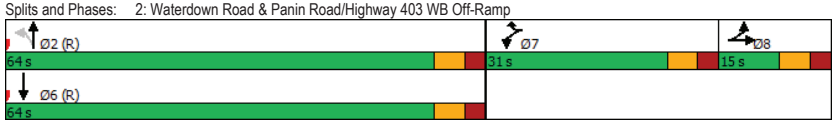
c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	0	280	370	5	1165	955
Future Volume (vph)	0	280	370	5	1165	955
Lane Group Flow (vph)	6	318	420	0	1330	1085
Turn Type	NA	Prot	Prot	Perm	NA	NA
Protected Phases	8	7	7		2	6
Permitted Phases				2		
Detector Phase	8	7	7	2	2	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	15.0	15.0	31.0	31.0	31.0
Total Split (s)	15.0	31.0	31.0	64.0	64.0	64.0
Total Split (%)	13.6%	28.2%	28.2%	58.2%	58.2%	58.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.03	0.43	0.86		0.64	0.49
Control Delay	0.2	37.0	41.5		16.3	13.3
Queue Delay	0.0	0.0	0.0		0.6	0.8
Total Delay	0.2	37.0	41.5		16.8	14.1
Queue Length 50th (m)	0.0	30.5	55.3		90.3	63.3
Queue Length 95th (m)	0.0	44.7	#110.4		143.1	101.2
Internal Link Dist (m)	106.5				174.0	121.9
Turn Bay Length (m)		145.0	115.0			
Base Capacity (vph)	234	797	512		2070	2221
Starvation Cap Reductn	0	0	0		344	763
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.03	0.40	0.82		0.77	0.74

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 94 (85%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	280	0	370	5	1165	0	0	955	0
Future Volume (vph)	0	0	5	280	0	370	5	1165	0	0	955	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3297			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	318	0	420	6	1324	0	0	1085	0
RTOR Reduction (vph)	0	6	0	0	0	128	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	318	0	292	0	1330	0	0	1085	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		24.9		24.9		62.5			62.5	
Effective Green, g (s)		2.6		25.9		25.9		63.5			63.5	
Actuated g/C Ratio		0.02		0.24		0.24		0.58			0.58	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		38		744		361		1903			2042	
v/s Ratio Prot		c0.00		0.10		c0.19					0.31	
v/s Ratio Perm								c0.40				
v/c Ratio		0.00		0.43		0.81		0.70			0.53	
Uniform Delay, d1		52.4		35.7		39.7		16.5			14.2	
Progression Factor		1.00		1.00		1.00		1.00			1.00	
Incremental Delay, d2		0.0		0.4		12.6		2.2			1.0	
Delay (s)		52.5		36.1		52.3		18.6			15.2	
Level of Service		D		D		D		B			B	
Approach Delay (s)		52.5			45.3			18.6			15.2	
Approach LOS		D			D			B			B	

Intersection Summary

HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

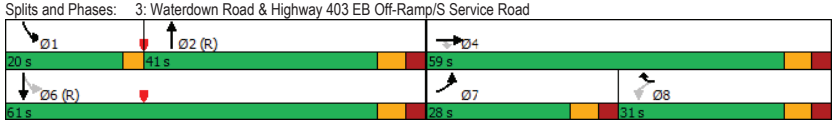
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	265	95	325	50	260	675	365	425	815
Future Volume (vph)	265	95	325	50	260	675	365	425	815
Lane Group Flow (vph)	298	107	365	56	292	758	410	478	916
Turn Type	Prot	NA	Perm	Perm	Prot	NA	Free	pm+pt	NA
Protected Phases	7	4			8	2		1	6
Permitted Phases			4	8			Free	6	
Detector Phase	7	4	4	8	8	2		1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0		6.0	8.0
Minimum Split (s)	15.0	21.0	21.0	15.0	15.0	29.0		9.0	29.0
Total Split (s)	28.0	59.0	59.0	31.0	31.0	41.0		20.0	61.0
Total Split (%)	23.3%	49.2%	49.2%	25.8%	25.8%	34.2%		16.7%	50.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		0.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		2.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag		Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	C-Min		None	C-Min
v/c Ratio	0.82	0.16	0.60	0.46	0.69	0.56	0.26	0.62	0.49
Control Delay	63.9	25.4	28.3	77.2	42.2	33.7	0.4	17.5	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.9	25.4	28.3	77.2	42.2	33.7	0.4	17.5	19.3
Queue Length 50th (m)	68.0	16.9	55.6	14.7	50.9	73.0	0.0	31.5	76.8
Queue Length 95th (m)	#127.5	29.9	87.6	28.5	76.9	98.9	0.0	40.5	91.8
Internal Link Dist (m)		253.6				353.3			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	364	799	713	243	548	1352	1568	831	1879
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.13	0.51	0.23	0.53	0.56	0.26	0.58	0.49

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	95	325	50	0	260	0	675	365	425	815	0
Future Volume (vph)	265	95	325	50	0	260	0	675	365	425	815	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	3255	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.23	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	800	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	298	107	365	56	0	292	0	758	410	478	916	0
RTOR Reduction (vph)	0	0	47	0	0	261	0	0	0	0	0	0
Lane Group Flow (vph)	298	107	318	56	0	31	0	758	410	478	916	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	24.6	43.3	43.3	11.7		11.7		44.8	120.0	62.7	62.7	
Effective Green, g (s)	25.6	44.3	44.3	12.7		12.7		45.8	120.0	63.7	63.7	
Actuated g/C Ratio	0.21	0.37	0.37	0.11		0.11		0.38	1.00	0.53	0.53	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	365	668	561	123		160		1350	1568	749	1878	
v/s Ratio Prot	c0.17	0.06				0.02		c0.21		c0.08	0.26	
v/s Ratio Perm			c0.21	0.05					0.26	0.25		
v/c Ratio	0.82	0.16	0.57	0.46		0.19		0.56	0.26	0.64	0.49	
Uniform Delay, d1	45.0	25.4	30.2	50.4		49.0		29.2	0.0	17.5	17.8	
Progression Factor	1.00	1.00	1.00	1.32		5.95		1.05	1.00	1.00	1.00	
Incremental Delay, d2	13.2	0.1	1.3	2.7		0.6		1.5	0.4	1.8	0.9	
Delay (s)	58.1	25.5	31.5	69.3		292.0		32.2	0.4	19.3	18.7	
Level of Service	E	C	C	E		F		C	A	B	B	
Approach Delay (s)		41.0			256.2			21.0			18.9	
Approach LOS		D			F			C			B	

Intersection Summary

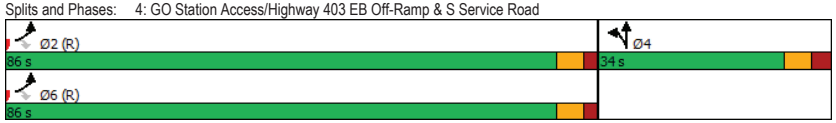
HCM 2000 Control Delay	46.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT	Ø2	Ø6
Lane Configurations					
Traffic Volume (vph)	750	15	30		
Future Volume (vph)	750	15	30		
Lane Group Flow (vph)	962	19	301		
Turn Type	Prot	Perm	NA		
Protected Phases	2 6		4	2	6
Permitted Phases		2 6			
Detector Phase	2 6	2 6	4		
Switch Phase					
Minimum Initial (s)			8.0	8.0	8.0
Minimum Split (s)			15.0	29.0	29.0
Total Split (s)			34.0	86.0	86.0
Total Split (%)			28.3%	72%	72%
Yellow Time (s)			4.0	4.0	4.0
All-Red Time (s)			3.0	2.0	2.0
Lost Time Adjust (s)			-1.0		
Total Lost Time (s)			6.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode			None	C-Min	C-Min
v/c Ratio	0.81	0.02	0.81		
Control Delay	20.2	1.3	62.3		
Queue Delay	1.0	0.0	0.0		
Total Delay	21.2	1.3	62.3		
Queue Length 50th (m)	77.3	0.3	70.6		
Queue Length 95th (m)	197.8	0.5	84.5		
Internal Link Dist (m)	190.8		55.4		
Turn Bay Length (m)					
Base Capacity (vph)	1192	1129	425		
Starvation Cap Reductn	75	0	0		
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.86	0.02	0.71		

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBL and 6:EBL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 4: GO Station Access/Highway 403 EB Off-Ramp & S Service Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	750	15	205	30	0	0
Future Volume (vph)	750	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	962	19	263	38	0	0
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	962	13	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	83.4	83.4		23.6		
Effective Green, g (s)	84.4	84.4		24.6		
Actuated g/C Ratio	0.70	0.70		0.21		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1191	1123		373		
v/s Ratio Prot	c0.57			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.81	0.01		0.81		
Uniform Delay, d1	12.2	5.3		45.4		
Progression Factor	1.03	0.46		1.00		
Incremental Delay, d2	5.7	0.0		12.0		
Delay (s)	18.3	2.5		57.5		
Level of Service	B	A		E		
Approach Delay (s)	17.9			57.5	0.0	
Approach LOS	B			E	A	

Intersection Summary				
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	63.7%	ICU Level of Service	B	
Analysis Period (min)	15			

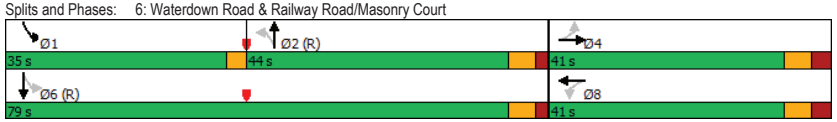
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	5	95	5	5	815	100	1080
Future Volume (vph)	10	5	95	5	5	815	100	1080
Lane Group Flow (vph)	0	25	120	284	6	1070	127	1380
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	29.0	29.0	35.0	35.0	11.0	35.0
Total Split (s)	41.0	41.0	41.0	41.0	44.0	44.0	35.0	79.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	36.7%	36.7%	29.2%	65.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)		6.0	6.0	6.0	5.0	5.0	2.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
v/c Ratio		0.35	0.63	0.61	0.03	0.47	0.31	0.52
Control Delay		49.7	62.0	11.4	5.2	5.2	4.4	4.4
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		49.7	62.0	11.4	5.2	5.2	4.4	4.4
Queue Length 50th (m)		4.3	28.4	1.3	0.2	25.4	4.4	31.5
Queue Length 95th (m)		11.0	39.7	13.8	m0.6	m30.8	7.1	43.6
Internal Link Dist (m)		95.0		120.3		324.2		353.3
Turn Bay Length (m)			25.0		35.0		45.0	
Base Capacity (vph)		139	389	657	180	2273	665	2662
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.18	0.31	0.43	0.03	0.47	0.19	0.52

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Waterdown Road & Railway Road/Masonry Court



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	95	5	220	5	815	30	100	1080	10
Future Volume (vph)	10	5	5	95	5	220	5	815	30	100	1080	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0		6.0	6.0		5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196		1711	1581		1353	3417		1694	3479	
Flt Permitted		0.38		0.74	1.00		0.19	1.00		0.22	1.00	
Satd. Flow (perm)		462		1334	1581		272	3417		387	3479	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	120	6	278	6	1032	38	127	1367	13
RTOR Reduction (vph)	0	5	0	0	238	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	20	0	120	46	0	6	1069	0	127	1380	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.2		16.2	16.2		78.8	78.8		90.8	90.8	
Effective Green, g (s)		17.2		17.2	17.2		79.8	79.8		91.8	91.8	
Actuated g/C Ratio		0.14		0.14	0.14		0.66	0.66		0.76	0.76	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		66		191	226		180	2272		404	2661	
v/s Ratio Prot					0.03			0.31		0.03	c0.40	
v/s Ratio Perm		0.04		c0.09			0.02			0.21		
v/c Ratio		0.30		0.63	0.20		0.03	0.47		0.31	0.52	
Uniform Delay, d1		46.0		48.4	45.4		6.9	9.8		4.9	5.5	
Progression Factor		1.00		1.00	1.00		0.51	0.43		0.75	0.61	
Incremental Delay, d2		2.6		6.3	0.4		0.3	0.5		0.4	0.7	
Delay (s)		48.6		54.7	45.8		3.8	4.8		4.1	4.0	
Level of Service		D		D	D		A	A		A	A	
Approach Delay (s)		48.6			48.4			4.8			4.0	
Approach LOS		D			D			A			A	

Intersection Summary

HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.55				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	64.0%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	80	55	15	240	0	75	0	15	0	0	0
Future Volume (Veh/h)	0	80	55	15	240	0	75	0	15	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	0	98	67	18	293	0	91	0	18	0	0	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)		144										
pX, platoon unblocked												
vC, conflicting volume	293			165			460	460	132	478	494	293
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			165			460	460	132	478	494	293
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			82	100	98	100	100	100
cM capacity (veh/h)	1280			1426			501	494	889	486	473	751

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	165	311	109	0
Volume Left	0	18	91	0
Volume Right	67	0	18	0
cSH	1280	1426	540	1700
Volume to Capacity	0.00	0.01	0.20	0.00
Queue Length 95th (m)	0.0	0.3	6.0	0.0
Control Delay (s)	0.0	0.5	13.3	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	0.5	13.3	0.0
Approach LOS			B	A

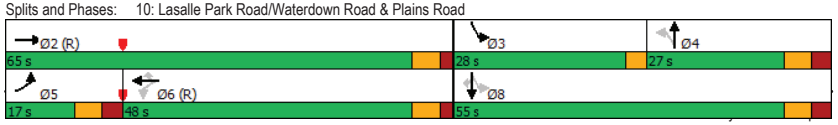
Intersection Summary					
Average Delay			2.8		
Intersection Capacity Utilization			36.1%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	265	630	85	1200	340	140	245	425	315	440
Future Volume (vph)	265	630	85	1200	340	140	245	425	315	440
Lane Group Flow (vph)	273	737	88	1237	351	144	330	438	325	454
Turn Type	Prot	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases			6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0
Minimum Split (s)	13.0	27.0	27.0	27.0	27.0	34.0	34.0	9.0	34.0	34.0
Total Split (s)	17.0	65.0	48.0	48.0	48.0	27.0	27.0	28.0	55.0	55.0
Total Split (%)	14.2%	54.2%	40.0%	40.0%	40.0%	22.5%	22.5%	23.3%	45.8%	45.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	5.0	5.0	5.0	5.0	6.0	6.0	2.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.95	0.42	0.39	0.98	0.49	0.82	1.03	1.00	0.42	0.62
Control Delay	96.5	19.4	34.9	58.4	9.3	81.7	104.8	78.6	30.3	21.7
Queue Delay	0.0	0.0	0.0	40.7	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	96.5	19.4	34.9	99.1	9.4	81.7	104.8	78.6	30.3	21.7
Queue Length 50th (m)	35.3	57.5	16.1	157.9	12.3	34.7	~85.0	102.8	58.6	47.8
Queue Length 95th (m)	#62.8	73.3	32.6	#207.6	38.4	#71.7	#145.3	#161.2	107.4	114.3
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	287	1739	228	1268	717	176	321	440	775	738
Starvation Cap Reductn	0	0	0	192	45	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.42	0.39	1.15	0.52	0.82	1.03	1.00	0.42	0.62

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 125
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Lasalle Park Road/Waterdown Road & Plains Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	630	85	85	1200	340	140	245	75	425	315	440
Future Volume (vph)	265	630	85	85	1200	340	140	245	75	425	315	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3134	3461		1629	3539	1507	1694	1785		1710	1900	1493
Flt Permitted	0.95	1.00		0.37	1.00	1.00	0.56	1.00		0.17	1.00	1.00
Satd. Flow (perm)	3134	3461		637	3539	1507	1006	1785		313	1900	1493
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	273	649	88	88	1237	351	144	253	77	438	325	454
RTOR Reduction (vph)	0	9	0	0	0	178	0	9	0	0	0	128
Lane Group Flow (vph)	273	728	0	88	1237	173	144	321	0	438	325	326
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	10.0	59.0		42.0	42.0	42.0	20.0	20.0		48.0	48.0	48.0
Effective Green, g (s)	11.0	60.0		43.0	43.0	43.0	21.0	21.0		49.0	49.0	49.0
Actuated g/C Ratio	0.09	0.50		0.36	0.36	0.36	0.18	0.18		0.41	0.41	0.41
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	287	1730		228	1268	540	176	312		430	775	609
v/s Ratio Prot	c0.09	0.21			c0.35			c0.18		c0.22	0.17	
v/s Ratio Perm				0.14		0.11	0.14			0.19		0.22
v/c Ratio	0.95	0.42		0.39	0.98	0.32	0.82	1.03		1.02	0.42	0.53
Uniform Delay, d1	54.2	19.0		28.7	38.0	27.9	47.7	49.5		34.9	25.3	26.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.25	1.12	1.29
Incremental Delay, d2	39.9	0.8		4.9	20.1	1.6	24.6	58.5		45.5	0.3	0.8
Delay (s)	94.2	19.8		33.5	58.0	29.5	72.3	108.0		89.2	28.7	35.5
Level of Service	F	B		C	E	C	E	F		F	C	D
Approach Delay (s)		39.9			50.8			97.2			53.0	
Approach LOS		D			D			F			D	

Intersection Summary				
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	100.1%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	55	1085	1625	70
Future Volume (vph)	55	1085	1625	70
Lane Group Flow (vph)	57	1119	1721	144
Turn Type	pm+pt	NA	NA	Perm
Protected Phases	5	2	6	
Permitted Phases	2			8
Detector Phase	5	2	6	8
Switch Phase				
Minimum Initial (s)	6.0	8.0	8.0	8.0
Minimum Split (s)	9.0	26.0	26.0	29.0
Total Split (s)	16.0	78.0	62.0	32.0
Total Split (%)	14.5%	70.9%	56.4%	29.1%
Yellow Time (s)	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None
v/c Ratio	0.25	0.43	0.74	0.60
Control Delay	5.5	5.5	14.6	41.7
Queue Delay	0.0	0.6	0.0	0.0
Total Delay	5.5	6.1	14.6	41.7
Queue Length 50th (m)	2.0	38.0	119.5	21.7
Queue Length 95th (m)	5.9	62.1	185.8	40.6
Internal Link Dist (m)		135.9	121.0	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	316	2584	2312	414
Starvation Cap Reductn	0	961	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.69	0.74	0.35

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 11: Plains Road & Cooke Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	1085	1625	45	70	70
Future Volume (vph)	55	1085	1625	45	70	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.93	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1687	3374	3317		1615	
Flt Permitted	0.08	1.00	1.00		0.98	
Satd. Flow (perm)	150	3374	3317		1615	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1119	1675	46	72	72
RTOR Reduction (vph)	0	0	1	0	38	0
Lane Group Flow (vph)	57	1119	1720	0	106	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	83.3	83.3	75.1		12.7	
Effective Green, g (s)	84.3	84.3	76.1		13.7	
Actuated g/C Ratio	0.77	0.77	0.69		0.12	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	201	2585	2294		201	
v/s Ratio Prot	0.02	c0.33	c0.52			
v/s Ratio Perm	0.20				c0.07	
v/c Ratio	0.28	0.43	0.75		0.53	
Uniform Delay, d1	8.6	4.5	10.9		45.1	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.8	0.5	2.3		2.5	
Delay (s)	9.3	5.0	13.2		47.6	
Level of Service	A	A	B		D	
Approach Delay (s)		5.2	13.2		47.6	
Approach LOS		A	B		D	

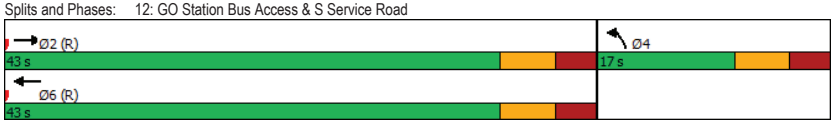
Intersection Summary				
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	64.5%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	965	295	15
Future Volume (vph)	965	295	15
Lane Group Flow (vph)	1048	314	16
Turn Type	NA	NA	Prot
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	4
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	15.0
Total Split (s)	43.0	43.0	17.0
Total Split (%)	71.7%	71.7%	28.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Min	None
v/c Ratio	0.33	0.09	0.12
Control Delay	1.5	0.8	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	1.5	0.8	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	34.3	8.9	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3155	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	108	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.34	0.09	0.10

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

Splits and Phases: 12: GO Station Bus Access & S Service Road





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	965	20	0	295	15	0
Future Volume (vph)	965	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3404			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3404			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1027	21	0	314	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1047	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2564			2719	42	
v/s Ratio Prot	c0.31			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.41			0.12	0.38	
Uniform Delay, d1	2.6			2.0	27.8	
Progression Factor	0.77			0.57	1.00	
Incremental Delay, d2	0.5			0.1	5.7	
Delay (s)	2.5			1.2	33.4	
Level of Service	A			A	C	
Approach Delay (s)	2.5			1.2	33.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	2.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	295	526	232	468	1095	121	758
v/c Ratio	0.60	0.96	0.39	0.63	0.76	0.44	0.68
Control Delay	38.7	68.7	5.9	19.4	25.6	16.3	33.0
Queue Delay	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Total Delay	38.7	68.7	5.9	19.4	26.2	16.3	33.0
Queue Length 50th (m)	57.0	117.4	0.0	34.2	83.4	10.5	71.6
Queue Length 95th (m)	87.0	#188.2	18.1	m45.1	131.4	18.6	103.1
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	493	547	597	1007	1453	281	1113
Starvation Cap Reductn	0	0	0	0	116	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.96	0.39	0.46	0.82	0.43	0.68

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	280	500	220	445	835	205	115	570	150
Future Volume (vph)	0	0	0	280	500	220	445	835	205	115	570	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	6.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3078		1601	3041	
Flt Permitted				0.95	1.00	1.00	0.21	1.00		0.20	1.00	
Satd. Flow (perm)				1616	1792	1426	675	3078		335	3041	
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	0	295	526	232	468	879	216	121	600	158
RTOR Reduction (vph)	0	0	0	0	0	161	0	20	0	0	19	0
Lane Group Flow (vph)	0	0	0	295	526	71	468	1075	0	121	739	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				32.6	32.6	32.6	61.4	50.0		47.0	38.6	
Effective Green, g (s)				33.6	33.6	33.6	62.4	51.0		49.0	39.6	
Actuated g/C Ratio				0.31	0.31	0.31	0.57	0.46		0.45	0.36	
Clearance Time (s)				8.0	8.0	8.0	7.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				493	547	435	741	1427		257	1094	
v/s Ratio Prot				0.18	c0.29		c0.10	c0.35		0.04	0.24	
v/s Ratio Perm						0.05	0.26			0.17		
v/c Ratio				0.60	0.96	0.16	0.63	0.75		0.47	0.68	
Uniform Delay, d1				32.5	37.6	27.9	15.0	24.3		18.8	29.8	
Progression Factor				1.00	1.00	1.00	1.40	0.95		1.00	1.00	
Incremental Delay, d2				2.0	28.9	0.2	1.4	2.9		1.4	3.4	
Delay (s)				34.4	66.4	28.1	22.3	26.0		20.2	33.1	
Level of Service				C	E	C	C	C		C	C	
Approach Delay (s)		0.0			49.0			24.9			31.3	
Approach LOS		A			D			C			C	

Intersection Summary

HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	6	381	369	1330	966
v/c Ratio	0.03	0.69	0.82	0.59	0.40
Control Delay	0.2	49.0	32.6	12.0	7.4
Queue Delay	0.0	0.0	0.3	0.2	0.4
Total Delay	0.2	49.0	32.8	12.2	7.8
Queue Length 50th (m)	0.0	41.8	32.9	79.6	33.3
Queue Length 95th (m)	0.0	56.7	#75.9	73.0	49.9
Internal Link Dist (m)	106.5			174.0	121.9
Turn Bay Length (m)		145.0	115.0		
Base Capacity (vph)	290	605	471	2270	2433
Starvation Cap Reductn	0	0	0	243	842
Spillback Cap Reductn	0	0	6	93	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.63	0.79	0.66	0.61

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	335	0	325	5	1165	0	0	850	0
Future Volume (vph)	0	0	5	335	0	325	5	1165	0	0	850	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3300			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	381	0	369	6	1324	0	0	966	0
RTOR Reduction (vph)	0	6	0	0	0	181	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	381	0	188	0	1330	0	0	966	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		18.4		18.4		69.0			69.0	
Effective Green, g (s)		2.6		19.4		19.4		70.0			70.0	
Actuated g/C Ratio		0.02		0.18		0.18		0.64			0.64	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		38		558		270		2100			2252	
v/s Ratio Prot		c0.00		0.12		c0.12					0.27	
v/s Ratio Perm								c0.40				
v/c Ratio		0.00		0.68		0.70		0.63			0.43	
Uniform Delay, d1		52.4		42.4		42.5		12.2			10.0	
Progression Factor		1.00		1.00		1.00		1.06			0.82	
Incremental Delay, d2		0.0		3.4		7.6		1.2			0.5	
Delay (s)		52.5		45.9		50.1		14.1			8.7	
Level of Service		D		D		D		B			A	
Approach Delay (s)		52.5			47.9			14.1			8.7	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	264	107	382	56	292	758	433	416	921
v/c Ratio	0.77	0.17	0.65	0.43	0.68	0.55	0.28	0.55	0.50
Control Delay	57.1	23.1	28.6	54.9	13.8	22.4	0.4	19.2	24.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.1	23.1	28.6	54.9	13.8	22.4	0.4	19.2	24.9
Queue Length 50th (m)	56.2	16.3	58.6	12.1	0.0	82.7	0.0	33.7	87.5
Queue Length 95th (m)	83.2	25.4	80.4	23.9	23.8	89.2	0.0	33.5	86.1
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	392	806	715	202	504	1372	1568	772	1859
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.13	0.53	0.28	0.58	0.55	0.28	0.54	0.50

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	95	340	50	0	260	0	675	385	370	820	0
Future Volume (vph)	235	95	340	50	0	260	0	675	385	370	820	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	7.0	7.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	3255	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.24	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	824	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	264	107	382	56	0	292	0	758	433	416	921	0
RTOR Reduction (vph)	0	0	44	0	0	260	0	0	0	0	0	0
Lane Group Flow (vph)	264	107	338	56	0	32	0	758	433	416	921	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	21.0	38.2	38.2	11.2		11.2		41.7	110.0	56.8	56.8	
Effective Green, g (s)	22.0	39.2	39.2	12.2		12.2		42.7	110.0	57.8	57.8	
Actuated g/C Ratio	0.20	0.36	0.36	0.11		0.11		0.39	1.00	0.53	0.53	
Clearance Time (s)	7.0	8.0	8.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	342	645	542	129		168		1373	1568	722	1859	
v/s Ratio Prot	c0.15	0.06				0.02		c0.21		c0.07	0.26	
v/s Ratio Perm			c0.22	0.05					0.28	0.23		
v/c Ratio	0.77	0.17	0.62	0.43		0.19		0.55	0.28	0.58	0.50	
Uniform Delay, d1	41.6	24.2	29.3	45.7		44.4		26.2	0.0	15.8	16.7	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.74	1.00	1.24	1.32	
Incremental Delay, d2	10.3	0.1	2.2	2.3		0.6		1.4	0.4	1.0	0.9	
Delay (s)	52.0	24.3	31.5	48.0		45.0		20.8	0.4	20.5	23.0	
Level of Service	D	C	C	D		D		C	A	C	C	
Approach Delay (s)		37.7			45.5			13.4			22.3	
Approach LOS		D			D			B			C	

Intersection Summary

HCM 2000 Control Delay	24.8	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.63				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	63.3%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBR	NBT
Lane Group Flow (vph)	917	19	301
v/c Ratio	0.77	0.02	0.80
Control Delay	20.2	2.2	60.7
Queue Delay	0.7	0.0	0.0
Total Delay	20.8	2.2	60.7
Queue Length 50th (m)	137.5	0.0	70.6
Queue Length 95th (m)	187.6	1.0	83.6
Internal Link Dist (m)	190.8		55.4
Turn Bay Length (m)			
Base Capacity (vph)	1186	1124	439
Starvation Cap Reductn	71	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.82	0.02	0.69

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	715	15	205	30	0	0
Future Volume (vph)	715	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	917	19	263	38	0	0
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	917	13	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	83.0	83.0		24.0		
Effective Green, g (s)	84.0	84.0		25.0		
Actuated g/C Ratio	0.70	0.70		0.21		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1185	1117		379		
v/s Ratio Prot	c0.54			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.77	0.01		0.79		
Uniform Delay, d1	11.8	5.4		45.1		
Progression Factor	1.13	0.77		1.00		
Incremental Delay, d2	4.8	0.0		10.9		
Delay (s)	18.1	4.2		56.0		
Level of Service	B	A		E		
Approach Delay (s)	17.9			56.0	0.0	
Approach LOS	B			E	A	

Intersection Summary				
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	61.7%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	955	25	0	1210
Future Volume (Veh/h)	0	110	955	25	0	1210
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	1038	27	0	1315
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.91	0.83			0.83	
vC, conflicting volume	1709	532			1065	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	784	30			671	
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	86			100	
cM capacity (veh/h)	305	867			772	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	692	373	658	658
Volume Left	0	0	0	0	0
Volume Right	120	0	27	0	0
cSH	867	1700	1700	1700	1700
Volume to Capacity	0.14	0.41	0.22	0.39	0.39
Queue Length 95th (m)	3.8	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		0.5		
Intersection Capacity Utilization		40.7%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	25	126	335	6	930	399	1133
v/c Ratio	0.15	0.63	0.63	0.03	0.54	0.68	0.44
Control Delay	32.6	56.3	9.8	21.0	20.9	15.7	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	56.3	9.8	21.0	20.9	15.7	11.4
Queue Length 50th (m)	3.8	27.0	0.0	0.5	81.6	47.5	73.4
Queue Length 95th (m)	9.5	37.6	12.2	m2.1	109.6	61.5	89.1
Internal Link Dist (m)	95.0	120.3			324.2		93.2
Turn Bay Length (m)				35.0		45.0	
Base Capacity (vph)	252	317	645	179	1712	681	2584
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.40	0.52	0.03	0.54	0.59	0.44

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

HCM Signalized Intersection Capacity Analysis
6: Waterdown Road & Railway Road/Masonry Court

1120 Cooke Boulevard
PM Peak Hour



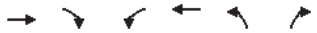
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	95	5	265	5	705	30	315	885	10
Future Volume (vph)	10	5	5	95	5	265	5	705	30	315	885	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196			1719	1599	1353	3413		1694	3473	
Flt Permitted		0.82			0.72	1.00	0.25	1.00		0.21	1.00	
Satd. Flow (perm)		1011			1293	1599	357	3413		380	3473	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	120	6	335	6	892	38	399	1120	13
RTOR Reduction (vph)	0	5	0	0	0	283	0	2	0	0	1	0
Lane Group Flow (vph)	0	20	0	0	126	52	6	928	0	399	1132	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		16.1			16.1	16.1	54.1	54.1		80.9	80.9	
Effective Green, g (s)		17.1			17.1	17.1	55.1	55.1		81.9	81.9	
Actuated g/C Ratio		0.16			0.16	0.16	0.50	0.50		0.74	0.74	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		157			201	248	178	1709		579	2585	
v/s Ratio Prot								c0.27		c0.16	0.33	
v/s Ratio Perm		0.02			c0.10	0.03	0.02			0.36		
v/c Ratio		0.13			0.63	0.21	0.03	0.54		0.69	0.44	
Uniform Delay, d1		40.0			43.5	40.6	13.9	18.8		10.7	5.3	
Progression Factor		1.00			1.00	1.00	0.98	0.92		1.18	1.82	
Incremental Delay, d2		0.4			6.0	0.4	0.3	1.1		3.2	0.5	
Delay (s)		40.4			49.4	41.0	14.0	18.4		15.7	10.2	
Level of Service		D			D	D	B	B		B	B	
Approach Delay (s)		40.4			43.3			18.4			11.6	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	59.9%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
7: Cooke Boulevard & Site Driveway (East)

1120 Cooke Boulevard
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	15	0	225	30
Future Volume (Veh/h)	0	50	15	0	225	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	16	0	245	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		32	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		32	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	97
cM capacity (veh/h)			1564		977	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	16	278
Volume Left	0	16	245
Volume Right	54	0	33
cSH	1700	1564	989
Volume to Capacity	0.03	0.01	0.28
Queue Length 95th (m)	0.0	0.2	9.3
Control Delay (s)	0.0	7.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.1
Approach LOS			B

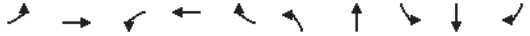
Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	185	110	55	25	260	0	75	70	40	0	40	25
Future Volume (Veh/h)	185	110	55	25	260	0	75	70	40	0	40	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	226	134	67	30	317	0	91	85	49	0	49	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	317			201			1051	996	168	1088	1030	317
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317			107			1018	960	71	1058	996	317
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 %	82			98			30	56	95	100	73	96
cM capacity (veh/h)	1255			1396			129	193	897	102	184	728

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	427	347	225	79
Volume Left	226	30	91	0
Volume Right	67	0	49	30
cSH	1255	1396	188	257
Volume to Capacity	0.18	0.02	1.20	0.31
Queue Length 95th (m)	5.2	0.5	94.4	10.1
Control Delay (s)	5.3	0.8	179.9	25.1
Lane LOS	A	A	F	D
Approach Delay (s)	5.3	0.8	179.9	25.1
Approach LOS			F	D

Intersection Summary				
Average Delay			41.8	
Intersection Capacity Utilization			61.4%	ICU Level of Service
Analysis Period (min)			15	



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	227	634	72	1036	330	119	268	371	268	376
v/c Ratio	0.63	0.34	0.26	0.74	0.41	0.57	0.74	0.92	0.38	0.54
Control Delay	55.1	14.8	14.6	21.8	3.4	49.9	51.4	60.5	26.7	16.0
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	14.8	14.6	22.3	3.4	49.9	51.4	60.5	26.7	16.0
Queue Length 50th (m)	25.1	39.4	9.2	106.9	16.4	24.4	54.5	75.2	50.1	39.9
Queue Length 95th (m)	#42.5	51.9	m6.8	73.3	7.7	41.6	78.6	#156.6	76.3	73.6
Internal Link Dist (m)		134.8		131.0			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	361	1881	294	1479	823	269	464	402	710	701
Starvation Cap Reductn	0	0	0	145	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.34	0.24	0.78	0.40	0.44	0.58	0.92	0.38	0.54

Intersection Summary	
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis — 1120 Cooke Boulevard
10: Lasalle Park Road/Waterdown Road & Plains Road — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	545	70	70	1005	320	115	200	60	360	260	365
Future Volume (vph)	220	545	70	70	1005	320	115	200	60	360	260	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	2.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3134	3466		1628	3539	1509	1694	1785		1709	1900	1492
Flt Permitted	0.95	1.00		0.41	1.00	1.00	0.59	1.00		0.31	1.00	1.00
Satd. Flow (perm)	3134	3466		705	3539	1509	1059	1785		553	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	227	562	72	72	1036	330	119	206	62	371	268	376
RTOR Reduction (vph)	0	9	0	0	0	199	0	10	0	0	0	144
Lane Group Flow (vph)	227	625	0	72	1036	131	119	258	0	371	268	232
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	11.6	57.3		42.7	42.7	42.7	20.7	20.7		39.7	39.7	39.7
Effective Green, g (s)	12.6	58.3		43.7	43.7	43.7	21.7	21.7		40.7	40.7	40.7
Actuated g/C Ratio	0.11	0.53		0.40	0.40	0.40	0.20	0.20		0.37	0.37	0.37
Clearance Time (s)	3.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	358	1836		280	1405	599	208	352		383	703	552
v/s Ratio Prot	c0.07	0.18			c0.29			c0.14		c0.15	0.14	
v/s Ratio Perm				0.10		0.09	0.11			0.21		0.16
v/c Ratio	0.63	0.34		0.26	0.74	0.22	0.57	0.73		0.97	0.38	0.42
Uniform Delay, d1	46.5	14.8		22.3	28.3	21.9	39.9	41.4		30.1	25.4	25.8
Progression Factor	1.00	1.00		0.57	0.68	0.98	1.00	1.00		1.11	0.96	1.25
Incremental Delay, d2	3.6	0.5		1.6	2.5	0.6	3.8	7.6		35.5	0.3	0.5
Delay (s)	50.1	15.3		14.3	21.7	22.1	43.7	49.1		68.9	24.8	32.8
Level of Service	D	B		B	C	C	D	D		E	C	C
Approach Delay (s)		24.5			21.4			47.4			43.9	
Approach LOS		C			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	85.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — 1120 Cooke Boulevard
11: Plains Road & Cooke Boulevard — PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	77	928	1547	196
v/c Ratio	0.32	0.37	0.71	0.70
Control Delay	7.9	5.0	15.3	46.3
Queue Delay	0.0	0.2	0.0	0.0
Total Delay	7.9	5.1	15.3	46.3
Queue Length 50th (m)	1.8	25.2	112.3	34.7
Queue Length 95th (m)	m8.1	m53.6	159.9	57.7
Internal Link Dist (m)		131.0	132.7	314.4
Turn Bay Length (m)	60.0			
Base Capacity (vph)	237	2479	2189	365
Starvation Cap Reductn	0	637	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.32	0.50	0.71	0.54

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



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	900	1380	120	105	85
Future Volume (vph)	75	900	1380	120	105	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3284		1620	
Flt Permitted	0.11	1.00	1.00		0.97	
Satd. Flow (perm)	181	3374	3284		1620	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	928	1423	124	108	88
RTOR Reduction (vph)	0	0	5	0	29	0
Lane Group Flow (vph)	77	928	1542	0	167	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	79.8	79.8	71.5		16.2	
Effective Green, g (s)	80.8	80.8	72.5		17.2	
Actuated g/C Ratio	0.73	0.73	0.66		0.16	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	215	2478	2164		253	
v/s Ratio Prot	0.02	c0.28	c0.47			
v/s Ratio Perm	0.24				c0.10	
v/c Ratio	0.36	0.37	0.71		0.66	
Uniform Delay, d1	8.6	5.3	12.1		43.7	
Progression Factor	1.30	0.78	1.00		0.93	
Incremental Delay, d2	0.9	0.4	2.0		6.3	
Delay (s)	12.0	4.6	14.1		47.1	
Level of Service	B	A	B		D	
Approach Delay (s)		5.1	14.1		47.1	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	71.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	1010	314	16
v/c Ratio	0.32	0.09	0.12
Control Delay	2.0	0.8	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	2.0	0.8	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	38.0	9.3	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3153	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	107	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.33	0.09	0.10

Intersection Summary



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	930	20	0	295	15	0
Future Volume (vph)	930	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3402			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3402			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	989	21	0	314	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1009	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2562			2719	42	
v/s Ratio Prot	c0.30			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.39			0.12	0.38	
Uniform Delay, d1	2.6			2.0	27.8	
Progression Factor	1.00			0.58	1.00	
Incremental Delay, d2	0.5			0.1	5.7	
Delay (s)	3.1			1.2	33.4	
Level of Service	A			A	C	
Approach Delay (s)	3.1			1.2	33.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	3.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	295	526	232	511	1105	121	832
v/c Ratio	0.60	0.96	0.39	0.69	0.74	0.44	0.75
Control Delay	38.2	67.7	5.8	24.6	23.5	16.8	36.4
Queue Delay	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Total Delay	38.2	67.7	5.8	24.6	24.1	16.8	36.4
Queue Length 50th (m)	56.2	115.8	0.0	36.4	92.2	10.5	84.0
Queue Length 95th (m)	85.8	#184.3	17.8	m55.4	119.7	18.6	#130.7
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	499	553	601	946	1500	283	1107
Starvation Cap Reductn	0	0	0	0	132	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.95	0.39	0.54	0.81	0.43	0.75

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	280	500	220	485	845	205	115	640	150
Future Volume (vph)	0	0	0	280	500	220	485	845	205	115	640	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	6.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3079		1601	3050	
Flt Permitted				0.95	1.00	1.00	0.17	1.00		0.21	1.00	
Satd. Flow (perm)				1616	1792	1426	539	3079		349	3050	
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	0	295	526	232	511	889	216	121	674	158
RTOR Reduction (vph)	0	0	0	0	0	161	0	19	0	0	16	0
Lane Group Flow (vph)	0	0	0	295	526	71	511	1086	0	121	816	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				32.7	32.7	32.7	63.3	51.9		46.8	38.4	
Effective Green, g (s)				33.7	33.7	33.7	64.3	52.9		48.8	39.4	
Actuated g/C Ratio				0.31	0.31	0.31	0.58	0.48		0.44	0.36	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				495	549	436	741	1480		261	1092	
v/s Ratio Prot				0.18	c0.29		c0.12	c0.35		0.04	0.27	
v/s Ratio Perm						0.05	0.28			0.17		
v/c Ratio				0.60	0.96	0.16	0.69	0.73		0.46	0.75	
Uniform Delay, d1				32.4	37.5	27.9	15.9	22.9		18.8	30.9	
Progression Factor				1.00	1.00	1.00	1.52	0.92		1.00	1.00	
Incremental Delay, d2				1.9	27.8	0.2	2.0	2.5		1.3	4.7	
Delay (s)				34.3	65.3	28.0	26.1	23.6		20.1	35.6	
Level of Service				C	E	C	C	C		C	D	
Approach Delay (s)		0.0			48.4			24.4			33.6	
Approach LOS		A			D			C			C	

Intersection Summary

HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	6	403	392	1364	1045
v/c Ratio	0.03	0.67	0.84	0.61	0.44
Control Delay	0.2	47.0	35.3	14.3	10.2
Queue Delay	0.0	0.0	0.3	0.2	0.4
Total Delay	0.2	47.0	35.6	14.5	10.7
Queue Length 50th (m)	0.0	42.9	38.6	90.8	63.6
Queue Length 95th (m)	0.0	60.0	#89.3	78.1	49.7
Internal Link Dist (m)	106.5			174.0	121.9
Turn Bay Length (m)		145.0	115.0		
Base Capacity (vph)	290	640	484	2220	2383
Starvation Cap Reductn	0	0	0	206	752
Spillback Cap Reductn	0	0	5	78	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.63	0.82	0.68	0.64

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	355	0	345	5	1195	0	0	920	0
Future Volume (vph)	0	0	5	355	0	345	5	1195	0	0	920	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3299			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	403	0	392	6	1358	0	0	1045	0
RTOR Reduction (vph)	0	6	0	0	0	176	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	403	0	216	0	1364	0	0	1045	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		19.9		19.9		67.5			67.5	
Effective Green, g (s)		2.6		20.9		20.9		68.5			68.5	
Actuated g/C Ratio		0.02		0.19		0.19		0.62			0.62	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		38		601		291		2054			2203	
v/s Ratio Prot		c0.00		0.13		c0.14					0.30	
v/s Ratio Perm								c0.41				
v/c Ratio		0.00		0.67		0.74		0.66			0.47	
Uniform Delay, d1		52.4		41.4		42.0		13.3			11.1	
Progression Factor		1.00		1.00		1.00		1.15			1.03	
Incremental Delay, d2		0.0		2.9		9.8		1.4			0.6	
Delay (s)		52.5		44.3		51.8		16.7			12.0	
Level of Service		D		D		D		B			B	
Approach Delay (s)		52.5			48.0			16.7			12.0	
Approach LOS		D			D			B			B	

Intersection Summary

HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	281	107	410	56	292	792	466	444	994
v/c Ratio	0.80	0.16	0.67	0.42	0.70	0.60	0.30	0.61	0.54
Control Delay	58.1	21.7	28.5	54.2	15.8	22.8	0.4	22.4	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	21.7	28.5	54.2	15.8	22.8	0.4	22.4	27.0
Queue Length 50th (m)	59.7	15.7	63.4	12.1	2.9	88.7	0.0	39.6	99.7
Queue Length 95th (m)	87.9	24.1	84.3	23.6	27.4	98.6	0.0	42.5	126.0
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	404	855	755	212	504	1317	1568	731	1829
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.13	0.54	0.26	0.58	0.60	0.30	0.61	0.54

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	95	365	50	0	260	0	705	415	395	885	0
Future Volume (vph)	250	95	365	50	0	260	0	705	415	395	885	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	3255	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.21	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	735	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	281	107	410	56	0	292	0	792	466	444	994	0
RTOR Reduction (vph)	0	0	43	0	0	247	0	0	0	0	0	0
Lane Group Flow (vph)	281	107	367	56	0	45	0	792	466	444	994	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	21.7	40.1	40.1	11.4		11.4		40.0	110.0	55.9	55.9	
Effective Green, g (s)	22.7	41.1	41.1	12.4		12.4		41.0	110.0	56.9	56.9	
Actuated g/C Ratio	0.21	0.37	0.37	0.11		0.11		0.37	1.00	0.52	0.52	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	353	676	568	131		171		1319	1568	698	1830	
v/s Ratio Prot	c0.16	0.06				0.03		c0.22		c0.08	0.28	
v/s Ratio Perm			c0.24	0.05					0.30	0.25		
v/c Ratio	0.80	0.16	0.65	0.43		0.27		0.60	0.30	0.64	0.54	
Uniform Delay, d1	41.5	22.9	28.4	45.5		44.6		27.9	0.0	16.9	17.8	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.70	1.00	1.36	1.34	
Incremental Delay, d2	11.7	0.1	2.5	2.2		0.8		1.8	0.4	1.7	1.0	
Delay (s)	53.2	23.0	31.0	47.7		45.5		21.2	0.4	24.6	24.9	
Level of Service	D	C	C	D		D		C	A	C	C	
Approach Delay (s)		37.7			45.8			13.5			24.8	
Approach LOS		D			D			B			C	

Intersection Summary

HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT
Lane Group Flow (vph)	987	19	301
v/c Ratio	0.83	0.02	0.82
Control Delay	22.3	2.0	63.8
Queue Delay	1.3	0.0	0.0
Total Delay	23.7	2.0	63.8
Queue Length 50th (m)	163.5	0.0	70.5
Queue Length 95th (m)	202.0	0.9	85.6
Internal Link Dist (m)	190.8		55.4
Turn Bay Length (m)			
Base Capacity (vph)	1196	1133	409
Starvation Cap Reductn	78	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.88	0.02	0.74

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	770	15	205	30	0	0
Future Volume (vph)	770	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	987	19	263	38	0	0
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	987	13	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	83.7	83.7		23.3		
Effective Green, g (s)	84.7	84.7		24.3		
Actuated g/C Ratio	0.71	0.71		0.20		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1195	1127		368		
v/s Ratio Prot	c0.58			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.83	0.01		0.82		
Uniform Delay, d1	12.5	5.2		45.7		
Progression Factor	1.13	0.78		1.00		
Incremental Delay, d2	6.3	0.0		13.2		
Delay (s)	20.4	4.1		58.9		
Level of Service	C	A		E		
Approach Delay (s)	20.1			58.9	0.0	
Approach LOS	C			E	A	

Intersection Summary				
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	64.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	1015	25	0	1300
Future Volume (Veh/h)	0	110	1015	25	0	1300
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	1103	27	0	1413
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.90	0.80			0.80	
vC, conflicting volume	1823	565			1130	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	754	0			676	
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	86			100	
cM capacity (veh/h)	313	878			744	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	735	395	706	706
Volume Left	0	0	0	0	0
Volume Right	120	0	27	0	0
cSH	878	1700	1700	1700	1700
Volume to Capacity	0.14	0.43	0.23	0.42	0.42
Queue Length 95th (m)	3.8	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		0.4		
Intersection Capacity Utilization		42.3%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	25	126	335	6	1006	399	1247
v/c Ratio	0.15	0.63	0.63	0.04	0.60	0.70	0.48
Control Delay	32.5	56.1	9.8	23.8	24.3	17.5	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	56.1	9.8	23.8	24.3	17.5	12.3
Queue Length 50th (m)	3.8	27.0	0.0	0.5	100.7	50.1	85.7
Queue Length 95th (m)	9.5	37.6	12.1	m2.2	125.8	66.5	103.0
Internal Link Dist (m)	95.0	120.3			324.2		93.2
Turn Bay Length (m)				35.0		45.0	
Base Capacity (vph)	271	340	668	156	1680	647	2584
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.37	0.50	0.04	0.60	0.62	0.48

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

HCM Signalized Intersection Capacity Analysis
6: Waterdown Road & Railway Road/Masonry Court

1120 Cooke Boulevard
PM Peak Hour



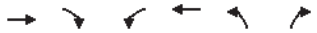
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	95	5	265	5	765	30	315	975	10
Future Volume (vph)	10	5	5	95	5	265	5	765	30	315	975	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196			1719	1599	1353	3415		1694	3476	
Flt Permitted		0.82			0.72	1.00	0.22	1.00		0.18	1.00	
Satd. Flow (perm)		1012			1293	1599	319	3415		324	3476	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	120	6	335	6	968	38	399	1234	13
RTOR Reduction (vph)	0	5	0	0	0	283	0	2	0	0	1	0
Lane Group Flow (vph)	0	20	0	0	126	52	6	1004	0	399	1246	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		16.2			16.2	16.2	53.1	53.1		80.8	80.8	
Effective Green, g (s)		17.2			17.2	17.2	54.1	54.1		81.8	81.8	
Actuated g/C Ratio		0.16			0.16	0.16	0.49	0.49		0.74	0.74	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		158			202	250	156	1679		561	2584	
v/s Ratio Prot								c0.29		c0.17	0.36	
v/s Ratio Perm		0.02			c0.10	0.03	0.02			0.36		
v/c Ratio		0.13			0.62	0.21	0.04	0.60		0.71	0.48	
Uniform Delay, d1		39.9			43.4	40.5	14.5	20.1		15.3	5.6	
Progression Factor		1.00			1.00	1.00	1.06	0.99		0.99	1.85	
Incremental Delay, d2		0.4			5.9	0.4	0.4	1.4		3.8	0.6	
Delay (s)		40.3			49.3	40.9	15.7	21.4		19.0	11.0	
Level of Service		D			D	D	B	C		B	B	
Approach Delay (s)		40.3			43.2			21.3			12.9	
Approach LOS		D			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	61.5%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
7: Cooke Boulevard & Site Driveway (East)

1120 Cooke Boulevard
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	15	0	225	30
Future Volume (Veh/h)	0	50	15	0	225	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	16	0	245	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		32	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		32	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	97
cM capacity (veh/h)			1564		977	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	16	278
Volume Left	0	16	245
Volume Right	54	0	33
cSH	1700	1564	989
Volume to Capacity	0.03	0.01	0.28
Queue Length 95th (m)	0.0	0.2	9.3
Control Delay (s)	0.0	7.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.1
Approach LOS			B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	110	55	25	260	0	75	70	40	0	40	25
Future Volume (Veh/h)	185	110	55	25	260	0	75	70	40	0	40	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	226	134	67	30	317	0	91	85	49	0	49	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	317			201			1051	996	168	1088	1030	317
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317			106			1018	960	70	1058	996	317
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 %	82			98			30	56	95	100	73	96
cM capacity (veh/h)	1255			1396			129	193	897	102	184	728

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	427	347	225	79
Volume Left	226	30	91	0
Volume Right	67	0	49	30
cSH	1255	1396	188	257
Volume to Capacity	0.18	0.02	1.20	0.31
Queue Length 95th (m)	5.2	0.5	94.4	10.1
Control Delay (s)	5.3	0.8	179.9	25.1
Lane LOS	A	A	F	D
Approach Delay (s)	5.3	0.8	179.9	25.1
Approach LOS			F	D

Intersection Summary				
Average Delay			41.8	
Intersection Capacity Utilization			61.4%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	247	690	77	1139	351	129	294	402	294	412
v/c Ratio	0.72	0.40	0.34	0.96	0.49	0.60	0.77	0.94	0.39	0.59
Control Delay	61.8	18.2	25.4	43.4	6.2	50.6	52.5	54.9	21.6	16.7
Queue Delay	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	18.2	25.4	51.6	6.2	50.6	52.5	54.9	21.6	16.7
Queue Length 50th (m)	28.4	48.6	9.5	132.6	11.7	26.3	59.9	77.1	53.1	55.7
Queue Length 95th (m)	#62.2	68.9	m12.8	#174.6	m23.7	45.1	86.8	#108.1	68.5	86.2
Internal Link Dist (m)		134.8		131.0			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	344	1743	224	1190	717	263	464	426	846	756
Starvation Cap Reductn	0	0	0	55	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.40	0.34	1.00	0.49	0.49	0.63	0.94	0.35	0.54

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	595	75	75	1105	340	125	220	65	390	285	400
Future Volume (vph)	240	595	75	75	1105	340	125	220	65	390	285	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3134	3467		1630	3539	1507	1694	1786		1709	1900	1493
Flt Permitted	0.95	1.00		0.39	1.00	1.00	0.58	1.00		0.28	1.00	1.00
Satd. Flow (perm)	3134	3467		668	3539	1507	1035	1786		499	1900	1493
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	247	613	77	77	1139	351	129	227	67	402	294	412
RTOR Reduction (vph)	0	8	0	0	0	211	0	10	0	0	0	99
Lane Group Flow (vph)	247	682	0	77	1139	140	129	284	0	402	294	313
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	11.1	54.1		36.0	36.0	36.0	21.9	21.9		42.9	42.9	42.9
Effective Green, g (s)	12.1	55.1		37.0	37.0	37.0	22.9	22.9		43.9	43.9	43.9
Actuated g/C Ratio	0.11	0.50		0.34	0.34	0.34	0.21	0.21		0.40	0.40	0.40
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	344	1736		224	1190	506	215	371		408	758	595
v/s Ratio Prot	c0.08	0.20			c0.32			c0.16		c0.17	0.15	
v/s Ratio Perm				0.12		0.09	0.12			0.22		0.21
v/c Ratio	0.72	0.39		0.34	0.96	0.28	0.60	0.76		0.99	0.39	0.53
Uniform Delay, d1	47.3	17.1		27.4	35.7	26.7	39.4	41.0		28.1	23.5	25.1
Progression Factor	1.00	1.00		0.79	0.83	1.04	1.00	1.00		1.04	0.88	0.92
Incremental Delay, d2	7.0	0.7		2.7	12.9	0.9	4.5	9.1		38.0	0.3	0.8
Delay (s)	54.3	17.7		24.4	42.5	28.6	43.9	50.1		67.2	21.1	23.9
Level of Service	D	B		C	D	C	D	D		E	C	C
Approach Delay (s)		27.4			38.5			48.2			38.9	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	93.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	77	1015	1676	196
v/c Ratio	0.37	0.41	0.76	0.70
Control Delay	13.1	6.4	17.1	46.2
Queue Delay	0.0	0.1	0.4	0.0
Total Delay	13.1	6.5	17.5	46.2
Queue Length 50th (m)	3.8	43.7	131.8	34.9
Queue Length 95th (m)	m8.1	m57.0	187.7	58.0
Internal Link Dist (m)		131.0	132.7	314.4
Turn Bay Length (m)	60.0			
Base Capacity (vph)	210	2479	2191	365
Starvation Cap Reductn	0	447	0	0
Spillback Cap Reductn	0	0	147	1
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.50	0.82	0.54

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



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	985	1505	120	105	85
Future Volume (vph)	75	985	1505	120	105	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3288		1620	
Flt Permitted	0.08	1.00	1.00		0.97	
Satd. Flow (perm)	142	3374	3288		1620	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	1015	1552	124	108	88
RTOR Reduction (vph)	0	0	4	0	29	0
Lane Group Flow (vph)	77	1015	1672	0	167	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	79.8	79.8	71.5		16.2	
Effective Green, g (s)	80.8	80.8	72.5		17.2	
Actuated g/C Ratio	0.73	0.73	0.66		0.16	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	189	2478	2167		253	
v/s Ratio Prot	0.02	c0.30	c0.51			
v/s Ratio Perm	0.28				c0.10	
v/c Ratio	0.41	0.41	0.77		0.66	
Uniform Delay, d1	10.8	5.5	13.0		43.7	
Progression Factor	2.44	0.98	1.00		0.93	
Incremental Delay, d2	1.1	0.4	2.7		6.3	
Delay (s)	27.6	5.8	15.7		46.9	
Level of Service	C	A	B		D	
Approach Delay (s)		7.3	15.7		46.9	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	74.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	1069	314	16
v/c Ratio	0.34	0.09	0.12
Control Delay	2.1	0.7	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	2.1	0.7	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	41.0	7.8	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3156	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	137	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.35	0.09	0.10

Intersection Summary



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	985	20	0	295	15	0
Future Volume (vph)	985	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3406			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3406			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1048	21	0	314	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1068	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2565			2719	42	
v/s Ratio Prot	c0.31			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.42			0.12	0.38	
Uniform Delay, d1	2.7			2.0	27.8	
Progression Factor	1.00			0.54	1.00	
Incremental Delay, d2	0.5			0.1	5.7	
Delay (s)	3.2			1.1	33.4	
Level of Service	A			A	C	
Approach Delay (s)	3.2			1.1	33.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	3.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	295	526	232	558	1132	121	916
v/c Ratio	0.56	0.90	0.38	0.89	0.77	0.50	0.82
Control Delay	34.7	55.0	5.8	40.5	21.8	19.1	38.9
Queue Delay	0.0	0.0	0.0	0.0	1.2	0.0	0.0
Total Delay	34.7	55.0	5.8	40.5	23.1	19.1	38.9
Queue Length 50th (m)	53.0	109.2	1.3	46.3	94.0	11.6	96.5
Queue Length 95th (m)	80.9	#169.0	18.4	m#74.3	126.2	20.6	124.0
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	558	619	638	624	1471	241	1129
Starvation Cap Reductn	0	0	0	0	156	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.85	0.36	0.89	0.86	0.50	0.81

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	280	500	220	530	870	205	115	720	150
Future Volume (vph)	0	0	0	280	500	220	530	870	205	115	720	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1616	1792	1426	3022	3081		1601	3058	
Flt Permitted				0.95	1.00	1.00	0.14	1.00		0.18	1.00	
Satd. Flow (perm)				1616	1792	1426	461	3081		303	3058	
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	0	295	526	232	558	916	216	121	758	158
RTOR Reduction (vph)	0	0	0	0	0	150	0	18	0	0	16	0
Lane Group Flow (vph)	0	0	0	295	526	82	558	1114	0	121	900	0
Heavy Vehicles (%)	0%	0%	0%	8%	6%	12%	12%	14%	13%	9%	15%	15%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				34.9	34.9	34.9	61.1	50.9		45.6	38.4	
Effective Green, g (s)				35.9	35.9	35.9	62.1	51.9		47.6	39.4	
Actuated g/C Ratio				0.33	0.33	0.33	0.56	0.47		0.43	0.36	
Clearance Time (s)				7.0	7.0	7.0	7.0	7.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				527	584	465	625	1453		227	1095	
v/s Ratio Prot				0.18	c0.29		c0.13	0.36		0.04	0.29	
v/s Ratio Perm						0.06	c0.38			0.19		
v/c Ratio				0.56	0.90	0.18	0.89	0.77		0.53	0.82	
Uniform Delay, d1				30.5	35.3	26.5	23.2	24.0		20.0	32.1	
Progression Factor				1.00	1.00	1.00	1.38	0.78		1.00	1.00	
Incremental Delay, d2				1.3	17.0	0.2	11.2	2.8		2.4	7.0	
Delay (s)				31.8	52.4	26.7	43.3	21.6		22.3	39.1	
Level of Service				C	D	C	D	C		C	D	
Approach Delay (s)		0.0			40.9			28.8			37.1	
Approach LOS		A			D			C			D	

Intersection Summary				
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	82.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	6	432	420	1415	1136
v/c Ratio	0.03	0.62	0.83	0.67	0.50
Control Delay	0.2	42.8	34.9	18.4	16.7
Queue Delay	0.0	0.0	0.3	0.1	0.6
Total Delay	0.2	42.8	35.2	18.6	17.3
Queue Length 50th (m)	0.0	43.5	44.1	102.4	87.3
Queue Length 95th (m)	0.0	64.4	#105.3	85.0	68.0
Internal Link Dist (m)	106.5			174.0	121.9
Turn Bay Length (m)		145.0	115.0		
Base Capacity (vph)	290	720	514	2120	2275
Starvation Cap Reductn	0	0	0	110	665
Spillback Cap Reductn	0	0	6	99	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.60	0.83	0.70	0.71

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	380	0	370	5	1240	0	0	1000	0
Future Volume (vph)	0	0	5	380	0	370	5	1240	0	0	1000	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00			1.00	
Frt		0.86		1.00		0.85		1.00			1.00	
Flt Protected		1.00		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1644		3164		1536		3471			3539	
Flt Permitted		1.00		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1644		3164		1536		3297			3539	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	6	432	0	420	6	1409	0	0	1136	0
RTOR Reduction (vph)	0	6	0	0	0	166	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	432	0	254	0	1415	0	0	1136	0
Confl. Bikes (#/hr)												5
Heavy Vehicles (%)	0%	0%	0%	7%	100%	4%	0%	4%	0%	0%	2%	0%
Turn Type		NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		23.3		23.3		64.1			64.1	
Effective Green, g (s)		2.6		24.3		24.3		65.1			65.1	
Actuated g/C Ratio		0.02		0.22		0.22		0.59			0.59	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		38		698		339		1951			2094	
v/s Ratio Prot		c0.00		0.14		c0.17					0.32	
v/s Ratio Perm								c0.43				
v/c Ratio		0.00		0.62		0.75		0.73			0.54	
Uniform Delay, d1		52.4		38.7		40.0		16.1			13.5	
Progression Factor		1.00		1.00		1.00		1.23			1.39	
Incremental Delay, d2		0.0		1.6		8.8		1.7			0.7	
Delay (s)		52.5		40.3		48.8		21.5			19.5	
Level of Service		D		D		D		C			B	
Approach Delay (s)		52.5			44.5			21.5			19.5	
Approach LOS		D			D			C			B	

Intersection Summary

HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	298	107	444	56	292	843	500	478	1079
v/c Ratio	0.84	0.16	0.73	0.43	0.69	0.67	0.32	0.66	0.59
Control Delay	63.6	22.2	31.7	54.5	14.9	23.1	0.5	23.2	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	63.6	22.2	31.7	54.5	14.9	23.1	0.5	23.2	26.6
Queue Length 50th (m)	63.5	15.6	71.3	12.1	1.7	92.3	0.0	33.1	122.8
Queue Length 95th (m)	#104.8	25.2	98.7	23.7	25.8	117.5	0.0	45.5	130.5
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	375	822	729	212	508	1253	1568	726	1832
Starvation Cap Reductn	0	0	0	0	0	0	0	0	111
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.13	0.61	0.26	0.57	0.67	0.32	0.66	0.63

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	95	395	50	0	260	0	750	445	425	960	0
Future Volume (vph)	265	95	395	50	0	260	0	750	445	425	960	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.6	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1810	1521	1616		1521		3539	1568	3255	3539	
Flt Permitted	0.95	1.00	1.00	0.69		1.00		1.00	1.00	0.18	1.00	
Satd. Flow (perm)	1711	1810	1521	1170		1521		3539	1568	607	3539	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	298	107	444	56	0	292	0	843	500	478	1079	0
RTOR Reduction (vph)	0	0	43	0	0	252	0	0	0	0	0	0
Lane Group Flow (vph)	298	107	401	56	0	40	0	843	500	478	1079	0
Confl. Peds. (#/hr)	5					5	5					5
Heavy Vehicles (%)	2%	5%	5%	8%	0%	5%	0%	2%	3%	4%	2%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	21.7	40.1	40.1	11.4		11.4		37.9	110.0	55.9	55.9	
Effective Green, g (s)	22.7	41.1	41.1	12.4		12.4		38.9	110.0	56.9	56.9	
Actuated g/C Ratio	0.21	0.37	0.37	0.11		0.11		0.35	1.00	0.52	0.52	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	353	676	568	131		171		1251	1568	699	1830	
v/s Ratio Prot	c0.17	0.06				0.03		c0.24		c0.10	0.30	
v/s Ratio Perm			c0.26	0.05					0.32	0.25		
v/c Ratio	0.84	0.16	0.71	0.43		0.23		0.67	0.32	0.68	0.59	
Uniform Delay, d1	42.0	22.9	29.3	45.5		44.5		30.2	0.0	17.9	18.4	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.64	1.00	1.34	1.29	
Incremental Delay, d2	16.6	0.1	4.0	2.2		0.7		2.5	0.5	2.4	1.2	
Delay (s)	58.6	23.0	33.3	47.7		45.2		21.8	0.5	26.5	25.0	
Level of Service	E	C	C	D		D		C	A	C	C	
Approach Delay (s)		40.9			45.6			13.8			25.5	
Approach LOS		D			D			B			C	

Intersection Summary

HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBT
Lane Group Flow (vph)	1064	19	301
v/c Ratio	0.88	0.02	0.84
Control Delay	26.3	1.9	66.6
Queue Delay	3.7	0.0	0.0
Total Delay	30.0	1.9	66.6
Queue Length 50th (m)	200.6	0.0	70.1
Queue Length 95th (m)	218.6	0.9	87.5
Internal Link Dist (m)	190.8		55.4
Turn Bay Length (m)			
Base Capacity (vph)	1207	1144	383
Starvation Cap Reductn	85	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.95	0.02	0.79

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	830	15	205	30	0	0
Future Volume (vph)	830	15	205	30	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1694	1597		1820		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1694	1597		1820		
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	1064	19	263	38	0	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	1064	14	0	301	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	84.3	84.3		22.7		
Effective Green, g (s)	85.3	85.3		23.7		
Actuated g/C Ratio	0.71	0.71		0.20		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1204	1135		359		
v/s Ratio Prot	c0.63			c0.17		
v/s Ratio Perm		0.01				
v/c Ratio	0.88	0.01		0.84		
Uniform Delay, d1	13.5	5.1		46.3		
Progression Factor	1.12	0.80		1.00		
Incremental Delay, d2	9.2	0.0		15.6		
Delay (s)	24.3	4.1		61.9		
Level of Service	C	A		E		
Approach Delay (s)	23.9			61.9	0.0	
Approach LOS	C			E	A	

Intersection Summary				
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	68.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	1090	25	0	1405
Future Volume (Veh/h)	0	110	1090	25	0	1405
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	1185	27	0	1527
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.88	0.78			0.78	
vC, conflicting volume	1962	606			1212	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	738	0			694	
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	86			100	
cM capacity (veh/h)	315	846			706	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	790	422	764	764
Volume Left	0	0	0	0	0
Volume Right	120	0	27	0	0
cSH	846	1700	1700	1700	1700
Volume to Capacity	0.14	0.46	0.25	0.45	0.45
Queue Length 95th (m)	3.9	0.0	0.0	0.0	0.0
Control Delay (s)	10.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	10.0	0.0		0.0	
Approach LOS	A				

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		44.4%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	25	126	335	6	1101	399	1380
v/c Ratio	0.15	0.63	0.63	0.04	0.65	0.74	0.53
Control Delay	32.5	56.1	9.8	23.0	25.8	22.1	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	56.1	9.8	23.0	25.8	22.1	13.3
Queue Length 50th (m)	3.8	27.0	0.0	0.7	92.8	58.9	107.5
Queue Length 95th (m)	9.5	37.6	12.1	3.8	129.6	75.9	117.8
Internal Link Dist (m)	95.0	120.3			324.2		93.2
Turn Bay Length (m)				35.0		45.0	
Base Capacity (vph)	289	364	691	138	1692	611	2588
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.35	0.48	0.04	0.65	0.65	0.53

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Waterdown Road & Railway Road/Masonry Court

1120 Cooke Boulevard
PM Peak Hour



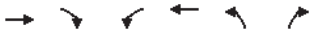
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	5	95	5	265	5	840	30	315	1080	10
Future Volume (vph)	10	5	5	95	5	265	5	840	30	315	1080	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1196			1719	1599	1353	3417		1694	3479	
Flt Permitted		0.82			0.72	1.00	0.20	1.00		0.15	1.00	
Satd. Flow (perm)		1012			1293	1599	279	3417		270	3479	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	6	6	120	6	335	6	1063	38	399	1367	13
RTOR Reduction (vph)	0	5	0	0	0	283	0	2	0	0	1	0
Lane Group Flow (vph)	0	20	0	0	126	52	6	1099	0	399	1379	0
Confl. Bikes (#/hr)									5			10
Heavy Vehicles (%)	38%	100%	25%	2%	75%	1%	29%	4%	3%	3%	3%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		16.2			16.2	16.2	53.4	53.4		80.8	80.8	
Effective Green, g (s)		17.2			17.2	17.2	54.4	54.4		81.8	81.8	
Actuated g/C Ratio		0.16			0.16	0.16	0.49	0.49		0.74	0.74	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		158			202	250	137	1689		529	2587	
v/s Ratio Prot								c0.32		c0.17	0.40	
v/s Ratio Perm		0.02			c0.10	0.03	0.02			0.39		
v/c Ratio		0.13			0.62	0.21	0.04	0.65		0.75	0.53	
Uniform Delay, d1		39.9			43.4	40.5	14.4	20.7		20.0	6.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		0.94	1.86	
Incremental Delay, d2		0.4			5.9	0.4	0.6	2.0		5.3	0.7	
Delay (s)		40.3			49.3	40.9	15.0	22.7		24.1	11.9	
Level of Service		D			D	D	B	C		C	B	
Approach Delay (s)		40.3			43.2			22.6			14.6	
Approach LOS		D			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	63.6%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
7: Cooke Boulevard & Site Driveway (East)

1120 Cooke Boulevard
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	15	0	225	30
Future Volume (Veh/h)	0	50	15	0	225	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	16	0	245	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		32	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		32	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	97
cM capacity (veh/h)			1564		977	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	16	278
Volume Left	0	16	245
Volume Right	54	0	33
cSH	1700	1564	989
Volume to Capacity	0.03	0.01	0.28
Queue Length 95th (m)	0.0	0.2	9.3
Control Delay (s)	0.0	7.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.1
Approach LOS			B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
8: Cooke Boulevard & Masonry Court

1120 Cooke Boulevard
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	110	55	25	260	0	75	70	40	0	40	25
Future Volume (Veh/h)	185	110	55	25	260	0	75	70	40	0	40	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	226	134	67	30	317	0	91	85	49	0	49	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	317			201			1051	996	168	1088	1030	317
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317			106			1018	960	70	1058	996	317
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 %	82			98			30	56	95	100	73	96
cM capacity (veh/h)	1255			1396			129	193	897	102	184	728

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	427	347	225	79
Volume Left	226	30	91	0
Volume Right	67	0	49	30
cSH	1255	1396	188	257
Volume to Capacity	0.18	0.02	1.20	0.31
Queue Length 95th (m)	5.2	0.5	94.4	10.1
Control Delay (s)	5.3	0.8	179.9	25.1
Lane LOS	A	A	F	D
Approach Delay (s)	5.3	0.8	179.9	25.1
Approach LOS			F	D

Intersection Summary					
Average Delay			41.8		
Intersection Capacity Utilization			61.4%	ICU Level of Service	B
Analysis Period (min)			15		

Queues
10: Lasalle Park Road/Waterdown Road & Plains Road

1120 Cooke Boulevard
PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	273	758	88	1253	376	144	330	438	325	454
v/c Ratio	0.62	0.39	0.39	0.98	0.54	0.67	0.84	1.46	0.49	0.56
Control Delay	54.6	15.5	37.6	59.1	15.4	58.9	63.1	251.5	33.3	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	54.6	15.5	37.6	59.1	15.5	58.9	63.1	251.5	33.3	5.3
Queue Length 50th (m)	33.2	54.0	16.6	~175.2	26.8	32.1	74.4	~118.8	61.0	0.0
Queue Length 95th (m)	45.9	68.5	35.7	#237.2	63.1	56.1	#117.5	#184.9	88.5	22.4
Internal Link Dist (m)		134.8		131.0			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	914	1952	226	1282	690	234	425	300	696	834
Starvation Cap Reductn	0	0	0	0	16	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.39	0.39	0.98	0.56	0.62	0.78	1.46	0.47	0.54

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	650	85	85	1215	365	140	245	75	425	315	440
Future Volume (vph)	265	650	85	85	1215	365	140	245	75	425	315	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		6.0	6.0	6.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3134	3463		1630	3539	1507	1694	1785		1710	1900	1492
Flt Permitted	0.95	1.00		0.36	1.00	1.00	0.56	1.00		0.21	1.00	1.00
Satd. Flow (perm)	3134	3463		625	3539	1507	1006	1785		384	1900	1492
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	273	670	88	88	1253	376	144	253	77	438	325	454
RTOR Reduction (vph)	0	8	0	0	0	149	0	9	0	0	0	296
Lane Group Flow (vph)	273	750	0	88	1253	227	144	321	0	438	325	158
Confl. Peds. (#/hr)	5		10	10		5			5	5		
Confl. Bikes (#/hr)			10			15						5
Heavy Vehicles (%)	8%	2%	0%	6%	2%	4%	3%	3%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	15.8	66.3		42.5	42.5	42.5	24.7	24.7		40.7	40.7	40.7
Effective Green, g (s)	16.8	67.3		43.5	43.5	43.5	25.7	25.7		41.7	41.7	41.7
Actuated g/C Ratio	0.14	0.56		0.36	0.36	0.36	0.21	0.21		0.35	0.35	0.35
Clearance Time (s)	7.0	6.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	438	1942		226	1282	546	215	382		288	660	518
v/s Ratio Prot	c0.09	0.22			c0.35			c0.18		c0.18	0.17	
v/s Ratio Perm				0.14		0.15	0.14			0.35		0.11
v/c Ratio	0.62	0.39		0.39	0.98	0.42	0.67	0.84		1.52	0.49	0.30
Uniform Delay, d1	48.6	14.8		28.4	37.8	28.7	43.3	45.2		34.3	30.8	28.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.8	0.6		5.0	20.3	2.3	7.7	14.9		251.4	0.6	0.3
Delay (s)	51.4	15.4		33.4	58.0	31.1	50.9	60.0		285.7	31.4	28.9
Level of Service	D	B		C	E	C	D	E		F	C	C
Approach Delay (s)		24.9			50.9			57.3			122.0	
Approach LOS		C			D			E			F	

Intersection Summary				
HCM 2000 Control Delay	65.0	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	101.4%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	77	1119	1825	196
v/c Ratio	0.41	0.45	0.84	0.69
Control Delay	15.7	7.2	21.5	44.0
Queue Delay	0.0	0.6	0.0	0.0
Total Delay	15.7	7.8	21.5	44.0
Queue Length 50th (m)	3.5	45.7	157.8	35.0
Queue Length 95th (m)	16.8	74.3	#270.3	57.1
Internal Link Dist (m)		131.0	132.7	314.4
Turn Bay Length (m)	60.0			
Base Capacity (vph)	270	2471	2164	409
Starvation Cap Reductn	0	876	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.70	0.84	0.48

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



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	1085	1650	120	105	85
Future Volume (vph)	75	1085	1650	120	105	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3374	3291		1620	
Flt Permitted	0.06	1.00	1.00		0.97	
Satd. Flow (perm)	98	3374	3291		1620	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	1119	1701	124	108	88
RTOR Reduction (vph)	0	0	3	0	29	0
Lane Group Flow (vph)	77	1119	1822	0	167	0
Confl. Peds. (#/hr)	10			10		
Confl. Bikes (#/hr)				10		
Heavy Vehicles (%)	7%	7%	7%	5%	9%	5%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	79.6	79.6	70.6		16.4	
Effective Green, g (s)	80.6	80.6	71.6		17.4	
Actuated g/C Ratio	0.73	0.73	0.65		0.16	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	169	2472	2142		256	
v/s Ratio Prot	c0.03	0.33	c0.55			
v/s Ratio Perm	0.31				c0.10	
v/c Ratio	0.46	0.45	0.85		0.65	
Uniform Delay, d1	15.5	5.9	15.0		43.4	
Progression Factor	1.00	1.00	1.00		0.91	
Incremental Delay, d2	1.9	0.6	4.5		5.7	
Delay (s)	17.4	6.5	19.5		45.1	
Level of Service	B	A	B		D	
Approach Delay (s)		7.2	19.5		45.1	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	78.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	1133	314	16
v/c Ratio	0.36	0.09	0.12
Control Delay	2.1	0.8	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	2.2	0.8	23.9
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	44.4	m6.6	6.3
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3158	3345	165
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	207	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.38	0.09	0.10

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



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1045	20	0	295	15	0
Future Volume (vph)	1045	20	0	295	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3409			3610	904	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3409			3610	904	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1112	21	0	314	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1132	0	0	314	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	4%	90%	0%	0%	93%	100%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.2			44.2	1.8	
Effective Green, g (s)	45.2			45.2	2.8	
Actuated g/C Ratio	0.75			0.75	0.05	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2568			2719	42	
v/s Ratio Prot	c0.33			0.09	c0.02	
v/s Ratio Perm						
v/c Ratio	0.44			0.12	0.38	
Uniform Delay, d1	2.7			2.0	27.8	
Progression Factor	1.00			0.56	1.00	
Incremental Delay, d2	0.6			0.1	5.7	
Delay (s)	3.3			1.2	33.4	
Level of Service	A			A	C	
Approach Delay (s)	3.3			1.2	33.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	3.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues — Future Total 2026 - Without Metrolinx

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — AM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	107	66	327	943	240	964
v/c Ratio	0.37	0.51	0.22	0.44	0.54	0.48	0.57
Control Delay	44.1	48.0	1.6	10.6	18.3	6.6	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	44.1	48.0	1.6	10.6	18.4	6.6	16.0
Queue Length 50th (m)	13.4	20.6	0.0	13.6	89.0	10.1	58.3
Queue Length 95th (m)	26.0	36.0	0.0	32.4	78.6	21.3	97.2
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	475	527	562	910	1738	594	1700
Starvation Cap Reductn	0	0	0	0	104	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.20	0.12	0.36	0.58	0.40	0.57

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Future Total 2026 - Without Metrolinx

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	70	105	65	320	465	460	235	735	210
Future Volume (vph)	0	0	0	70	105	65	320	465	460	235	735	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	6.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2969		1616	2986	
Flt Permitted				0.95	1.00	1.00	0.25	1.00		0.24	1.00	
Satd. Flow (perm)				1442	1597	1439	793	2969		407	2986	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	71	107	66	327	474	469	240	750	214
RTOR Reduction (vph)	0	0	0	0	0	57	0	113	0	0	17	0
Lane Group Flow (vph)	0	0	0	71	107	9	327	830	0	240	947	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				12.3	12.3	12.3	63.0	53.7		70.4	55.4	
Effective Green, g (s)				13.3	13.3	13.3	65.0	54.7		72.4	56.4	
Actuated g/C Ratio				0.13	0.13	0.13	0.65	0.55		0.72	0.56	
Clearance Time (s)				8.0	8.0	8.0	7.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				191	212	191	742	1624		488	1684	
v/s Ratio Prot				0.05	c0.07		0.05	0.28		c0.08	c0.32	
v/s Ratio Perm						0.01	0.24			0.28		
v/c Ratio				0.37	0.50	0.05	0.44	0.51		0.49	0.56	
Uniform Delay, d1				39.5	40.3	37.8	7.4	14.2		5.8	13.9	
Progression Factor				1.00	1.00	1.00	1.77	1.46		1.00	1.00	
Incremental Delay, d2				1.2	1.9	0.1	0.4	1.0		0.8	1.4	
Delay (s)				40.8	42.2	37.9	13.5	21.8		6.6	15.3	
Level of Service				D	D	D	B	C		A	B	
Approach Delay (s)		0.0			40.6			19.6			13.6	
Approach LOS		A			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	62.3%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Queues — Future Total 2026 - Without Metrolinx

2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp — AM Peak Hour



Lane Group	EBT	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	5	272	163	1190	875
v/c Ratio	0.05	0.58	0.47	0.52	0.36
Control Delay	43.0	44.3	10.5	9.8	3.8
Queue Delay	0.0	0.0	0.0	0.2	0.1
Total Delay	43.0	44.3	10.5	10.0	3.9
Queue Length 50th (m)	1.0	27.0	0.0	79.2	14.8
Queue Length 95th (m)	4.6	38.6	17.5	49.8	50.7
Internal Link Dist (m)	106.5			174.0	121.9
Turn Bay Length (m)		145.0	115.0		
Base Capacity (vph)	135	670	428	2268	2414
Starvation Cap Reductn	0	0	0	305	491
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.41	0.38	0.61	0.46

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Future Total 2026 - Without Metrolinx

2: Waterdown Road & Panin Road/Highway 403 WB Off-Ramp — AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	250	0	150	5	1090	0	0	805	0
Future Volume (vph)	5	0	0	250	0	150	5	1090	0	0	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3392			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3229			3438	
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)	5	0	0	272	0	163	5	1185	0	0	875	0
RTOR Reduction (vph)	0	0	0	0	0	139	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	272	0	24	0	1190	0	0	875	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		13.8		13.8		63.6			63.6	
Effective Green, g (s)		2.6		14.8		14.8		64.6			64.6	
Actuated g/C Ratio		0.03		0.15		0.15		0.65			0.65	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		29		472		211		2085			2220	
v/s Ratio Prot		c0.00		c0.09		0.02					0.25	
v/s Ratio Perm								c0.37				
v/c Ratio		0.17		0.58		0.11		0.57			0.39	
Uniform Delay, d1		47.6		39.7		36.9		9.9			8.4	
Progression Factor		1.00		1.00		1.00		1.06			0.47	
Incremental Delay, d2		2.8		1.7		0.2		0.9			0.5	
Delay (s)		50.5		41.4		37.2		11.4			4.4	
Level of Service		D		D		D		B			A	
Approach Delay (s)		50.5			39.8			11.4			4.4	
Approach LOS		D			D			B			A	

Intersection Summary					
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.56				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	61.2%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	296	339	280	27	108	774	753	608	527
v/c Ratio	0.77	0.47	0.38	0.36	0.40	0.67	0.49	0.66	0.32
Control Delay	50.0	25.0	5.4	56.4	7.2	23.5	2.0	19.6	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	25.0	5.4	56.4	7.2	23.5	2.0	19.6	14.2
Queue Length 50th (m)	56.2	49.8	4.3	5.2	0.0	75.8	4.9	29.4	27.7
Queue Length 95th (m)	83.6	72.2	20.2	14.4	7.2	73.7	12.4	55.2	39.5
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	449	790	775	76	269	1161	1524	929	1659
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.43	0.36	0.36	0.40	0.67	0.49	0.65	0.32

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	275	315	260	25	0	100	0	720	700	565	490	0
Future Volume (vph)	275	315	260	25	0	100	0	720	700	565	490	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	6.0	6.0	7.0		7.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	3426	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	1131	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	296	339	280	27	0	108	0	774	753	608	527	0
RTOR Reduction (vph)	0	0	151	0	0	98	0	0	0	0	0	0
Lane Group Flow (vph)	296	339	129	27	0	10	0	774	753	608	527	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	pm+pt	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free	6		
Actuated Green, G (s)	21.2	37.4	37.4	8.2		8.2		32.7	100.0	48.6	48.6	
Effective Green, g (s)	22.2	38.4	38.4	9.2		9.2		33.7	100.0	49.6	49.6	
Actuated g/C Ratio	0.22	0.38	0.38	0.09		0.09		0.34	1.00	0.50	0.50	
Clearance Time (s)	7.0	7.0	7.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	383	722	578	77		131		1147	1524	879	1658	
v/s Ratio Prot	c0.17	0.18				0.01		c0.23		c0.10	0.16	
v/s Ratio Perm			0.09	0.03					c0.49	0.25		
v/c Ratio	0.77	0.47	0.22	0.35		0.08		0.67	0.49	0.69	0.32	
Uniform Delay, d1	36.5	23.1	20.8	42.6		41.5		28.4	0.0	15.4	15.1	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.70	1.00	1.16	0.86	
Incremental Delay, d2	9.3	0.5	0.2	2.8		0.2		2.8	1.0	2.2	0.5	
Delay (s)	45.9	23.6	20.9	45.3		41.8		22.7	1.0	20.1	13.5	
Level of Service	D	C	C	D		D		C	A	C	B	
Approach Delay (s)		30.0			42.5			12.0			17.0	
Approach LOS		C			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.0	
Intersection Capacity Utilization	71.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBR	NBT
Lane Group Flow (vph)	1042	168	37
v/c Ratio	0.86	0.12	0.27
Control Delay	16.3	0.6	57.9
Queue Delay	1.2	0.0	0.0
Total Delay	17.5	0.6	57.9
Queue Length 50th (m)	145.5	0.0	8.8
Queue Length 95th (m)	#324.9	5.1	20.3
Internal Link Dist (m)	190.8		55.4
Turn Bay Length (m)			
Base Capacity (vph)	1208	1454	136
Starvation Cap Reductn	51	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.90	0.12	0.27

Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	990	160	10	25	0	0
Future Volume (vph)	990	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1042	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	1042	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.78			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	0.90	0.11		0.42		
Uniform Delay, d1	5.3	1.3		55.5		
Progression Factor	1.25	1.67		1.00		
Incremental Delay, d2	10.1	0.1		3.2		
Delay (s)	16.7	2.3		58.7		
Level of Service	B	A		E		
Approach Delay (s)	14.7			58.7	0.0	
Approach LOS	B			E	A	

Intersection Summary				
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	70.7%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	195	1225	10	0	775
Future Volume (Veh/h)	0	195	1225	10	0	775
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	212	1332	11	0	842
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.80	0.77			0.77	
vC, conflicting volume	1758	672			1343	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1074	0			847	
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	75			100	
cM capacity (veh/h)	175	840			615	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	212	888	455	421	421
Volume Left	0	0	0	0	0
Volume Right	212	0	11	0	0
cSH	840	1700	1700	1700	1700
Volume to Capacity	0.25	0.52	0.27	0.25	0.25
Queue Length 95th (m)	8.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.7	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		52.9%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	23	227	6	1279	261	613
v/c Ratio	0.13	0.17	0.63	0.02	0.63	0.58	0.23
Control Delay	1.7	42.5	13.9	11.4	15.6	12.3	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.7	42.5	13.9	11.4	15.6	12.3	7.4
Queue Length 50th (m)	0.0	4.4	0.0	0.4	76.5	22.7	30.8
Queue Length 95th (m)	0.0	11.4	19.5	2.7	130.7	34.7	38.0
Internal Link Dist (m)	95.0	120.3			324.2		93.2
Turn Bay Length (m)				35.0		45.0	
Base Capacity (vph)	283	295	518	387	2045	504	2647
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.08	0.44	0.02	0.63	0.52	0.23

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Future Total 2026 - Without Metrolinx
6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour

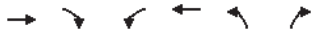


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	20	0	200	5	1025	100	230	530	10
Future Volume (vph)	10	0	10	20	0	200	5	1025	100	230	530	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184			1641	1495	1454	3385		1728	3373	
Flt Permitted		0.84			0.74	1.00	0.42	1.00		0.14	1.00	
Satd. Flow (perm)		1014			1283	1495	642	3385		263	3373	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	23	0	227	6	1165	114	261	602	11
RTOR Reduction (vph)	0	20	0	0	0	203	0	5	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	23	24	6	1274	0	261	612	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		9.5			9.5	9.5	59.3	59.3		77.5	77.5	
Effective Green, g (s)		10.5			10.5	10.5	60.3	60.3		78.5	78.5	
Actuated g/C Ratio		0.10			0.10	0.10	0.60	0.60		0.78	0.78	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		106			134	156	387	2041		443	2647	
v/s Ratio Prot								c0.38		c0.10	0.18	
v/s Ratio Perm		0.00			c0.02	0.02	0.01			0.37		
v/c Ratio		0.02			0.17	0.15	0.02	0.62		0.59	0.23	
Uniform Delay, d1		40.1			40.8	40.7	8.0	12.6		9.1	2.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.10	2.38	
Incremental Delay, d2		0.1			0.6	0.5	0.1	1.5		1.9	0.2	
Delay (s)		40.2			41.4	41.2	8.0	14.1		12.0	6.9	
Level of Service		D			D	D	A	B		B	A	
Approach Delay (s)		40.2			41.2			14.1			8.4	
Approach LOS		D			D			B			A	

Intersection Summary				
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	64.7%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2026 - Without Metrolinx
7: Cooke Boulevard & Site Driveway (East) — AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	85	30	0	70	5
Future Volume (Veh/h)	0	85	30	0	70	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	92	33	0	76	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)						
pX, platoon unblocked						
vC, conflicting volume			92		66	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		66	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	100
cM capacity (veh/h)			1515		924	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	33	81
Volume Left	0	33	76
Volume Right	92	0	5
cSH	1700	1515	933
Volume to Capacity	0.05	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.3
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

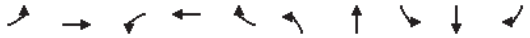
Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	235	40	40	95	0	80	20	20	0	70	45
Future Volume (Veh/h)	55	235	40	40	95	0	80	20	20	0	70	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	71	301	51	51	122	0	103	26	26	0	90	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.98			0.98	0.98	0.98	0.98	0.98	
vC, conflicting volume	122			352			796	692	326	732	718	122
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	122			334			785	680	308	720	706	122
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	95			96			50	92	96	100	72	94
cM capacity (veh/h)	1478			1218			208	337	725	289	326	913

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	423	173	155	148
Volume Left	71	51	103	0
Volume Right	51	0	26	58
cSH	1478	1218	254	436
Volume to Capacity	0.05	0.04	0.61	0.34
Queue Length 95th (m)	1.2	1.0	29.0	11.8
Control Delay (s)	1.6	2.6	39.0	17.4
Lane LOS	A	A	E	C
Approach Delay (s)	1.6	2.6	39.0	17.4
Approach LOS			E	C

Intersection Summary					
Average Delay			10.9		
Intersection Capacity Utilization			40.4%	ICU Level of Service	A
Analysis Period (min)			15		



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	660	1006	74	356	261	85	341	245	165	191
v/c Ratio	0.89	0.57	0.67	0.47	0.49	0.32	0.83	0.72	0.23	0.28
Control Delay	57.8	20.6	72.3	40.6	8.1	37.9	56.3	32.9	22.5	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.8	20.6	72.3	40.6	8.1	37.9	56.3	32.9	22.5	3.9
Queue Length 50th (m)	75.5	82.3	15.8	38.1	0.0	15.8	70.4	34.9	23.6	0.0
Queue Length 95th (m)	#114.5	106.5	#42.4	53.6	22.3	30.1	#103.7	53.1	38.0	13.3
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	738	1751	110	755	530	300	463	354	773	727
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.57	0.67	0.47	0.49	0.28	0.74	0.69	0.21	0.26

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	620	810	135	70	335	245	80	265	55	230	155	180
Future Volume (vph)	620	810	135	70	335	245	80	265	55	230	155	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		6.0	6.0	6.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3255	3408		1667	3438	1488	1719	1795		1614	1810	1446
Flt Permitted	0.95	1.00		0.28	1.00	1.00	0.65	1.00		0.23	1.00	1.00
Satd. Flow (perm)	3255	3408		500	3438	1488	1181	1795		386	1810	1446
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)	660	862	144	74	356	261	85	282	59	245	165	191
RTOR Reduction (vph)	0	11	0	0	0	204	0	7	0	0	0	117
Lane Group Flow (vph)	660	995	0	74	356	57	85	334	0	245	165	74
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	23.9	55.1		23.2	23.2	23.2	23.9	23.9		41.9	41.9	41.9
Effective Green, g (s)	24.9	56.1		24.2	24.2	24.2	24.9	24.9		42.9	42.9	42.9
Actuated g/C Ratio	0.23	0.51		0.22	0.22	0.22	0.23	0.23		0.39	0.39	0.39
Clearance Time (s)	7.0	6.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	736	1738		110	756	327	267	406		329	705	563
v/s Ratio Prot	c0.20	0.29			0.10			c0.19		c0.11	0.09	
v/s Ratio Perm				c0.15		0.04	0.07			0.18		0.05
v/c Ratio	0.90	0.57		0.67	0.47	0.18	0.32	0.82		0.74	0.23	0.13
Uniform Delay, d1	41.3	18.6		39.3	37.3	34.8	35.5	40.5		25.7	22.5	21.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.5	1.4		28.2	2.1	1.2	0.7	12.6		8.8	0.2	0.1
Delay (s)	54.9	20.0		67.5	39.4	36.0	36.2	53.1		34.5	22.7	21.7
Level of Service	D	C		E	D	D	D	D		C	C	C
Approach Delay (s)		33.8			41.1			49.7			27.2	
Approach LOS		C			D			D			C	

Intersection Summary				
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	85.2%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	106	1128	783	205
v/c Ratio	0.22	0.50	0.41	0.71
Control Delay	6.0	9.0	13.1	43.6
Queue Delay	0.0	0.5	0.0	0.0
Total Delay	6.0	9.6	13.1	43.6
Queue Length 50th (m)	5.3	50.3	41.5	33.7
Queue Length 95th (m)	13.4	83.7	70.5	52.9
Internal Link Dist (m)		135.9	143.9	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	527	2272	1900	385
Starvation Cap Reductn	0	652	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.70	0.41	0.53

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	95	1015	630	75	110	75
Future Volume (vph)	95	1015	630	75	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.98		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3282	3236		1381	
Flt Permitted	0.31	1.00	1.00		0.97	
Satd. Flow (perm)	526	3282	3236		1381	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1128	700	83	122	83
RTOR Reduction (vph)	0	0	7	0	27	0
Lane Group Flow (vph)	106	1128	776	0	178	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	68.1	68.1	57.5		17.9	
Effective Green, g (s)	69.1	69.1	58.5		18.9	
Actuated g/C Ratio	0.69	0.69	0.58		0.19	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	458	2267	1893		261	
v/s Ratio Prot	0.02	c0.34	0.24			
v/s Ratio Perm	0.14				c0.13	
v/c Ratio	0.23	0.50	0.41		0.68	
Uniform Delay, d1	5.5	7.3	11.3		37.8	
Progression Factor	1.00	1.00	1.00		0.96	
Incremental Delay, d2	0.3	0.8	0.7		7.2	
Delay (s)	5.8	8.1	12.0		43.6	
Level of Service	A	A	B		D	
Approach Delay (s)		7.9	12.0		43.6	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	1717	120	16
v/c Ratio	0.53	0.04	0.12
Control Delay	3.0	1.2	24.5
Queue Delay	0.0	0.0	0.0
Total Delay	3.0	1.2	24.5
Queue Length 50th (m)	0.0	0.0	1.6
Queue Length 95th (m)	84.8	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3232	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	75	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.54	0.04	0.12

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1565	15	0	110	15	0
Future Volume (vph)	1565	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3474			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3474			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1701	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1716	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2628			2731	38	
v/s Ratio Prot	c0.49			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.65			0.04	0.42	
Uniform Delay, d1	3.5			1.8	28.0	
Progression Factor	1.00			0.90	1.00	
Incremental Delay, d2	1.3			0.0	7.4	
Delay (s)	4.8			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	4.8			1.7	35.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues — Future Total 2031 - Without Metrolinx

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — AM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	107	66	352	1010	240	995
v/c Ratio	0.37	0.51	0.22	0.48	0.58	0.50	0.59
Control Delay	44.1	48.0	1.6	10.7	20.6	7.1	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	48.0	1.6	10.7	20.6	7.1	16.9
Queue Length 50th (m)	13.4	20.6	0.0	15.5	41.0	10.1	61.7
Queue Length 95th (m)	26.0	36.0	0.0	35.6	92.2	21.3	103.8
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	475	527	562	885	1729	573	1687
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.20	0.12	0.40	0.58	0.42	0.59

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Future Total 2031 - Without Metrolinx

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	70	105	65	345	530	460	235	765	210
Future Volume (vph)	0	0	0	70	105	65	345	530	460	235	765	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	6.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2979		1616	2988	
Flt Permitted				0.95	1.00	1.00	0.24	1.00		0.22	1.00	
Satd. Flow (perm)				1442	1597	1439	744	2979		369	2988	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	71	107	66	352	541	469	240	781	214
RTOR Reduction (vph)	0	0	0	0	0	57	0	98	0	0	16	0
Lane Group Flow (vph)	0	0	0	71	107	9	352	912	0	240	979	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				12.3	12.3	12.3	63.5	53.7		69.9	54.9	
Effective Green, g (s)				13.3	13.3	13.3	65.5	54.7		71.9	55.9	
Actuated g/C Ratio				0.13	0.13	0.13	0.66	0.55		0.72	0.56	
Clearance Time (s)				8.0	8.0	8.0	7.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				191	212	191	730	1629		464	1670	
v/s Ratio Prot				0.05	c0.07		0.05	0.31		c0.08	c0.33	
v/s Ratio Perm						0.01	0.26			0.29		
v/c Ratio				0.37	0.50	0.05	0.48	0.56		0.52	0.59	
Uniform Delay, d1				39.5	40.3	37.8	7.5	14.8		6.4	14.5	
Progression Factor				1.00	1.00	1.00	1.73	1.48		1.00	1.00	
Incremental Delay, d2				1.2	1.9	0.1	0.4	1.2		1.0	1.5	
Delay (s)				40.8	42.2	37.9	13.5	23.0		7.3	16.0	
Level of Service				D	D	D	B	C		A	B	
Approach Delay (s)		0.0			40.6			20.5			14.3	
Approach LOS		A			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	64.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	5	293	174	1277	908
v/c Ratio	0.05	0.60	0.48	0.57	0.38
Control Delay	43.0	44.2	10.2	13.9	3.8
Queue Delay	0.0	0.0	0.0	0.2	0.1
Total Delay	43.0	44.2	10.2	14.1	3.9
Queue Length 50th (m)	1.0	29.0	0.0	84.0	12.7
Queue Length 95th (m)	4.6	40.8	17.8	m42.0	51.8
Internal Link Dist (m)	106.5			174.0	121.9
Turn Bay Length (m)		145.0	115.0		
Base Capacity (vph)	135	670	436	2247	2391
Starvation Cap Reductn	0	0	0	257	477
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.44	0.40	0.64	0.47

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	270	0	160	5	1170	0	0	835	0
Future Volume (vph)	5	0	0	270	0	160	5	1170	0	0	835	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3393			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3230			3438	
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)	5	0	0	293	0	174	5	1272	0	0	908	0
RTOR Reduction (vph)	0	0	0	0	0	147	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	293	0	27	0	1277	0	0	908	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		14.4		14.4		63.0			63.0	
Effective Green, g (s)		2.6		15.4		15.4		64.0			64.0	
Actuated g/C Ratio		0.03		0.15		0.15		0.64			0.64	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		29		491		219		2067			2200	
v/s Ratio Prot		c0.00		c0.09		0.02					0.26	
v/s Ratio Perm								c0.40				
v/c Ratio		0.17		0.60		0.12		0.62			0.41	
Uniform Delay, d1		47.6		39.4		36.5		10.7			8.8	
Progression Factor		1.00		1.00		1.00		1.42			0.44	
Incremental Delay, d2		2.8		2.0		0.3		0.7			0.5	
Delay (s)		50.5		41.4		36.7		15.9			4.4	
Level of Service		D		D		D		B			A	
Approach Delay (s)		50.5			39.6			15.9			4.4	
Approach LOS		D			D			B			A	

Intersection Summary				
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	64.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	323	339	306	27	108	860	790	640	548
v/c Ratio	0.84	0.45	0.44	0.30	0.38	0.97	0.52	0.93	0.34
Control Delay	56.7	23.5	11.0	49.6	6.2	51.7	2.1	64.4	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.7	23.5	11.0	49.6	6.2	51.7	2.1	64.4	16.7
Queue Length 50th (m)	61.8	49.1	18.6	5.2	0.0	91.6	4.1	61.2	30.3
Queue Length 95th (m)	#103.6	67.8	37.5	13.6	6.8	#130.4	13.7	#125.5	53.3
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	414	940	835	159	394	885	1524	685	1605
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.36	0.37	0.17	0.27	0.97	0.52	0.93	0.34

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	315	285	25	0	100	0	800	735	595	510	0
Future Volume (vph)	300	315	285	25	0	100	0	800	735	595	510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	6.0	6.0	7.0		7.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	3426	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	1131	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	339	306	27	0	108	0	860	790	640	548	0
RTOR Reduction (vph)	0	0	98	0	0	96	0	0	0	0	0	0
Lane Group Flow (vph)	323	339	208	27	0	12	0	860	790	640	548	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	21.3	39.0	39.0	9.7		9.7		25.0	100.0	19.0	47.0	
Effective Green, g (s)	22.3	40.0	40.0	10.7		10.7		26.0	100.0	20.0	48.0	
Actuated g/C Ratio	0.22	0.40	0.40	0.11		0.11		0.26	1.00	0.20	0.48	
Clearance Time (s)	7.0	7.0	7.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	385	752	602	89		152		885	1524	685	1604	
v/s Ratio Prot	c0.19	0.18				0.01		c0.25		c0.19	0.16	
v/s Ratio Perm			0.14	0.03					c0.52			
v/c Ratio	0.84	0.45	0.34	0.30		0.08		0.97	0.52	0.93	0.34	
Uniform Delay, d1	37.1	22.0	20.9	41.2		40.2		36.6	0.0	39.4	16.2	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.78	1.00	1.07	0.94	
Incremental Delay, d2	14.7	0.4	0.3	1.9		0.2		21.7	1.1	18.9	0.5	
Delay (s)	51.9	22.4	21.2	43.1		40.4		50.2	1.1	61.1	15.8	
Level of Service	D	C	C	D		D		D	A	E	B	
Approach Delay (s)		31.9			41.0			26.7			40.2	
Approach LOS		C			D			C			D	

Intersection Summary				
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.0	
Intersection Capacity Utilization	75.7%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	EBL	EBR	NBT
Lane Group Flow (vph)	1111	168	37
v/c Ratio	0.89	0.11	0.11
Control Delay	18.1	0.9	18.1
Queue Delay	0.0	0.0	0.0
Total Delay	18.1	0.9	18.1
Queue Length 50th (m)	0.0	0.0	2.5
Queue Length 95th (m)	#222.6	5.5	10.1
Internal Link Dist (m)	190.8		55.4
Turn Bay Length (m)			
Base Capacity (vph)	1244	1492	1127
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.89	0.11	0.03

Intersection Summary

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



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1055	160	10	25	0	0
Future Volume (vph)	1055	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1111	168	11	26	0	0
RTOR Reduction (vph)	0	38	0	0	0	0
Lane Group Flow (vph)	1111	130	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	38.5	38.5		1.4		
Effective Green, g (s)	39.5	39.5		2.4		
Actuated g/C Ratio	0.75	0.75		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1002	1192		82		
v/s Ratio Prot	c0.83			c0.02		
v/s Ratio Perm		0.08				
v/c Ratio	1.11	0.11		0.45		
Uniform Delay, d1	6.7	1.8		24.6		
Progression Factor	1.00	1.00		1.00		
Incremental Delay, d2	63.1	0.0		3.9		
Delay (s)	69.8	1.9		28.5		
Level of Service	E	A		C		
Approach Delay (s)	60.9			28.5	0.0	
Approach LOS	E			C	A	

Intersection Summary

HCM 2000 Control Delay	60.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	52.9	Sum of lost time (s)	11.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	195	1340	10	0	820
Future Volume (Veh/h)	0	195	1340	10	0	820
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	212	1457	11	0	891
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.77	0.73			0.73	
vC, conflicting volume	1908	734			1468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1128	0			905	
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	73			100	
cM capacity (veh/h)	155	798			556	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	212	971	497	446	446
Volume Left	0	0	0	0	0
Volume Right	212	0	11	0	0
cSH	798	1700	1700	1700	1700
Volume to Capacity	0.27	0.57	0.29	0.26	0.26
Queue Length 95th (m)	8.6	0.0	0.0	0.0	0.0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		56.1%	ICU Level of Service	B
Analysis Period (min)		15		



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	23	227	6	1409	261	670
v/c Ratio	0.13	0.17	0.63	0.02	0.68	0.64	0.25
Control Delay	1.7	42.5	13.9	11.2	16.5	17.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.7	42.5	13.9	11.2	16.5	17.7	7.7
Queue Length 50th (m)	0.0	4.4	0.0	0.4	86.1	26.2	23.7
Queue Length 95th (m)	0.0	11.4	19.5	2.7	152.3	41.5	47.3
Internal Link Dist (m)	95.0	120.3			324.2		93.2
Turn Bay Length (m)				35.0		45.0	
Base Capacity (vph)	283	295	518	371	2077	496	2652
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.08	0.44	0.02	0.68	0.53	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Future Total 2031 - Without Metrolinx
6: Waterdown Road & Railway Road/Masonry Court — AM Peak Hour

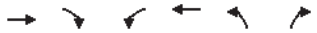


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	20	0	200	5	1140	100	230	580	10
Future Volume (vph)	10	0	10	20	0	200	5	1140	100	230	580	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184			1641	1495	1454	3390		1728	3376	
Flt Permitted		0.84			0.74	1.00	0.40	1.00		0.12	1.00	
Satd. Flow (perm)		1014			1283	1495	608	3390		213	3376	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	23	0	227	6	1295	114	261	659	11
RTOR Reduction (vph)	0	20	0	0	0	203	0	4	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	23	24	6	1405	0	261	669	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		9.5			9.5	9.5	60.2	60.2		77.5	77.5	
Effective Green, g (s)		10.5			10.5	10.5	61.2	61.2		78.5	78.5	
Actuated g/C Ratio		0.10			0.10	0.10	0.61	0.61		0.78	0.78	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		106			134	156	372	2074		399	2650	
v/s Ratio Prot								c0.41		c0.10	0.20	
v/s Ratio Perm		0.00			c0.02	0.02	0.01			0.41		
v/c Ratio		0.02			0.17	0.15	0.02	0.68		0.65	0.25	
Uniform Delay, d1		40.1			40.8	40.7	7.6	12.9		15.6	2.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00		0.97	2.41	
Incremental Delay, d2		0.1			0.6	0.5	0.1	1.8		3.7	0.2	
Delay (s)		40.2			41.4	41.2	7.7	14.7		18.8	7.2	
Level of Service		D			D	D	A	B		B	A	
Approach Delay (s)		40.2			41.2			14.6			10.4	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	67.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Future Total 2031 - Without Metrolinx
7: Cooke Boulevard & Site Driveway (East) — AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	85	30	0	70	5
Future Volume (Veh/h)	0	85	30	0	70	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	92	33	0	76	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)						
pX, platoon unblocked						
vC, conflicting volume			92		66	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		66	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	100
cM capacity (veh/h)			1515		924	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	33	81
Volume Left	0	33	76
Volume Right	92	0	5
cSH	1700	1515	933
Volume to Capacity	0.05	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.3
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Future Total 2031 - Without Metrolinx
8: Cooke Boulevard & Masonry Court — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	235	45	40	95	0	80	20	20	0	70	45
Future Volume (Veh/h)	55	235	45	40	95	0	80	20	20	0	70	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	71	301	58	51	122	0	103	26	26	0	90	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.98			0.98	0.98	0.98	0.98	0.98	
vC, conflicting volume	122			359			799	696	330	735	725	122
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	122			341			788	684	312	723	713	122
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	95			96			50	92	96	100	72	94
cM capacity (veh/h)	1478			1210			206	336	722	287	323	913

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	430	173	155	148
Volume Left	71	51	103	0
Volume Right	58	0	26	58
cSH	1478	1210	253	432
Volume to Capacity	0.05	0.04	0.61	0.34
Queue Length 95th (m)	1.2	1.1	29.3	12.0
Control Delay (s)	1.6	2.6	39.5	17.6
Lane LOS	A	A	E	C
Approach Delay (s)	1.6	2.6	39.5	17.6
Approach LOS			E	C

Intersection Summary					
Average Delay	10.9				
Intersection Capacity Utilization	40.7%	ICU Level of Service		A	
Analysis Period (min)	15				

Queues — Future Total 2031 - Without Metrolinx
10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	729	1107	80	388	282	96	378	261	181	207
v/c Ratio	0.70	0.61	0.66	0.42	0.47	0.35	0.87	0.93	0.27	0.31
Control Delay	20.7	19.7	66.5	36.3	7.2	38.1	60.1	64.4	25.1	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	19.7	66.5	36.3	7.2	38.1	60.1	64.4	25.1	4.5
Queue Length 50th (m)	51.6	87.9	16.2	38.3	0.0	17.7	78.8	40.2	27.7	0.0
Queue Length 95th (m)	66.8	109.8	#48.4	58.2	23.2	33.4	#127.4	#87.2	45.0	15.0
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	1166	1807	121	924	606	296	464	282	691	680
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.61	0.66	0.42	0.47	0.32	0.81	0.93	0.26	0.30

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis — Future Total 2031 - Without Metrolinx

10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	685	890	150	75	365	265	90	295	60	245	170	195
Future Volume (vph)	685	890	150	75	365	265	90	295	60	245	170	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3243	3408		1668	3438	1490	1719	1796		1614	1810	1446
Flt Permitted	0.36	1.00		0.26	1.00	1.00	0.64	1.00		0.19	1.00	1.00
Satd. Flow (perm)	1218	3408		452	3438	1490	1164	1796		321	1810	1446
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)	729	947	160	80	388	282	96	314	64	261	181	207
RTOR Reduction (vph)	0	12	0	0	0	206	0	7	0	0	0	130
Lane Group Flow (vph)	729	1095	0	80	388	76	96	371	0	261	181	77
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	57.0	57.0		28.6	28.6	28.6	25.2	25.2		40.0	40.0	40.0
Effective Green, g (s)	58.0	58.0		29.6	29.6	29.6	26.2	26.2		41.0	41.0	41.0
Actuated g/C Ratio	0.53	0.53		0.27	0.27	0.27	0.24	0.24		0.37	0.37	0.37
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1054	1796		121	925	400	277	427		270	674	538
v/s Ratio Prot	c0.14	0.32			0.11			c0.21		c0.11	0.10	
v/s Ratio Perm	c0.22			0.18		0.05	0.08			0.25		0.05
v/c Ratio	0.69	0.61		0.66	0.42	0.19	0.35	0.87		0.97	0.27	0.14
Uniform Delay, d1	16.8	18.1		35.7	33.1	31.0	34.8	40.3		28.6	24.0	22.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.0	1.6		24.9	1.4	1.1	0.8	16.9		45.1	0.2	0.1
Delay (s)	18.8	19.7		60.7	34.5	32.0	35.5	57.1		73.7	24.3	23.0
Level of Service	B	B		E	C	C	D	E		E	C	C
Approach Delay (s)		19.3			36.4			52.8			43.7	
Approach LOS		B			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	88.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Total 2031 - Without Metrolinx

11: Plains Road & Cooke Boulevard — AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	106	1239	844	205
v/c Ratio	0.24	0.55	0.44	0.71
Control Delay	6.2	9.7	13.5	43.0
Queue Delay	0.0	0.7	0.0	0.0
Total Delay	6.2	10.4	13.5	43.0
Queue Length 50th (m)	5.3	58.0	45.9	32.6
Queue Length 95th (m)	13.4	96.5	77.7	m52.6
Internal Link Dist (m)		135.9	143.9	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	451	2268	1924	397
Starvation Cap Reductn	0	617	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.24	0.75	0.44	0.52

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



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	95	1115	685	75	110	75
Future Volume (vph)	95	1115	685	75	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3282	3239		1381	
Flt Permitted	0.28	1.00	1.00		0.97	
Satd. Flow (perm)	483	3282	3239		1381	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1239	761	83	122	83
RTOR Reduction (vph)	0	0	7	0	28	0
Lane Group Flow (vph)	106	1239	837	0	177	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	68.1	68.1	57.5		17.9	
Effective Green, g (s)	69.1	69.1	58.5		18.9	
Actuated g/C Ratio	0.69	0.69	0.58		0.19	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	432	2267	1894		261	
v/s Ratio Prot	0.02	c0.38	0.26			
v/s Ratio Perm	0.15				c0.13	
v/c Ratio	0.25	0.55	0.44		0.68	
Uniform Delay, d1	5.7	7.7	11.6		37.7	
Progression Factor	1.00	1.00	1.00		0.95	
Incremental Delay, d2	0.3	1.0	0.8		6.8	
Delay (s)	6.0	8.6	12.4		42.8	
Level of Service	A	A	B		D	
Approach Delay (s)		8.4	12.4		42.8	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	1788	120	16
v/c Ratio	0.55	0.04	0.09
Control Delay	3.2	1.5	20.2
Queue Delay	0.0	0.0	0.0
Total Delay	3.2	1.5	20.2
Queue Length 50th (m)	0.0	0.0	1.1
Queue Length 95th (m)	92.3	4.4	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3233	3357	173
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.55	0.04	0.09

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1630	15	0	110	15	0
Future Volume (vph)	1630	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3475			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3475			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1772	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1787	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	37.9			37.9	1.3	
Effective Green, g (s)	38.9			38.9	2.3	
Actuated g/C Ratio	0.73			0.73	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2540			2639	38	
v/s Ratio Prot	c0.51			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.70			0.05	0.42	
Uniform Delay, d1	4.0			2.0	24.8	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.9			0.0	7.4	
Delay (s)	4.9			2.0	32.2	
Level of Service	A			A	C	
Approach Delay (s)	4.9			2.0	32.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues — Future Total 2036 - Without Metrolinx

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — AM Peak Hour

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	107	66	378	1081	240	1035
v/c Ratio	0.41	0.56	0.23	0.48	0.56	0.53	0.58
Control Delay	54.8	60.3	1.8	10.2	14.7	7.9	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	54.8	60.3	1.8	10.2	14.9	7.9	17.8
Queue Length 50th (m)	16.5	25.4	0.0	9.0	89.8	10.9	76.6
Queue Length 95th (m)	30.4	42.4	0.0	40.1	96.0	22.1	124.1
Internal Link Dist (m)		247.0			121.9		158.7
Turn Bay Length (m)	170.0		135.0	100.0		85.0	
Base Capacity (vph)	396	439	494	1041	1917	512	1784
Starvation Cap Reductn	0	0	0	0	185	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.24	0.13	0.36	0.62	0.47	0.58

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Future Total 2036 - Without Metrolinx

1: Waterdown Road & Highway 403 WB On-Ramp/N Service Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	70	105	65	370	600	460	235	805	210
Future Volume (vph)	0	0	0	70	105	65	370	600	460	235	805	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)				7.0	7.0	7.0	6.0	7.0		2.0	7.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1442	1597	1439	2996	2988		1616	2991	
Flt Permitted				0.95	1.00	1.00	0.21	1.00		0.22	1.00	
Satd. Flow (perm)				1442	1597	1439	672	2988		377	2991	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	71	107	66	378	612	469	240	821	214
RTOR Reduction (vph)	0	0	0	0	0	58	0	77	0	0	12	0
Lane Group Flow (vph)	0	0	0	71	107	8	378	1004	0	240	1023	0
Heavy Vehicles (%)	0%	0%	0%	21%	19%	11%	13%	16%	9%	8%	18%	13%
Turn Type				Split	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8	2			6		
Actuated Green, G (s)				13.4	13.4	13.4	86.4	72.9		84.8	70.1	
Effective Green, g (s)				14.4	14.4	14.4	88.4	73.9		86.8	71.1	
Actuated g/C Ratio				0.12	0.12	0.12	0.74	0.62		0.72	0.59	
Clearance Time (s)				8.0	8.0	8.0	7.0	8.0		3.0	8.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				173	191	172	775	1840		434	1772	
v/s Ratio Prot				0.05	c0.07		0.06	c0.34		c0.07	c0.34	
v/s Ratio Perm						0.01	0.30			0.33		
v/c Ratio				0.41	0.56	0.05	0.49	0.55		0.55	0.58	
Uniform Delay, d1				48.9	49.8	46.7	6.9	13.3		6.6	15.1	
Progression Factor				1.00	1.00	1.00	2.04	1.12		1.00	1.00	
Incremental Delay, d2				1.6	3.7	0.1	0.4	1.0		1.5	1.4	
Delay (s)				50.5	53.5	46.8	14.5	15.9		8.1	16.5	
Level of Service				D	D	D	B	B		A	B	
Approach Delay (s)		0.0			50.8			15.5			14.9	
Approach LOS		A			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	66.0%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	5	321	190	1364	951
v/c Ratio	0.06	0.66	0.56	0.58	0.38
Control Delay	53.4	54.5	18.7	13.6	3.8
Queue Delay	0.0	0.0	0.0	0.5	0.1
Total Delay	53.4	54.5	18.7	14.1	3.9
Queue Length 50th (m)	1.2	39.1	9.2	106.8	27.1
Queue Length 95th (m)	5.5	52.4	31.7	m30.0	11.6
Internal Link Dist (m)	106.5			174.0	121.9
Turn Bay Length (m)		145.0	115.0		
Base Capacity (vph)	84	589	384	2340	2489
Starvation Cap Reductn	0	0	0	495	556
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.54	0.49	0.74	0.49

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	295	0	175	5	1250	0	0	875	0
Future Volume (vph)	5	0	0	295	0	175	5	1250	0	0	875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0		6.0		6.0		6.0			6.0	
Lane Util. Factor		1.00		0.97		1.00		0.95			0.95	
Frt		1.00		1.00		0.85		1.00			1.00	
Flt Protected		0.95		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1128		3193		1426		3394			3438	
Flt Permitted		0.95		0.95		1.00		0.95			1.00	
Satd. Flow (perm)		1128		3193		1426		3231			3438	
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)	5	0	0	321	0	190	5	1359	0	0	951	0
RTOR Reduction (vph)	0	0	0	0	0	125	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	321	0	65	0	1364	0	0	951	0
Heavy Vehicles (%)	60%	0%	100%	6%	100%	12%	100%	6%	0%	0%	5%	100%
Turn Type	Split	NA		Prot		Prot	Perm	NA			NA	
Protected Phases	8	8		7		7		2			6	
Permitted Phases							2					
Actuated Green, G (s)		1.6		17.3		17.3		80.1			80.1	
Effective Green, g (s)		2.6		18.3		18.3		81.1			81.1	
Actuated g/C Ratio		0.02		0.15		0.15		0.68			0.68	
Clearance Time (s)		7.0		7.0		7.0		7.0			7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)		24		486		217		2183			2323	
v/s Ratio Prot		c0.00		c0.10		0.05					0.28	
v/s Ratio Perm								c0.42				
v/c Ratio		0.21		0.66		0.30		0.62			0.41	
Uniform Delay, d1		57.7		47.9		45.1		10.9			8.7	
Progression Factor		1.00		1.00		1.00		1.37			0.45	
Incremental Delay, d2		4.3		3.4		0.8		0.5			0.5	
Delay (s)		62.0		51.3		45.9		15.5			4.4	
Level of Service		E		D		D		B			A	
Approach Delay (s)		62.0			49.3			15.5			4.4	
Approach LOS		E			D			B			A	

Intersection Summary					
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.62				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	67.2%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Queues — Future Total 2036 - Without Metrolinx

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	355	339	339	27	108	946	833	677	581
v/c Ratio	1.05	0.52	0.50	0.35	0.44	0.97	0.55	0.79	0.31
Control Delay	109.5	34.1	12.1	61.4	12.1	61.5	2.1	58.1	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	109.5	34.1	12.1	61.4	12.1	61.5	2.1	58.1	15.6
Queue Length 50th (m)	~95.8	67.4	19.1	6.7	0.0	~109.1	4.0	86.7	41.4
Queue Length 95th (m)	#156.7	91.0	44.5	14.7	12.6	#171.4	9.2	#116.8	53.7
Internal Link Dist (m)		253.6				236.1			174.0
Turn Bay Length (m)	135.0			100.0				40.0	
Base Capacity (vph)	338	775	756	132	332	975	1524	855	1848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.44	0.45	0.20	0.33	0.97	0.55	0.79	0.31

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis — Future Total 2036 - Without Metrolinx

3: Waterdown Road & Highway 403 EB Off-Ramp/S Service Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	315	315	25	0	100	0	880	775	630	540	0
Future Volume (vph)	330	315	315	25	0	100	0	880	775	630	540	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	6.0	6.0	7.0		7.0		6.0	3.0	2.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1728	1881	1507	1430		1426		3406	1524	3426	3343	
Flt Permitted	0.95	1.00	1.00	0.56		1.00		1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1728	1881	1507	838		1426		3406	1524	1131	3343	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	355	339	339	27	0	108	0	946	833	677	581	0
RTOR Reduction (vph)	0	0	150	0	0	98	0	0	0	0	0	0
Lane Group Flow (vph)	355	339	189	27	0	10	0	946	833	677	581	0
Heavy Vehicles (%)	1%	1%	6%	22%	0%	12%	0%	6%	6%	4%	8%	0%
Turn Type	Prot	NA	Perm	Perm		Prot		NA	Free	Prot	NA	
Protected Phases	7	4				8		2		1	6	
Permitted Phases			4	8					Free			
Actuated Green, G (s)	22.5	40.7	40.7	10.2		10.2		33.3	120.0	29.0	65.3	
Effective Green, g (s)	23.5	41.7	41.7	11.2		11.2		34.3	120.0	30.0	66.3	
Actuated g/C Ratio	0.20	0.35	0.35	0.09		0.09		0.29	1.00	0.25	0.55	
Clearance Time (s)	7.0	7.0	7.0	8.0		8.0		7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	338	653	523	78		133		973	1524	856	1847	
v/s Ratio Prot	c0.21	0.18				0.01		c0.28		c0.20	0.17	
v/s Ratio Perm			0.13	0.03					c0.55			
v/c Ratio	1.05	0.52	0.36	0.35		0.08		0.97	0.55	0.79	0.31	
Uniform Delay, d1	48.2	31.2	29.2	51.0		49.7		42.4	0.0	42.1	14.5	
Progression Factor	1.00	1.00	1.00	0.98		1.14		0.97	1.00	1.21	1.01	
Incremental Delay, d2	62.7	0.7	0.4	2.7		0.2		20.2	1.2	4.7	0.4	
Delay (s)	111.0	31.9	29.6	52.5		57.0		61.2	1.2	55.5	15.2	
Level of Service	F	C	C	D		E		E	A	E	B	
Approach Delay (s)		58.3			56.1			33.1			36.9	
Approach LOS		E			E			C			D	

Intersection Summary				
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.0	
Intersection Capacity Utilization	80.6%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	EBL	EBR	NBT
Lane Group Flow (vph)	1189	168	37
v/c Ratio	0.98	0.12	0.27
Control Delay	34.2	0.6	57.9
Queue Delay	11.2	0.0	0.0
Total Delay	45.4	0.6	57.9
Queue Length 50th (m)	~329.4	0.0	8.8
Queue Length 95th (m)	#403.8	5.1	20.3
Internal Link Dist (m)	190.8		55.4
Turn Bay Length (m)			
Base Capacity (vph)	1208	1454	136
Starvation Cap Reductn	51	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.03	0.12	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1130	160	10	25	0	0
Future Volume (vph)	1130	160	10	25	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.6	3.6	3.6	3.6
Total Lost time (s)	5.0	5.0		6.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.99		
Satd. Flow (prot)	1342	1597		1821		
Flt Permitted	0.95	1.00		0.99		
Satd. Flow (perm)	1342	1597		1821		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1189	168	11	26	0	0
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	1189	144	0	37	0	0
Heavy Vehicles (%)	30%	0%	0%	4%	0%	0%
Turn Type	Prot	Perm	Split	NA		
Protected Phases	2 6		4	4		
Permitted Phases		2 6				
Actuated Green, G (s)	102.2	102.2		4.8		
Effective Green, g (s)	103.2	103.2		5.8		
Actuated g/C Ratio	0.86	0.86		0.05		
Clearance Time (s)				7.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	1154	1373		88		
v/s Ratio Prot	c0.89			c0.02		
v/s Ratio Perm		0.09				
v/c Ratio	1.03	0.11		0.42		
Uniform Delay, d1	8.4	1.3		55.5		
Progression Factor	1.52	1.57		1.00		
Incremental Delay, d2	32.1	0.1		3.2		
Delay (s)	44.9	2.2		58.7		
Level of Service	D	A		E		
Approach Delay (s)	39.6			58.7	0.0	
Approach LOS	D			E	A	

Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	195	1460	10	0	880
Future Volume (Veh/h)	0	195	1460	10	0	880
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	212	1587	11	0	957
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			117			260
pX, platoon unblocked	0.75	0.71			0.71	
vC, conflicting volume	2071	799			1598	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1300	0			1026	
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	73			100	
cM capacity (veh/h)	116	775			486	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	212	1058	540	478	478
Volume Left	0	0	0	0	0
Volume Right	212	0	11	0	0
cSH	775	1700	1700	1700	1700
Volume to Capacity	0.27	0.62	0.32	0.28	0.28
Queue Length 95th (m)	8.9	0.0	0.0	0.0	0.0
Control Delay (s)	11.4	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.4	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	59.4%	ICU Level of Service	B	
Analysis Period (min)	15			



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	23	227	6	1546	261	738
v/c Ratio	0.16	0.20	0.67	0.02	0.70	0.67	0.27
Control Delay	2.4	53.5	16.5	11.0	17.3	35.5	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	53.5	16.5	11.0	17.3	35.5	2.3
Queue Length 50th (m)	0.0	5.5	0.0	0.5	111.7	34.0	12.4
Queue Length 95th (m)	0.2	13.2	21.6	2.9	190.7	61.7	26.7
Internal Link Dist (m)	95.0	120.3			324.2		93.2
Turn Bay Length (m)				35.0		45.0	
Base Capacity (vph)	237	245	470	368	2207	526	2768
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.09	0.48	0.02	0.70	0.50	0.27

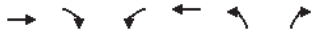
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	10	20	0	200	5	1260	100	230	640	10
Future Volume (vph)	10	0	10	20	0	200	5	1260	100	230	640	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Total Lost time (s)		6.0			6.0	6.0	5.0	5.0		2.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1184			1641	1495	1454	3394		1728	3379	
Flt Permitted		0.83			0.74	1.00	0.37	1.00		0.10	1.00	
Satd. Flow (perm)		1010			1283	1495	568	3394		182	3379	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	0	11	23	0	227	6	1432	114	261	727	11
RTOR Reduction (vph)	0	20	0	0	0	207	0	3	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	23	20	6	1543	0	261	737	0
Confl. Bikes (#/hr)									10			5
Heavy Vehicles (%)	42%	100%	50%	10%	50%	8%	20%	4%	3%	1%	6%	44%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	5	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		9.7			9.7	9.7	77.0	77.0		97.3	97.3	
Effective Green, g (s)		10.7			10.7	10.7	78.0	78.0		98.3	98.3	
Actuated g/C Ratio		0.09			0.09	0.09	0.65	0.65		0.82	0.82	
Clearance Time (s)		7.0			7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		90			114	133	369	2206		384	2767	
v/s Ratio Prot								c0.45		c0.10	0.22	
v/s Ratio Perm		0.00			c0.02	0.01	0.01			0.45		
v/c Ratio		0.02			0.20	0.15	0.02	0.70		0.68	0.27	
Uniform Delay, d1		49.9			50.7	50.5	7.4	13.5		23.4	2.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.67	0.78	
Incremental Delay, d2		0.1			0.9	0.5	0.1	1.9		4.5	0.2	
Delay (s)		50.0			51.6	51.0	7.5	15.3		43.5	2.2	
Level of Service		D			D	D	A	B		D	A	
Approach Delay (s)		50.0			51.0			15.3			13.0	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	71.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	85	30	0	70	5
Future Volume (Veh/h)	0	85	30	0	70	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	92	33	0	76	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)						
pX, platoon unblocked						
vC, conflicting volume			92		66	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		66	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	100
cM capacity (veh/h)			1515		924	1091

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	33	81
Volume Left	0	33	76
Volume Right	92	0	5
cSH	1700	1515	933
Volume to Capacity	0.05	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.3
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

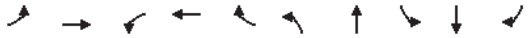
Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	55	235	40	40	95	0	80	20	20	0	70	45
Future Volume (Veh/h)	55	235	40	40	95	0	80	20	20	0	70	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	71	301	51	51	122	0	103	26	26	0	90	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		144										
pX, platoon unblocked				0.99			0.99	0.99	0.99	0.99	0.99	
vC, conflicting volume	122			352			796	692	326	732	718	122
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	122			337			786	682	311	721	708	122
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	95			96			50	92	96	100	72	94
cM capacity (veh/h)	1478			1218			208	337	724	288	326	913

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	423	173	155	148
Volume Left	71	51	103	0
Volume Right	51	0	26	58
cSH	1478	1218	254	436
Volume to Capacity	0.05	0.04	0.61	0.34
Queue Length 95th (m)	1.2	1.0	29.0	11.9
Control Delay (s)	1.6	2.6	39.0	17.4
Lane LOS	A	A	E	C
Approach Delay (s)	1.6	2.6	39.0	17.4
Approach LOS			E	C

Intersection Summary					
Average Delay			10.9		
Intersection Capacity Utilization			40.4%	ICU Level of Service	A
Analysis Period (min)			15		



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	803	1219	90	420	303	106	415	282	202	229
v/c Ratio	1.10	0.70	0.99	0.54	0.53	0.38	0.92	1.00	0.28	0.32
Control Delay	103.4	23.2	136.7	40.4	8.2	38.5	66.3	82.0	23.9	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.4	23.2	136.7	40.4	8.2	38.5	66.3	82.0	23.9	4.1
Queue Length 50th (m)	~108.8	106.4	20.3	44.2	0.9	19.7	89.0	45.3	30.3	0.0
Queue Length 95th (m)	#147.6	132.4	#54.3	60.7	24.3	36.8	#147.1	#101.8	48.4	15.1
Internal Link Dist (m)		134.8		135.9			101.9		324.2	
Turn Bay Length (m)	60.0		50.0			50.0				50.0
Base Capacity (vph)	732	1738	91	781	568	290	464	281	724	715
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.70	0.99	0.54	0.53	0.37	0.89	1.00	0.28	0.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis — Future Total 2036 - Without Metrolinx

10: Lasalle Park Road/Waterdown Road & Plains Road — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	755	980	165	85	395	285	100	325	65	265	190	215
Future Volume (vph)	755	980	165	85	395	285	100	325	65	265	190	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5
Total Lost time (s)	6.0	5.0		5.0	5.0	5.0	6.0	6.0		2.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3255	3408		1670	3438	1489	1720	1797		1615	1810	1446
Flt Permitted	0.95	1.00		0.23	1.00	1.00	0.63	1.00		0.15	1.00	1.00
Satd. Flow (perm)	3255	3408		405	3438	1489	1142	1797		254	1810	1446
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)	803	1043	176	90	420	303	106	346	69	282	202	229
RTOR Reduction (vph)	0	12	0	0	0	230	0	7	0	0	0	139
Lane Group Flow (vph)	803	1207	0	90	420	73	106	408	0	282	202	90
Confl. Peds. (#/hr)	10		10	10		10	5		10	10		5
Confl. Bikes (#/hr)			10			5						
Heavy Vehicles (%)	4%	3%	2%	4%	5%	5%	1%	2%	6%	8%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	1
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases				6		6	4			8		8
Actuated Green, G (s)	23.8	54.8		24.0	24.0	24.0	26.2	26.2		42.2	42.2	42.2
Effective Green, g (s)	24.8	55.8		25.0	25.0	25.0	27.2	27.2		43.2	43.2	43.2
Actuated g/C Ratio	0.23	0.51		0.23	0.23	0.23	0.25	0.25		0.39	0.39	0.39
Clearance Time (s)	7.0	6.0		6.0	6.0	6.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	733	1728		92	781	338	282	444		272	710	567
v/s Ratio Prot	c0.25	0.35			0.12			c0.23		c0.13	0.11	
v/s Ratio Perm				c0.22		0.05	0.09			0.27		0.06
v/c Ratio	1.10	0.70		0.98	0.54	0.22	0.38	0.92		1.04	0.28	0.16
Uniform Delay, d1	42.6	20.7		42.2	37.4	34.5	34.4	40.3		28.7	22.8	21.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	62.4	2.4		88.0	2.6	1.5	0.8	23.9		64.4	0.2	0.1
Delay (s)	105.0	23.0		130.3	40.1	36.0	35.2	64.2		93.1	23.1	21.8
Level of Service	F	C		F	D	D	D	E		F	C	C
Approach Delay (s)		55.6			48.5			58.3			50.4	
Approach LOS		E			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	53.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	92.8%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Queues — Future Total 2036 - Without Metrolinx

11: Plains Road & Cooke Boulevard — AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	106	1367	911	205
v/c Ratio	0.25	0.60	0.48	0.71
Control Delay	6.4	10.5	14.1	44.7
Queue Delay	0.0	0.9	0.0	0.0
Total Delay	6.4	11.5	14.1	44.7
Queue Length 50th (m)	5.3	68.5	51.4	33.2
Queue Length 95th (m)	13.4	113.6	86.1	53.1
Internal Link Dist (m)		135.9	143.9	319.9
Turn Bay Length (m)	60.0			
Base Capacity (vph)	475	2272	1901	385
Starvation Cap Reductn	0	575	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.81	0.48	0.53

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	95	1230	745	75	110	75
Future Volume (vph)	95	1230	745	75	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	2.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frt	1.00	1.00	0.99		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1631	3282	3241		1381	
Flt Permitted	0.26	1.00	1.00		0.97	
Satd. Flow (perm)	439	3282	3241		1381	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1367	828	83	122	83
RTOR Reduction (vph)	0	0	6	0	27	0
Lane Group Flow (vph)	106	1367	905	0	178	0
Heavy Vehicles (%)	7%	10%	9%	4%	36%	12%
Bus Blockages (#/hr)	0	0	6	6	0	0
Turn Type	pm+pt	NA	NA		Perm	
Protected Phases	5	2	6			
Permitted Phases	2				8	
Actuated Green, G (s)	68.1	68.1	57.5		17.9	
Effective Green, g (s)	69.1	69.1	58.5		18.9	
Actuated g/C Ratio	0.69	0.69	0.58		0.19	
Clearance Time (s)	3.0	7.0	7.0		7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	405	2267	1895		261	
v/s Ratio Prot	0.02	c0.42	0.28			
v/s Ratio Perm	0.16				c0.13	
v/c Ratio	0.26	0.60	0.48		0.68	
Uniform Delay, d1	5.9	8.2	12.0		37.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	1.2	0.9		7.2	
Delay (s)	6.2	9.4	12.8		44.9	
Level of Service	A	A	B		D	
Approach Delay (s)		9.2	12.8		44.9	
Approach LOS		A	B		D	

Intersection Summary				
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	54.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	1869	120	16
v/c Ratio	0.58	0.04	0.12
Control Delay	3.8	1.2	24.5
Queue Delay	0.1	0.0	0.0
Total Delay	3.9	1.2	24.5
Queue Length 50th (m)	3.7	0.0	1.6
Queue Length 95th (m)	131.4	3.3	6.4
Internal Link Dist (m)	215.9	190.8	64.4
Turn Bay Length (m)			
Base Capacity (vph)	3234	3357	134
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	195	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.62	0.04	0.12

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1705	15	0	110	15	0
Future Volume (vph)	1705	15	0	110	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.3	3.5
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3476			3610	899	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3476			3610	899	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1853	16	0	120	16	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	1868	0	0	120	16	0
Confl. Peds. (#/hr)						10
Heavy Vehicles (%)	3%	87%	0%	0%	94%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	4	
Permitted Phases						
Actuated Green, G (s)	44.4			44.4	1.6	
Effective Green, g (s)	45.4			45.4	2.6	
Actuated g/C Ratio	0.76			0.76	0.04	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2630			2731	38	
v/s Ratio Prot	c0.54			0.03	c0.02	
v/s Ratio Perm						
v/c Ratio	0.71			0.04	0.42	
Uniform Delay, d1	3.8			1.8	28.0	
Progression Factor	1.42			0.90	1.00	
Incremental Delay, d2	1.3			0.0	7.4	
Delay (s)	6.8			1.7	35.3	
Level of Service	A			A	D	
Approach Delay (s)	6.8			1.7	35.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

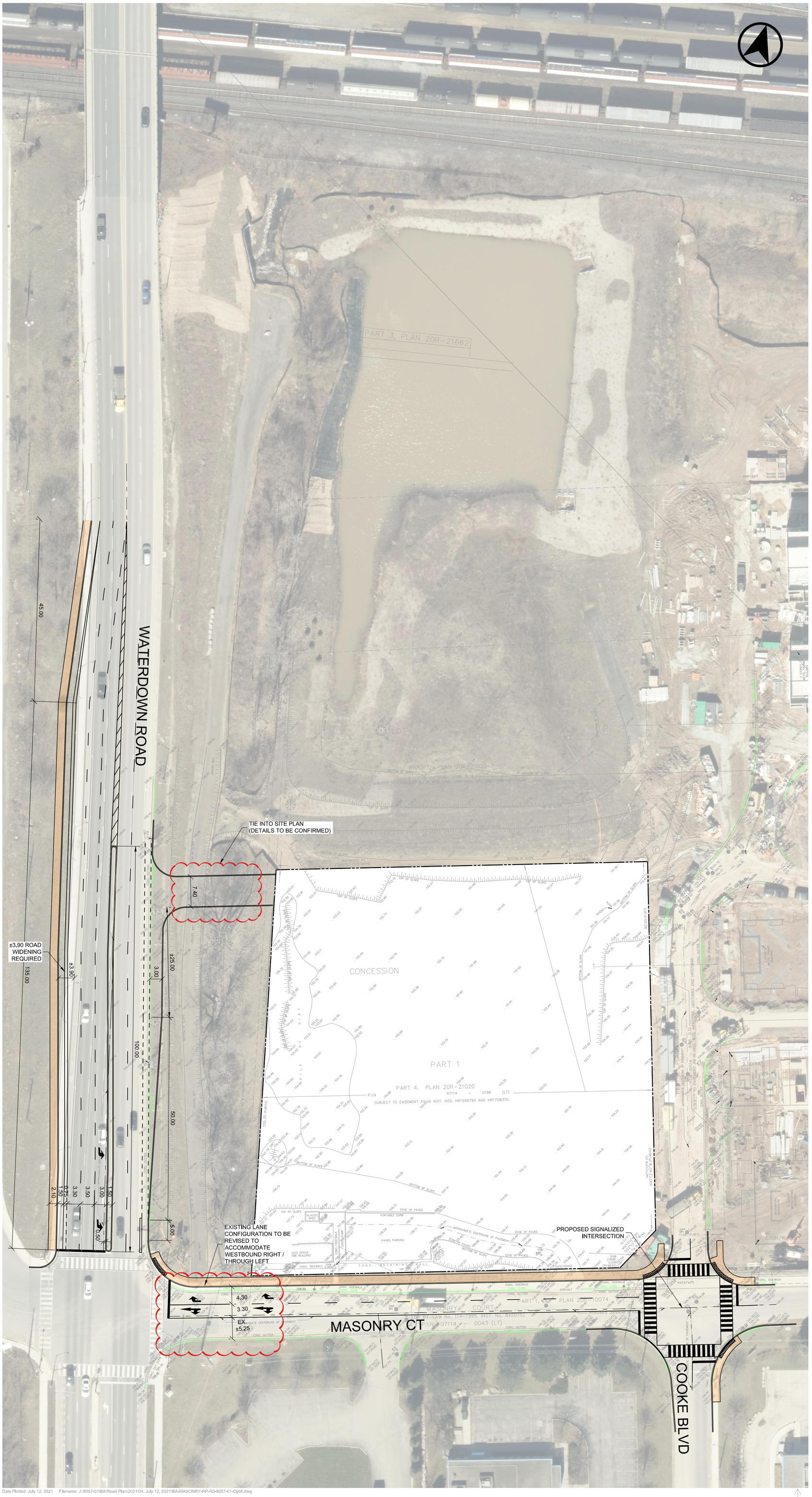
APPENDIX G:
Functional Road Plan

GENERAL NOTES

1. SURVEY PREPARED BY R. AVIS SURVEYING INC. DATED MARCH 2021
2. ARCHITECTURAL PLANS PREPARED BY CORE ARCHITECTS AND RECEIVED ON MAY 21, 2021
3. AERIAL DATED 2019

DRAFT

FOR DISCUSSION PURPOSES ONLY
NOT APPROVED FOR CONSTRUCTION



00	MM-DD-YR	INT	REVISION NOTE

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MOVEMENT IN URBAN ENVIRONMENTS
BAGROUP.COM

101 MASONRY COURT

DRAFT FUNCTIONAL DESIGN
WATERDOWN RD / MASONRY CT
OPT A - 135m (STORAGE) + 45m (TAPER)

Date: JUNE 2021

Project No.: 8057-01

Scale: 1:500 (0 5 10 15 20m)

FD-01A

Date Plotted: July 12, 2021 Filename: J:\8057-01\BA\Road Plan\2021\04. July 12, 2021\BA-MASONRY-RP-R0-8057-01-OptA.dwg