Final Report

Orleans Health Hub (OHH)

2225 Mer Bleue Road

Transportation Impact Study

Toronto, Ontario
March 28, 2018

Executive Summary

Introduction

HDR Corporation has been retained to undertake a Transportation Impact Study for the proposed Orleans Health Hub (OHH) at the north-east quadrant of Mer Bleue Road and Brian Coburn Boulevard. The Health Hub will include services for geriatrics, youth, mental health, and diagnostics (MRI, X-ray, and Ultrasound) but will not include any urgent care facility or outpatient surgery. The proposed development includes a one-storey building with construction estimated to begin in 2019.

A surface parking lot of 242 parking stalls will be developed north of the building to accommodate parking demand as per the requirements of Zoning By-law 2008-250.

Two driveway access points are proposed, a right-in / right-out driveway on Mer Bleue Road which will serve as the main access to the parking lot and pick-up/drop-off area for the building, and a full-movement driveway on Brian Coburn Boulevard to serve as the loading access for the building. A potential extension of this driveway to connect to the parking lot is also contemplated in the long term plans for the development. The study did not assess this long term potential connection.

The study assessed the impacts of the development on the surrounding transportation network and this report documents the findings, which is summarized below.

Findings

Traffic Operations

It was found that most of the adjacent intersections to the proposed development will continue to operate with residual capacity. Only the signalized intersection of Innes Road / Mer Bleue Road and the westbound leg of the roundabout at Mer Bleue Road / Brian Coburn Boulevard will be operating under high-delay conditions, primarily due to existing and future background traffic growth both in 2019 and 2024.

However, the proposed development trips will only add a relatively small amount of new traffic onto the surrounding road network and only will contribute a nominal increase to volume to capacity (v/c) ratios (6% increase) and levels of service at the study area intersections. The marginal delays at these two location will occur on already-congested movements that should not be attributable to the proposed Health Hub as existing traffic and background traffic would have triggered road improvements without the Health Hub (based on approaching or exceeding v/c ratios of 1 and LOS F).

To improve the operations of the signalized intersection of Innes Road / Mer Bleue Road, intersection and lane capacity improvement options can be explored further based on discussions with the City. We have recommended only optimized timings and increased cycle lengths for the AM peak hour.

For the Mer Bleue Road / Brian Coburn Boulevard roundabout, we have also recommended for consideration, increasing the westbound approach lane from one to two lanes to accommodate adding a right turn slip lane to increase capacity for the westbound direction.

No external road improvements will be required on Mer Bleue Road and Brian Coburn Boulevard to accommodate the proposed site access driveways.

Transit Ridership and Bicycle/Walk Routes

The proposed development site is well connected with existing and planned bus transit routes, bicycle routes and pedestrian sidewalks along the public roads. No improvements are required to add additional transit services or to provide additional active transportation facilities on the public right-of-way; however, pedestrian connections are proposed-on site to connect sidewalks with the proposed entrances to the Health Hub building and a new future bus stop closer to the roundabout at Mer Bleue Road / Brian Coburn Boulevard and the west entrance should be considered.

Parking Needs

A total of 242 parking spaces is provided in the main parking lot for both visitors and employees according to the Zoning By-law 2008 -250. Also, additional parking for para-transit vehicles and passenger drop-offs are provided in the west-entrance of the development.

Loading

Loading for the proposed development will be provided at the east side of the building using a proposed full-movement driveway that will lead to Chaperal Private and Brian Coburn Boulevard. This full movement access already exists to serve the neighbouring townhouse development and the amount of loading activity will be minimal to create any conflict with residential traffic from this townhouse development.

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1 Introduction

HDR Corporation has been retained to undertake a Transportation Impact Study for the proposed Orleans Health Hub (OHH) at the north-east quadrant of Mer Bleue Road and Brian Coburn Boulevard. The Health Hub will include services for geriatrics, youth, mental health, and diagnostics (MRI, X-ray, and Ultrasound) but will not include any urgent care facility or outpatient surgery. The proposed development includes a one-storey building with construction estimated to begin in 2019.

The site location is shown in **Exhibit 1**. The proposed site parcel (2225 Mer Bleue Road) is identified as a mixed use area. (Source: Mer Bleue Community Design Plan[1]).

A Transportation Impact Study is required to assess the operational impacts of the proposed Health Hub on the surrounding road network, and a Parking Assessment is required to determine the needs of the proposed building and existing building in terms of number of parking spaces for all users.

Two driveway access points are proposed, a right-in / right-out driveway on Mer Bleue Road which will serve as the main access to the parking lot and pick-up/drop-off area for the building, and a full-movement driveway on Brian Coburn Boulevard to serve as the loading access for the building. A potential extension of this driveway to connect to the parking lot is also contemplated in the long term plans for the development. The study did not assess this long term potential connection.

A surface parking lot of 242 parking stalls will be developed north of the building to accommodate parking demand as per the requirements of Zoning By-law 2008-250.

This report documents the study scope of work, assumptions, and findings in the following chapters.

1.1 Scope of Work

The scope of work has been prepared in accordance with the **City of Ottawa Guidelines for the Preparation of Transportation Impact Assessment (TIA) Guidelines** (2017). The scope of work is as follows:

Study Area

- Bounded to the north by Innes, to the south by Brian Coburn, to the east by Gerry Lalonde Drive, and to the west by Mer Bleue Road

Scenarios

- Existing 2017 Traffic Conditions
- Buildout/full occupancy of the development:
  - 2019 Background Traffic Conditions
    Includes general background traffic growth in the vicinity of the site.
  - 2019 Total Traffic Conditions
    Includes 2019 background plus the proposed development
- Buildout/full occupancy + 5 years after the development:
  - 2024 Background Traffic Conditions
    Includes general background traffic growth in the vicinity of the site.

[1]https://ottawa.ca/en/mer-bleue-community-design-plan

- 2024 Total Traffic Conditions
  Includes 2024 background plus the proposed development

Time Periods

- Weekday AM Peak Hour (between 7:00 am and 9:00 am)
- Weekday PM Peak Hour (between 4:00pm and 6:00pm)

Intersections to be analyzed

- Brian Coburn Boulevard and Mer Bleue Road (Roundabout)
- Innes Road and Mer Bleue Road (Signalized)
- Brain Coburn Boulevard and Gerry Lalonde Drive (Unsignalized)
- Site Driveway at Mer Bleue Road (Access 1)
- Site Driveway at Brian Coburn Boulevard (Access 2)

Exhibit 1: Site Location

1.2 Intersection Operations and Analysis Methodology

Intersection operations were assessed for the site driveways and study intersections using the software program Synchro 9. The roundabout in the study area was assessed with SIDRA Intersection 7 as it is one of the more reliable tools (compared with Synchro) for its modelling and analysis capability of roundabouts. For both Synchro and SIDRA programs, the analysis followed the Highway Capacity Manual (HCM2000) methodology.

The signalized and unsignalized intersection analysis considers two separate measures of performance:

- the capacity of all intersection movements, which is based on a volume to capacity ratio; and
- the level of service for all intersection movements, which is based on the average control delay per vehicle for the various movements through the intersection and overall.

Level of service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay. The volume to capacity (v/c) ratio is a measure of the degree of capacity utilized at an intersection. The analysis also followed the City of Ottawa Guidelines for Synchro Analysis Parameters (June, 2017).

1.2.1 SIDRA Intersection Analysis of Roundabouts

The SIDRA Intersection has two model options for analysis of roundabouts: the Sidra Standard roundabout capacity model as well as the Sidra Standard delay model. SIDRA HCM methodology is based on empirical data from North America whereas Sidra Standard methodology is based on empirical data from Australia where roundabouts are more common. Hence, this study adopted the SIDRA HCM methodology (i.e. to be consistent with the North American driving behaviors).

As HCM standard methodology is overly conservative compared to other parts of the world, some field studies about Gap Acceptance Parameters of locally observed roundabouts in Canada observed that the critical gap time and follow up gap times vary within the range of 3.0 to 3.9 seconds, and 2.2 to 2.7 seconds[2]. These gap times decrease based on driver's familiarity of the roundabout and during congestion when drivers seems to take aggressive maneuvering due to impatience. This study adopted a critical gap time of 3.5 seconds and a follow-up gap time of 2.5 seconds, which represent average driver behavior.

The selected roundabout level of service method followed the same delay thresholds (in seconds) that are used to assign level of service grades for signalized intersections.

2 Existing Conditions

2.1 Site Context

The site is bound by Mer Bleue Road to the west and by Brian Coburn Boulevard to the south. Currently, there is no existing development adjacent to the north-east corner of the roundabout of

[2] *Kearney Lake Road Roundabout Traffic Operational Review (Griffin Transportation Group Inc., March 2013)*

Mer Bleue Road and Brian Coburn Boulevard. Site Access 1 from Mer Bleue Road does not exist yet, but Site Access 2 from Brain Coburn Boulevard will be constructed as an extension of Chaperal Private. Site Access 1 is intended to accommodate all incoming and outgoing employee, patient, and visitor trips to/from the development site, whereas Site Access 2 is only to be used for accessing the loading area of the proposed development by commercial vehicles.

2.2 Existing Road Network

The existing road network is described below and is also illustrated in **Exhibit 2**.

Innes Road	Innes Road is a 4-lane median-divided arterial road running in the east-west direction throughout Orleans. It has exclusive bicycle lanes on both sides of the road. The speed limit of this arterial road within the study area is 60 kph.
Mer Bleue Road	Mer Bleue Road is a 4-lane median-divided arterial road within the study area running in the north-south direction. There are also exclusive bicycle lanes on both sides of the road within the study area. It will serve as the main access road to the development site with the Access 1 driveway. The speed limit of this road segment is 60 kph.
Brian Coburn Boulevard	Brian Coburn Boulevard is a 2-lane east-west undivided arterial road within the study area. Access 2 of the proposed site will be connected to Brian Coburn Boulevard. The speed limit of this road segment is 60 kph.
Chaperal Private	This is an existing 2-lane north-south road that connects to Brian Coburn Boulevard, and currently provides access to the Gallery Townhomes development. The proposed Access 2 will be a northerly extension of this road and will only be used for loading and unloading purposes. There is no posted speed limit on this road.
Gerry Lalonde Drive	Gerry Lalonde Drive is a residential collector road between Brian Coburn Boulevard and Tenth Line Road. It has a wide 2-lane cross section and serves as the main collector of all the residential trips of south-eastern area of the Mer Bleue Community. The speed limit of this road is 50 kph.

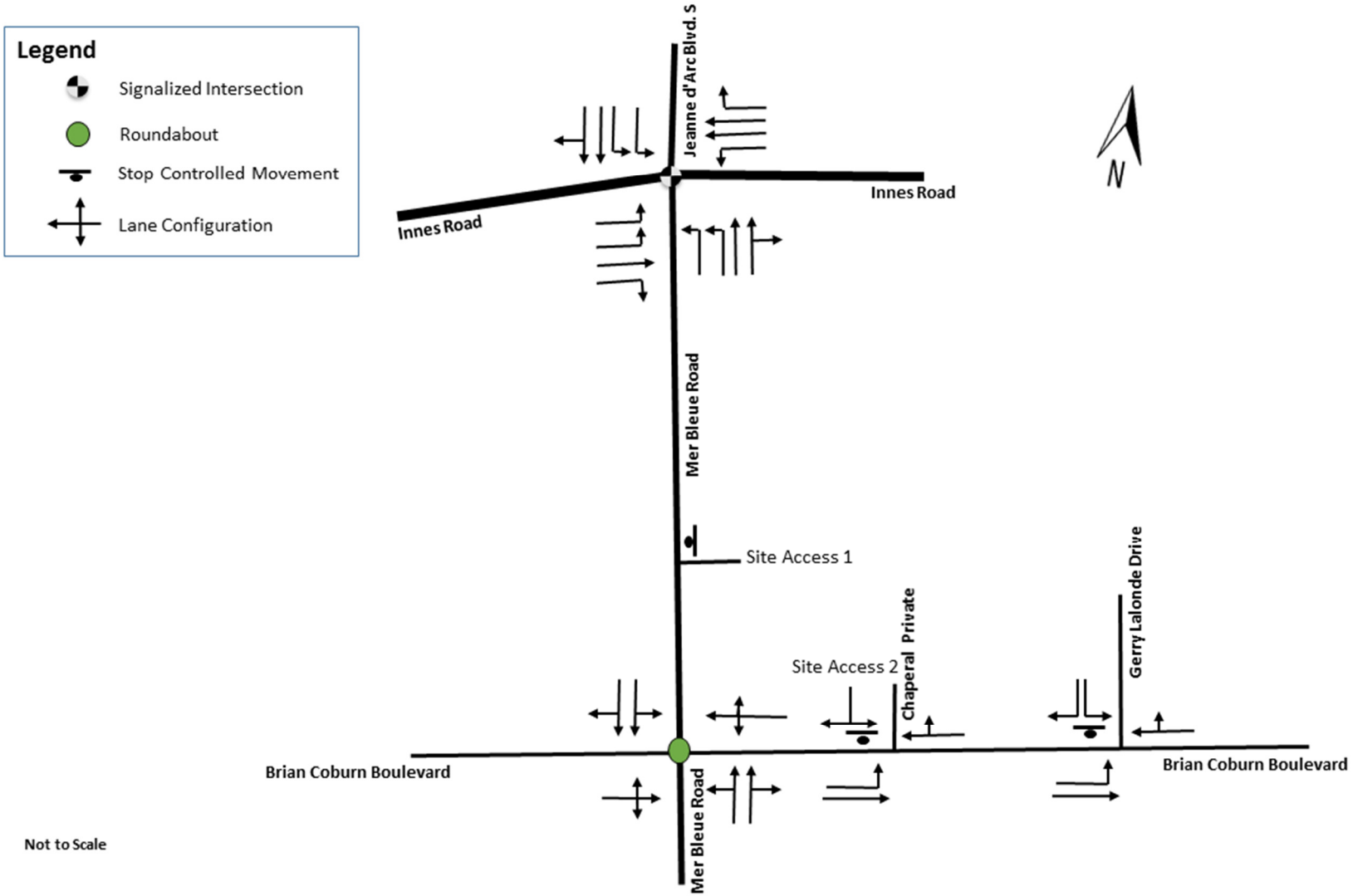


Exhibit 2: Existing Road Network and Lane Configurations

2.3 Active Transportation and Cycling

The surrounding area of the development site is already connected in terms of sidewalks and pedestrian crossings. Eastbound Brian Coburn Boulevard from Gerry Lalonde Drive before the roundabout has existing sidewalks. The sidewalk just before the roundabout is still under construction or to be constructed soon (based on Google Street View). Both sides of Mer Bleue Road from the Brian Coburn Boulevard to Innes Road have existing sidewalks and any missing gaps in sidewalk is planned to be constructed as shown in **Exhibit 3** (as excerpted from the Geographic Data of City of Ottawa[3]).

It is assumed that by the time the development site is built and operational, all the sidewalks would be implemented by then. Close to the development site, crosswalks are located on all four legs of the roundabout of Mer Bleue Road and Brian Coburn Boulevard. The roundabout crosswalk location is within approximately 150 m of the development access 1, and within approximately 200 m of the development access 2.

In terms of the surrounding cycling network, the area is also well connected. Both Innes Road and Mer Bleue Road already have existing dedicated bike lanes. Brain Coburn Boulevard also has dedicated bike lanes on the north side (i.e. from Tenth Line Road towards Mer Bleue Road) of the road. The surrounding cycle network is shown in **Exhibit 4** as excerpted from the Geographic Data of City of Ottawa[4].

[3]http://maps.ottawa.ca/geoOttawa/?layer=Pedestrains

[4]http://maps.ottawa.ca/geoOttawa/?layer=Cycling

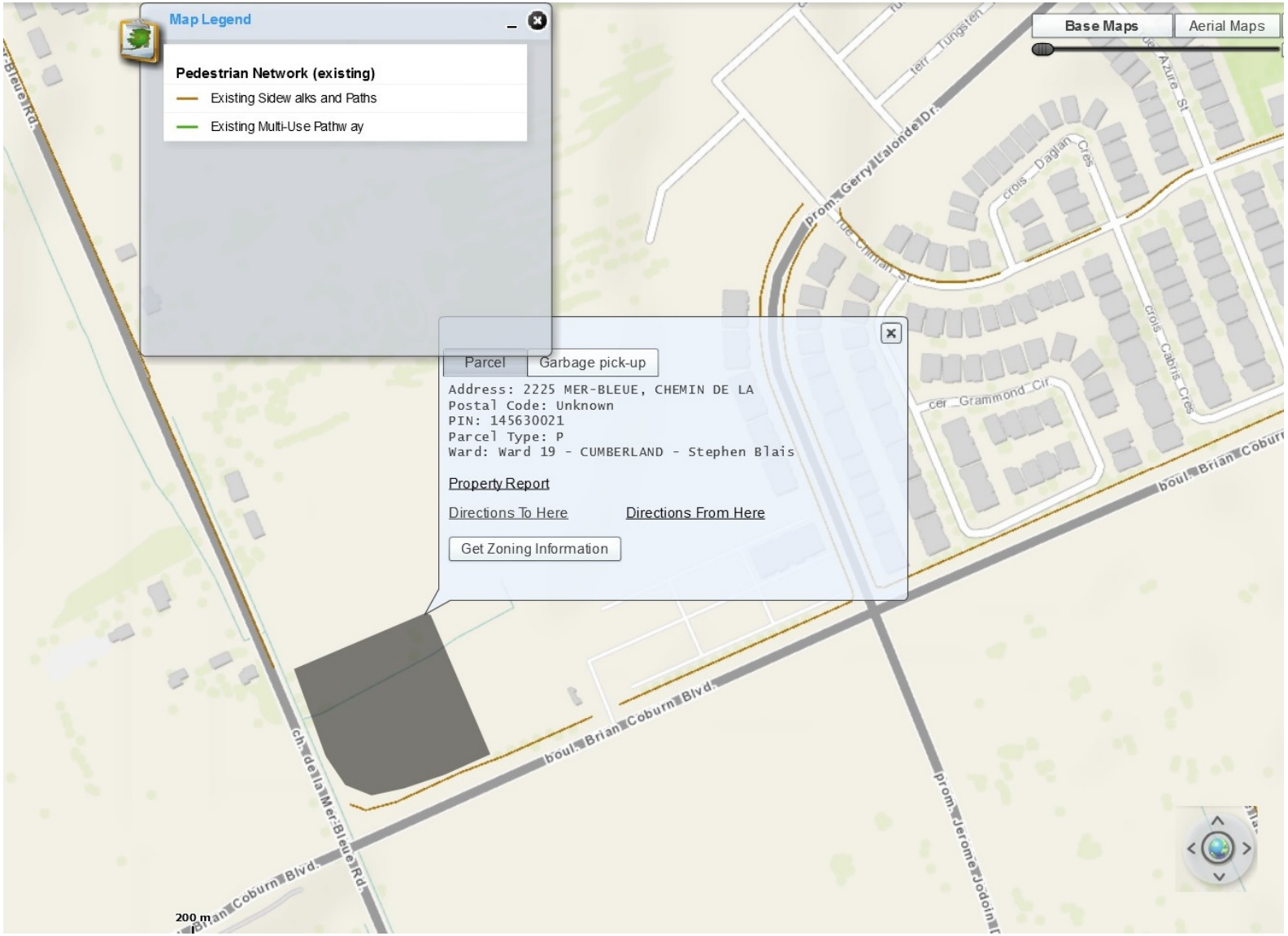


Exhibit 3: Existing Pedestrian Sidewalks and Paths

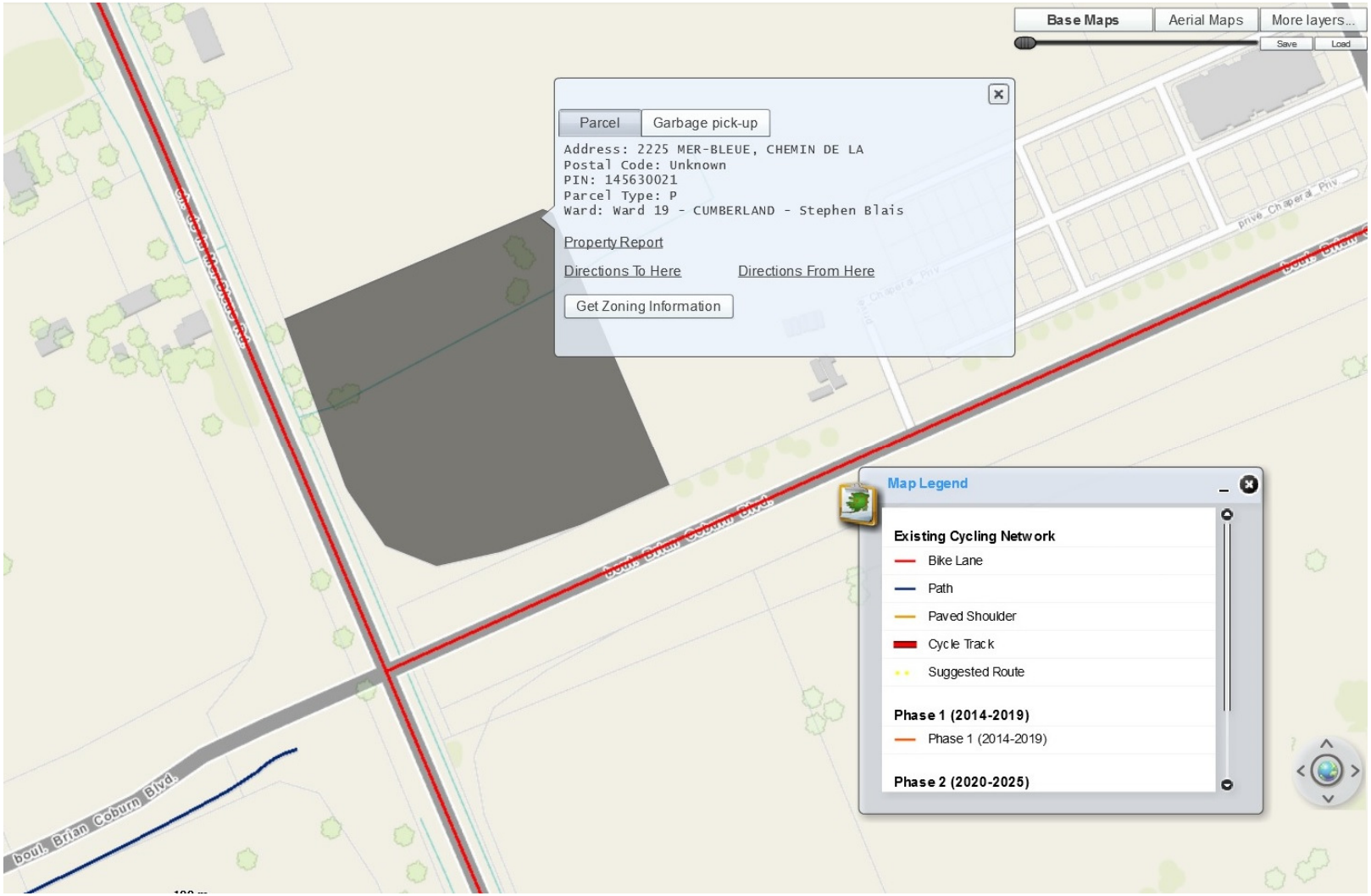


Exhibit 4: Existing Bike Lanes

2.4 Transit Service

The OC Transpo of Ottawa operates routes 30, 225, 302, 618 and 630 along Mer Bleue Road adjacent to the development site. New Connexion Route 225 does not stop close to the development site as the closest stop is located close to Mer Bleue Road / Renaud Road. Route 302 is a Shopper Route operating on Tuesdays only, also it does not stop nearby the development site. Route 618 and 630 are school routes only for the school students. Route 30 is the only local bus route available to access the development site directly as other routes bypass the bus stop at the Mer Bleue Road and Brian Coburn Boulevard roundabout.

Route 30 **"Albert/Bay - Millennium"**	Route 30 operates seven days per week and generally between the hours of 5:30 to 24:00 in weekdays. On Saturdays it operates between 7:20 to 23:30, and on Sundays it operates between 7:20 to 22:30. Currently, both peak and off-peak headways on both weekdays and weekends are approximately 30 minutes with a frequency of 2 buses per hour. Route 30 starts from the Millennium station and ends to either Blair Station or Lebreton Station.

Two bus stops to access the site are on both Mer Bleue Road and Brain Coburn Boulevard. The bus stop on both sides of Mer Bleue Road (named as Mer Bleue / Hydro stop) is approximately within 150 m of the access 1, and within 250 m to the west entrance and 230 m to the north entrance of the proposed building. The other bus stops on Brian Coburn Boulevard (named as Brian Coburn / Mer Bleue stop) is approximately within 50 m of site access 2 and 200 m from the east entrance of the proposed building. However, transit passengers who use the bus stops on Brian Coburn Boulevard can also reach the west entrance of the building which is 400 m away.

The details of the existing Bus Routes and Bus Stops surrounding the development site, excerpted from both OC Transport[5] and Google Maps[6], are illustrated in **Exhibit 5**.

[5]http://www.octranspo.com/routes

[6]https://www.google.com/maps

Exhibit 5: Existing Transit Routes and Bus Stops

2.5 Existing Traffic Volumes

Turning movement counts were performed in December 2017 for the weekday AM and PM peak periods (7:00 am to 9:00 am, and 4:00pm to 6:00pm). There is no identified peak at this time for the proposed development; however, these periods represent peak traffic generation time for the adjacent street traffic. From the traffic counts, the peak hours of the surrounding areas were identified as 7: 15 am to 8:15 am and 4:00 pm to 5:00 pm.

The existing peak hour traffic volumes are shown in **Exhibit 6**.

2.6 Existing Traffic Operations

Based on the existing traffic volumes (shown in **Exhibit 6**) and the existing road network depicted in **Exhibit 2**, existing traffic operations were assessed. Intersection operations for critical movements are summarized in **Table 1** for signalized intersections, and **Table** 2 for unsignalized intersections.

For the signalized intersection of Innes Road / Mer Bleue Road, the current signal timing plan of the AM Heavy Plan (which operates on a 120 seconds cycle) was used during the AM peak and the PM Plan (which operates on a 130 seconds cycle) was used during the PM peak for both existing conditions and also for future years. Existing signal timing plan from City of Ottawa is shown in **Appendix A**. This signal operation was modelled in Synchro 9.0 according to the *City of Ottawa Guidelines for the Preparation of Transportation Impact Assessment (TIA) Guidelines* (2017).

The roundabout of Mer Bleue Road / Brian Coburn Boulevard was modelled in SIDRA Intersection 7.0 to assess the current operational performance with 2017 existing traffic volumes.

Other unsignalized intersections were modelled in Synchro 9.0 as unsignalized intersections.

Detailed Synchro reports are provided in **Appendix B**. Detailed SIDRA analysis reports are provided in **Appendix C**.

Table 1: Existing 2017 Signalized Intersection Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LOS	v/c	Q(95th)	LOS	v/c	Q(95th)
Innes Road / Mer Bleue Road		F	1.28		D	0.75	
EB	Left	C	0.48	22.9	C	0.18	8.7
	Through	C	0.84	155.7	C	0.28	42.0
	Right	B	0.08	6.6	C	0.06	2.5
WB	Left	F	1.42	91.6	C	0.39	36.1
	Through	C	0.53	82.0	D	0.94	#194.5
	Right	C	0.56	66.1	C	0.48	45.9
NB	Left	E	0.61	26.0	D	0.40	29.3
	Through - Right	D	0.75	68.8	E	0.73	71.8
SB	Left	F	1.90	107.2	D	0.34	25.6
	Through - Right	D	0.75	72.3	D	0.32	32.3

LOS – Level of Service v/c – Volume to Capacity Ratio Q 95th – 95th percentile queue length in metres

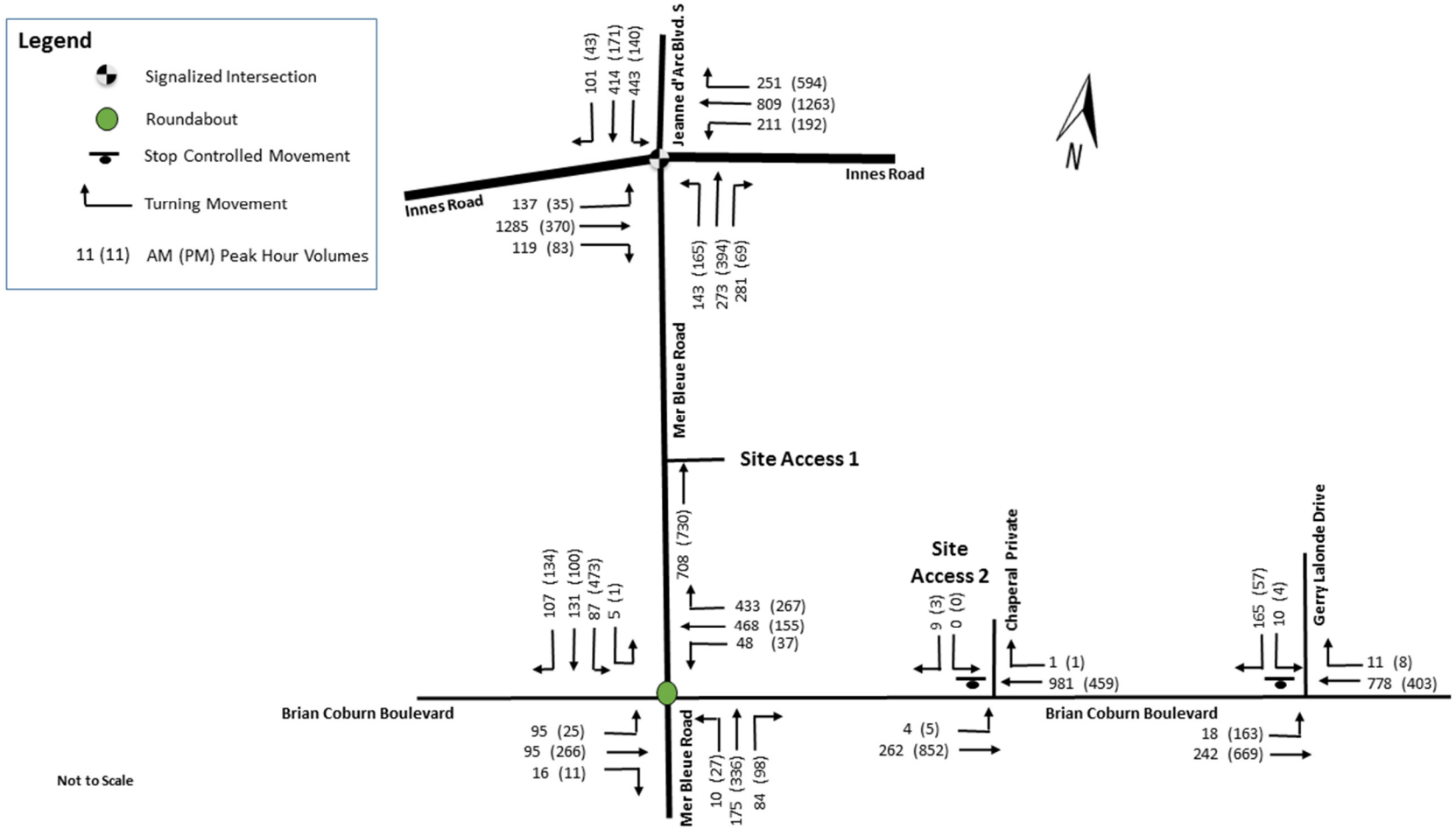


Exhibit 6: Existing 2017 Traffic Volumes

Under existing conditions, during the AM peak, eastbound through, westbound left and southbound left turn movements currently operates at capacity. The 95th percentile queue for the southbound left turn also exceeds the left-turn storage lanes. During PM peak, only the 95th percentile queue of the westbound through movement might be an issue though it's currently operating under capacity with a v/c ratio of 0.94.

Other movements during both AM and PM peaks are operating under their capacity limits (below v/c ratios of 0.94).

Table 2: Existing 2017 Unsignalized Intersections Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LOS	v/c	Q(95th)	LOS	v/c	Q(95th)
Roundabout: Mer Bleue Road / Brian Coburn Boulevard		C	0.91	109.4	A	0.46	15.3
EB	Left – Through -Right	A	0.20	4.7	A	0.36	9.7
WB	Left – Through -Right	D	0.91	109.4	A	0.46	15.3
NB	Left - Through	A	0.13	2.9	A	0.30	7.5
	Through - Right	A	0.13	2.9	A	0.30	7.5
SB	Left - Through	A	0.19	4.4	A	0.43	13.5
	Through - Right	A	0.19	4.4	A	0.21	5.2
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Chaperal Private		C	-	-	B	-	-
EB	Left	B	0.01	0.1	A	0.00	0.1
	Through	-	0.16	0.0	-	0.54	0.0
WB	Through- Right	-	0.60	0.0	-	0.29	0.0
SB	Left- Right	C	0.03	0.7	B	0.01	0.1
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Gerry Lalonde Dr.		B	-	-	A	-	-
EB	Left	A	0.02	0.5	A	0.16	4.0
	Through	-	0.15	0.0	-	0.43	0.0
WB	Through- Right	-	0.47	0.0	-	0.26	0.0
SB	Left	C	0.04	0.9	E	0.04	0.8
	Right	C	0.44	15.3	B	0.10	2.4

LOS – Level of Service v/c – Volume to Capacity Ratio Q 95th – 95th percentile queue length in metres

Also, under existing traffic conditions, all unsignalized intersections (including the roundabout) are operating with acceptable LOS levels, and all mostly below v/c ratio of 0.60 during both AM and PM peaks, except the roundabout's westbound approach during the AM peak.

This westbound approach of the roundabout lane is currently experiencing a longer queue length of 109.4 m (using 95th percentile back of queue from SIDRA analysis) with a v/c ratio of 0.91 during the AM peak. The main reason could be attributed to the relatively higher proportion of westbound right-turning traffic that have to wait on the Brian Coburn Boulevard approach, and yield to the oncoming circulatory traffic to find a safe gap to make an entry to the roundabout.

The westbound queue length can be easily accommodated through the approach lane on the Brian Coburn Boulevard.

No other movements at the unsignalized intersections show operational concerns during both peak hours.

3 Background Traffic Conditions (2019)

3.1 Planned Network Improvements

We understand that Brian Coburn Boulevard is currently being extended to the west of Mer Bleue Road. Information on other planned road network improvements was not available or identified within the study area for the opening year of 2019.

We are aware of a planned road link named ‘Jerome Jodoin Drive’ that would intersect Brian Coburn Boulevard in the vicinity of Gerry Lalonde Drive. It is yet to be developed and we assume this road could form the south leg of a future 4-legged intersection. As there is no volume forecast information for future years that is readily available, this study has continued to analyze the Brian Coburn Boulevard and Gerry Lalonde Drive intersection as an unsignalized T-intersection.

3.2 Background Traffic Volumes

Future background traffic volumes are comprised of existing traffic volumes plus general background traffic growth, plus traffic associated with nearby developments. No information of any specific background development projects nearby the site was available from the City of Ottawa, so for a conservative approach, all turning movement counts from 2017 at each of the intersections were projected with an annual rate of growth of 2% to determine 2019 background traffic volumes.

Exhibit 7 shows the projected background traffic volumes for both AM and PM peak hours in the opening year 2019.

3.3 Background Traffic Operations

Intersection operations for turning movements are summarized in **Table 3** for signalized intersections and in **Table 4** for unsignalized intersections. Synchro reports of year 2019 conditions are included in **Appendix B**, and SIDRA reports are also included in **Appendix C**.

Table 3: Opening Year 2019 Background Conditions Signalized Intersection Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LOS	v/c	Q(95th)	LOS	v/c	Q(95th)
Innes Road / Mer Bleue Road		F	1.36		E	0.89	
EB	Left	C	0.50	23.5	C	0.19	9.0
	Through	C	0.85	160.6	C	0.28	42.8
	Right	B	0.08	7.1	C	0.06	2.8
WB	Left	F	1.51	97.9	C	0.41	36.9
	Through	C	0.54	84.0	D	0.96	201.2
	Right	B	0.18	12.9	C	0.52	53.8
NB	Left	E	0.63	26.8	E	0.41	30.0
	Through - Right	D	0.78	71.6	E	0.75	73.4
SB	Left	F	1.94	109.2	D	0.35	26.1
	Through - Right	D	0.77	74.3	D	0.33	33.1

LOS – Level of Service v/c – Volume to Capacity Ratio Q 95th – 95th percentile queue length in metres

The signalized intersection of Innes/Mer Bleue Road under 2019 background traffic conditions will operate with similar conditions to 2017.

The westbound left and southbound left movements during the AM peak shows over the capacity conditions with a v/c ratio of 1.51 and 1.94, respectively. Consequently, longer delays and queue lengths for these movements are expected. Other movements during the AM peak will operate with acceptable levels of service and with v/c ratios less than 0.85.

During the PM peak, only the westbound through movement will operate close to capacity with a v/c ratio of 0.96. Other movements of this signalized intersection will operate well below capacity with v/c ratios of 0.84 or less. Otherwise, all movements during PM peak will be operating below capacity levels.

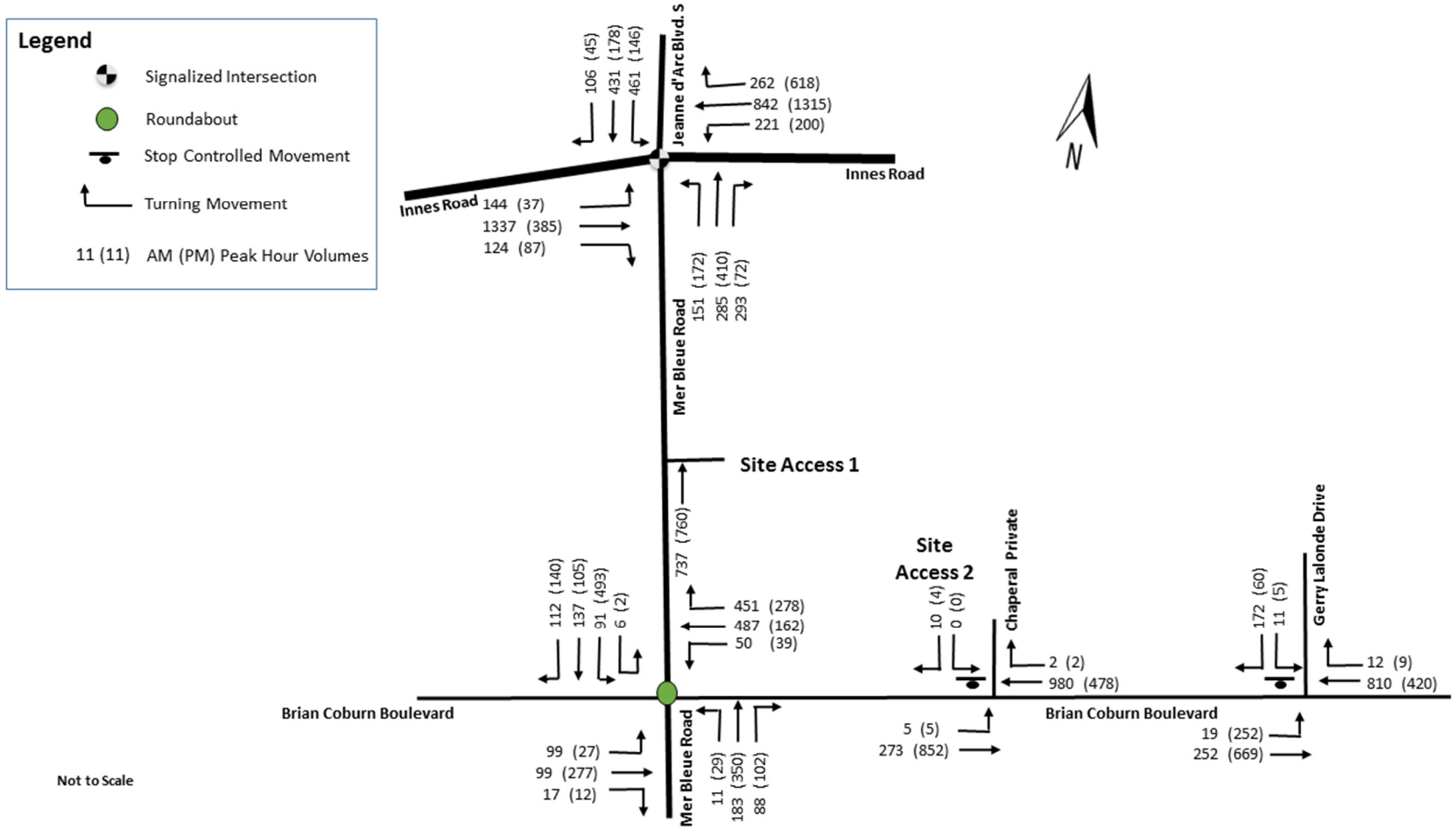


Exhibit 7: Opening Year 2019 Background Traffic Volumes

Table 4: Opening Year 2019 Background Conditions Unsignalized Intersection Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LOS	v/c	Q(95th)	LOS	v/c	Q(95th)
Roundabout: Mer Bleue Road / Brian Coburn Boulevard		C	0.96	151.7	A	0.49	17.1
EB	Left – Through -Right	A	0.21	5.0	A	0.38	10.7
WB	Left – Through -Right	E	0.96	151.7	A	0.49	17.1
NB	Left - Through	A	0.14	3.1	A	0.32	8.3
	Through - Right	A	0.14	3.1	A	0.32	8.3
SB	Left - Through	A	0.20	4.7	A	0.45	14.6
	Through - Right	A	0.20	4.7	A	0.22	5.6
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Chaperal Private		C	-	-	B	-	-
EB	Left	B	0.01	0.2	A	0.00	0.1
	Through	-	0.16	0.0	-	0.50	0.0
WB	Through- Right	-	0.58	0.0	-	0.28	0.0
SB	Left- Right	D	0.05	1.2	B	0.01	0.1
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Gerry Lalonde Dr.		B	-	-	A	-	-
EB	Left	A	0.02	0.5	A	0.25	7.0
	Through	-	0.15	0.0	-	0.43	0.0
WB	Through- Right	-	0.49	0.0	-	0.27	0.0
SB	Left	F	0.81	41.6	F	0.07	1.6
	Right	C	0.03	0.7	B	0.11	2.6

LOS – Level of Service v/c – Volume to Capacity Ratio 95th – 95th percentile queue length in metres

Under 2019 background traffic conditions, all unsignalized intersections (including the roundabout) will be operating with acceptable LOS, and with v/c ratios of 0.60 or less during both AM and PM peaks.

Only the westbound approach of the roundabout at Mer Bleue Road / Brian Coburn Boulevard will experience a longer 95th percentile queue (151.7m) which could be accommodated on Brian Coburn Boulevard. The v/c ratio of this westbound approach during AM peak is 0.96 which indicates that this movement is approaching capacity due to background traffic growth.

4 Proposed Development

4.1 Conceptual Site Plan

The conceptual site plan is shown in **Exhibit 8**.

The proposed Site Access 1 driveway from the Mer Bleue Road connects directly to the surface parking lot. This Access 1 is planned to be a right in –right out (RIRO) intersection controlled by a stop sign for the exiting traffic.

In between the access and the parking lot, there is a 2-lane internal driveway for fire, para-transit vehicles, taxis, and cars for dropping off (or picking up) passengers that will connect to the west entrance of the proposed building. At the end of this internal driveway, there are some reserved parking spots for para-transit vehicles and taxi drop-offs.

The access 2 for this site is at the back of the building and will be constructed as the extension of the existing Chaperal Private that is connected to Brian Coburn Boulevard. Chaperal Private is currently used by residents of the existing nearby townhouse development. The proposed Health Hub will only have commercial vehicles use this access for loading and unloading at the proposed development. Minimal traffic is expected to conflict with residential traffic on Chaperal Private.

4.2 Site Vehicular Traffic Trip Generation and Modal Splits

Trips Generation of the proposed OFHH was estimated from the ITE Trip Generation (9th Edition) publication. The GFA of the proposed site is 6040 sq. m (or 65,014 sq. ft.). The proposed health hub is not meant for bed-based long-term care units, so it does not fall under the category of a Hospital (ITE Land Use Code 610). The description of the features of the proposed health hub matches closely to the Clinic (ITE Land Use Code 630).

Because of the unavailability of ITE trip rates for AM peak hour, and directional distribution of PM peak hours, GFA based trip generation cannot be used. Hence, a better predictor is either ‘number of full-time doctors’ or ‘number of employees’ to predict the trips generations. However, the number of full-time doctors would generate a lower estimate of trips, a conservative approach was chosen by using ‘number of employees’ as the predictor, though using peak hour of generator trip rate for AM only can be thought of conservative analysis as the AM peak rate of adjacent street was not available.

The expected number of full-time employees of the proposed OFHH is 109. However, the business is expecting some learners from different health related institutions to work as either interns or volunteers. The expected numbers of total learners in a year would be between 240 and 341 resulting in an expected average number of 290 learners an academic year, and on average 97 learners in a semester. These learners are expected from (a) Undergraduate Medical Education (UGME) of first, second, third and fourth years (b) Post-graduate medical education (PGME), and (c) Professional students. All of these learners are not meant to be full-time regular employees who normally enter the site during AM peak hours and exit the site during PM peak hours like other regular employees. Presumably, students of these medical schools or other universities are mostly transit trip makers rather than auto trip makers in the Ottawa region.

A modal survey in 2011 on students of both University of Ottawa and University of Carleton by OC Transpo supports that students / learners are primarily transit users. The survey of shows that for University of Ottawa students, the proportion of auto and transit were 24.8% and 59% respectively, and Carleton University students, the proportion of auto and transit were 23.6% and 69.7% respectively[7].

Ignoring their part-time hours, and arrivals at site, and exiting from the site in different hours other than during peak hours, a worst-case trip generation scenario would be to consider these semester-based learners as part-time employees to be included in the trips generated for the site.

As per the Transportation Impact Assessment Guidelines (2017)[8] of City of Ottawa, "ITE Trip Generation Manual typically represent suburban or low-density conditions. Consequently, the inherent transit modes shares are low". Thus, a conversion factor of 1.278 has to be used considering inherent 10% non-auto mode share and average vehicle occupancy of 1.15 for the purposes of translating auto-trips to person-trips.

Also, as per the same TIA Guideline, the rates of TRANS Survey data of 2011[9] for the Orleans traffic analysis zone can be used to translate auto-trips into person-trips. Using this Orleans Travel survey 2011 data, we found that the average proportion of '*Auto Driver: Auto Passenger: Transit: Bicycle: Walk: Other'* respectively is "*55%:11%:23%:1%:2%:9%*' during AM peak and "*61%:20%:13%:0%:2%:4%*' during PM peak from within or outside Orleans considering only zonal percentage of work and medical trips. Also, The City of Ottawa Official Plan has a citywide target for modal split of 30% for transit. The Mer Bleue CDP is designed to accommodate transit as an integral part of community development. (Source: Mer Bleue Community Design Plan[10]).

However, considering only existing one local bus route of 30, and also assuming future minor improvement on transit supply in terms of more frequent buses close to the development site and on this south-east side of Mer Bleue Area within 7 years from now on, a conservative approach would be to take a 15% transit mode share, 15% Auto-Passenger, and 2% Bicycle or Walk for this development site. Thus, this results in 68% Auto-driver trips to and from the development site as the worst case scenario of auto-vehicle trips. It is also to be noted that no pass by trips was assumed.

Therefore, using these above rates of modal share, after converting to the Person Trips, the proposed OFHH site generates a total of 145 auto-driver trips (with 72 In and 73 Out) during AM peak hour and a total of 172 auto-driver trips (with 71 In and 101 Out) during PM peak hour.

The details of trip generation by all modes are shown in **Table 5**.

[7]http://app06.ottawa.ca/calendar/ottawa/citycouncil/ec/2011/02-07/OC%20Transpo%20Marketing%20Plan%202011%20doc%202.pdf

[8]http://documents.ottawa.ca/sites/documents.ottawa.ca/files/tia_guidelines_en.pdf

[9]http://www.ncr-trans-rcn.ca/wp-content/uploads/2013/03/300-Orleans-2011.pdf

[10]https://ottawa.ca/en/mer-bleue-community-design-plan

Table 5: Trips Generated by Proposed Development

Steps	Land Use Code	Units	AM Peak Hour			PM Peak Hour		
			Trips	In	Out	Trips	In	Out
Step 1: ITE Trip Generation Rates / Employee	Clinic 630	Employees	0.81	50%	50%	0.96	41%	59%
Step 2: Auto Trips Generated (by ITE rates)	Full-time employees	109	88	44	44	105	43	62
	Learners	97	79	39	40	93	38	55
	Auto Trips		167	83	84	198	81	117
Step 3: Conversion from Auto Trips to Person Trips	(Multiply by 1.278)		213	106	107	253	104	149
Step 4: Person Trips by Modal Share (Using Assumed Modal Share)	Auto Driver	68%	145	72	73	172	71	101
	Auto Passenger	15%	32	16	16	38	16	22
	Transit	15%	32	16	16	38	16	22
	Walk/Bike	2%	4	2	2	5	2	3

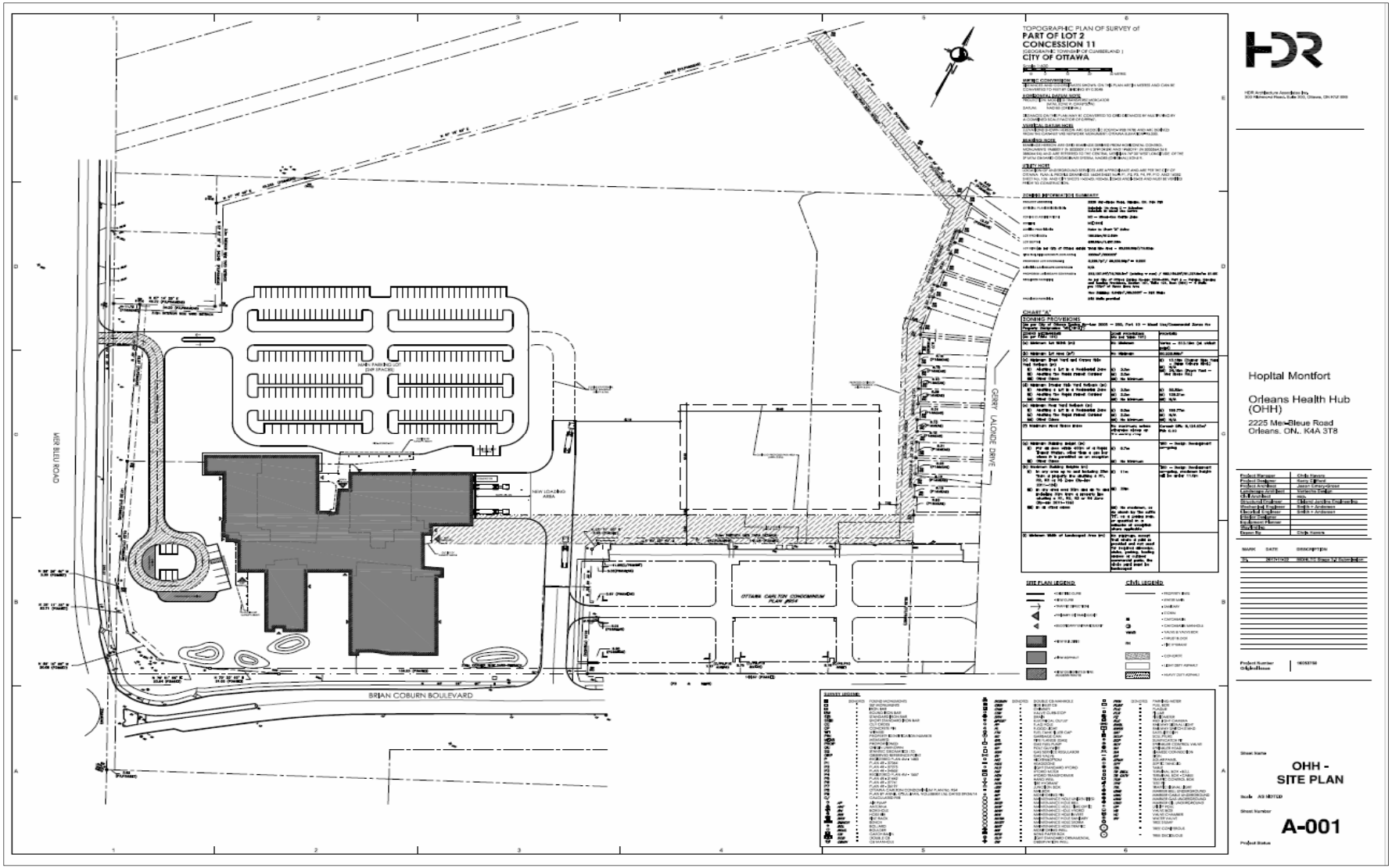


Exhibit 8: Conceptual Site Plan

4.3 Site Traffic Distribution and Assignment

Trip distribution was determined primarily from observing the existing developed (or built-up) areas surrounding the Mer Bleue Community area. The proposed trip distributions were also informed by the existing travel patterns for the overall Orleans area (from the TRANS Survey data of 2011[11]). The TRANS Survey data of 2011 shows that major trips to/from the Orleans are from within the Orleans zone, and for rest of the trips the major destinations and origins are in the north-west sides of Orleans towards Beacon Hill, Ottawa Centre, and Alta Vista. Thus, for the development site same distribution pattern is assumed to be same within the 2024 horizon. We note that all development in and out trips would be using the proposed right in and right out (RIRO) driveway on Mer Bleue Road and trip distribution was based on this only access point.

Trip distribution is summarized in **Table 6**.

Table 6: Trips Distributions to/from the Development Site

From/To (Cardinal Direction)	Trips Distribution	In-Trips		Out-trips	
		Via*	Assignment	Via*	Assignment
North	40%	Innes Road (West) Jeanne D'arc Blvd. S Innes Road (East)	10% 20% 10%	Mer Bleue Road (South)	40%
South	5%	Mer Bleue Road (South)	5%	Mer Bleue Road (South)	5%
East	20%	Innes Road (East) Brian Coburn Blvd. (East)	10% 10%	Mer Bleue Road (South)	20%
West	35%	Innes Road (West) Brian Coburn Blvd. (West)	30% 5%	Mer Bleue Road (South)	35%
Total	100%	Total	100%	Total	100%

The trip distribution percentages are also shown in **Exhibit 9,** and the resulting site auto trips on the road network are shown in **Exhibit 10**.

[11]http://www.ncr-trans-rcn.ca/wp-content/uploads/2013/03/300-Orleans-2011.pdf

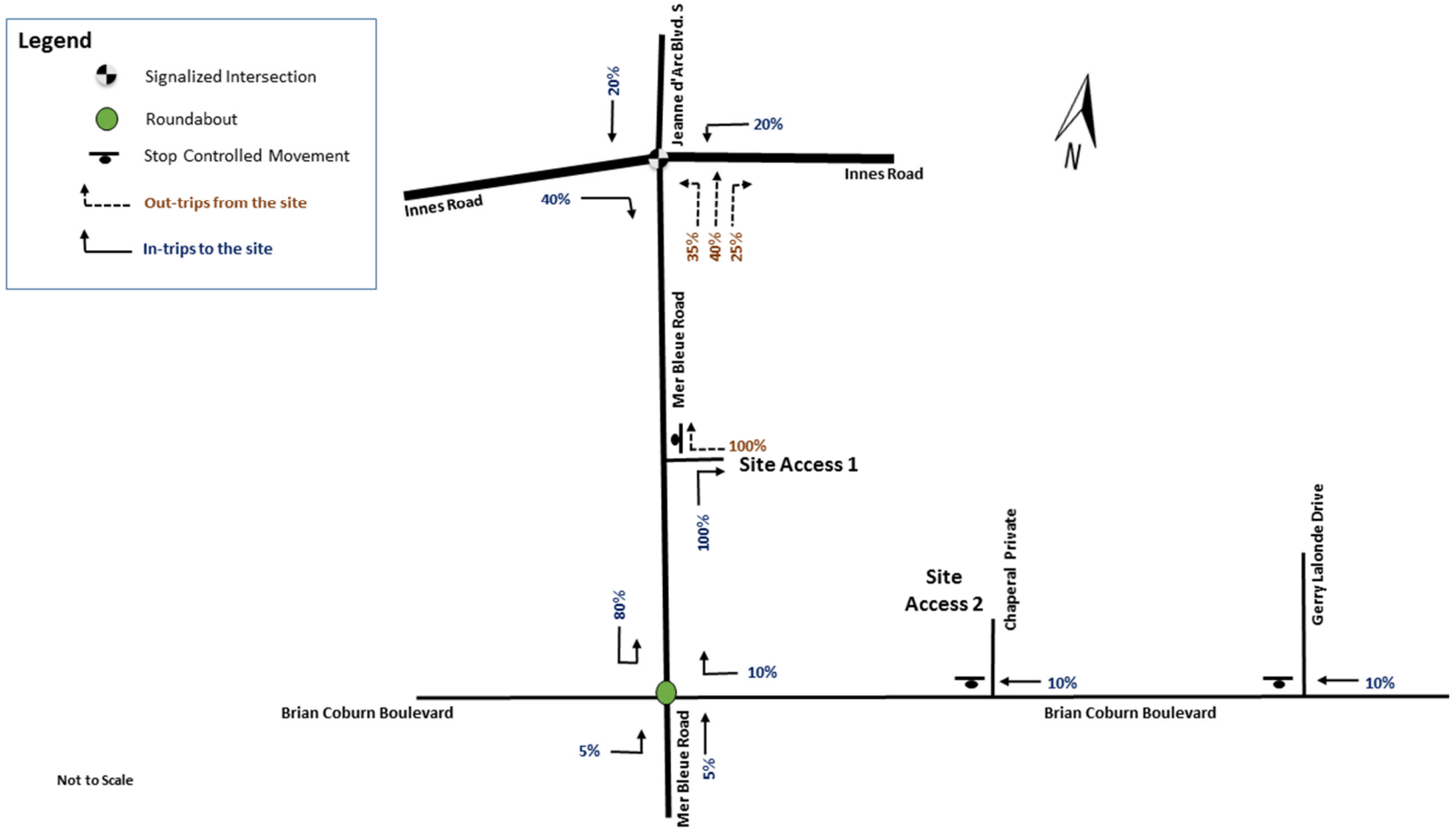


Exhibit 9: Development Trips Assignments

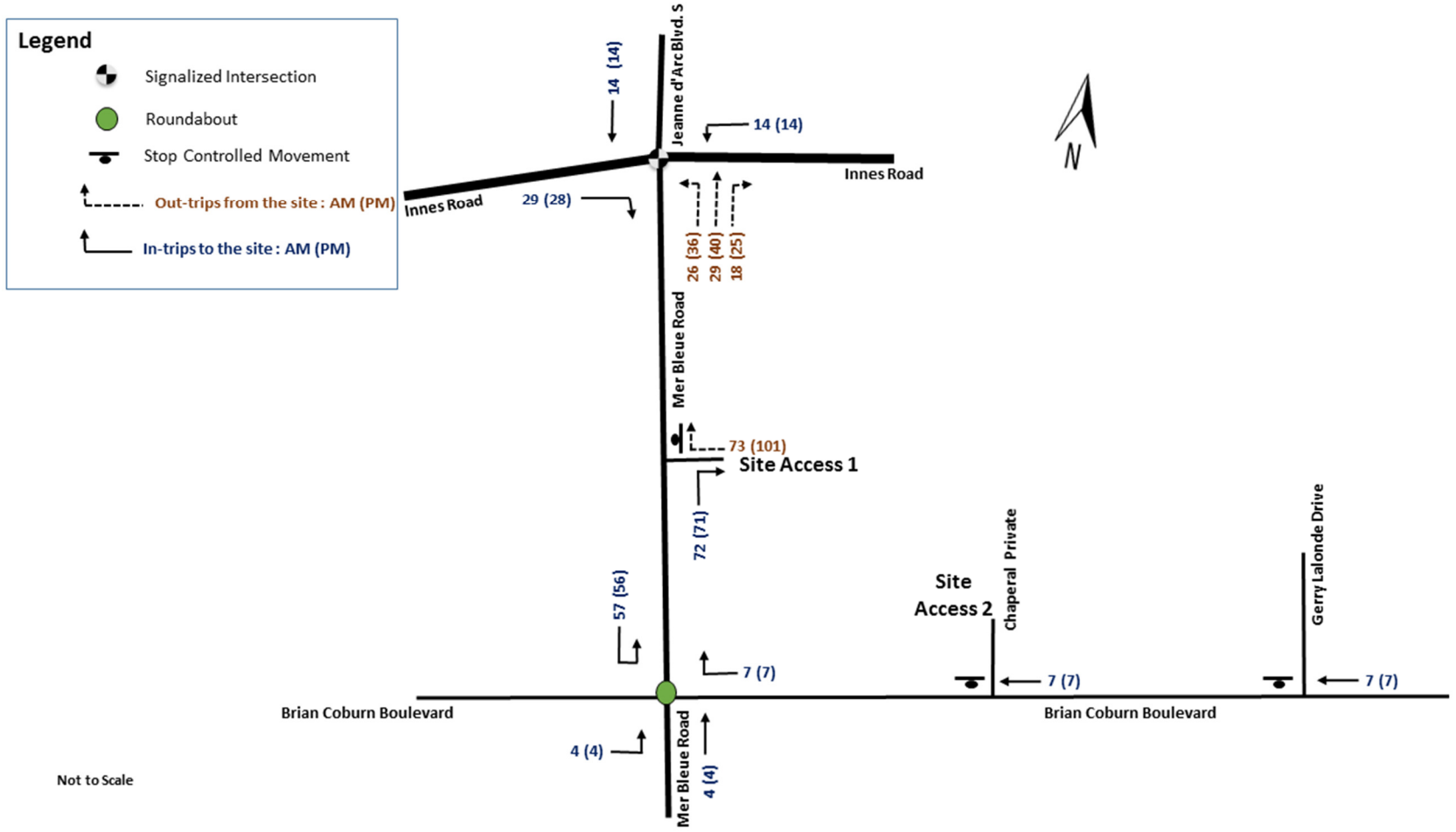


Exhibit 10: Development Trips - Auto Volumes

5 Total Traffic Conditions in Opening Year 2019

Total traffic volumes shown in **Exhibit 11** were derived by adding site traffic volumes shown in **Exhibit 10** to background traffic volumes shown in **Exhibit 7**.Intersection operations analyses are summarized in **Table 7** for signalized intersections and **Table 8** for unsignalized intersections. Detailed reports are provided in **Appendix B** for Synchro and **Appendix C** for SIDRA analyses for 2019 total traffic conditions.

Table 7: Opening Year 2019 Total Traffic Conditions Signalized Intersection Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LOS	v/c	Q(95th)	LOS	v/c	Q(95th)
Innes Road / Mer Bleue Road		F	1.44		D	0.90	
EB	Left	C	0.50	23.5	C	0.19	9.0
	Through	C	0.85	160.6	C	0.28	42.8
	Right	B	0.10	10.3	C	0.08	8.1
WB	Left	F	1.61	105.2	C	0.43	39.4
	Through	C	0.54	84.0	D	0.96	201.2
	Right	B	0.18	12.9	C	0.53	55.6
NB	Left	E	0.74	34.3	E	0.49	35.5
	Through - Right	E	0.85	85.8	E	0.85	89.7
SB	Left	F	1.94	109.2	D	0.35	26.1
	Through - Right	D	0.79	76.5	D	0.36	35.3

LOS – Level of Service v/c – Volume to Capacity Ratio 95^{th} – 95^{th} percentile queue length in metres

Regarding the impact of the development on the operational performance of the signalized intersection of Innes Road / Mer Bleue Road, the findings are as follows:

- During the AM peak, westbound left and southbound left turn movements will operate at LOS F along with long queues and v/c ratios of 1.61 and 1.94 respectively.
- However, during the AM peak, the development will only contribute to a slight increase of the v/c ratio (from 1.51 to 1.61, which is just 6.6%) only for the westbound left turn movement, which would be already operating at capacity due to 2019 background traffic growth. The proposed development will not generate any southbound left turn traffic at this intersection.
- During the PM peak, no movement will be exceeding its capacity and will be operating below LOS E. Similar to existing and background conditions, the westbound through and northbound shared through-right lane will continue to have longer queue lengths.
- All other movements show below capacity operations with acceptable LOS and v/c ratios during both AM and PM peak hours.

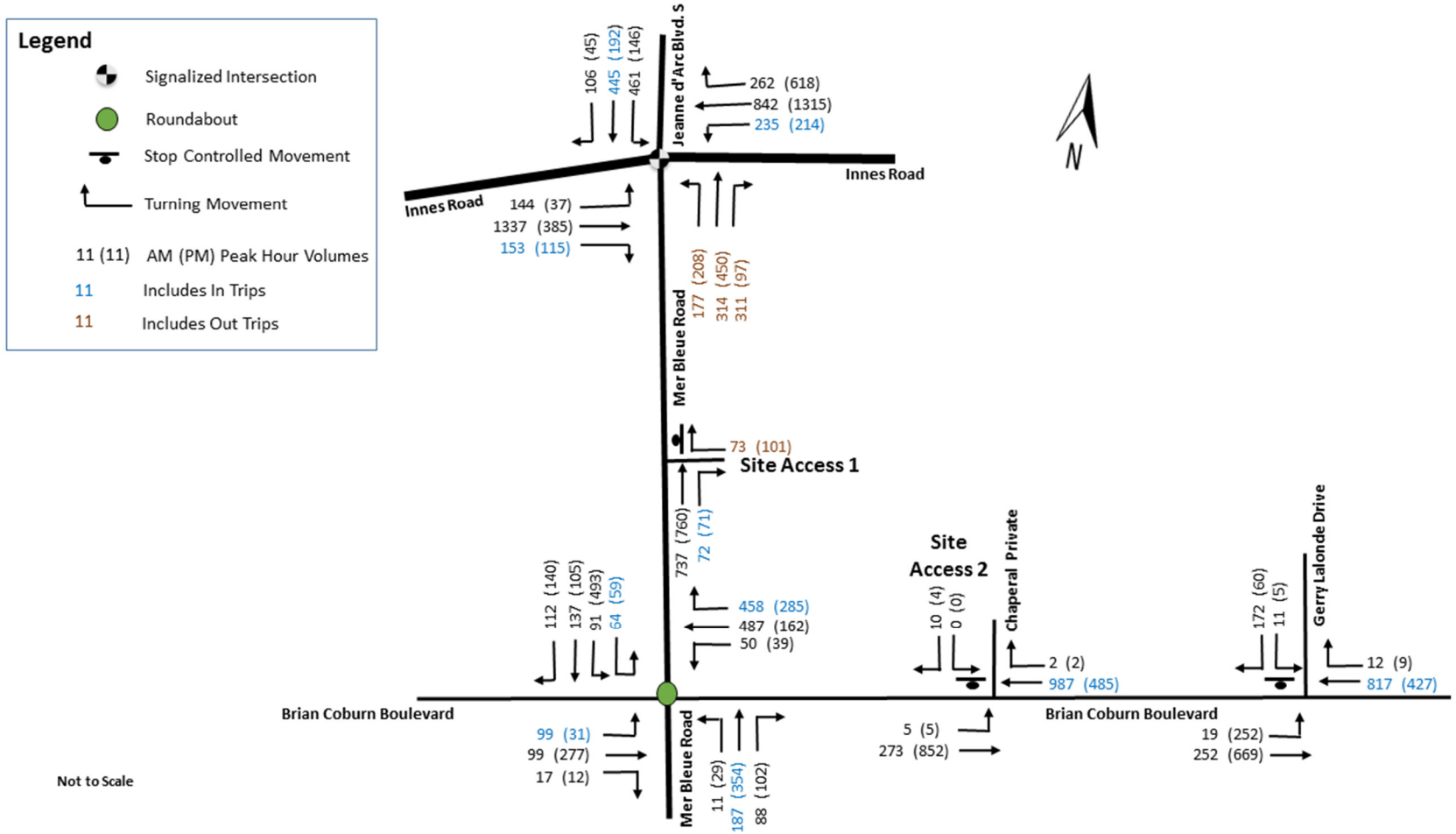


Exhibit 11: Opening Year 2019 Total Traffic Volumes

- In summary, during both AM and PM peaks, the development trips will not have a significant impact to the overall LOS levels of this intersection and the v/c ratios of all movements at this intersection compared with background conditions. The overall v/c ratio will only increase by 0.08 for the AM peak and 0.01 for the PM peak.

Table 8: Opening Year 2019 Total Traffic Conditions Unsignalized Intersection Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LOS	v/c	Q(95th)	LOS	v/c	Q(95th)
Roundabout: Mer Bleue Road / Brian Coburn Boulevard		D	1.01	228.2	A	0.52	19.0
EB	Left – Through -Right	A	0.22	5.3	A	0.40	11.6
WB	Left – Through -Right	F	1.01	228.2	A	0.52	19.0
NB	Left - Through	A	0.15	3.3	A	0.34	8.9
	Through - Right	A	0.15	3.3	A	0.34	8.9
SB	Left - Through	A	0.23	5.6	A	0.50	17.5
	Through - Right	A	0.23	5.6	A	0.22	5.6
Unsignalized (Stop Controlled RIRO): Mer Bleue Road Blvd. / Development Access		A	-	-	A	-	-
WB	Right	B	0.12	3.0	B	0.18	4.4
NB	Through	-	0.29	0.0	-	0.30	0.0
	Through- Right	-	0.19	0.0	-	0.19	0.0
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Access Drive 2		C	-	-	B	-	-
EB	Left	B	0.01	0.2	A	0.00	0.1
	Through	-	0.16	0.0	-	0.50	0.0
WB	Through- Right	-	0.58	0.0	-	0.29	0.0
SB	Left- Right	D	0.05	1.2	B	0.01	0.1
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Gerry Lalonde Dr.		B	-	-	A	-	-
EB	Left	A	0.02	0.5	A	0.25	7.1
	Through	-	0.15	0.0	-	0.43	0.0
WB	Through- Right	-	0.50	0.0	-	0.28	0.0
SB	Left	F	0.82	42.5	F	0.07	1.6
	Right	C	0.03	0.7	B	0.11	2.6

LOS – Level of Service v/c – Volume to Capacity Ratio 95th – 95th percentile queue length in metres
#- 95th percentile volume exceeds capacity, queue may be longer

For the roundabout at Mer Bleue Road / Brian Coburn Boulevard, a trend of performances similar to the background traffic of 2019 is also observed as follows:

- During both AM and PM peaks, all of the movements, except westbound movements during the AM peak, will be operating at excellent LOS levels and with v/c ratios below 0.58 similar to the background traffic conditions of 2019.
- Only the westbound approach will operate at LOS F with a v/c ratio of 1.01 meaning the development trips will have a marginal effect (increase of 0.05) on the capacity condition of this approach compared with background traffic.

The following are observed for the all other unsignalized intersections in 2019 total traffic conditions:

- Access 1 will operate at LOS A with v/c ratios of 0.30 or less during both AM and PM peaks.
- At Brian Coburn Blvd. / Chaperal Private (Access Drive 2), the worst case movement will be the southbound left-right movement which will operate at LOS D and with a v/c ratio of 0.58 or less.
- At Brian Coburn Blvd. / Gerry Lalonde Dr., the worst case movement will be the southbound left turn movement which will operate at LOS F (but with a v/c ratio of 0.82). The development trips will not contribute to the southbound left lane which will be operating below capacity

Potential improvements triggered primarily by existing and background traffic based on the above findings could include:

- Increasing the AM peak hour cycle length at Innes Road / Mer Bleue Road to 130 seconds similar to the PM peak hour
- Consideration of a full 2-lane roundabout at Mer Bleue Road / Brian Coburn Boulevard along with increasing the number of westbound approach lanes on Brian Coburn Boulevard from one to two lanes

6 Background Traffic Conditions (2024)

6.1 Planned Network Improvements

No planned road network improvements were assumed within the study area.

6.2 Background Traffic Volumes

Continuation of applying an annual rate of growth of 2% was carried out to develop 2024 background traffic.

Exhibit 12 shows the projected background traffic volumes of both AM and PM peak hours in the horizon year 2024.

Intersection operations are summarized in **Table 9** for signalized intersections and in **Table 10** for unsignalized intersections in 2024 background traffic scenarios. Synchro reports of year 2024 conditions are included in **Appendix B**, and SIDRA reports of year 2024 conditions are also included in **Appendix C**.

Similar to horizon year of 2019, this study analyzed the intersection of Brian Coburn Blvd./ Gerry Lalonde Dr. as an unsignalized T-intersection.

Table 9: Horizon Year 2024 Background Conditions Signalized Intersection Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LOS	v/c	Q(95th)	LOS	v/c	Q(95th)
Innes Road / Mer Bleue Road		F	1.54		E	0.85	
EB	Left	C	0.62	25.9	C	0.21	9.6
	Through	D	0.94	203.2	C	0.31	47.4
	Right	B	0.09	9.1	C	0.07	4.7
WB	Left	F	1.73	112.0	C	0.47	40.8
	Through	C	0.59	95.4	F	1.06	236.8
	Right	B	0.20	13.4	D	0.65	86.6
NB	Left	E	0.71	32.0	E	0.45	32.6
	Through - Right	E	0.89	91.1	E	0.83	86.4
SB	Left	F	2.14	121.3	D	0.38	28.4
	Through - Right	E	0.86	89.8	D	0.37	36.6

LOS – Level of Service v/c – Volume to Capacity Ratio 95^{th} – 95^{th} percentile queue length in metres

For the signalized intersection of Innes Road / Mer Bleue Road under 2024 background traffic conditions, a trend of performances similar to the background traffic of 2019 is observed as follows:

- During the AM peak, westbound left and southbound left movements will continue to operate at LOS F and with a v/c ratio of 1.51 and 1.94, respectively.

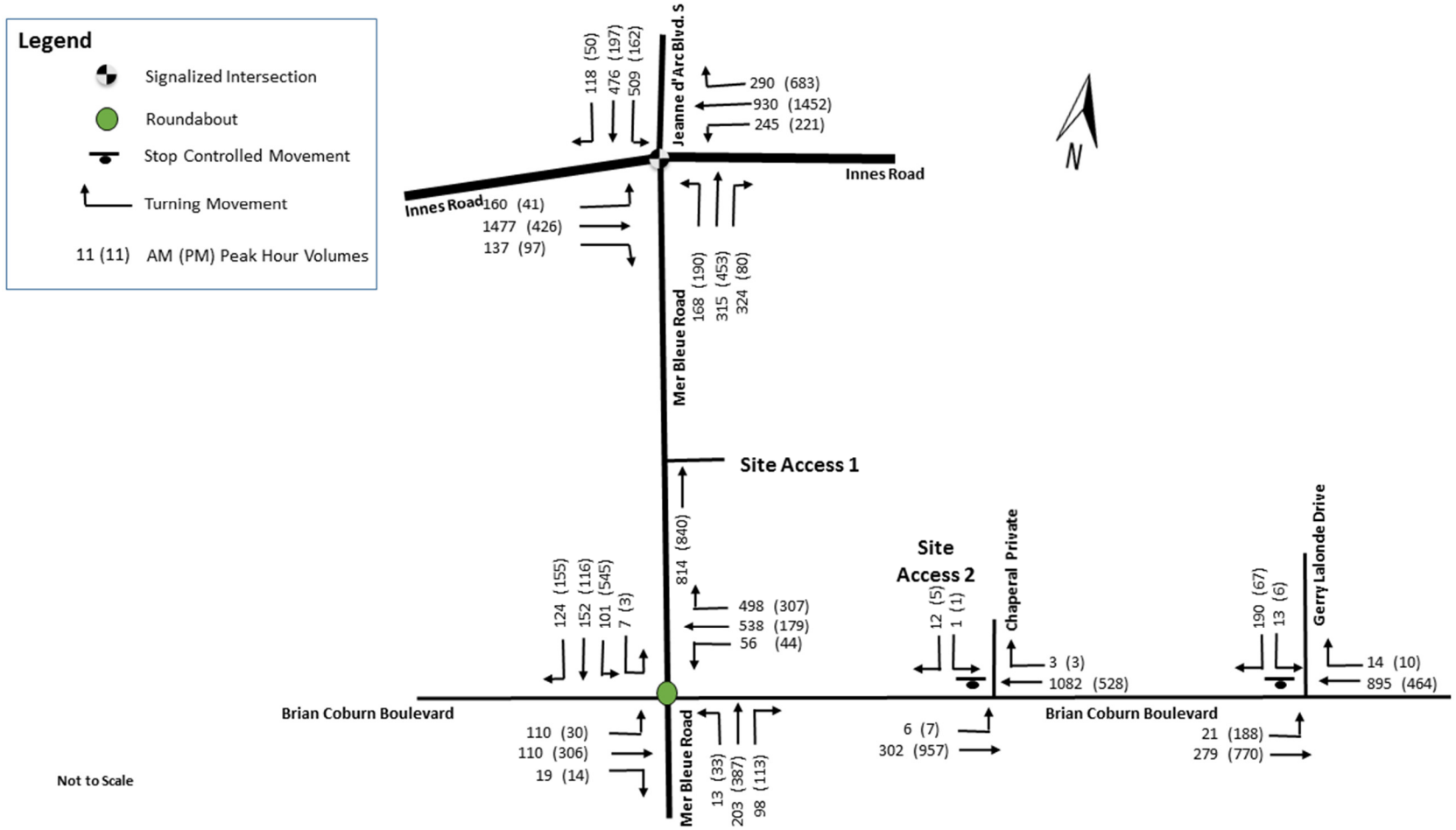


Exhibit 12: Horizon Year 2024 Background Traffic Volumes

- During the PM peak, only the westbound through movement will operate at capacity with a v/c of 1.06 and LOS F.

Table 10: Horizon Year 2024 Background Conditions Unsignalized Intersection Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LOS	v/c	Q(95th)	LOS	v/c	Q(95th)
Roundabout: Mer Bleue Road / Brian Coburn Boulevard		E	1.08	392.7	A	0.56	22.1
EB	Left – Through -Right	A	0.23	5.8	A	0.44	13.5
WB	Left – Through -Right	F	1.08	392.7	A	0.56	22.1
NB	Left - Through	A	0.16	3.6	A	0.38	10.4
	Through - Right	A	0.16	3.6	A	0.38	10.4
SB	Left - Through	A	0.23	5.3	A	0.51	17.7
	Through - Right	A	0.23	5,3	A	0.25	6.4
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Access Drive 2		C	-	-	B	-	-
EB	Left	B	0.01	0.2	A	0.01	0.1
	Through	-	0.18	0.0	-	0.56	0.0
WB	Through- Right	-	0.64	0.0	-	0.31	0.0
SB	Left- Right	C	0.05	1.2	C	0.02	0.4
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Gerry Lalonde Dr.		C	-	-	A	-	-
EB	Left	B	0.03	0.6	A	0.20	5.1
	Through	-	0.17	0.0	-	0.49	0.0
WB	Through- Right	-	0.55	0.0	-	0.30	0.0
SB	Left	F	1.07	65.3	F	0.10	2.2
	Right	C	0.04	0.9	B	0.13	3.2

LOS – Level of Service v/c – Volume to Capacity Ratio 95th – 95th percentile queue length in metres

For the roundabout at Mer Bleue Road / Brian Coburn Boulevard, a trend of performances similar to the background traffic of 2019 is also observed as follows:

- During both AM and PM peaks, all of the movements except westbound approach will be operating at excellent LOS levels.
- Only the westbound approach will be operating at LOS F and with a v/c of 1.08 along with longer queue lengths.

The following are observed for the other unsignalized intersections:

- At Brian Coburn Blvd. / Chaperal Private (i.e. Existing Access Drive 2), the worst case movement will be the southbound left-right movement operating at LOS C.
- At Brian Coburn Blvd. / Gerry Lalonde Dr., the worst case movement will be the southbound left lane will operate at LOS F and with a v/c of 1.07.

7 Total Traffic Conditions in Horizon Year 2024

Total traffic volumes shown in **Exhibit 13** were derived by adding site traffic volumes shown in **Exhibit 10** to background traffic volumes shown in **Exhibit 12**.Intersection operations for critical movements are summarized in **Table 11** for signalized intersections and Table **12** for unsignalized intersections. Detailed reports are provided in **Appendix B** for Synchro analysis and **Appendix C** for SIDRA analysis.

Table 11: Horizon Year 2024 Total Traffic Conditions Signalized Intersection Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LOS	v/c	Q(95th)	LOS	v/c	Q(95th)
Innes Road / Mer Bleue Road		F	1.62		E	0.89	9.6
EB	Left	C	0.62	25.9	C	0.21	47.4
	Through	D	0.94	203.2	C	0.31	10.1
	Right	B	0.11	10.6	C	0.09	43.3
WB	Left	F	1.82	119.8	C	0.50	236.8
	Through	C	0.59	95.4	F	1.06	88.0
	Right	B	0.20	13.4	D	0.66	38.1
NB	Left	F	0.82	39.0	E	0.54	104.3
	Through - Right	E	0.96	103.1	E	0.94	28.4
SB	Left	F	2.14	121.3	D	0.38	38.7
	Through - Right	E	0.88	93.3	D	0.39	

LOS – Level of Service v/c – Volume to Capacity Ratio Q 95th – 95th percentile queue length in metres

For the signalized intersection of Innes Road / Mer Bleue Road under 2024 total traffic conditions, the findings are as follows:

- During the AM peak, westbound left and southbound left turn movements will operate at LOS F along with long queues for over the capacity v/c ratios of 1.82 and 2.14 respectively.
- The development will contribute to an increase of the v/c ratio (from 1.73 to 1.82, which is just 5.2%) only for westbound left turn movement, which would be already operating at capacity due to 2024 background traffic growth.
- During the PM peak, the westbound through movement will operate at LOS F with a v/c ratio of 1.06.
- All other movements will operate below the capacity at acceptable LOS during both AM and PM peak hours.

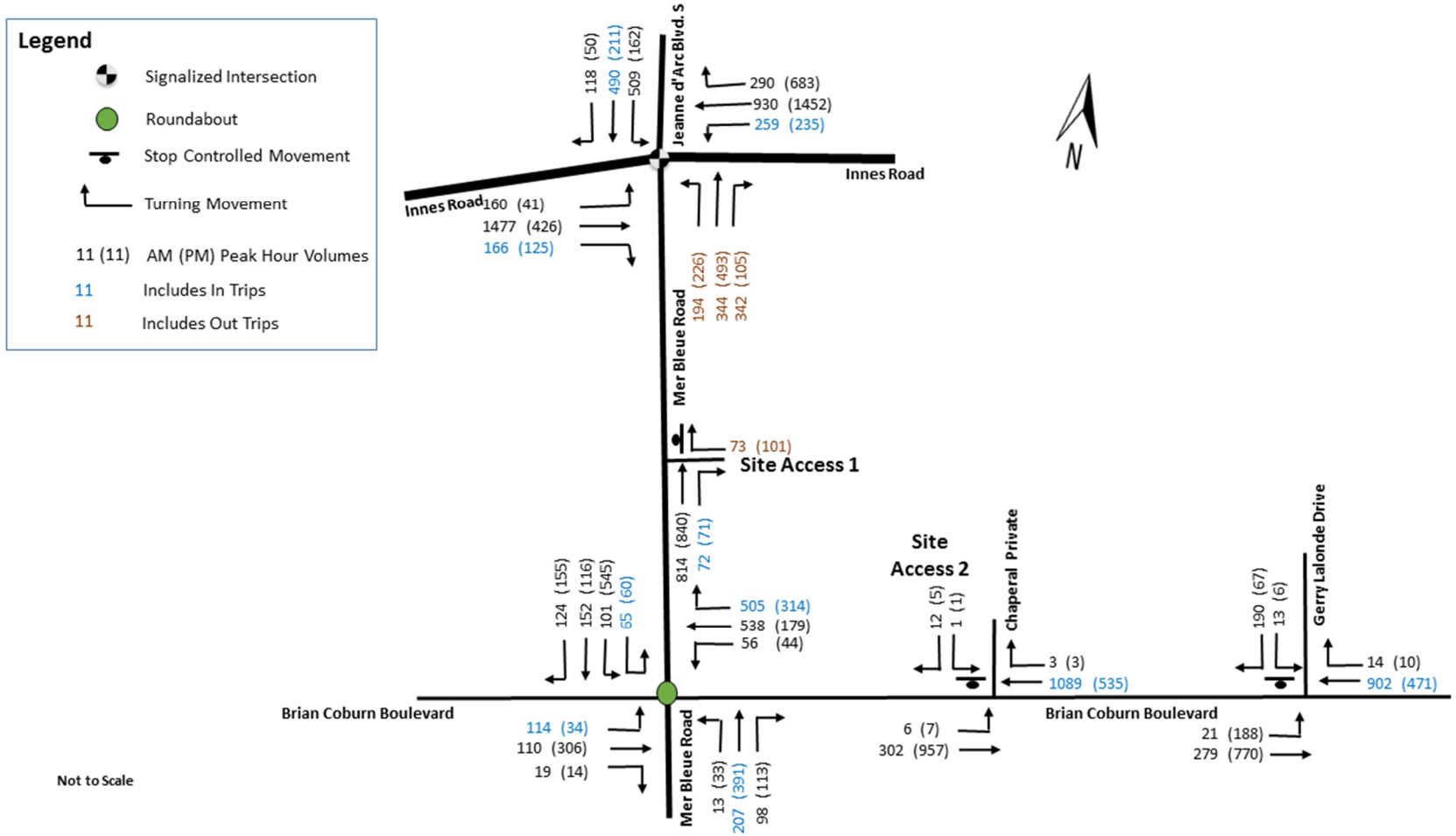


Exhibit 13: Horizon Year 2024 Total Traffic Volumes

Table 12: Horizon Year 2024 Total Traffic Conditions Unsignalized Intersection Operations

Intersection & Critical Movement		Weekday AM			Weekday PM		
		LO	v/c	Q(95th)	LOS	v/c	Q(95th)
Roundabout: Mer Bleue Road / Brian Coburn Boulevard		F	1.14	492.6	A	0.59	24.5
EB	Left – Through -Right	A	0.24	6.1	A	0.59	14.5
WB	Left – Through -Right	F	1.14	492.6	A	0.46	24.5
NB	Left - Through	A	1.16	3.7	A	0.59	11.1
	Through - Right	A	1.16	3.7	A	0.40	11.1
SB	Left - Through	A	0.25	6.2	A	0.40	22.2
	Through - Right	A	0.25	6.2	A	0.56	6.4
Unsignalized (Stop Controlled RIRO): Mer Bleue Road / Development Access Drive 1		A	-	-	A	-	-
WB	Right	B	0.13	3.2	B	0.19	4.7
NB	Through	-	0.32	0.0	-	0.33	0.0
	Through- Right	-	0.20	0.0	-	0.21	0.0
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Access Drive 2		C	-	-	B	-	-
EB	Left	B	0.01	0.2	A	0.01	0.1
	Through	-	0.18	0.0	-	0.56	0.0
WB	Through- Right	-	0.64	0.0	-	0.32	0.0
SB	Left- Right	C	0.05	1.2	C	0.02	0.4
Unsignalized (Stop Controlled): Brian Coburn Blvd. / Gerry Lalonde Dr.		C	-	-	A	-	-
EB	Left	B	0.03	0.6	A	0.20	5.1
	Through	-	0.17	0.0	-	0.49	0.0
WB	Through- Right	-	0.55	0.0	-	0.31	0.0
SB	Left	F	1.08	66.6	F	0.10	2.2
	Right	C	0.04	0.9	B	0.13	3.2

LOS – Level of Service v/c – Volume to Capacity Ratio 95^{th} – 95^{th} percentile queue length in metres

For the roundabout at Mer Bleue Road / Brian Coburn Boulevard, the findings are as follows:

- During both AM and PM peaks, all of the movements, except westbound movements during the AM peak will be operating at acceptable LOS levels and with v/c ratios below 0.64 similar to the 2024 background traffic conditions.
- Only the westbound approach will operate at LOS F with a v/c ratio of 1.13. This represents an increase of 4.8% in the v/c ratio from the 2024 background condition. The development

will only contribute approximately 1.4% out of the total westbound traffic in 2024 at this roundabout.

The following are observed for the all other unsignalized intersections in 2019 total traffic conditions:

- At Brian Coburn Blvd. / Chaperal Private (Access Drive 2), the southbound left-right lane will operate at LOS D and with a v/c ratio of 0.64 or better.
- At Brian Coburn Blvd. / Gerry Lalonde Dr., the southbound left lane will continue to operate at LOS F (but with v/c of 1.08) which is already triggered by 2024 background traffic. Development trips will continue to have no contributions to this southbound left lane.

Under 2024 total traffic conditions, the development trips will only affect the operations of already congested movements under existing and future background conditions, with some marginal increases to v/c ratios for already congested movements due to existing traffic and background traffic growth.

Given the contribution to these worst case movements, the study is not recommending any capacity improvements attributable to the proposed development at the signalized, unsignalized, or roundabout intersections in the study area. However, we do recommend the following improvements for City consideration:

- Increasing the AM peak hour cycle length at Innes Road / Mer Bleue Road to 130 or 140 seconds
- Consideration of increasing the number of westbound approach lanes on Brian Coburn Boulevard from one to two lanes to accommodate a right turn slip lane to increase the roundabout capacity
- Eventual signalization or roundabout at Brian Coburn Blvd. / Gerry Lalonde Dr. should the intersection be expanded to include a south leg and additional background traffic growth added to the intersection
- Additional bus stops closer to the roundabout at Mer Bleue Road / Brian Coburn Boulevard

7.1 Transit Route Performance

During the PM peak, 16 person trips were forecast to travel to the development site and 22 person trips are exiting the development site. As no information on current loading and unloading rates of buses is available, assuming current frequency of Route 30 of OC Transpo, an average of 11 persons can be well accommodated into any of the two outbound buses during the highest PM peak hour.

7.2 Walk/Bicycle Route Performance

The current traffic counts captures very minimal level of walk-bicycle traffic in the current road network. It is expected that during the PM peak, a maximum of 5 walk/bicycle trips could be generated by the development and this will not impact the performance levels of the current walk/bicycle routes in the vicinity of the development site.

8 Parking

This section of the report reviews the parking (vehicular) needs based on a review of City of Ottawa Zoning By-law 2008 -250. Part 4 – Parking, Queuing and Loading Provisions.

8.1 Zoning By-law Requirements

8.1.1 Vehicular Parking

Zoning By-law City of Ottawa Zoning By-law 2008 -250 was reviewed to determine the total number of parking spaces for the proposed health hub. The parking requirements are summarized in **Table 13**.

Table 13: Zoning By-law 2008 -250 Parking Requirements

Unit Type	# Units of OFHH	Zoning By-law 2008 -250 Rate	# Spaces
100 sq. m of GFA	60.04	4 stalls per 100 sq. m unit	242
		Total Parking Requirement:	242
		Spots Provided at Main Parking Lot	242
		Visitor (or Temporary Parking)	12
		Total Parking Provided:	254
		Parking Surplus	12

A total of 242 parking is required, a total of 242 parking spots provided at the Main Parking Lot. Also, additional parking spots for dropping offs and para-transit vehicles are reserved close to the west entrance of the building.

8.1.2 Loading Requirements

Loading for the new building will be provided at the east side of the development using a proposed full-movement driveway that connects to Chaperal Private and Brian Coburn Boulevard. A full movement access point already exists to serve the neighbouring townhouse development and the amount of loading activity will be minimal to create any conflict with the residential traffic from this townhouse development.

9 Conclusions & Recommendations

9.1 Traffic Operations

It was found that most of the adjacent intersections to the proposed development will continue to operate with residual capacity. Only the signalized intersection of Innes Road / Mer Bleue Road and the westbound leg of the roundabout at Mer Bleue Road / Brian Coburn Boulevard will be operating under high-delay conditions, primarily due to existing and future background traffic growth both in 2019 and 2024.

However, the proposed development trips will only add a relatively small amount of new traffic onto the surrounding road network and only will contribute a nominal increase to volume to capacity (v/c) ratios and levels of service at the study area intersections. The marginal delays at these two location will occur on already-congested movements that should not be attributable to the Health Hub as existing traffic and background traffic would have triggered road improvements without the Health Hub (based on approaching or exceeding v/c ratios of 1 and LOS F).

We note that the v/c ratios and delays generated from Synchro and Sidra analyses are not based on any detailed calibration of the models developed for the Innes Road / Mer Bleue Road intersection or the Mer Bleue Road / Brian Coburn Boulevard roundabout. The models incorporate default parameters for key inputs such as saturation flow rates. Generally existing v/c ratios of 1.0 should not be generated for existing movements and intersections that currently accommodate existing volumes. Since calibration was not carried out, the findings focused on the relative or incremental increase to levels of service and volume to capacity ratios compared with the impact caused by existing and background traffic.

To improve the operations of the signalized intersection of Innes Road / Mer Bleue Road, and the roundabout at roundabout at Mer Bleue Road / Brian Coburn Boulevard, signal timing, intersection and lane capacity improvement options can be explored further based on discussions with the City.

The study has determined that the proposed access points will operate acceptably and no external road improvements are recommended at this time. From the transit perspective, additional bus stops closer to the roundabout at Mer Bleue Road / Brian Coburn Boulevard are recommended to provide shorter walking distances to the west entrance of the proposed development.

The following improvements should be considered by the City to address existing and future background anticipated capacity deficiencies:

- Increasing the AM peak hour cycle length at Innes Road / Mer Bleue Road to 130 or 140 seconds
- Consideration of increasing the number of westbound approach lanes on Brian Coburn Boulevard from one to two lanes to accommodate a right turn slip lane to increase the roundabout capacity
- Protection of future signalization or roundabout at Brian Coburn Blvd. / Gerry Lalonde Dr. should the intersection be expanded to include a south leg and additional background traffic growth added to the intersection

Appendix A

Existing Signal Timing Card

Traffic Signal Timing

City of Ottawa, Transporation Services Department

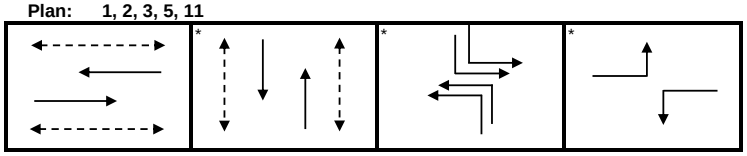
Traffic Operations Unit

Intersection:	***Main:*** Innes	***Side:***	Jeanne d'Arc/Mer Bleue
Controller:	**MS-3200**	**TSD:**	5907
Author:	Krystle Blachford	**Date:**	20-Feb-18

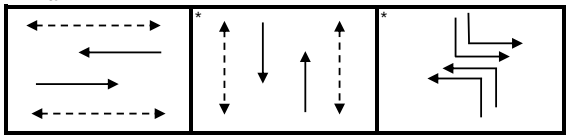
Existing Timing Plans†

	Plan						**Ped Minimum Time**		
	AM Peak	**Off Peak**	**PM Peak**	**Night**	**Weekend**	**AM Heavy**	***Walk***	***DW***	***A+R***
	1	2	3	4	5	11			
Cycle	110	110	130	90	130	120			
Offset	0	0	0	X	0	0			
EB Thru	52	41	59	41	49	62	7	20	3.7 + 2.7
WB Thru	52	41	59	41	49	62	7	20	3.7 + 2.7
NB Thru	31	31	31	31	31	31	7	17	3.7 + 2.5
SB Thru	31	31	31	31	31	31	7	17	3.7 + 2.5
NB Left (fp)	15	25	23	18	23	15	-	-	3.7 + 2.6
SB Left (fp)	15	25	23	18	23	15	-	-	3.7 + 2.6
EB Left	12	13	17	-	27	12	-	-	3.7 + 2.4
WB Left	12	13	17	-	27	12	-	-	3.7 + 2.4

Plan: 1, 2, 3, 5, 11



Plan: 4



Notes: 1) The maximum green times for all left turns are 20s except for the following: the SB Left has a maximum green time of 25s except for Plans 3 & 5, and the WB Left has a maximum green time of 25s for Plan 5.

Schedule

Weekday	
Time	Plan
0:10	4
6:00	11
9:00	1
9:30	2
15:00	3
18:30	2
22:00	4

Saturday	
Time	Plan
0:10	4
7:00	2
9:00	5
20:00	2
22:00	4

Sunday	
Time	Plan
0:10	4
7:00	2
10:00	5
19:00	2
22:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄- - - -► *Pedestrian signal*

Cost is $56.50 ($50 + HST)

Appendix B

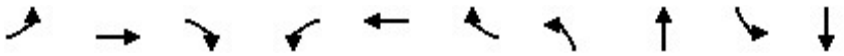
Synchro Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	1285	119	211	809	594	143	273	281	443	414	101
Future Volume (vph)	137	1285	119	211	809	594	143	273	281	443	414	101
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1695	3390	1496	1695	3390	1496	3288	3111		3288	3282	
Flt Permitted	0.25	1.00	1.00	0.08	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	453	3390	1496	148	3390	1496	3288	3111		3288	3282	
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)	140	1311	121	215	826	606	146	279	287	452	422	103
RTOR Reduction (vph)	0	0	65	0	0	221	0	87	0	0	18	0
Lane Group Flow (vph)	140	1311	56	215	826	385	146	479	0	452	507	0
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Effective Green, g (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Actuated g/C Ratio	0.51	0.46	0.46	0.51	0.46	0.46	0.07	0.21		0.07	0.21	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	293	1570	693	151	1570	693	238	642		238	678	
v/s Ratio Prot	0.02	0.39		c0.07	0.24		0.04	0.15		c0.14	c0.15	
v/s Ratio Perm	0.22		0.04	c0.66		0.26						
v/c Ratio	0.48	0.84	0.08	1.42	0.53	0.56	0.61	0.75		1.90	0.75	
Uniform Delay, d1	16.6	28.2	18.0	24.1	22.9	23.3	54.0	44.6		55.6	44.7	
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	5.5	5.4	0.2	224.7	1.3	3.2	11.3	7.7		420.0	7.4	
Delay (s)	22.1	33.6	18.2	248.9	24.1	26.5	65.3	52.3		475.7	52.0	
Level of Service	C	C	B	F	C	C	E	D		F	D	
Approach Delay (s)		31.4			54.3			55.0			248.0	
Approach LOS		C			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	85.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/26/2018

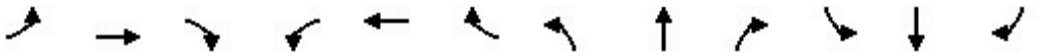


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	1311	121	215	826	606	146	566	452	525
v/c Ratio	0.48	0.84	0.16	1.41	0.53	0.66	0.61	0.78	1.90	0.75
Control Delay	18.8	34.1	2.4	243.4	24.4	11.3	65.7	44.2	450.4	50.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	34.1	2.4	243.4	24.4	11.3	65.7	44.2	450.4	50.5
Queue Length 50th (m)	13.7	127.9	0.0	~47.1	65.3	29.3	16.1	50.0	~77.4	54.4
Queue Length 95th (m)	22.9	155.7	6.6	#91.6	82.0	66.1	26.0	68.8	#107.2	72.3
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	294	1570	769	152	1570	913	238	730	238	696
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	0.84	0.16	1.41	0.53	0.66	0.61	0.78	1.90	0.75

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.



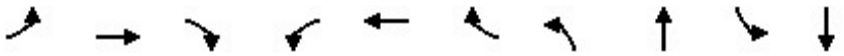
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	1337	124	221	842	262	151	285	293	461	431	106
Future Volume (vph)	144	1337	124	221	842	262	151	285	293	461	431	106
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.98		1.00	0.99	
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	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1694	3390	1467	1695	3390	1467	3288	3073		3288	3266	
Flt Permitted	0.25	1.00	1.00	0.08	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	440	3390	1467	136	3390	1467	3288	3073		3288	3266	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	144	1337	124	221	842	262	151	285	293	461	431	106
RTOR Reduction (vph)	0	0	67	0	0	141	0	85	0	0	18	0
Lane Group Flow (vph)	144	1337	57	221	842	121	151	493	0	461	519	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Confl. Bikes (#/hr)			3			3			3			3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Effective Green, g (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Actuated g/C Ratio	0.51	0.46	0.46	0.51	0.46	0.46	0.07	0.21		0.07	0.21	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	287	1570	679	146	1570	679	238	635		238	674	
v/s Ratio Prot	0.02	0.39		c0.07	0.25		0.05	c0.16		c0.14	0.16	
v/s Ratio Perm	0.23		0.04	c0.70		0.08						
v/c Ratio	0.50	0.85	0.08	1.51	0.54	0.18	0.63	0.78		1.94	0.77	
Uniform Delay, d1	16.8	28.5	18.0	26.2	23.0	18.8	54.1	45.0		55.6	44.9	
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	6.1	6.0	0.2	263.1	1.3	0.6	12.2	9.0		436.7	8.3	
Delay (s)	22.9	34.6	18.2	289.2	24.3	19.4	66.3	54.0		492.4	53.2	
Level of Service	C	C	B	F	C	B	E	D		F	D	
Approach Delay (s)		32.3			67.5			56.6			256.1	
Approach LOS		C			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	94.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	106.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/26/2018

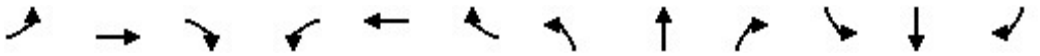


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	144	1337	124	221	842	262	151	578	461	537
v/c Ratio	0.50	0.85	0.16	1.51	0.54	0.32	0.63	0.80	1.94	0.78
Control Delay	19.7	35.1	2.6	285.8	24.6	3.3	66.7	46.3	466.5	51.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	35.1	2.6	285.8	24.6	3.3	66.7	46.3	466.5	51.7
Queue Length 50th (m)	14.1	132.1	0.0	~52.4	66.8	0.0	16.7	52.1	~79.5	56.0
Queue Length 95th (m)	23.5	160.6	7.1	#97.9	84.0	12.9	26.8	71.6	#109.2	74.3
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	287	1570	755	146	1570	820	238	720	238	692
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	0.50	0.85	0.16	1.51	0.54	0.32	0.63	0.80	1.94	0.78

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.



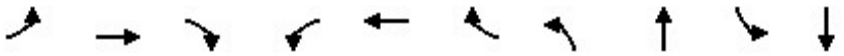
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	1337	153	235	842	262	177	314	311	461	445	106
Future Volume (vph)	144	1337	153	235	842	262	177	314	311	461	445	106
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.98		1.00	0.99	
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	1.00	0.85	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	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1694	3390	1467	1695	3390	1467	3288	3079		3288	3269	
Flt Permitted	0.25	1.00	1.00	0.08	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	440	3390	1467	136	3390	1467	3288	3079		3288	3269	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	144	1337	153	235	842	262	177	314	311	461	445	106
RTOR Reduction (vph)	0	0	82	0	0	141	0	85	0	0	17	0
Lane Group Flow (vph)	144	1337	71	235	842	121	177	540	0	461	534	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Confl. Bikes (#/hr)			3			3			3			3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Effective Green, g (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Actuated g/C Ratio	0.51	0.46	0.46	0.51	0.46	0.46	0.07	0.21		0.07	0.21	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	287	1570	679	146	1570	679	238	636		238	675	
v/s Ratio Prot	0.02	0.39		c0.08	0.25		0.05	c0.18		c0.14	0.16	
v/s Ratio Perm	0.23		0.05	c0.75		0.08						
v/c Ratio	0.50	0.85	0.10	1.61	0.54	0.18	0.74	0.85		1.94	0.79	
Uniform Delay, d1	16.8	28.5	18.2	26.2	23.0	18.8	54.6	45.8		55.6	45.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	6.0	0.3	303.7	1.3	0.6	18.9	13.3		436.7	9.2	
Delay (s)	22.9	34.6	18.5	329.9	24.3	19.4	73.4	59.1		492.4	54.3	
Level of Service	C	C	B	F	C	B	E	E		F	D	
Approach Delay (s)		32.0			77.0			62.3			253.9	
Approach LOS		C			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	96.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/26/2018

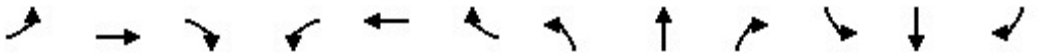


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	144	1337	153	235	842	262	177	625	461	551
v/c Ratio	0.50	0.85	0.20	1.61	0.54	0.32	0.74	0.87	1.94	0.80
Control Delay	19.7	35.1	3.5	325.9	24.6	3.3	73.8	51.7	466.5	53.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	35.1	3.5	325.9	24.6	3.3	73.8	51.7	466.5	53.0
Queue Length 50th (m)	14.1	132.1	0.0	~58.9	66.8	0.0	19.7	58.5	~79.5	57.9
Queue Length 95th (m)	23.5	160.6	10.3	#105.2	84.0	12.9	#34.3	#85.8	#109.2	76.5
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	287	1570	761	146	1570	820	238	721	238	692
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	0.50	0.85	0.20	1.61	0.54	0.32	0.74	0.87	1.94	0.80

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.



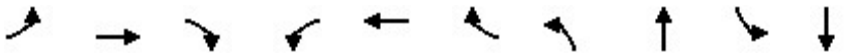
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	1477	137	245	930	290	168	315	324	509	476	118
Future Volume (vph)	160	1477	137	245	930	290	168	315	324	509	476	118
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.98		1.00	0.99	
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	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1694	3390	1455	1695	3390	1455	3288	3058		3288	3259	
Flt Permitted	0.21	1.00	1.00	0.07	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	374	3390	1455	128	3390	1455	3288	3058		3288	3259	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	1477	137	245	930	290	168	315	324	509	476	118
RTOR Reduction (vph)	0	0	74	0	0	156	0	80	0	0	18	0
Lane Group Flow (vph)	160	1477	63	245	930	134	168	559	0	509	576	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Effective Green, g (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Actuated g/C Ratio	0.51	0.46	0.46	0.51	0.46	0.46	0.07	0.21		0.07	0.21	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	256	1570	674	142	1570	674	238	631		238	673	
v/s Ratio Prot	0.03	0.44		c0.08	0.27		0.05	c0.18		c0.15	0.18	
v/s Ratio Perm	0.29		0.04	c0.79		0.09						
v/c Ratio	0.62	0.94	0.09	1.73	0.59	0.20	0.71	0.89		2.14	0.86	
Uniform Delay, d1	18.0	30.6	18.1	28.6	23.8	19.0	54.4	46.2		55.6	45.9	
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	11.0	12.4	0.3	354.2	1.7	0.7	16.2	16.7		526.2	13.2	
Delay (s)	29.0	43.1	18.3	382.8	25.5	19.7	70.6	62.9		581.9	59.0	
Level of Service	C	D	B	F	C	B	E	E		F	E	
Approach Delay (s)		39.9			84.1			64.5			300.3	
Approach LOS		D			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	112.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	114.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/26/2018

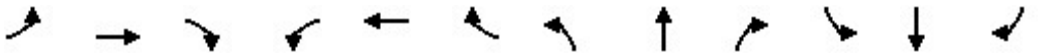


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	160	1477	137	245	930	290	168	639	509	594
v/c Ratio	0.62	0.94	0.18	1.73	0.59	0.35	0.71	0.90	2.14	0.86
Control Delay	25.7	43.5	3.3	376.3	25.8	3.4	71.0	55.6	553.3	57.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	43.5	3.3	376.3	25.8	3.4	71.0	55.6	553.3	57.7
Queue Length 50th (m)	15.9	156.5	0.0	~65.2	76.6	0.0	18.7	61.2	~90.6	63.6
Queue Length 95th (m)	25.9	#203.2	9.1	#112.0	95.4	13.4	#32.0	#91.1	#121.3	#89.8
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	257	1570	750	142	1570	829	238	712	238	691
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	0.62	0.94	0.18	1.73	0.59	0.35	0.71	0.90	2.14	0.86

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.



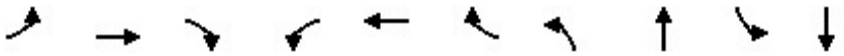
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	1477	166	259	930	290	194	344	342	509	490	118
Future Volume (vph)	160	1477	166	259	930	290	194	344	342	509	490	118
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.98		1.00	0.99	
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	1.00	0.85	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	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1694	3390	1455	1695	3390	1455	3288	3064		3288	3262	
Flt Permitted	0.21	1.00	1.00	0.07	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	374	3390	1455	128	3390	1455	3288	3064		3288	3262	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	1477	166	259	930	290	194	344	342	509	490	118
RTOR Reduction (vph)	0	0	89	0	0	156	0	80	0	0	17	0
Lane Group Flow (vph)	160	1477	77	259	930	134	194	606	0	509	591	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Effective Green, g (s)	61.5	55.6	55.6	61.5	55.6	55.6	8.7	24.8		8.7	24.8	
Actuated g/C Ratio	0.51	0.46	0.46	0.51	0.46	0.46	0.07	0.21		0.07	0.21	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	256	1570	674	142	1570	674	238	633		238	674	
v/s Ratio Prot	0.03	0.44		c0.09	0.27		0.06	c0.20		c0.15	0.18	
v/s Ratio Perm	0.29		0.05	c0.84		0.09						
v/c Ratio	0.62	0.94	0.11	1.82	0.59	0.20	0.82	0.96		2.14	0.88	
Uniform Delay, d1	18.0	30.6	18.2	28.6	23.8	19.0	54.9	47.1		55.6	46.1	
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	11.0	12.4	0.3	397.0	1.7	0.7	25.5	26.7		526.2	14.9	
Delay (s)	29.0	43.1	18.6	425.5	25.5	19.7	80.4	73.7		581.9	61.0	
Level of Service	C	D	B	F	C	B	F	E		F	E	
Approach Delay (s)		39.6			94.4			75.2			298.4	
Approach LOS		D			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	115.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	117.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/26/2018

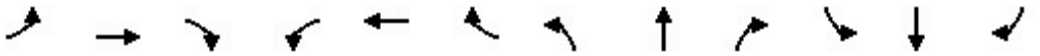


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	160	1477	166	259	930	290	194	686	509	608
v/c Ratio	0.62	0.94	0.22	1.82	0.59	0.35	0.82	0.96	2.14	0.88
Control Delay	25.7	43.5	3.5	418.5	25.8	3.4	80.7	66.1	553.3	59.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	43.5	3.5	418.5	25.8	3.4	80.7	66.1	553.3	59.8
Queue Length 50th (m)	15.9	156.5	0.0	~71.6	76.6	0.0	21.7	68.0	~90.6	65.5
Queue Length 95th (m)	25.9	#203.2	10.6	#119.8	95.4	13.4	#39.0	#103.1	#121.3	#93.3
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	257	1570	763	142	1570	829	238	713	238	691
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	0.62	0.94	0.22	1.82	0.59	0.35	0.82	0.96	2.14	0.88

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.



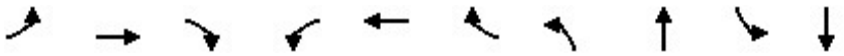
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	370	83	192	1263	594	165	394	69	140	171	43
Future Volume (vph)	35	370	83	192	1263	594	165	394	69	140	171	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1695	3390	1496	1694	3390	1496	3288	3308		3288	3279	
Flt Permitted	0.08	1.00	1.00	0.50	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	136	3390	1496	883	3390	1496	3288	3308		3288	3279	
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)	36	378	85	196	1289	606	168	402	70	143	174	44
RTOR Reduction (vph)	0	0	51	0	0	313	0	11	0	0	17	0
Lane Group Flow (vph)	36	378	34	196	1289	293	168	461	0	143	201	0
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Effective Green, g (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Actuated g/C Ratio	0.49	0.40	0.40	0.49	0.40	0.40	0.13	0.19		0.13	0.19	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	197	1371	605	499	1371	605	422	631		422	625	
v/s Ratio Prot	0.02	0.11		c0.03	c0.38		c0.05	c0.14		0.04	0.06	
v/s Ratio Perm	0.07		0.02	0.16		0.20						
v/c Ratio	0.18	0.28	0.06	0.39	0.94	0.48	0.40	0.73		0.34	0.32	
Uniform Delay, d1	24.1	25.9	23.6	19.3	37.2	28.7	52.0	49.5		51.6	45.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.5	0.2	2.3	13.7	2.8	2.8	7.3		2.2	1.4	
Delay (s)	26.1	26.4	23.8	21.6	50.9	31.4	54.8	56.8		53.8	46.7	
Level of Service	C	C	C	C	D	C	D	E		D	D	
Approach Delay (s)		26.0			42.5			56.3			49.5	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	36	378	85	196	1289	606	168	472	143	218
v/c Ratio	0.18	0.28	0.12	0.39	0.94	0.66	0.40	0.74	0.34	0.34
Control Delay	16.7	26.6	1.3	18.6	51.2	8.3	55.2	55.9	54.1	42.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	26.6	1.3	18.6	51.2	8.3	55.2	55.9	54.1	42.7
Queue Length 50th (m)	3.9	31.1	0.0	23.3	151.8	11.8	19.0	54.2	16.0	21.3
Queue Length 95th (m)	8.7	42.0	2.5	36.1	#194.5	45.9	29.3	71.8	25.6	32.3
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	197	1371	683	501	1371	918	422	641	422	642
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	0.18	0.28	0.12	0.39	0.94	0.66	0.40	0.74	0.34	0.34

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/27/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	385	87	200	1315	618	172	410	72	146	178	45
Future Volume (vph)	37	385	87	200	1315	618	172	410	72	146	178	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1695	3390	1464	1686	3390	1464	3288	3295		3288	3262	
Flt Permitted	0.08	1.00	1.00	0.49	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	136	3390	1464	869	3390	1464	3288	3295		3288	3262	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	385	87	200	1315	618	172	410	72	146	178	45
RTOR Reduction (vph)	0	0	52	0	0	308	0	11	0	0	17	0
Lane Group Flow (vph)	37	385	35	200	1315	310	172	471	0	146	206	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Confl. Bikes (#/hr)			3			3			3			3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Effective Green, g (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Actuated g/C Ratio	0.49	0.40	0.40	0.49	0.40	0.40	0.13	0.19		0.13	0.19	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	197	1371	592	492	1371	592	422	628		422	622	
v/s Ratio Prot	0.02	0.11		c0.03	c0.39		c0.05	c0.14		0.04	0.06	
v/s Ratio Perm	0.08		0.02	0.16		0.21						
v/c Ratio	0.19	0.28	0.06	0.41	0.96	0.52	0.41	0.75		0.35	0.33	
Uniform Delay, d1	24.6	26.0	23.6	19.4	37.7	29.2	52.1	49.7		51.7	45.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.5	0.2	2.5	16.3	3.3	2.9	8.0		2.2	1.4	
Delay (s)	26.7	26.5	23.8	21.8	54.0	32.5	55.0	57.7		53.9	46.9	
Level of Service	C	C	C	C	D	C	E	E		D	D	
Approach Delay (s)		26.1			44.7			57.0			49.7	
Approach LOS		C			D			E			D	

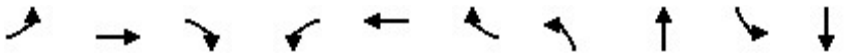
Intersection Summary			
HCM 2000 Control Delay	44.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

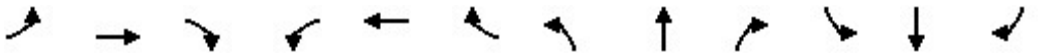
02/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	37	385	87	200	1315	618	172	482	146	223
v/c Ratio	0.19	0.28	0.13	0.41	0.96	0.69	0.41	0.75	0.35	0.35
Control Delay	16.7	26.7	1.4	18.9	54.2	9.6	55.3	56.6	54.3	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	26.7	1.4	18.9	54.2	9.6	55.3	56.6	54.3	42.9
Queue Length 50th (m)	4.0	31.7	0.0	23.9	157.0	14.9	19.5	55.5	16.4	21.8
Queue Length 95th (m)	9.0	42.8	2.8	36.9	#201.2	53.8	30.0	73.4	26.1	33.1
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	197	1371	670	493	1371	900	422	640	422	639
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	0.19	0.28	0.13	0.41	0.96	0.69	0.41	0.75	0.35	0.35

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)	37	385	115	214	1315	618	208	450	97	146	192	45
Future Volume (vph)	37	385	115	214	1315	618	208	450	97	146	192	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	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	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1695	3390	1464	1686	3390	1464	3288	3277		3288	3269	
Flt Permitted	0.08	1.00	1.00	0.49	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	136	3390	1464	869	3390	1464	3288	3277		3288	3269	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	385	115	214	1315	618	208	450	97	146	192	45
RTOR Reduction (vph)	0	0	68	0	0	305	0	14	0	0	15	0
Lane Group Flow (vph)	37	385	47	214	1315	313	208	533	0	146	222	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Confl. Bikes (#/hr)			3			3			3			3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Effective Green, g (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Actuated g/C Ratio	0.49	0.40	0.40	0.49	0.40	0.40	0.13	0.19		0.13	0.19	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	197	1371	592	492	1371	592	422	625		422	623	
v/s Ratio Prot	0.02	0.11		c0.04	c0.39		c0.06	c0.16		0.04	0.07	
v/s Ratio Perm	0.08		0.03	0.18		0.21						
v/c Ratio	0.19	0.28	0.08	0.43	0.96	0.53	0.49	0.85		0.35	0.36	
Uniform Delay, d1	24.6	26.0	23.8	19.5	37.7	29.3	52.7	50.8		51.7	45.7	
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	2.1	0.5	0.3	2.8	16.3	3.4	4.1	13.8		2.2	1.6	
Delay (s)	26.7	26.5	24.1	22.3	54.0	32.7	56.8	64.7		53.9	47.3	
Level of Service	C	C	C	C	D	C	E	E		D	D	
Approach Delay (s)		26.0			44.7			62.5			49.8	
Approach LOS		C			D			E			D	

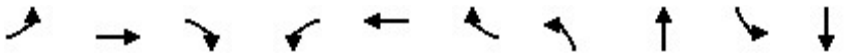
Intersection Summary			
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	37	385	115	214	1315	618	208	547	146	237
v/c Ratio	0.19	0.28	0.17	0.43	0.96	0.69	0.49	0.86	0.35	0.37
Control Delay	16.7	26.7	3.5	19.4	54.2	10.0	57.1	63.5	54.3	43.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	26.7	3.5	19.4	54.2	10.0	57.1	63.5	54.3	43.9
Queue Length 50th (m)	4.0	31.7	0.0	25.8	157.0	15.9	23.8	64.4	16.4	23.7
Queue Length 95th (m)	9.0	42.8	8.1	39.4	#201.2	55.6	35.5	#89.7	26.1	35.3
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	197	1371	670	493	1371	897	422	638	422	639
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	0.19	0.28	0.17	0.43	0.96	0.69	0.49	0.86	0.35	0.37

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/26/2018

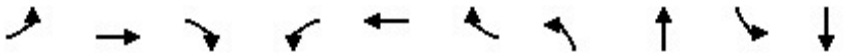
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	426	97	221	1452	683	190	453	80	162	197	50
Future Volume (vph)	41	426	97	221	1452	683	190	453	80	162	197	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1695	3390	1452	1684	3390	1452	3288	3289		3288	3254	
Flt Permitted	0.08	1.00	1.00	0.46	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	136	3390	1452	815	3390	1452	3288	3289		3288	3254	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	41	426	97	221	1452	683	190	453	80	162	197	50
RTOR Reduction (vph)	0	0	58	0	0	300	0	11	0	0	17	0
Lane Group Flow (vph)	41	426	39	221	1452	383	190	522	0	162	230	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Effective Green, g (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Actuated g/C Ratio	0.49	0.40	0.40	0.49	0.40	0.40	0.13	0.19		0.13	0.19	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	197	1371	587	470	1371	587	422	627		422	620	
v/s Ratio Prot	0.02	0.13		c0.04	c0.43		c0.06	c0.16		0.05	0.07	
v/s Ratio Perm	0.08		0.03	0.19		0.26						
v/c Ratio	0.21	0.31	0.07	0.47	1.06	0.65	0.45	0.83		0.38	0.37	
Uniform Delay, d1	26.7	26.4	23.7	19.7	38.7	31.3	52.4	50.6		51.9	45.8	
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	2.4	0.6	0.2	3.4	41.6	5.6	3.4	12.2		2.6	1.7	
Delay (s)	29.1	26.9	23.9	23.0	80.3	36.9	55.8	62.8		54.6	47.5	
Level of Service	C	C	C	C	F	D	E	E		D	D	
Approach Delay (s)		26.6			62.3			61.0			50.3	
Approach LOS		C			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	55.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/26/2018

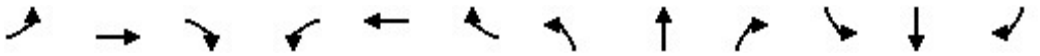


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	41	426	97	221	1452	683	190	533	162	247
v/c Ratio	0.21	0.31	0.15	0.47	1.06	0.77	0.45	0.84	0.38	0.39
Control Delay	17.1	27.1	2.0	20.2	79.3	14.9	56.2	61.9	54.9	44.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	27.1	2.0	20.2	79.3	14.9	56.2	61.9	54.9	44.0
Queue Length 50th (m)	4.4	35.5	0.0	26.8	~197.6	35.9	21.7	62.7	18.3	24.6
Queue Length 95th (m)	9.6	47.4	4.7	40.8	#236.8	86.6	32.6	#86.4	28.4	36.6
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	197	1371	665	470	1371	887	422	638	422	638
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	0.21	0.31	0.15	0.47	1.06	0.77	0.45	0.84	0.38	0.39

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.



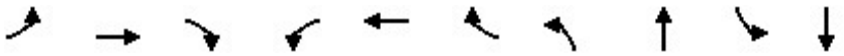
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	426	125	235	1452	683	226	493	105	162	211	50
Future Volume (vph)	41	426	125	235	1452	683	226	493	105	162	211	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	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	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1695	3390	1452	1684	3390	1452	3288	3272		3288	3262	
Flt Permitted	0.08	1.00	1.00	0.46	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	136	3390	1452	815	3390	1452	3288	3272		3288	3262	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	41	426	125	235	1452	683	226	493	105	162	211	50
RTOR Reduction (vph)	0	0	74	0	0	298	0	14	0	0	16	0
Lane Group Flow (vph)	41	426	51	235	1452	385	226	584	0	162	245	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Effective Green, g (s)	63.5	52.6	52.6	63.5	52.6	52.6	16.7	24.8		16.7	24.8	
Actuated g/C Ratio	0.49	0.40	0.40	0.49	0.40	0.40	0.13	0.19		0.13	0.19	
Clearance Time (s)	6.1	6.4	6.4	6.1	6.4	6.4	6.3	6.2		6.3	6.2	
Lane Grp Cap (vph)	197	1371	587	470	1371	587	422	624		422	622	
v/s Ratio Prot	0.02	0.13		c0.04	c0.43		c0.07	c0.18		0.05	0.08	
v/s Ratio Perm	0.08		0.03	0.20		0.27						
v/c Ratio	0.21	0.31	0.09	0.50	1.06	0.66	0.54	0.94		0.38	0.39	
Uniform Delay, d1	26.7	26.4	23.9	19.9	38.7	31.4	53.0	51.8		51.9	46.0	
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	2.4	0.6	0.3	3.8	41.6	5.7	4.8	23.4		2.6	1.9	
Delay (s)	29.1	26.9	24.2	23.6	80.3	37.0	57.8	75.2		54.6	47.9	
Level of Service	C	C	C	C	F	D	E	E		D	D	
Approach Delay (s)		26.5			62.2			70.4			50.4	
Approach LOS		C			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	57.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: Mer Bleue Road/Jeanne D'Arc Blvd S & Innes Road

02/26/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	41	426	125	235	1452	683	226	598	162	261
v/c Ratio	0.21	0.31	0.19	0.50	1.06	0.77	0.54	0.94	0.38	0.41
Control Delay	17.1	27.1	4.2	21.0	79.3	15.1	58.2	73.6	54.9	44.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	27.1	4.2	21.0	79.3	15.1	58.2	73.6	54.9	44.7
Queue Length 50th (m)	4.4	35.5	0.0	28.7	~197.6	37.0	26.1	72.0	18.3	26.4
Queue Length 95th (m)	9.6	47.4	10.1	43.3	#236.8	88.0	38.1	#104.3	28.4	38.7
Internal Link Dist (m)		393.7			442.7			299.0		178.8
Turn Bay Length (m)	115.0		125.0	150.0		100.0	85.0		47.0	
Base Capacity (vph)	197	1371	665	470	1371	885	422	638	422	638
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	0.21	0.31	0.19	0.50	1.06	0.77	0.54	0.94	0.38	0.41

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	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	73	737	72	0	0
Future Volume (Veh/h)	0	73	737	72	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	73	737	72	0	0
Pedestrians	2		2			2
Lane Width (m)	3.7		3.7			0.0
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	777	408			811	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	777	408			811	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	88			100	
cM capacity (veh/h)	328	585			797	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	73	491	318
Volume Left	0	0	0
Volume Right	73	0	72
cSH	585	1700	1700
Volume to Capacity	0.12	0.29	0.19
Queue Length 95th (m)	3.0	0.0	0.0
Control Delay (s)	12.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.0	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	101	760	71	0	0
Future Volume (Veh/h)	0	101	760	71	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	101	760	71	0	0
Pedestrians	2		2			2
Lane Width (m)	3.7		3.7			0.0
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	800	420			833	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	800	420			833	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	82			100	
cM capacity (veh/h)	317	576			781	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	101	507	324
Volume Left	0	0	0
Volume Right	101	0	71
cSH	576	1700	1700
Volume to Capacity	0.18	0.30	0.19
Queue Length 95th (m)	4.4	0.0	0.0
Control Delay (s)	12.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.6	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	73	814	72	0	0
Future Volume (Veh/h)	0	73	814	72	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	73	814	72	0	0
Pedestrians	2		2			2
Lane Width (m)	3.7		3.7			0.0
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	854	447			888	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	854	447			888	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	87			100	
cM capacity (veh/h)	293	552			745	

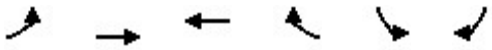
Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	73	543	343
Volume Left	0	0	0
Volume Right	73	0	72
cSH	552	1700	1700
Volume to Capacity	0.13	0.32	0.20
Queue Length 95th (m)	3.2	0.0	0.0
Control Delay (s)	12.5	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.5	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	101	840	71	0	0
Future Volume (Veh/h)	0	101	840	71	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	101	840	71	0	0
Pedestrians	2		2			2
Lane Width (m)	3.7		3.7			0.0
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	880	460			913	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	880	460			913	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	81			100	
cM capacity (veh/h)	282	542			728	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	101	560	351
Volume Left	0	0	0
Volume Right	101	0	71
cSH	542	1700	1700
Volume to Capacity	0.19	0.33	0.21
Queue Length 95th (m)	4.7	0.0	0.0
Control Delay (s)	13.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.2	0.0	
Approach LOS	B		

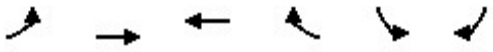
Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	262	981	1	0	9
Future Volume (Veh/h)	4	262	981	1	0	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	4	270	1011	1	0	9
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	1012				1290	1012
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1012				1290	1012
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				100	97
cM capacity (veh/h)	677				178	288

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	4	270	1012	9
Volume Left	4	0	0	0
Volume Right	0	0	1	9
cSH	677	1700	1700	288
Volume to Capacity	0.01	0.16	0.60	0.03
Queue Length 95th (m)	0.1	0.0	0.0	0.7
Control Delay (s)	10.3	0.0	0.0	17.9
Lane LOS	B			C
Approach Delay (s)	0.2		0.0	17.9
Approach LOS				C

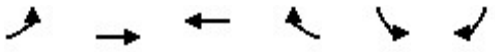
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	852	459	1	0	3
Future Volume (Veh/h)	5	852	459	1	0	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	5	916	494	1	0	3
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	495				1420	494
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	495				1420	494
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1069				150	575

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	916	495	3
Volume Left	5	0	0	0
Volume Right	0	0	1	3
cSH	1069	1700	1700	575
Volume to Capacity	0.00	0.54	0.29	0.01
Queue Length 95th (m)	0.1	0.0	0.0	0.1
Control Delay (s)	8.4	0.0	0.0	11.3
Lane LOS	A			B
Approach Delay (s)	0.0		0.0	11.3
Approach LOS				B

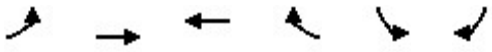
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	273	980	2	10	0
Future Volume (Veh/h)	5	273	980	2	10	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	273	980	2	10	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)						
pX, platoon unblocked						
vC, conflicting volume	982				1264	981
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	982				1264	981
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				95	100
cM capacity (veh/h)	695				184	300

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	273	982	10
Volume Left	5	0	0	10
Volume Right	0	0	2	0
cSH	695	1700	1700	184
Volume to Capacity	0.01	0.16	0.58	0.05
Queue Length 95th (m)	0.2	0.0	0.0	1.2
Control Delay (s)	10.2	0.0	0.0	25.7
Lane LOS	B			D
Approach Delay (s)	0.2		0.0	25.7
Approach LOS				D

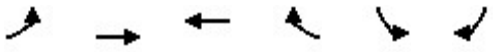
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	852	478	2	0	4
Future Volume (Veh/h)	5	852	478	2	0	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	852	478	2	0	4
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	480				1341	479
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	480				1341	479
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1082				167	587

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	852	480	4
Volume Left	5	0	0	0
Volume Right	0	0	2	4
cSH	1082	1700	1700	587
Volume to Capacity	0.00	0.50	0.28	0.01
Queue Length 95th (m)	0.1	0.0	0.0	0.1
Control Delay (s)	8.3	0.0	0.0	11.2
Lane LOS	A			B
Approach Delay (s)	0.0		0.0	11.2
Approach LOS				B

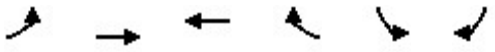
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	273	987	2	10	0
Future Volume (Veh/h)	5	273	987	2	10	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	273	987	2	10	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)						
pX, platoon unblocked						
vC, conflicting volume	989				1271	988
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	989				1271	988
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				95	100
cM capacity (veh/h)	691				182	297

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	273	989	10
Volume Left	5	0	0	10
Volume Right	0	0	2	0
cSH	691	1700	1700	182
Volume to Capacity	0.01	0.16	0.58	0.05
Queue Length 95th (m)	0.2	0.0	0.0	1.2
Control Delay (s)	10.2	0.0	0.0	25.9
Lane LOS	B			D
Approach Delay (s)	0.2		0.0	25.9
Approach LOS				D

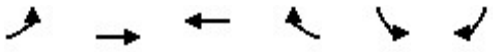
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	852	485	2	0	4
Future Volume (Veh/h)	5	852	485	2	0	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	852	485	2	0	4
Pedestrians		2	2		2	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	489				1352	490
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	489				1352	490
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1072				164	576

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	852	487	4
Volume Left	5	0	0	0
Volume Right	0	0	2	4
cSH	1072	1700	1700	576
Volume to Capacity	0.00	0.50	0.29	0.01
Queue Length 95th (m)	0.1	0.0	0.0	0.1
Control Delay (s)	8.4	0.0	0.0	11.3
Lane LOS	A			B
Approach Delay (s)	0.0		0.0	11.3
Approach LOS				B

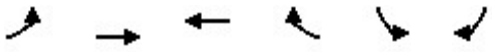
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	302	1082	3	1	12
Future Volume (Veh/h)	6	302	1082	3	1	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	302	1082	3	1	12
Pedestrians		1	1		1	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1086				1400	1086
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1086				1400	1086
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				99	95
cM capacity (veh/h)	634				151	260

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	6	302	1085	13
Volume Left	6	0	0	1
Volume Right	0	0	3	12
cSH	634	1700	1700	247
Volume to Capacity	0.01	0.18	0.64	0.05
Queue Length 95th (m)	0.2	0.0	0.0	1.2
Control Delay (s)	10.7	0.0	0.0	20.4
Lane LOS	B			C
Approach Delay (s)	0.2		0.0	20.4
Approach LOS				C

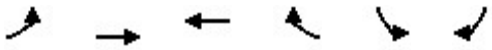
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	957	528	3	1	5
Future Volume (Veh/h)	7	957	528	3	1	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	957	528	3	1	5
Pedestrians		1	1		1	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	532				1502	532
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	532				1502	532
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				99	99
cM capacity (veh/h)	1035				133	547

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	7	957	531	6
Volume Left	7	0	0	1
Volume Right	0	0	3	5
cSH	1035	1700	1700	360
Volume to Capacity	0.01	0.56	0.31	0.02
Queue Length 95th (m)	0.1	0.0	0.0	0.4
Control Delay (s)	8.5	0.0	0.0	15.2
Lane LOS	A			C
Approach Delay (s)	0.1		0.0	15.2
Approach LOS				C

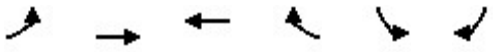
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	302	1089	3	1	12
Future Volume (Veh/h)	6	302	1089	3	1	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	302	1089	3	1	12
Pedestrians		2	2		2	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1094				1408	1094
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1094				1408	1094
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				99	95
cM capacity (veh/h)	629				149	257

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	6	302	1092	13
Volume Left	6	0	0	1
Volume Right	0	0	3	12
cSH	629	1700	1700	243
Volume to Capacity	0.01	0.18	0.64	0.05
Queue Length 95th (m)	0.2	0.0	0.0	1.2
Control Delay (s)	10.8	0.0	0.0	20.6
Lane LOS	B			C
Approach Delay (s)	0.2		0.0	20.6
Approach LOS				C

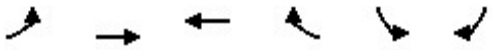
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	957	535	3	1	5
Future Volume (Veh/h)	7	957	535	3	1	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	957	535	3	1	5
Pedestrians		2	2		2	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	540				1512	540
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	540				1512	540
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				99	99
cM capacity (veh/h)	1027				131	539

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	7	957	538	6
Volume Left	7	0	0	1
Volume Right	0	0	3	5
cSH	1027	1700	1700	355
Volume to Capacity	0.01	0.56	0.32	0.02
Queue Length 95th (m)	0.1	0.0	0.0	0.4
Control Delay (s)	8.5	0.0	0.0	15.3
Lane LOS	A			C
Approach Delay (s)	0.1		0.0	15.3
Approach LOS				C

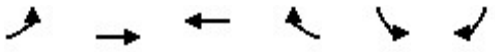
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	242	778	11	10	165
Future Volume (Veh/h)	18	242	778	11	10	165
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	18	247	794	11	10	168
Pedestrians		1	1		1	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	806				1084	802
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	806				1084	802
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				96	56
cM capacity (veh/h)	809				232	380

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	18	247	805	10	168
Volume Left	18	0	0	10	0
Volume Right	0	0	11	0	168
cSH	809	1700	1700	232	380
Volume to Capacity	0.02	0.15	0.47	0.04	0.44
Queue Length 95th (m)	0.5	0.0	0.0	0.9	15.3
Control Delay (s)	9.5	0.0	0.0	21.2	21.7
Lane LOS	A			C	C
Approach Delay (s)	0.6		0.0	21.7	
Approach LOS				C	

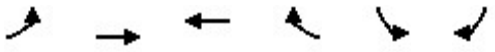
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	163	669	403	8	4	57
Future Volume (Veh/h)	163	669	403	8	4	57
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)	177	727	438	9	4	62
Pedestrians		2	14		2	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	449				1540	446
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	449				1540	446
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				96	90
cM capacity (veh/h)	1109				105	610

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	177	727	447	4	62
Volume Left	177	0	0	4	0
Volume Right	0	0	9	0	62
cSH	1109	1700	1700	105	610
Volume to Capacity	0.16	0.43	0.26	0.04	0.10
Queue Length 95th (m)	4.0	0.0	0.0	0.8	2.4
Control Delay (s)	8.9	0.0	0.0	40.6	11.6
Lane LOS	A			E	B
Approach Delay (s)	1.7		0.0	13.3	
Approach LOS				B	

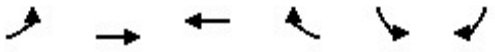
Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	252	810	12	172	11
Future Volume (Veh/h)	19	252	810	12	172	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	19	257	827	12	176	11
Pedestrians		1	1		1	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	840				1130	835
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	840				1130	835
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				19	97
cM capacity (veh/h)	786				217	364

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	19	257	839	176	11
Volume Left	19	0	0	176	0
Volume Right	0	0	12	0	11
cSH	786	1700	1700	217	364
Volume to Capacity	0.02	0.15	0.49	0.81	0.03
Queue Length 95th (m)	0.5	0.0	0.0	41.6	0.7
Control Delay (s)	9.7	0.0	0.0	67.4	15.2
Lane LOS	A			F	C
Approach Delay (s)	0.7		0.0	64.3	
Approach LOS				F	

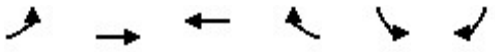
Intersection Summary			
Average Delay	9.4		
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	252	669	420	9	5	60
Future Volume (Veh/h)	252	669	420	9	5	60
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)	274	727	457	10	5	65
Pedestrians		3	15		3	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	470				1755	468
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	470				1755	468
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	75				93	89
cM capacity (veh/h)	1089				69	592

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	274	727	467	5	65
Volume Left	274	0	0	5	0
Volume Right	0	0	10	0	65
cSH	1089	1700	1700	69	592
Volume to Capacity	0.25	0.43	0.27	0.07	0.11
Queue Length 95th (m)	7.0	0.0	0.0	1.6	2.6
Control Delay (s)	9.4	0.0	0.0	61.3	11.8
Lane LOS	A			F	B
Approach Delay (s)	2.6		0.0	15.4	
Approach LOS				C	

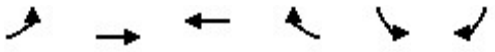
Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	252	817	12	172	11
Future Volume (Veh/h)	19	252	817	12	172	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	19	257	834	12	176	11
Pedestrians		2	2		2	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	848				1139	844
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	848				1139	844
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				18	97
cM capacity (veh/h)	780				214	359

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	19	257	846	176	11
Volume Left	19	0	0	176	0
Volume Right	0	0	12	0	11
cSH	780	1700	1700	214	359
Volume to Capacity	0.02	0.15	0.50	0.82	0.03
Queue Length 95th (m)	0.5	0.0	0.0	42.5	0.7
Control Delay (s)	9.7	0.0	0.0	70.0	15.3
Lane LOS	A			F	C
Approach Delay (s)	0.7		0.0	66.8	
Approach LOS				F	

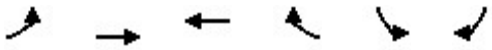
Intersection Summary			
Average Delay	9.7		
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	252	669	427	9	5	60
Future Volume (Veh/h)	252	669	427	9	5	60
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)	274	727	464	10	5	65
Pedestrians		5	17		5	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	2		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	479				1766	479
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	479				1766	479
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	75				93	89
cM capacity (veh/h)	1078				67	581

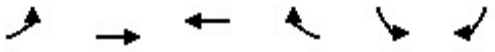
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	274	727	474	5	65
Volume Left	274	0	0	5	0
Volume Right	0	0	10	0	65
cSH	1078	1700	1700	67	581
Volume to Capacity	0.25	0.43	0.28	0.07	0.11
Queue Length 95th (m)	7.1	0.0	0.0	1.6	2.6
Control Delay (s)	9.5	0.0	0.0	62.7	12.0
Lane LOS	A			F	B
Approach Delay (s)	2.6		0.0	15.6	
Approach LOS				C	

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	279	895	14	190	13
Future Volume (vph)	21	279	895	14	190	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0			0.0	0.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1662	1750	1746	0	1662	1488
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1662	1750	1746	0	1662	1488
Link Speed (k/h)		60	60		50	
Link Distance (m)		148.6	124.3		143.1	
Travel Time (s)		8.9	7.5		10.3	
Confl. Peds. (#/hr)	3			3	3	3
Confl. Bikes (#/hr)				3		3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	21	285	913	14	194	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	285	927	0	194	13
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

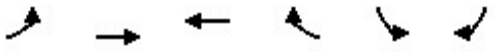
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 68.6%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	188	770	464	10	6	67
Future Volume (Veh/h)	188	770	464	10	6	67
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)	204	837	504	11	7	73
Pedestrians		4	16		4	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	519				1774	518
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	519				1774	518
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	80				90	87
cM capacity (veh/h)	1043				72	554

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	204	837	515	7	73
Volume Left	204	0	0	7	0
Volume Right	0	0	11	0	73
cSH	1043	1700	1700	72	554
Volume to Capacity	0.20	0.49	0.30	0.10	0.13
Queue Length 95th (m)	5.1	0.0	0.0	2.2	3.2
Control Delay (s)	9.3	0.0	0.0	60.4	12.5
Lane LOS	A			F	B
Approach Delay (s)	1.8		0.0	16.7	
Approach LOS				C	

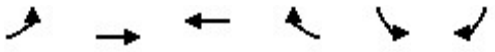
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	279	902	14	190	13
Future Volume (Veh/h)	21	279	902	14	190	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	21	285	920	14	194	13
Pedestrians		4	4		4	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	938				1262	935
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	938				1262	935
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				0	96
cM capacity (veh/h)	720				179	317

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	21	285	934	194	13
Volume Left	21	0	0	194	0
Volume Right	0	0	14	0	13
cSH	720	1700	1700	179	317
Volume to Capacity	0.03	0.17	0.55	1.08	0.04
Queue Length 95th (m)	0.6	0.0	0.0	66.6	0.9
Control Delay (s)	10.2	0.0	0.0	144.7	16.9
Lane LOS	B			F	C
Approach Delay (s)	0.7		0.0	136.7	
Approach LOS				F	

Intersection Summary			
Average Delay	19.7		
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	188	770	471	10	6	67
Future Volume (Veh/h)	188	770	471	10	6	67
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)	204	837	512	11	7	73
Pedestrians		5	17		5	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	2		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	528				1784	528
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	528				1784	528
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	80				90	87
cM capacity (veh/h)	1034				71	546

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	204	837	523	7	73
Volume Left	204	0	0	7	0
Volume Right	0	0	11	0	73
cSH	1034	1700	1700	71	546
Volume to Capacity	0.20	0.49	0.31	0.10	0.13
Queue Length 95th (m)	5.1	0.0	0.0	2.2	3.2
Control Delay (s)	9.3	0.0	0.0	61.6	12.6
Lane LOS	A			F	B
Approach Delay (s)	1.8		0.0	16.9	
Approach LOS				C	

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix C

SIDRA Intersection Reports

DEGREE OF SATURATION

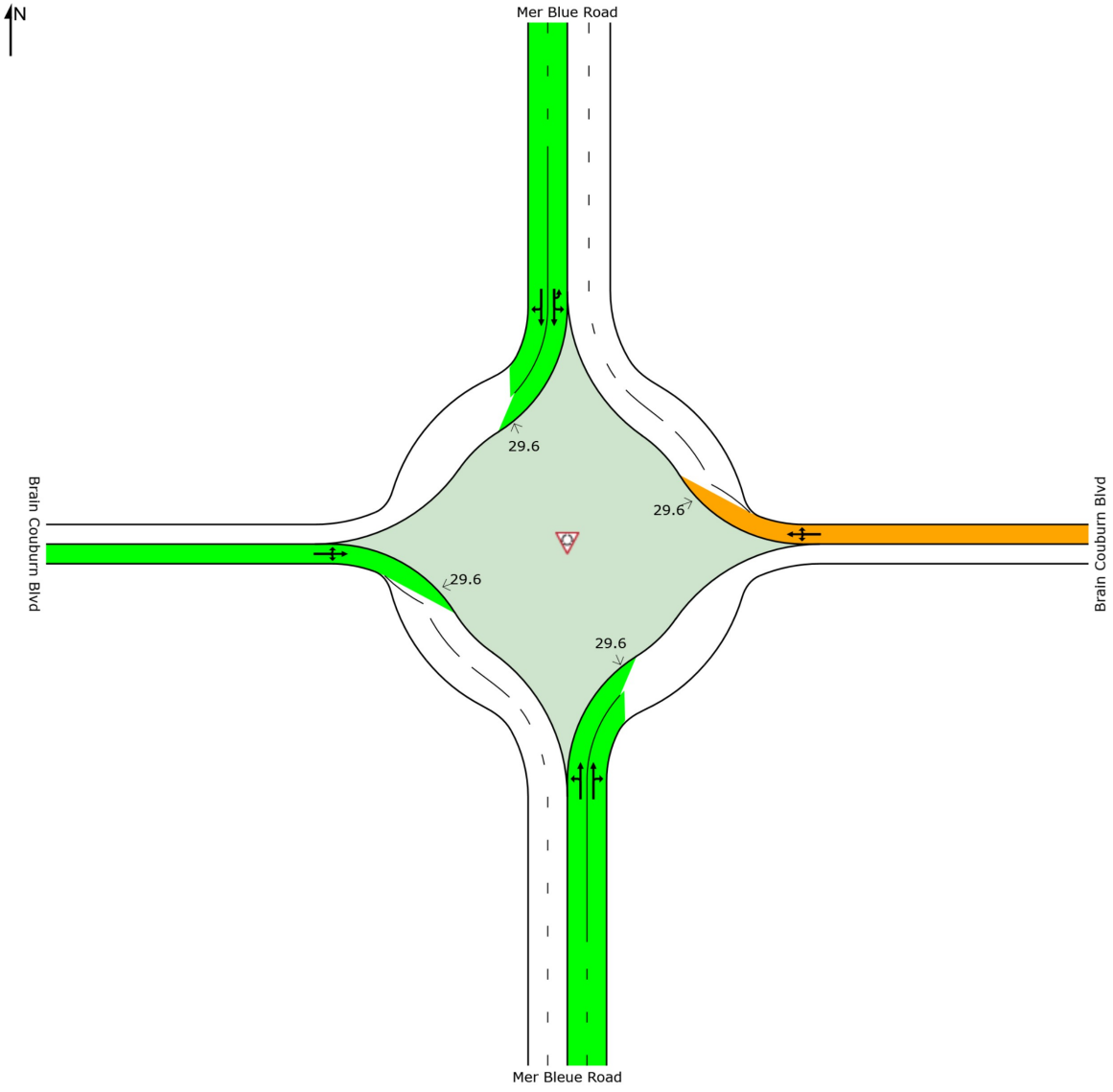
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [AM 2017 Existing Roundabout of Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.13	0.91	0.19	0.20	0.91



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

LANE SUMMARY

Site: 3 [AM 2017 Existing Roundabout of Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	146	3.8	1127	0.130	100	4.3	LOS A	0.4	2.9	Full	400	0.0	0.0
Lane 2[d]	146	3.8	1127	0.130	100	4.3	LOS A	0.4	2.9	Full	400	0.0	0.0
Approach	292	3.8		0.130		4.3	LOS A	0.4	2.9				
East: Brain Couburn Blvd													
Lane 1[d]	1032	3.8	1133	0.910	100	28.9	LOS D	14.0	109.4	Full	250	0.0	0.0
Approach	1032	3.8		0.910		28.9	LOS D	14.0	109.4				
North: Mer Blue Road													
Lane 1	179	3.8	952	0.188	100	5.6	LOS A	0.6	4.4	Full	400	0.0	0.0
Lane 2[d]	179	3.8	952	0.188	100	5.6	LOS A	0.6	4.4	Full	400	0.0	0.0
Approach	359	3.8		0.188		5.6	LOS A	0.6	4.4				
West: Brain Couburn Blvd													
Lane 1[d]	224	3.8	1144	0.196	100	4.9	LOS A	0.6	4.7	Full	400	0.0	0.0
Approach	224	3.8		0.196		4.9	LOS A	0.6	4.7				
Intersection	1907	3.8		0.910		17.9	LOS C	14.0	109.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

DEGREE OF SATURATION

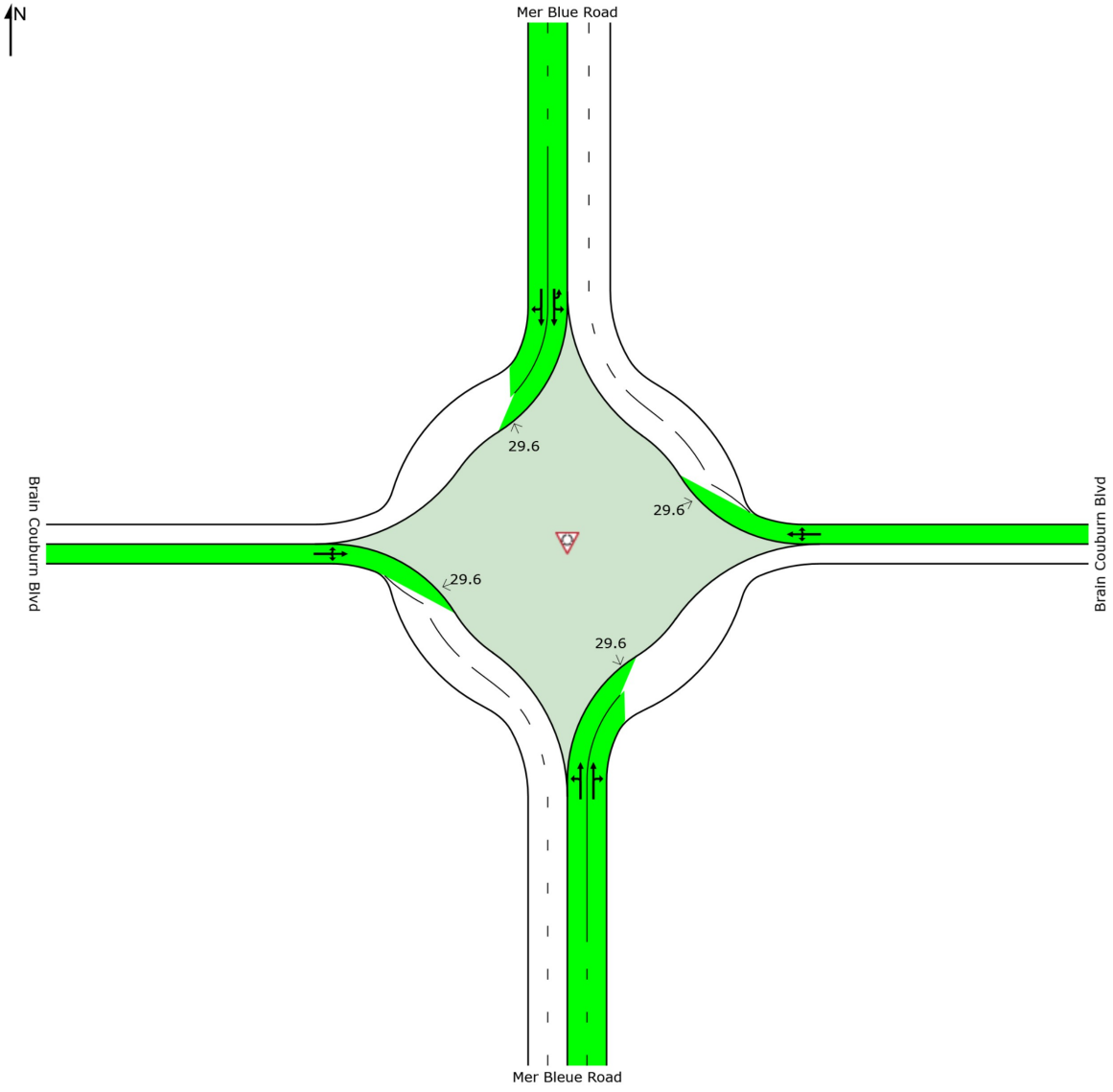
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [PM 2017 Existing Roundabout of Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.30	0.46	0.43	0.36	0.46



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

LANE SUMMARY

Site: 3 [PM 2017 Existing Roundabout of Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	251	2.0	830	0.302	100	7.7	LOS A	1.0	7.5	Full	400	0.0	0.0
Lane 2[d]	251	2.0	830	0.302	100	7.7	LOS A	1.0	7.5	Full	400	0.0	0.0
Approach	501	2.0		0.302		7.7	LOS A	1.0	7.5				
East: Brain Couburn Blvd													
Lane 1[d]	499	2.0	1077	0.463	100	8.5	LOS A	2.0	15.3	Full	250	0.0	0.0
Approach	499	2.0		0.463		8.5	LOS A	2.0	15.3				
North: Mer Blue Road													
Lane 1[d]	515	2.0	1201	0.429	100	7.4	LOS A	1.8	13.5	Full	400	0.0	0.0
Lane 2	254	2.0	1201	0.212	49[5]	4.9	LOS A	0.7	5.2	Full	400	0.0	0.0
Approach	770	2.0		0.429		6.5	LOS A	1.8	13.5				
West: Brain Couburn Blvd													
Lane 1[d]	328	2.0	923	0.356	100	7.8	LOS A	1.3	9.7	Full	400	0.0	0.0
Approach	328	2.0		0.356		7.8	LOS A	1.3	9.7				
Intersection	2098	2.0		0.463		7.5	LOS A	2.0	15.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

DEGREE OF SATURATION

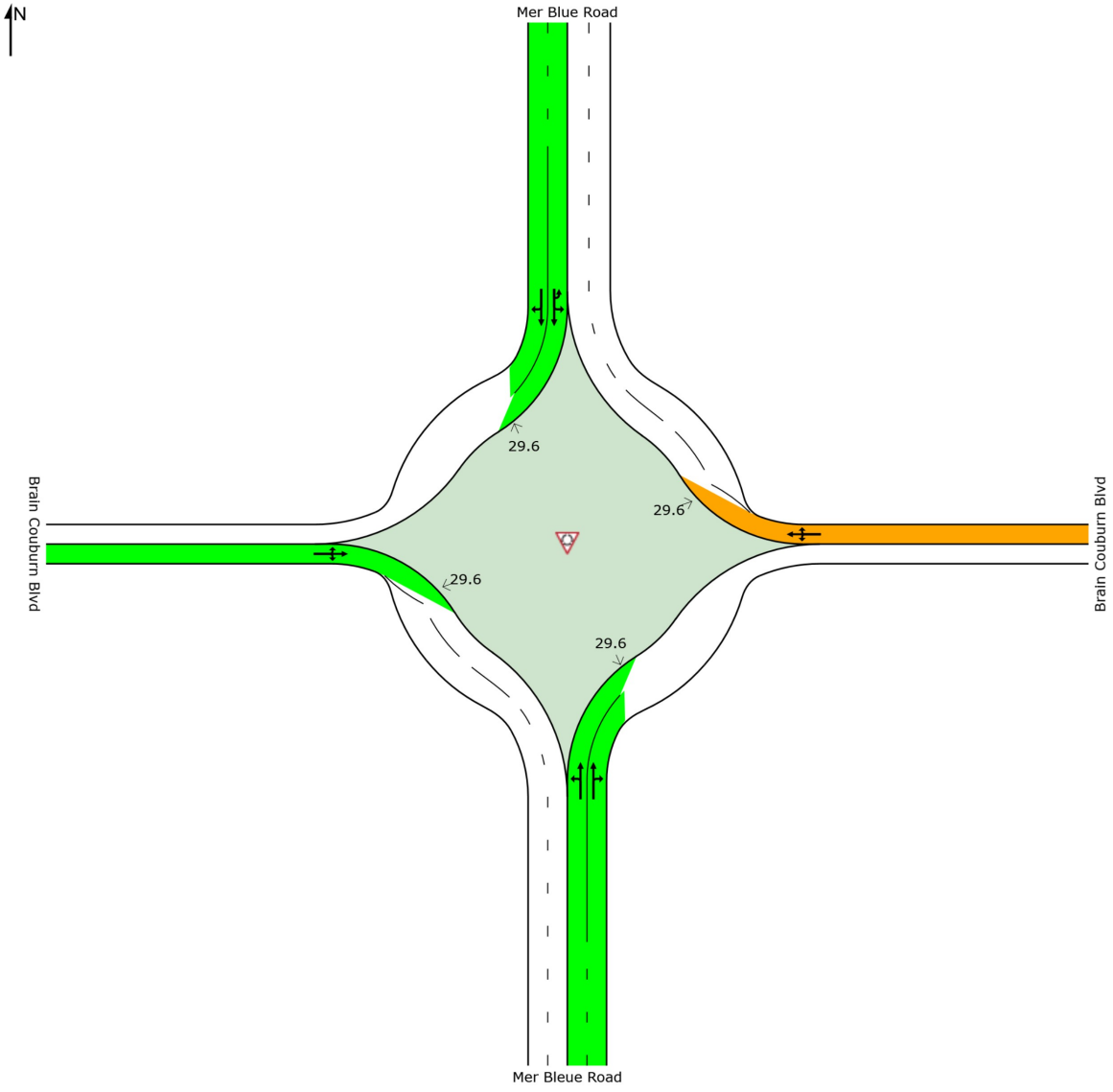
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [AM 2019 Background Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.14	0.96	0.20	0.21	0.96



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

LANE SUMMARY

Site: 3 [AM 2019 Background Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	153	3.8	1117	0.137	100	4.4	LOS A	0.4	3.1	Full	400	0.0	0.0
Lane 2[d]	153	3.8	1117	0.137	100	4.4	LOS A	0.4	3.1	Full	400	0.0	0.0
Approach	307	3.8		0.137		4.4	LOS A	0.4	3.1				
East: Brain Couburn Blvd													
Lane 1[d]	1074	3.8	1122	0.957	100	36.8	LOS E	19.3	151.7	Full	250	0.0	0.0
Approach	1074	3.8		0.957		36.8	LOS E	19.3	151.7				
North: Mer Blue Road													
Lane 1	188	3.8	938	0.201	100	5.8	LOS A	0.6	4.7	Full	400	0.0	0.0
Lane 2[d]	188	3.8	938	0.201	100	5.8	LOS A	0.6	4.7	Full	400	0.0	0.0
Approach	376	3.8		0.201		5.8	LOS A	0.6	4.7				
West: Brain Couburn Blvd													
Lane 1[d]	234	3.8	1134	0.206	100	5.0	LOS A	0.6	5.0	Full	400	0.0	0.0
Approach	234	3.8		0.206		5.0	LOS A	0.6	5.0				
Intersection	1990	3.8		0.957		22.2	LOS C	19.3	151.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

DEGREE OF SATURATION

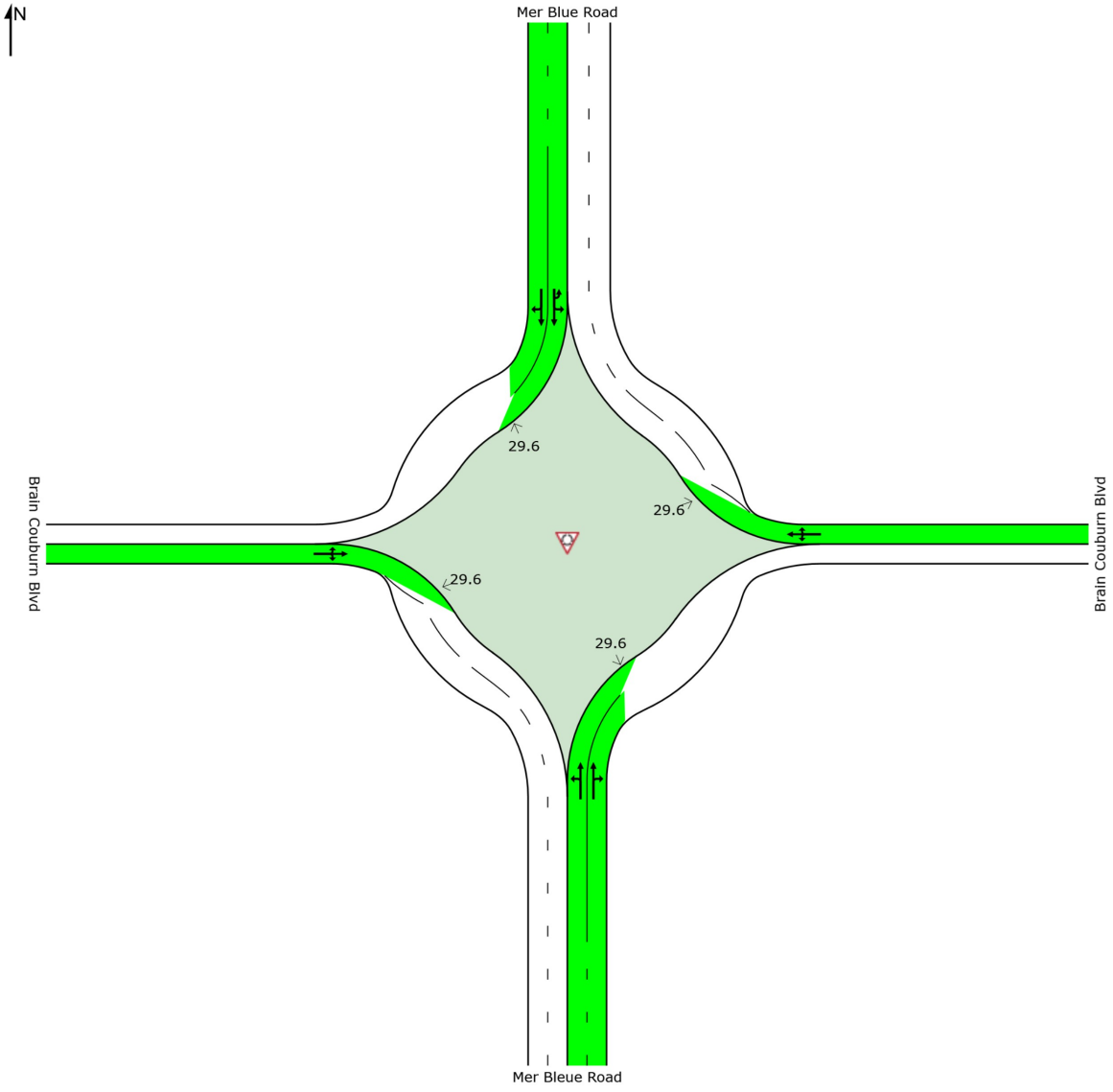
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [PM 2019 Background Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.32	0.49	0.45	0.38	0.49



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

LANE SUMMARY

Site: 3 [PM 2019 Background Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	261	2.0	811	0.322	100	8.1	LOS A	1.1	8.3	Full	400	0.0	0.0
Lane 2[d]	261	2.0	811	0.322	100	8.1	LOS A	1.1	8.3	Full	400	0.0	0.0
Approach	523	2.0		0.322		8.1	LOS A	1.1	8.3				
East: Brain Couburn Blvd													
Lane 1[d]	521	2.0	1063	0.490	100	9.0	LOS A	2.2	17.1	Full	250	0.0	0.0
Approach	521	2.0		0.490		9.0	LOS A	2.2	17.1				
North: Mer Blue Road													
Lane 1[d]	538	2.0	1192	0.451	100	7.7	LOS A	1.9	14.6	Full	400	0.0	0.0
Lane 2	266	2.0	1192	0.223	49[5]	5.0	LOS A	0.7	5.6	Full	400	0.0	0.0
Approach	804	2.0		0.451		6.8	LOS A	1.9	14.6				
West: Brain Couburn Blvd													
Lane 1[d]	343	2.0	905	0.379	100	8.3	LOS A	1.4	10.7	Full	400	0.0	0.0
Approach	343	2.0		0.379		8.3	LOS A	1.4	10.7				
Intersection	2191	2.0		0.490		7.9	LOS A	2.2	17.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

DEGREE OF SATURATION

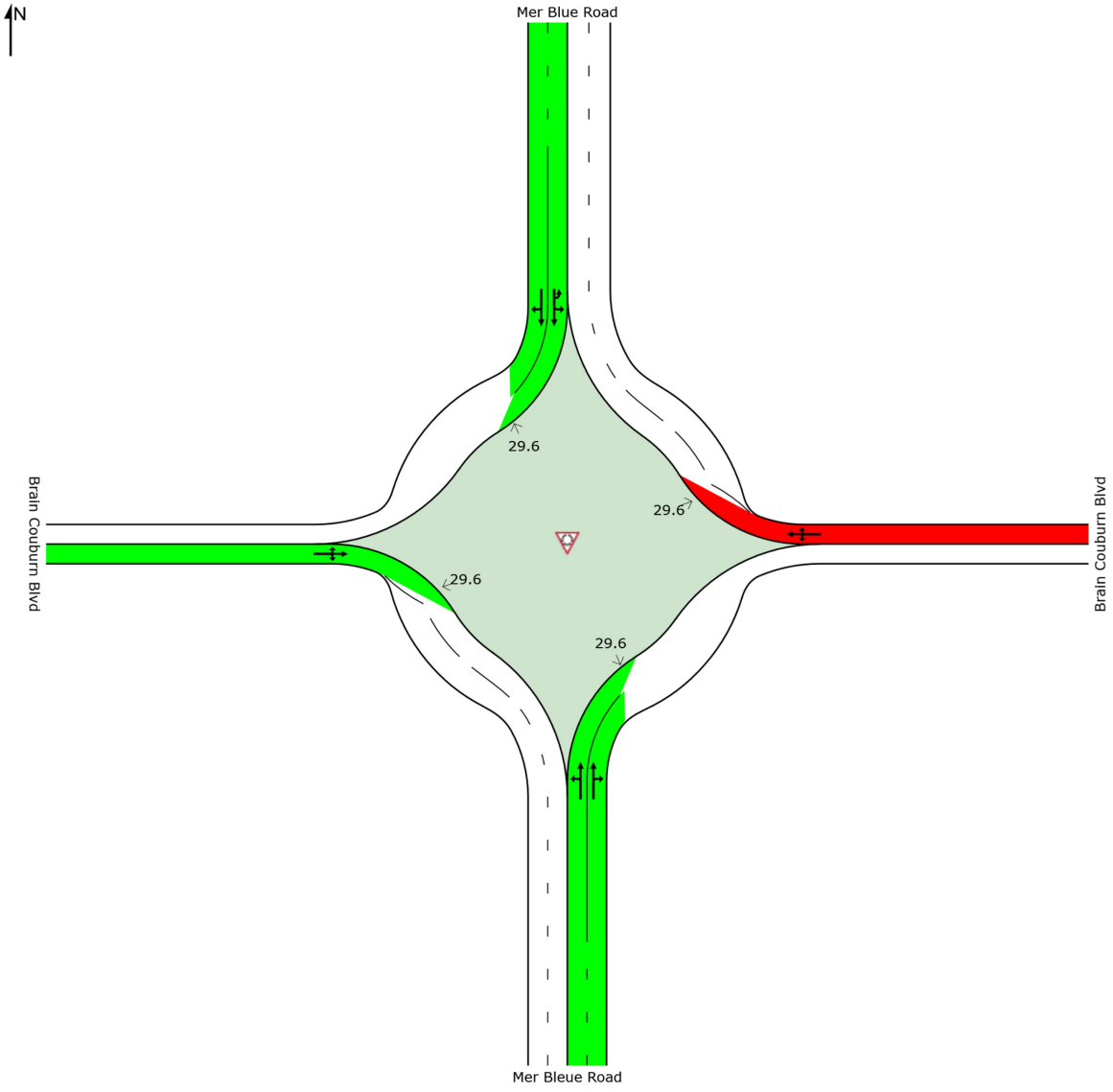
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [AM 2019 Total Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.15	1.01	0.23	0.22	1.01



Colour code based on Degree of Saturation

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LANE SUMMARY

Site: 3 [AM 2019 Total Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	155	3.8	1070	0.145	100	4.7	LOS A	0.4	3.3	Full	400	0.0	0.0
Lane 2[d]	155	3.8	1070	0.145	100	4.7	LOS A	0.4	3.3	Full	400	0.0	0.0
Approach	311	3.8		0.145		4.7	LOS A	0.4	3.3				
East: Brain Couburn Blvd													
Lane 1[d]	1082	3.8	1071	1.010	100	49.8	LOS F	29.1	228.2	Full	250	0.0	2.4
Approach	1082	3.8		1.010		49.8	LOS E	29.1	228.2				
North: Mer Blue Road													
Lane 1	220	3.8	941	0.233	100	6.2	LOS A	0.7	5.6	Full	400	0.0	0.0
Lane 2[d]	220	3.8	941	0.233	100	6.2	LOS A	0.7	5.6	Full	400	0.0	0.0
Approach	439	3.8		0.233		6.2	LOS A	0.7	5.6				
West: Brain Couburn Blvd													
Lane 1[d]	238	3.8	1089	0.219	100	5.3	LOS A	0.7	5.3	Full	400	0.0	0.0
Approach	238	3.8		0.219		5.3	LOS A	0.7	5.3				
Intersection	2070	3.8		1.010		28.6	LOS D	29.1	228.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

DEGREE OF SATURATION

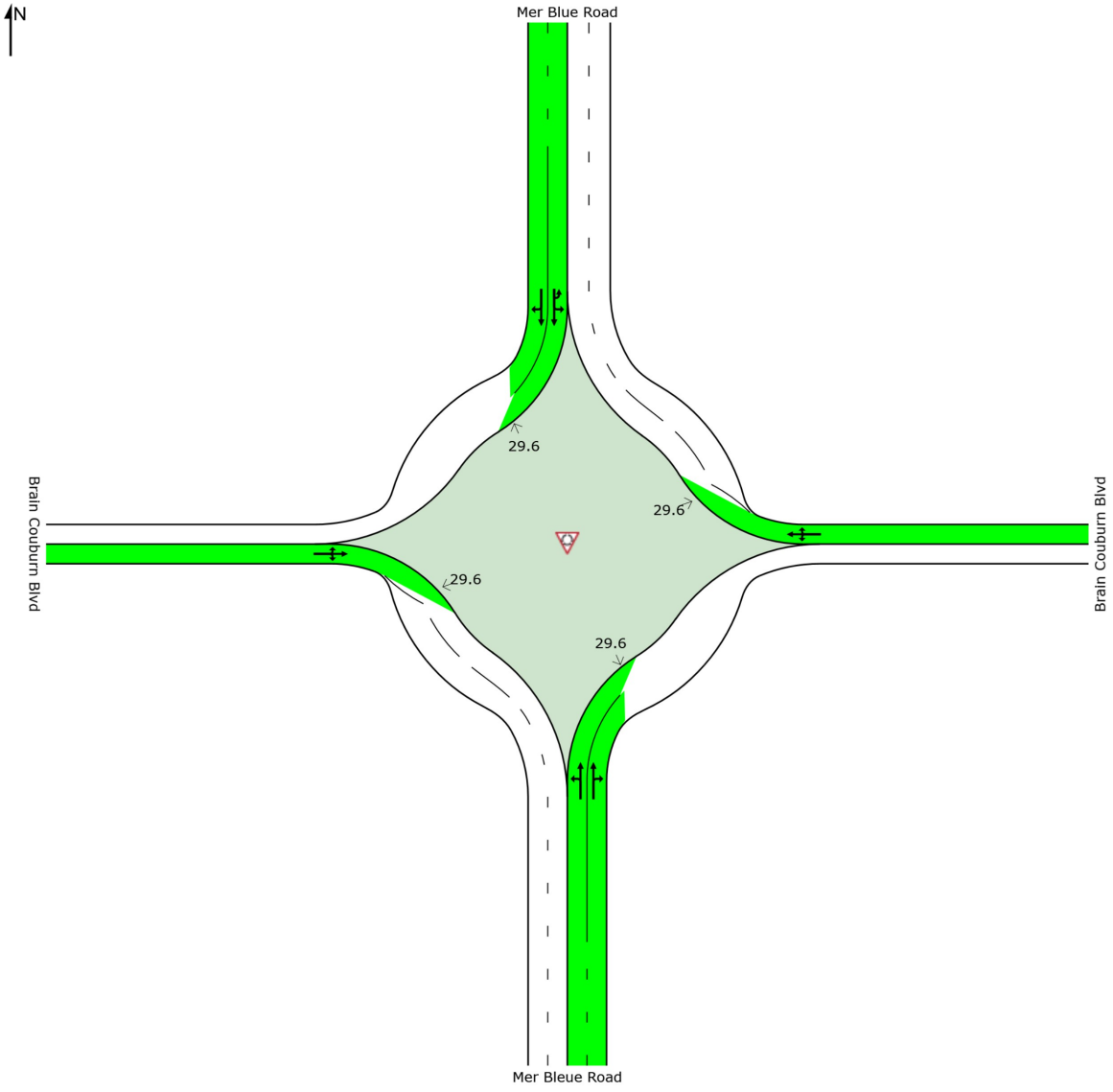
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [PM 2019 Total Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.34	0.52	0.50	0.40	0.52



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LANE SUMMARY

Site: 3 [PM 2019 Total Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	264	2.0	778	0.339	100	8.7	LOS A	1.1	8.9	Full	400	0.0	0.0
Lane 2[d]	264	2.0	778	0.339	100	8.7	LOS A	1.1	8.9	Full	400	0.0	0.0
Approach	527	2.0		0.339		8.7	LOS A	1.1	8.9				
East: Brain Couburn Blvd													
Lane 1[d]	528	2.0	1016	0.520	100	9.9	LOS A	2.5	19.0	Full	250	0.0	0.0
Approach	528	2.0		0.520		9.9	LOS A	2.5	19.0				
North: Mer Blue Road													
Lane 1[d]	600	2.0	1192	0.503	100	8.6	LOS A	2.3	17.5	Full	400	0.0	0.0
Lane 2	266	2.0	1192	0.223	44[5]	5.0	LOS A	0.7	5.6	Full	400	0.0	0.0
Approach	866	2.0		0.503		7.5	LOS A	2.3	17.5				
West: Brain Couburn Blvd													
Lane 1[d]	348	2.0	870	0.400	100	8.9	LOS A	1.5	11.6	Full	400	0.0	0.0
Approach	348	2.0		0.400		8.9	LOS A	1.5	11.6				
Intersection	2270	2.0		0.520		8.5	LOS A	2.5	19.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

DEGREE OF SATURATION

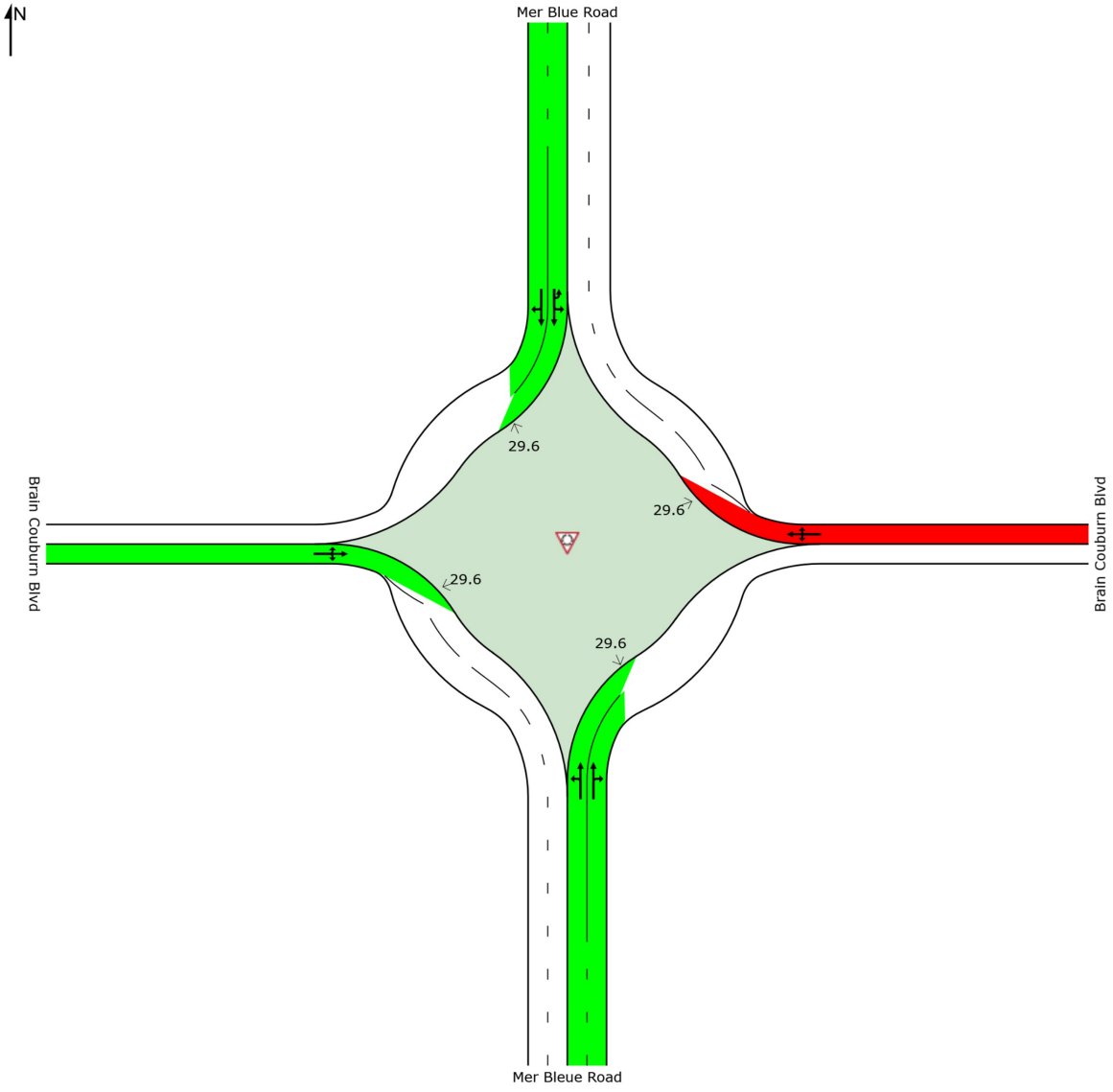
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [AM 2024 Background Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.16	1.08	0.22	0.23	1.08



Colour code based on Degree of Saturation

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LANE SUMMARY

Site: 3 [AM 2024 Background Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	171	3.8	1091	0.156	100	4.7	LOS A	0.5	3.6	Full	400	0.0	0.0
Lane 2[d]	171	3.8	1091	0.156	100	4.7	LOS A	0.5	3.6	Full	400	0.0	0.0
Approach	341	3.8		0.156		4.7	LOS A	0.5	3.6				
East: Brain Couburn Blvd													
Lane 1[d]	1187	3.8	1095	1.084	100	71.4	LOS F	50.1	392.7	Full	250	0.0	20.5
Approach	1187	3.8		1.084		71.4	LOS F	50.1	392.7				
North: Mer Blue Road													
Lane 1	209	3.8	929	0.225	100	6.1	LOS A	0.7	5.3	Full	400	0.0	0.0
Lane 2[d]	209	3.8	929	0.225	100	6.1	LOS A	0.7	5.3	Full	400	0.0	0.0
Approach	417	3.8		0.225		6.1	LOS A	0.7	5.3				
West: Brain Couburn Blvd													
Lane 1[d]	260	3.8	1112	0.234	100	5.4	LOS A	0.7	5.8	Full	400	0.0	0.0
Approach	260	3.8		0.234		5.4	LOS A	0.7	5.8				
Intersection	2205	3.8		1.084		40.9	LOS E	50.1	392.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

DEGREE OF SATURATION

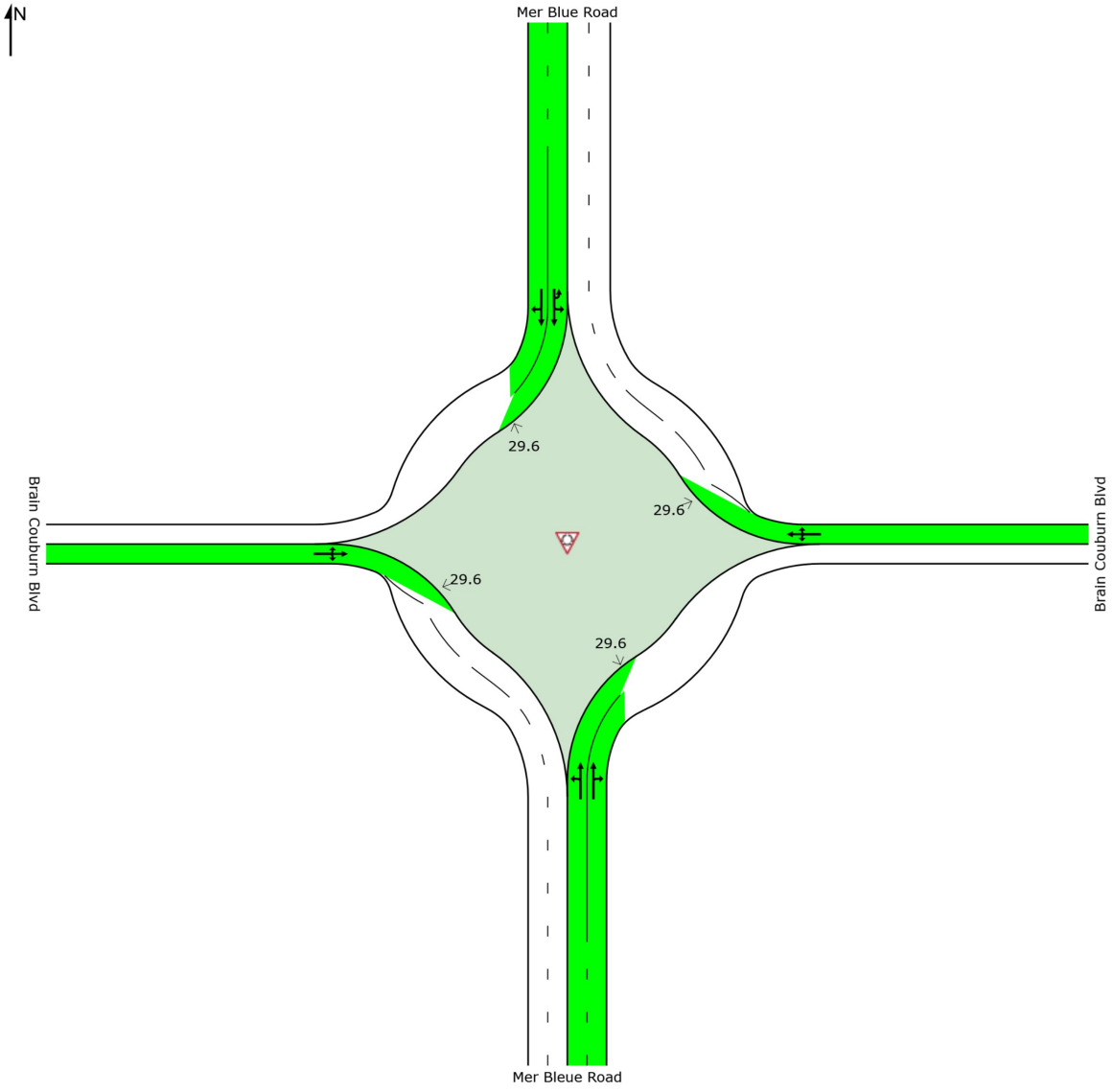
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [PM 2024 Background Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.38	0.56	0.51	0.44	0.56



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LANE SUMMARY

Site: 3 [PM 2024 Background Traffic Condition at Mer Bleue Road & Brian Coburn Blvd]

New Site
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	290	2.0	765	0.379	100	9.4	LOS A	1.3	10.4	Full	400	0.0	0.0
Lane 2[d]	290	2.0	765	0.379	100	9.4	LOS A	1.3	10.4	Full	400	0.0	0.0
Approach	579	2.0		0.379		9.4	LOS A	1.3	10.4				
East: Brain Couburn Blvd													
Lane 1[d]	576	2.0	1030	0.559	100	10.6	LOS B	2.9	22.1	Full	250	0.0	0.0
Approach	576	2.0		0.559		10.6	LOS B	2.9	22.1				
North: Mer Blue Road													
Lane 1[d]	596	2.0	1171	0.509	100	8.8	LOS A	2.3	17.7	Full	400	0.0	0.0
Lane 2	295	2.0	1171	0.252	49[5]	5.4	LOS A	0.8	6.4	Full	400	0.0	0.0
Approach	890	2.0		0.509		7.6	LOS A	2.3	17.7				
West: Brain Couburn Blvd													
Lane 1[d]	380	2.0	863	0.441	100	9.6	LOS A	1.8	13.5	Full	400	0.0	0.0
Approach	380	2.0		0.441		9.6	LOS A	1.8	13.5				
Intersection	2426	2.0		0.559		9.1	LOS A	2.9	22.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

DEGREE OF SATURATION

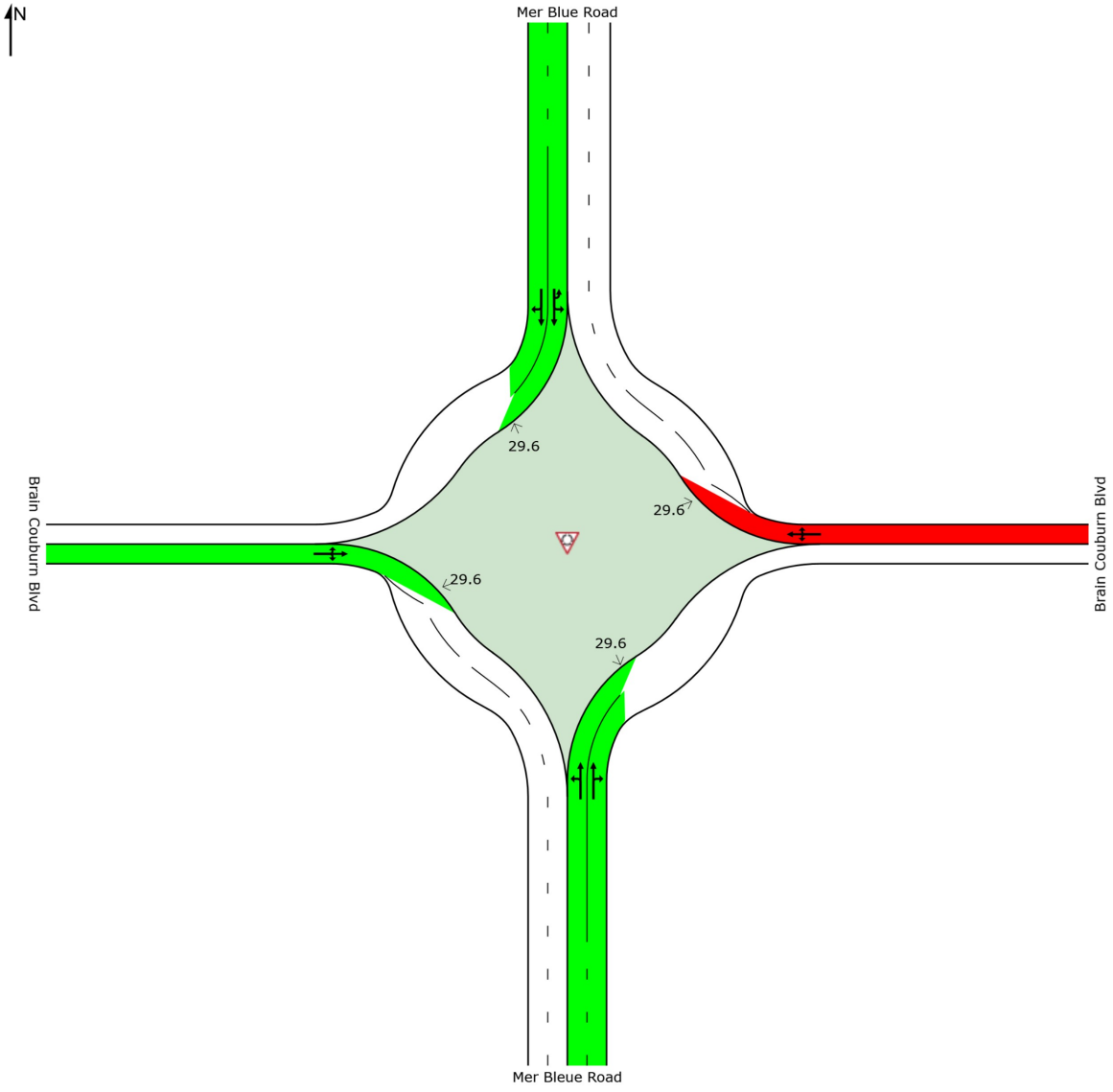
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [AM 2024 Total Traffic Condition at Mer Bleue Road & Brian Coburn Blvd.]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.16	1.14	0.25	0.24	1.14



Colour code based on Degree of Saturation

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LANE SUMMARY

Site: 3 [AM 2024 Total Traffic Condition at Mer Bleue Road & Brian Coburn Blvd.]

New Site
Roundabout

Lane Use and Performance	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	171	3.8	1048	0.163	100	4.9	LOS A	0.5	3.7	Full	400	0.0	0.0
Lane 2[d]	171	3.8	1048	0.163	100	4.9	LOS A	0.5	3.7	Full	400	0.0	0.0
Approach	341	3.8		0.163		4.9	LOS A	0.5	3.7				
East: Brain Couburn Blvd													
Lane 1[d]	1195	3.8	1051	1.136	100	90.9	LOS F	62.8	492.6	Full	250	0.0	31.5
Approach	1195	3.8		1.136		90.9	LOS F	62.8	492.6				
North: Mer Blue Road													
Lane 1	240	3.8	946	0.254	100	6.4	LOS A	0.8	6.2	Full	400	0.0	0.0
Lane 2[d]	240	3.8	946	0.254	100	6.4	LOS A	0.8	6.2	Full	400	0.0	0.0
Approach	480	3.8		0.254		6.4	LOS A	0.8	6.2				
West: Brain Couburn Blvd													
Lane 1[d]	260	3.8	1069	0.243	100	5.7	LOS A	0.8	6.1	Full	400	0.0	0.0
Approach	260	3.8		0.243		5.7	LOS A	0.8	6.1				
Intersection	2276	3.8		1.136		50.4	LOS F	62.8	492.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

DEGREE OF SATURATION

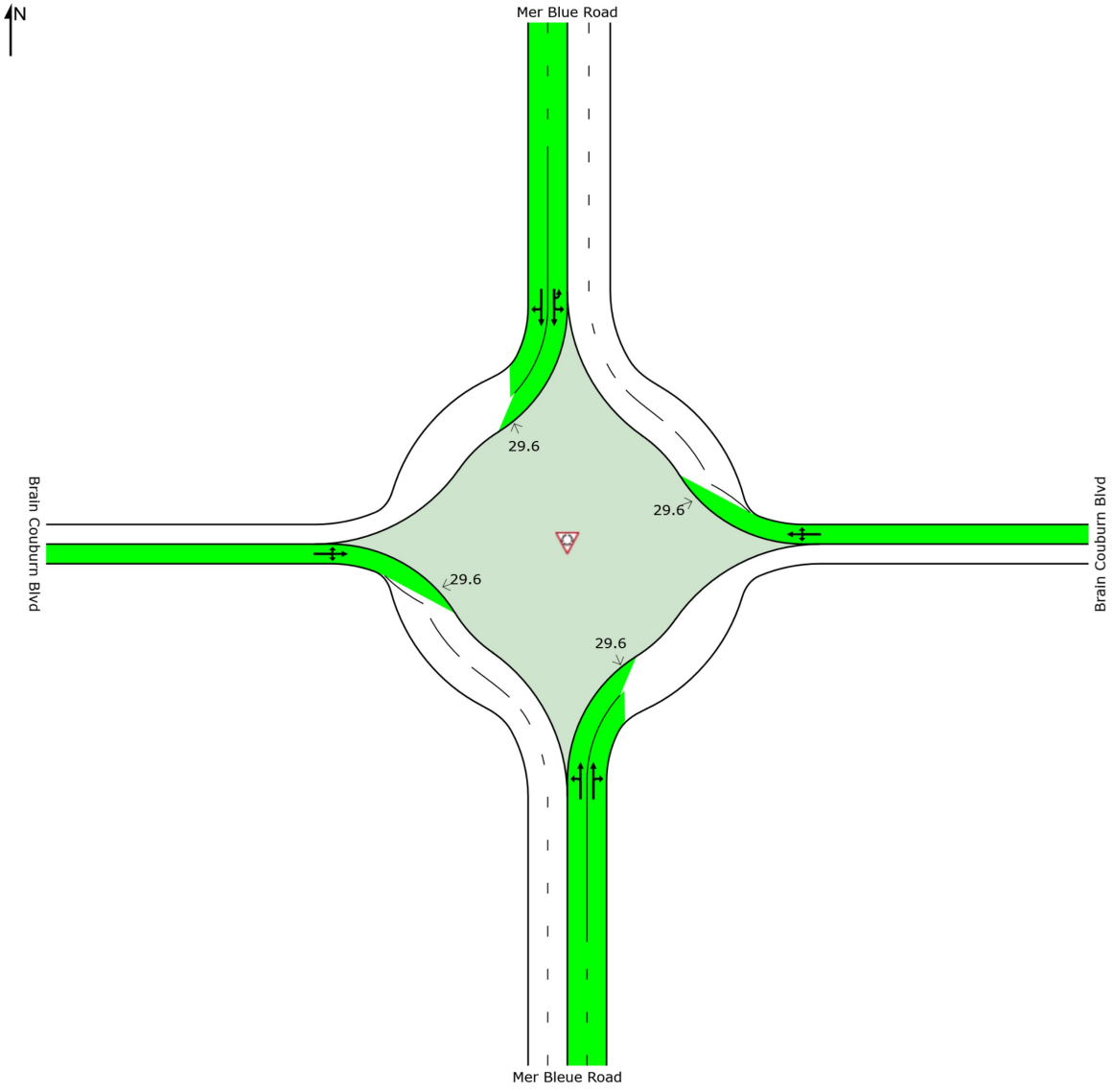
Ratio of Demand Volume to Capacity (v/c ratio)

Site: 3 [PM 2024 Total Traffic Condition at Mer Bleue Road & Brian Coburn Blvd.]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.40	0.59	0.56	0.46	0.59



Colour code based on Degree of Saturation

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LANE SUMMARY

Site: 3 [PM 2024 Total Traffic Condition at Mer Bleue Road & Brian Coburn Blvd.]

New Site
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Mer Bleue Road													
Lane 1	292	2.0	733	0.398	100	10.1	LOS B	1.4	11.1	Full	400	0.0	0.0
Lane 2[d]	292	2.0	733	0.398	100	10.1	LOS B	1.4	11.1	Full	400	0.0	0.0
Approach	584	2.0		0.398		10.1	LOS B	1.4	11.1				
East: Brain Couburn Blvd													
Lane 1[d]	584	2.0	985	0.593	100	11.8	LOS B	3.2	24.5	Full	250	0.0	0.0
Approach	584	2.0		0.593		11.8	LOS B	3.2	24.5				
North: Mer Blue Road													
Lane 1[d]	658	2.0	1171	0.562	100	9.7	LOS A	2.9	22.2	Full	400	0.0	0.0
Lane 2	295	2.0	1171	0.252	45[5]	5.4	LOS A	0.8	6.4	Full	400	0.0	0.0
Approach	952	2.0		0.562		8.4	LOS A	2.9	22.2				
West: Brain Couburn Blvd													
Lane 1[d]	385	2.0	830	0.464	100	10.4	LOS B	1.9	14.5	Full	400	0.0	0.0
Approach	385	2.0		0.464		10.4	LOS B	1.9	14.5				
Intersection	2504	2.0		0.593		9.9	LOS A	3.2	24.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach