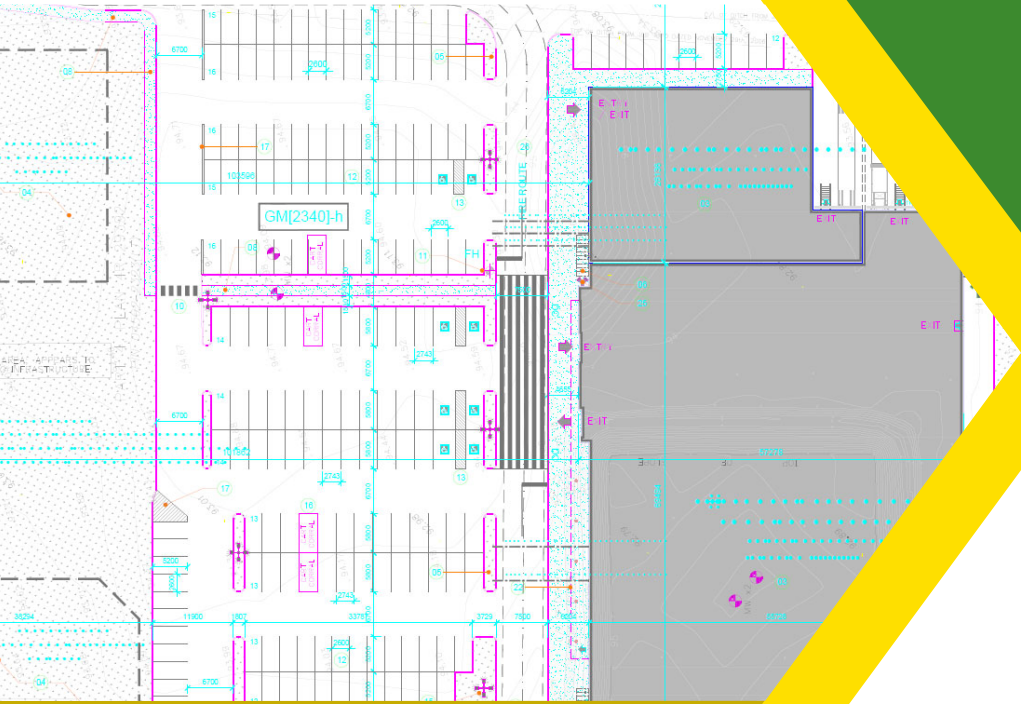


Metro Ontario Inc.

3831 Cambrian Road



Transportation Impact Study



3831 Cambrian Road

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

Prepared for:

Metro Ontario Inc.
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Etobicoke, ON
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Prepared by:



13 Markham Avenue
Ottawa, ON K2G 3Z1

September 2020

PN: 2019-54

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1 Screening

This study has been prepared according to the City of Ottawa’s 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component.

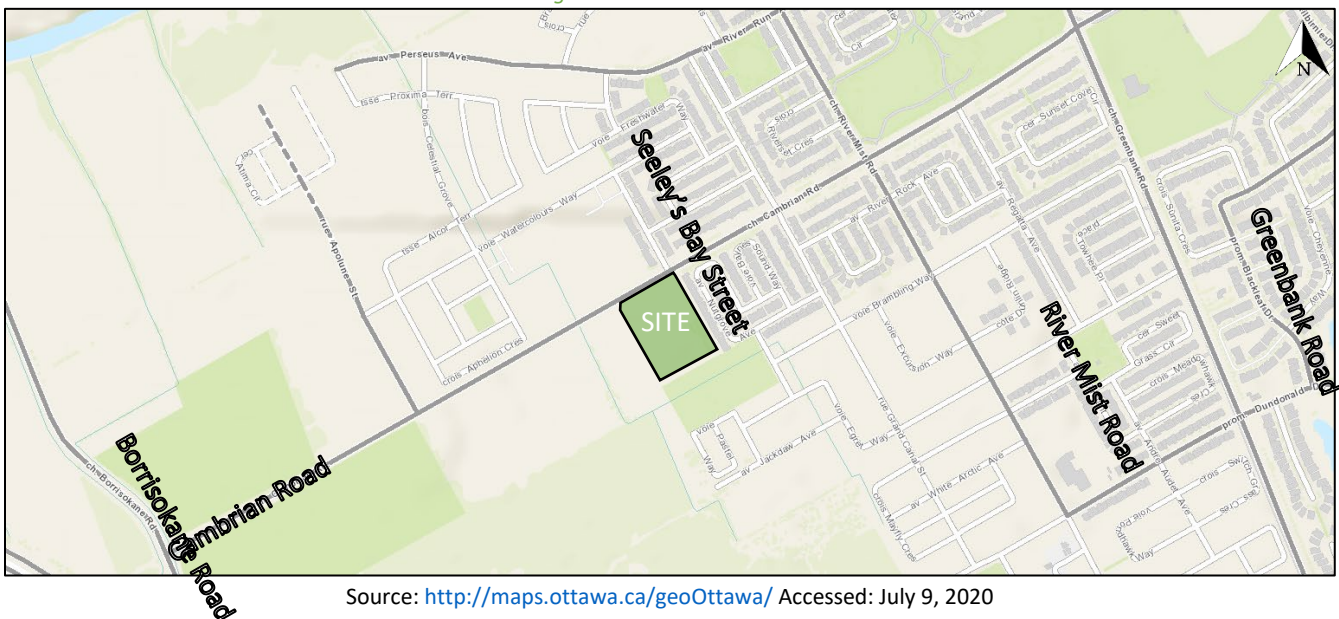
2 Existing and Planned Conditions

2.1 Proposed Development

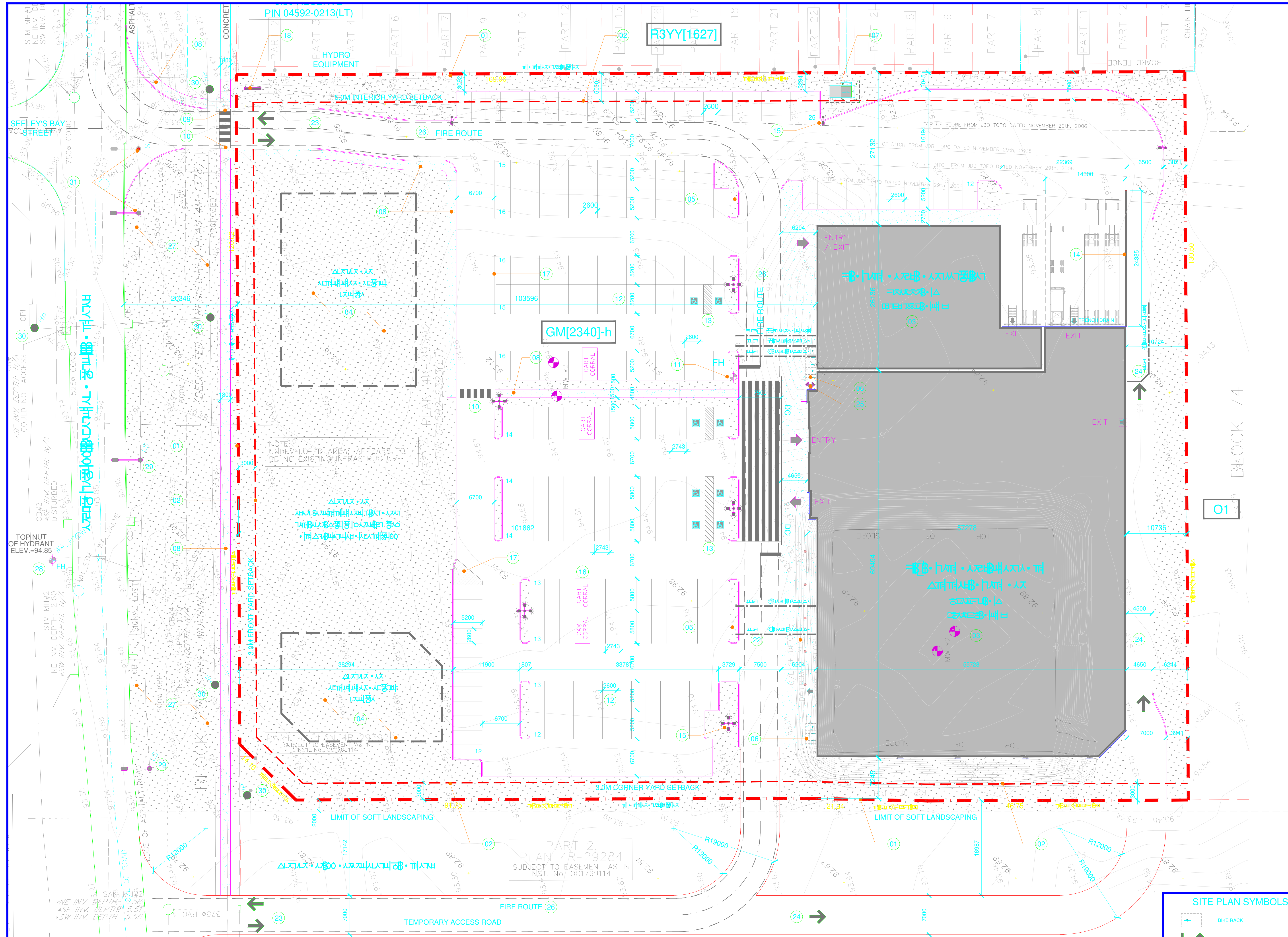
The subject property, located at 3831 Cambrian Road, is zoned as General Mixed Use [GM] and is currently undeveloped. The proposed development consists of a 4,024 square metre supermarket and an attached 929 square metre retail store. The subject property contains a total of 257 surface parking spaces and no drive-through based on the site plan.

Access to the site will be accommodated for general traffic via Cambrian Road (140 metres east of future Greenbank Road) and future Greenbank Road (120 metres south of Cambrian Road). Trucks would enter the site via the third access at the future Greenbank Road (190 metres south of Cambrian Road) and exit the site via the Cambrian Road access. The Cambrian Road access is anticipated to be a full movement access and the configuration of this access will be confirmed as part of this TIA. As future Greenbank Road is a conceptual future BRT corridor, the accesses on this road would be restricted to right in / right out only once realigned Greenbank Road is constructed. Due to the spatial limitations, the access 190 metres south of Cambrian Road will be a one-directional driveway and will provide truck access to the supermarket and retail store loading docks. In the interim, the two accesses south of Cambrian Road would be accommodated via a temporary driveway that will run along the west edge of the development property line. For the purposes of this TIA, the projected full build-out and occupancy horizon is 2023, and the plus five-year horizon is 2028. Figure 1 illustrates the Study Area Context. Figure 2 and Figure 3 illustrate the proposed interim and ultimate concept plans. The ultimate site plan has been provided for discussion and information purposes only and does not form part of the development application. It is anticipated that the ultimate site plan would be constructed beyond the 2028 horizon.

Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: July 9, 2020



PROJECT INFORMATION

ZONING	GM(2340)-h
SITE AREA	22,063.0 sq. m. (237,484 sq. ft.)
BUILDING HEIGHT	6 Storeys or 24.0 M
FRONT YARD SETBACK	3.0 M
CORNER YARD SETBACK	3.0 M
INTERIOR YARD SETBACK	5.0 M
REAR YARD SETBACK	0.0 M
LANDSCAPE BUFFER AROUND A PARKING LOT	3.0 M
LOADING SPACE - METRO	1
LOADING SPACE - RETAIL 'A'	0
PARKING - FOOD STORE	99
PARKING - RETAIL	24

PROJECT STATISTICS

GROSS BUILDING - AREAS	
GFA - CITY OF OTTAWA'S DEFINITION	
RETAIL FOOD - METRO	2,921.3 sq. m. (31,445 sq. ft.)
RETAIL STORE 'A' (ESTIMATE)	696.8 sq. m. (7,500 sq. ft.)
TOTAL AREA	3,618.1 sq. m. (38,945 sq. ft.)
GFA - BUILDING FOOTPRINT	
RETAIL FOOD - METRO	4,024.0 sq. m. (43,315 sq. ft.)
RETAIL STORE 'A'	829.0 sq. m. (10,000 sq. ft.)
TOTAL AREA	4,853.0 sq. m. (53,315 sq. ft.)

CAR PARKING

REQUIRED	
METRO - RETAIL FOOD	99
RETAIL - BLDG 'A'	24
TOTAL	123
PROVIDED	
METRO - RETAIL FOOD	190
RETAIL - BLDG 'A'	30
TOTAL	220

METRO PARKING SPACE	2.74 x 5.75 m	62
STANDARD PARKING SPACE	2.6 x 5.2 m	150
SMALL CAR PARKING SPACE	2.4 x 4.6 m	0
BARRIER FREE SPACE - TYPE A	3.4 x 5.2 m	4
BARRIER FREE SPACE - TYPE B	2.4 x 5.2 m	4

BICYCLE PARKING

REQUIRED	
COMMERCIAL RETAIL	14
PROVIDED	16

LOADING

PROVIDED	
COMMERCIAL RETAIL	2
COMMERCIAL METRO	1
TOTAL	3

LOT COVERAGE

PAVED SURFACE	= 9,993.5 sq. m.	45.3%
BUILDING FOOTPRINT	= 4,921.0 sq. m.	22.3%
LANDSCAPE OPEN SPACE	= 7,148.5 sq. m.	32.4%
TOTAL	= 22,063.0 sq. m.	100.0%

NOTATION SYMBOLS:

- INDICATES DRAWING NOTES, LISTED ON EACH SHEET.
- INDICATES ASSEMBLY TYPE; REFER TO TYPICAL ASSEMBLY SCHEDULE.
- INDICATES WINDOW TYPE; REFER TO WINDOW ELEVATIONS AND DETAILS ON A300 SERIES.
- INDICATES DOOR TYPE; REFER TO DOOR SCHEDULES AND DETAILS ON A300 SERIES.
- TITLE
- DETAIL NUMBER
- DETAIL REFERENCE PAGE
- DETAIL CROSS REFERENCE PAGE

REVISIONS:

No.	DESCRIPTION	DATE
1	ISSUED FOR SITE PLAN CONTROL	Aug. 31, 20
2	ISSUED FOR CONSULTANT REVIEW	July 9, 20
3	ISSUED FOR CONSULTANT REVIEW	June 25, 20

DRAWING NOTES

- PROPERTY LINE
- BUILDING SETBACK LINE
- PROPOSED COMMERCIAL BUILDING
- FUTURE DEVELOPMENT AREA
- LANDSCAPE ISLAND WITH 150mm BARRIER CURB
- BICYCLE PARKING SPACES (0.6 x 1.8M) WITH RACK
- HYDRO EQUIPMENT
- CONCRETE SIDEWALK, WIDTH AS NOTED
- TWIS TO BE LOCATED AND INSTALLED AS PER CITY REQUIREMENTS
- PEDESTRIAN CROSS WALK WITH DEPRESSION CURBS
- FIRE HYDRANT
- STANDARD PARKING SPACE (2.6 X 5.2 M)
- BARRIER FREE PARKING SPACE
- DROPPED GARBAGE / LOADING BAYS WITH SCREEN WALL
- LIGHT STANDARD - LOCATION TO BE CONFIRMED
- FAMILY PARKING SPACE WITH SIGNAGE
- WATER STORAGE TANK, SEE CIVIL
- BUILDING CANOPY
- 2 WAY ACCESS DRIVEWAY / ROAD
- 1 WAY ACCESS DRIVEWAY / ROAD
- SHAMOSE CONNECTION
- FIRE ROUTE
- SOFT LANDSCAPING
- EXISTING FIRE HYDRANT
- EXISTING LIGHT STANDARD
- EXISTING HYDRO POLE
- LOCATE EXISTING LIGHT STANDARD

SITE PLAN SYMBOLS

- BIKE RACK
- VEHICLE CIRCULATION
- MAIN ENTRANCE
- SERVICE DOOR / FIRE EXIT
- PROPERTY LINE
- ZONING SETBACKS
- PARKING LOT LIGHTING
- BARRIER FREE PARKING SPACE AS PER PARKING BYLAW SECTION 3.1
- TYPE 'A' = 3.4M X 5.2M
- TYPE 'B' = 2.4M X 5.2M
- ACCESS AISLE = 1.5M WIDE
- BUILDING ROOF DRAINS

ARCHITECT SEAL: [Signature]

SEAL DATE: [Stamp]

CLIENT: [Stamp]

PROJECT TITLE: **METRO - BARRHAVEN**
GREENBANK ROAD @ CAMBRIAN ROAD
OTTAWA ONTARIO

SHEET TITLE: **SITE PLAN**

DRAWN: RV
SCALE: 1:300
PROJECT No: 1949

CHECKED: R.V.
SHEET No: SP-1

SITE PLAN

SCALE: 1:300

KEY MAP

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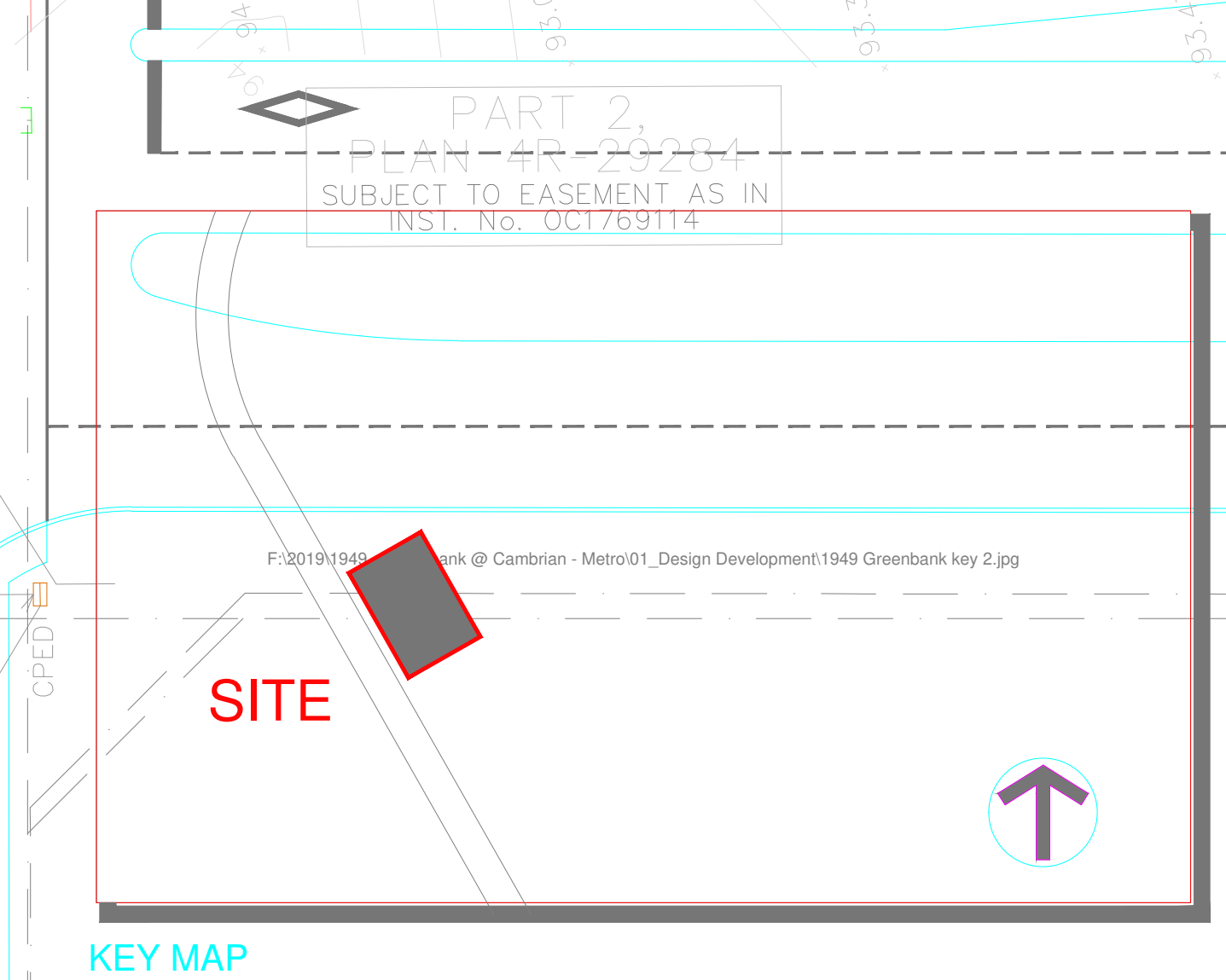
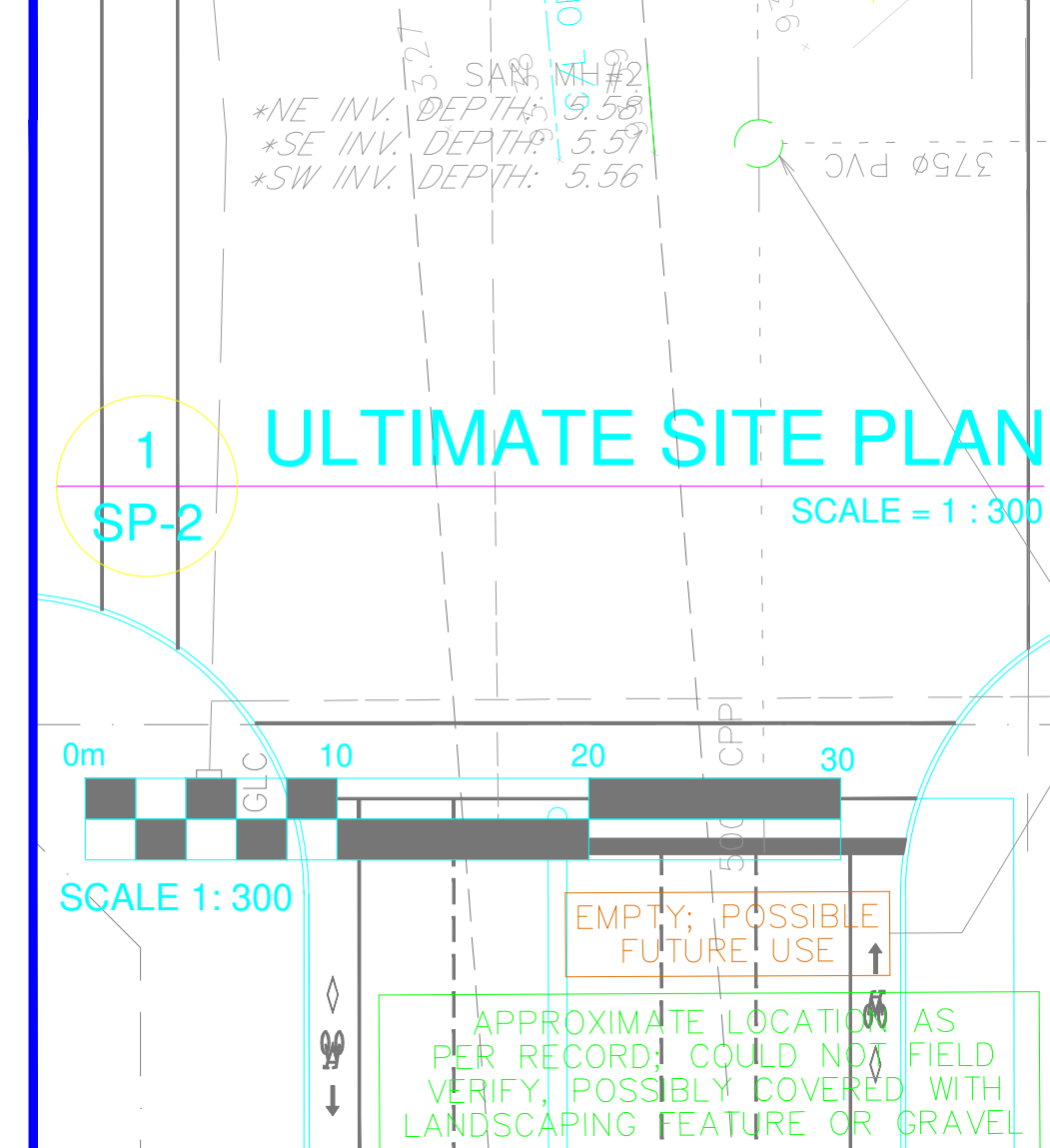
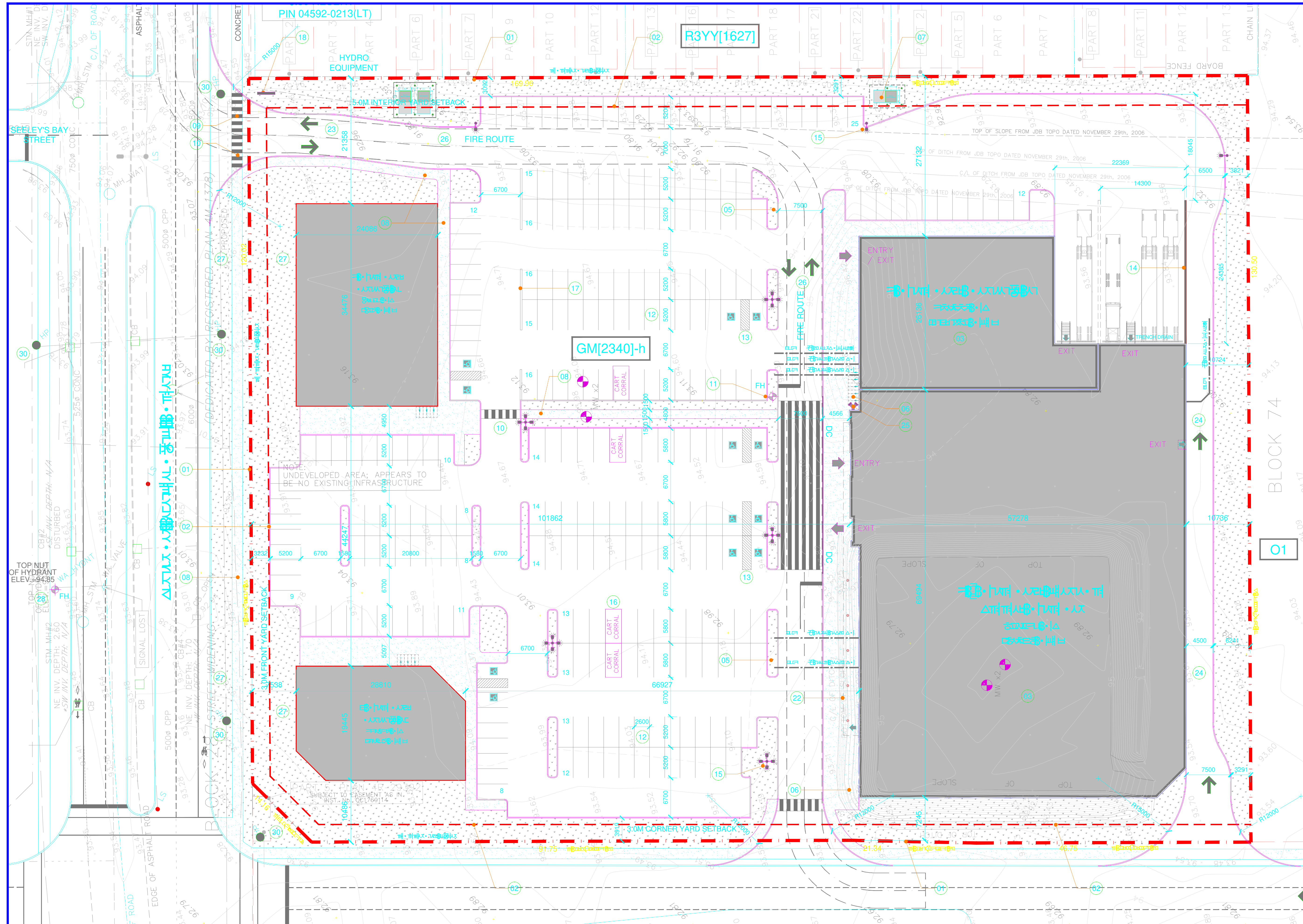
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Tel: (613) 731-7244
Fax: (613) 731-8955
Cell: (613) 852-9260
E-Mail: cfox@jdbarnes.com

LEGAL DESCRIPTION

PLAN OF SURVEY SHOWING
TOPOGRAPHIC DETAIL OF
PART OF LOT 10
CONCESSION 3 (RIDEAU FRONT)
CITY OF OTTAWA



TRANSPORTATION ENGINEER CGH Transportation Inc. 13 Markham Avenue Ottawa, Ontario K2E 0C2 Tel: (343) 999-9117 Email: Christopher.Gordon@CGHTransportation.com	LANDSCAPE ARCHITECT Gino J. Aiello Landscape Architect 110 Didsbury Road Unit 9, Ottawa, Ontario K2E 0C2 Tel: (613) 852-1343 Cell: (613) Email: gino@giala.com	URBAN PLANNER FoTenn Consultants Inc. 396 Cooper Street, Unit 300 Ottawa, ON Canada, K2P 2H7 Tel: (613) 730-5709 Cell: (613) 730-1136 E-Mail: posen@fotenn.com	PROJECT DEVELOPER Metro Ontario Inc. 5150 Spectrum Way, Suite 401, Mississauga, ON, L4W 5G2 Tel: (416) 234-6158 Cell: (416) 523-6168 Fax: (416) 234-6927 E-Mail: Antony.Cannell@metro.ca
GEOTECHNICAL ENGINEER paterson group 154 Colonnade Road South Ottawa, Ontario K2E 7J5 Tel: 613.226-7381 Email: DGBilbert@Patersongroup.ca	CIVIL ENGINEER David Schaeffer Engineering Ltd. 120 Iber Road, Unit 203 Ottawa, Ontario K1H 1E1 Tel: (613) 836-0856 Fax: (613) 836-7183 Email: bchow@DSEL.ca	SURVEYOR J.D. Barnes Limited 2430 Don Reid Drive, Suite 204, Ottawa, Ontario, K1H 1E1 Tel: (613) 731-7244 Fax: (613) 731-8955 Cell: (613) 852-9260 E-Mail: cfox@jdbarnes.com	LEGAL DESCRIPTION PLAN OF SURVEY SHOWING TOPOGRAPHIC DETAIL OF PART OF LOT 10 CONCESSION 3 (RIDEAU FRONT) CITY OF OTTAWA

SITE PLAN SYMBOLS	
	BIKE RACK
	VEHICLE CIRCULATION
	MAIN ENTRANCE
	SERVICE DOOR / FIRE EXIT
	PROPERTY LINE
	ZONING SETBACKS
	PARKING LOT LIGHTING
	BARRIER FREE PARKING SPACE AS PER PARKING BY-LAW SECTION 3.1
	TYPE 'A' - 3.0M X 5.2M
	TYPE 'B' - 2.4M X 5.2M
	ACCESS AISLE - 1.5M WIDE
	BUILDING ROOF DRAINS

DRAWING NOTES	
1	PROPERTY LINE
2	BUILDING SETBACK LINE
3	PROPOSED COMMERCIAL BUILDING
4	FUTURE DEVELOPMENT AREA
5	LANDSCAPE ISLAND WITH 150mm BARRIER CURB
6	BICYCLE PARKING SPACES (0.6 X 1.8M) WITH RACK
7	HYDRO EQUIPMENT
8	CONCRETE SIDEWALK, WIDTH AS NOTED
9	TWIS TO BE LOCATED AND INSTALLED AS PER CITY REQUIREMENTS
10	PEDESTRIAN CROSS WALK WITH DEPRESSED CURBS
11	FIRE HYDRANT
12	STANDARD PARKING SPACE (2.4 X 5.2 M)
13	BARRIER FREE PARKING SPACE
14	DROPPED GARBAGE / LOADING BAYS WITH SCREEN WALL
15	LIGHT STANDARD - LOCATION TO BE CONFIRMED
16	CART CORRAL
17	PAINTED ISLAND AND/OR CURBS
18	PYLON SIGN
19	ELECTRIC VEHICLE SPACE WITH CHARGING STATION
20	FAMILY PARKING SPACE WITH SIGNAGE
21	WATER STORAGE TANK, SEE CIVIL
22	BUILDING CANOPY
23	2 WAY ACCESS DRIVEWAY / ROAD
24	1 WAY ACCESS DRIVEWAY / ROAD
25	SIAMSE CONNECTION
26	FIRE ROUTE
27	SOFT LANDSCAPING
28	EXISTING FIRE HYDRANT
29	EXISTING LIGHT STANDARD
30	EXISTING HYDRO POLE
31	RELOCATE EXISTING LIGHT STANDARD

PROJECT INFORMATION	
ZONING	GM[2340]-h
SITE AREA	22,063.0 sq. m. 237,484 sq. ft.
BUILDING HEIGHT	6 Storeys or 24.0 M
FRONT YARD SETBACK	3.0 M
CORNER YARD SETBACK	3.0 M
INTERIOR YARD SETBACK	5.0 M
REAR YARD SETBACK	0.0 M
LANDSCAPE BUFFER AROUND A PARKING LOT	3.0 M
LOADING SPACE - METRO	1
LOADING SPACE - RETAIL 'A'	0
PARKING - FOOD STORE	99
PARKING - RETAIL	96

PROJECT STATISTICS	
GROSS BUILDING - AREAS	
GFA - CITY OF OTTAWA'S DEFINITION	2,921.3 sq. m. (31,445) sq. ft.
RETAIL FOOD - METRO	656.8 sq. m. (7,050) sq. ft.
RETAIL STORE 'A' (ESTIMATE)	622.5 sq. m. (6,700) sq. ft.
RETAIL STORE 'B' (ESTIMATE)	785.0 sq. m. (8,557) sq. ft.
RETAIL STORE 'C' (ESTIMATE)	5,055.1 sq. m. (54,197) sq. ft.
TOTAL AREA	6,843.0 sq. m. (73,650) sq. ft.
GFA - BUILDING FOOTPRINT	
RETAIL FOOD - METRO	4,024.0 sq. m. (43,315) sq. ft.
RETAIL STORE 'A'	969.0 sq. m. (10,000) sq. ft.
RETAIL STORE 'B'	830.0 sq. m. (8,935) sq. ft.
RETAIL STORE 'C'	1,060.0 sq. m. (11,410) sq. ft.
TOTAL AREA	6,843.0 sq. m. (73,650) sq. ft.
CAR PARKING	
REQUIRED	
METRO - RETAIL FOOD	99
RETAIL - BLDG 'A'	21
RETAIL - BLDG 'B'	27
RETAIL - BLDG 'C'	123
TOTAL	123
PROVIDED	
METRO - RETAIL FOOD	190
RETAIL - BLDG 'A'	30
RETAIL - BLDG 'B'	25
RETAIL - BLDG 'C'	29
TOTAL	274
METRO PARKING SPACE	
STANDARD PARKING SPACE	62
SMALL CAR PARKING SPACE	200
BARRIER FREE SPACE - TYPE A	6
BARRIER FREE SPACE - TYPE B	6
BICYCLE PARKING	
REQUIRED	
COMMERCIAL RETAIL	20
PROVIDED	
COMMERCIAL RETAIL	24
LOADING	
PROVIDED	
COMMERCIAL RETAIL	2
COMMERCIAL METRO	1
TOTAL	3
LOT COVERAGE	
PAVED SURFACE	10,464.1 sq. m. 47.4%
BUILDING FOOTPRINT	6,281.0 sq. m. 28.5%
LANDSCAPE OPEN SPACE	5,317.9 sq. m. 24.1%
TOTAL	22,063.0 sq. m. 100.0%

NOTATION SYMBOLS:	
	INDICATES DRAWING NOTES, LISTED ON EACH SHEET.
	INDICATES ASSEMBLY TYPE; REFER TO TYPICAL ASSEMBLY SCHEDULE.
	INDICATES WINDOW TYPE; REFER TO WINDOW ELEVATIONS AND DETAILS ON A300 SERIES.
	INDICATES DOOR TYPE; REFER TO DOOR SCHEDULES AND DETAILS ON A300 SERIES.
	DETAIL NUMBER
	TITLE
	DETAIL REFERENCE PAGE
	DETAIL CROSS REFERENCE PAGE

REVISIONS		
1	ISSUED FOR SITE PLAN CONTROL	Aug. 31, 20
2	ISSUED FOR CONSULTANT REVIEW	July 9, 20
No.	DESCRIPTION	DATE

ARCHITECT SEAL	
SEAL DATE: STAMP DATE	NORTH ARROW

2.2 Existing Conditions

2.2.1 Area Road Network

Borrisokane Road

Borrisokane Road is a Ministry of Ontario road with a two-lane cross-section and a posted speed limit of 80 km/h. Gravel shoulders are present on both sides of the road. No sidewalks are provided. North of Cambrian Road, Borrisokane Road is an arterial road, and south of Cambrian Road it is a collector road. Borrisokane is part of the Veterans Memorial Highway (Highway 416) corridor to the south of Cambrian Road and has a measured 37.5 metre right of way to the north of Cambrian Road.

Cambrian Road

Cambrian Road is a City of Ottawa arterial road with a two-lane cross-section and a posted speed limit of 70 km/h for approximately 700 metres east of Borrisokane Road and 50 km/h in the remaining Study Area. To the west of Seeley's Bay Street, Cambrian Road has gravel shoulders and no sidewalks. To the east of Seeley's Bay Street, Cambrian Road has curbs, gutters, parking lanes, and sidewalks. The Ottawa Official Plan reserves a 37.5 metre right-of-way for this road.

Seeley's Bay Street

Seeley's Bay Street is a City of Ottawa local road with a two-lane urban cross-section including gutters, parking lanes and a sidewalk on the west side. The unposted speed limit is assumed to be 50 km/hr. The measured right-of-way is approximately 16 metres.

River Mist Road

River Mist Road is a City of Ottawa collector road with a two-lane urban cross-section including gutters, parking lanes and sidewalks on both sides of the road. The unposted speed limit is assumed to be 50 km/hr. The measured right-of-way is approximately 24 metres.

Greenbank Road

Greenbank Road is a City of Ottawa arterial road with a two-lane cross-section with pedestrian and cyclist path on the west side and a sidewalk on the east side. The posted speed limit is 60 km/hr. The Ottawa Official Plan reserves a 37.5 metre right-of-way for this road south of Cambrian Road and the measured right-of-way north of Cambrian Road is approximately 26.5 metres.

2.2.2 Existing Intersections

A description and accompanying aerial photographs of the existing intersections within one kilometre of the Study Area can be found below.

Borrisokane Road at Cambrian Road

Borrisokane Road at Cambrian Road is an unsignalized T-intersection. The westbound approach is stop-controlled and consists of a shared left-turn/right-turn lane. The northbound approach consists of a shared through/right-turn lane and the southbound approach consists of a shared left-turn/through lane. No turn restrictions are noted.



Seeley's Bay Street at Cambrian Road

Seeley's Bay Street at Cambrian Road is an unsignalized T-intersection. The southbound approach is stop-controlled and consists of a shared left-turn/right-turn lane. The westbound approach consists of a shared through/right-turn lane and the eastbound approach consists of a shared left-turn/through lane. No turn restrictions are noted.



River Mist Road at Cambrian Road

The intersection of River Mist Road and Cambrian Road is an all-way stop-controlled intersection with shared movement lanes on all approaches. No turn restrictions were noted.



Greenbank Road at Cambrian Road

Greenbank Road at Cambrian Road is a single-lane roundabout intersection. Each roundabout approach consists of a single lane.



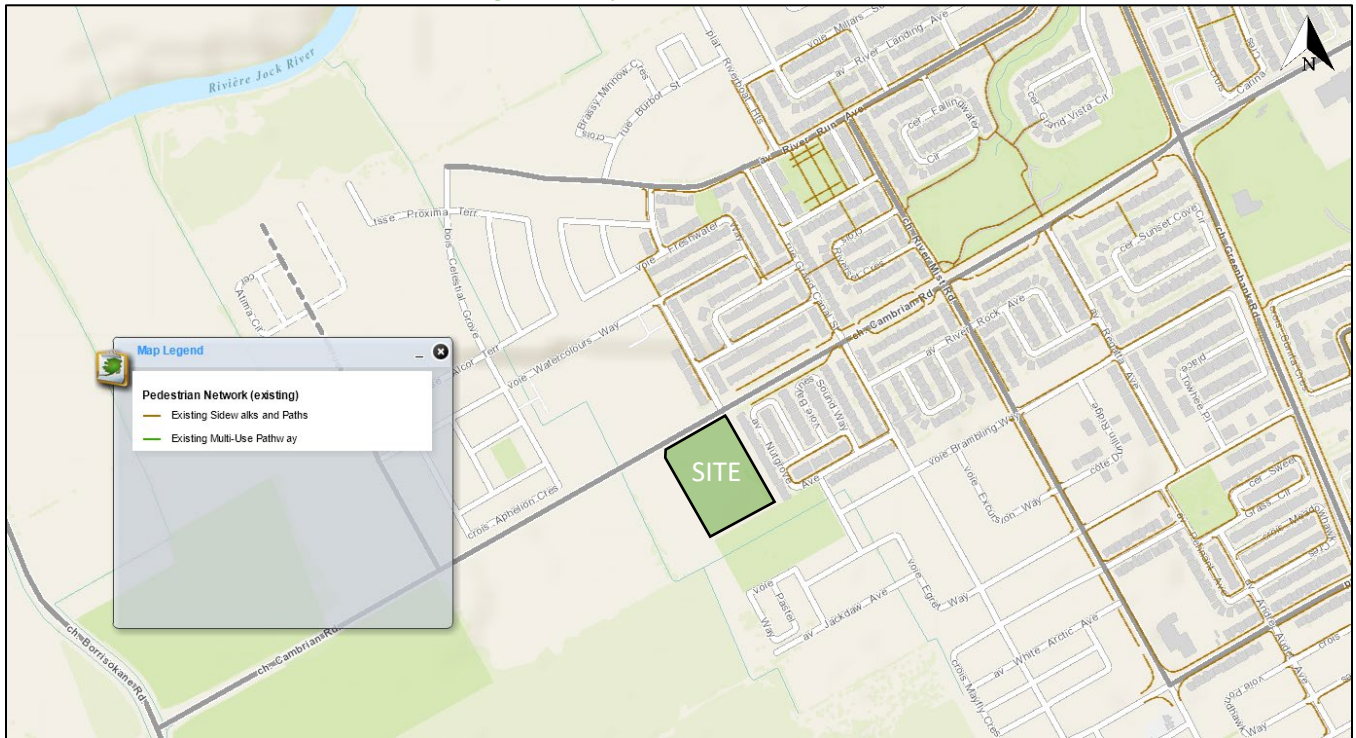
2.2.3 Existing Driveways

There is a driveway within 200 metres of the proposed site access that runs parallel to Cambrian Road. This driveway is located to the northeast of the Subject Site and provides a one-way access to four triplex dwellings on the north side of Cambrian Road. The proposed Cambrian Road access to the Subject Site is located 200 metres west of the existing driveway entrance and 35 metres west of the existing driveway exit.

2.2.4 Cycling and Pedestrian Facilities

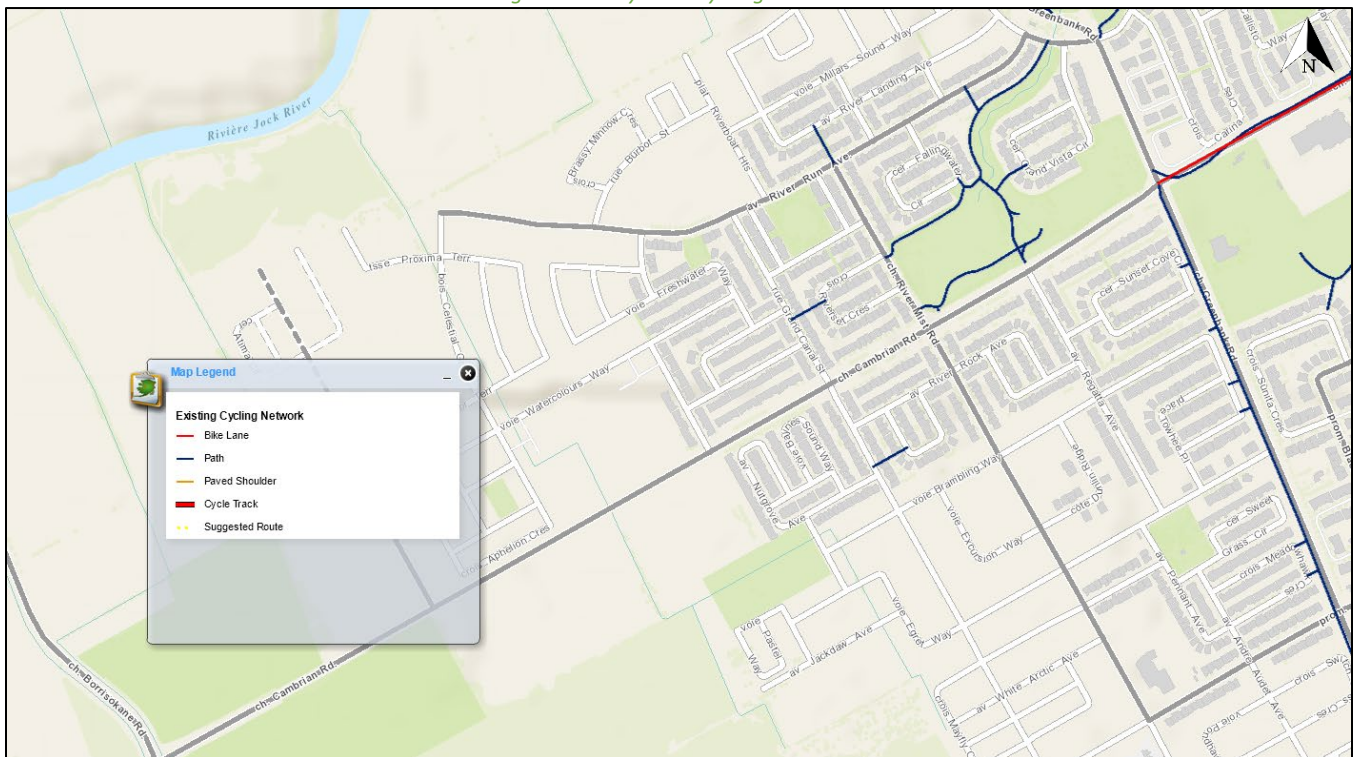
There are sidewalks on both sides of Cambrian Road which start at approximately 40 metres east of the proposed site and can be seen in Figure 4. Additionally, the sidewalks extend 50 metres west of the east edge of the proposed development on the south and to the east edge of the proposed site on the north. These sidewalk segments are not shown on the geoOttawa map. The cycling network consists of bike paths along Greenbank Road and at the Half Moon Bay Park. Figure 4 illustrates the pedestrian facilities in the vicinity of the proposed site and Figure 5 illustrates the cycling facilities.

Figure 4: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: July 14, 2020

Figure 5: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: July 14, 2020

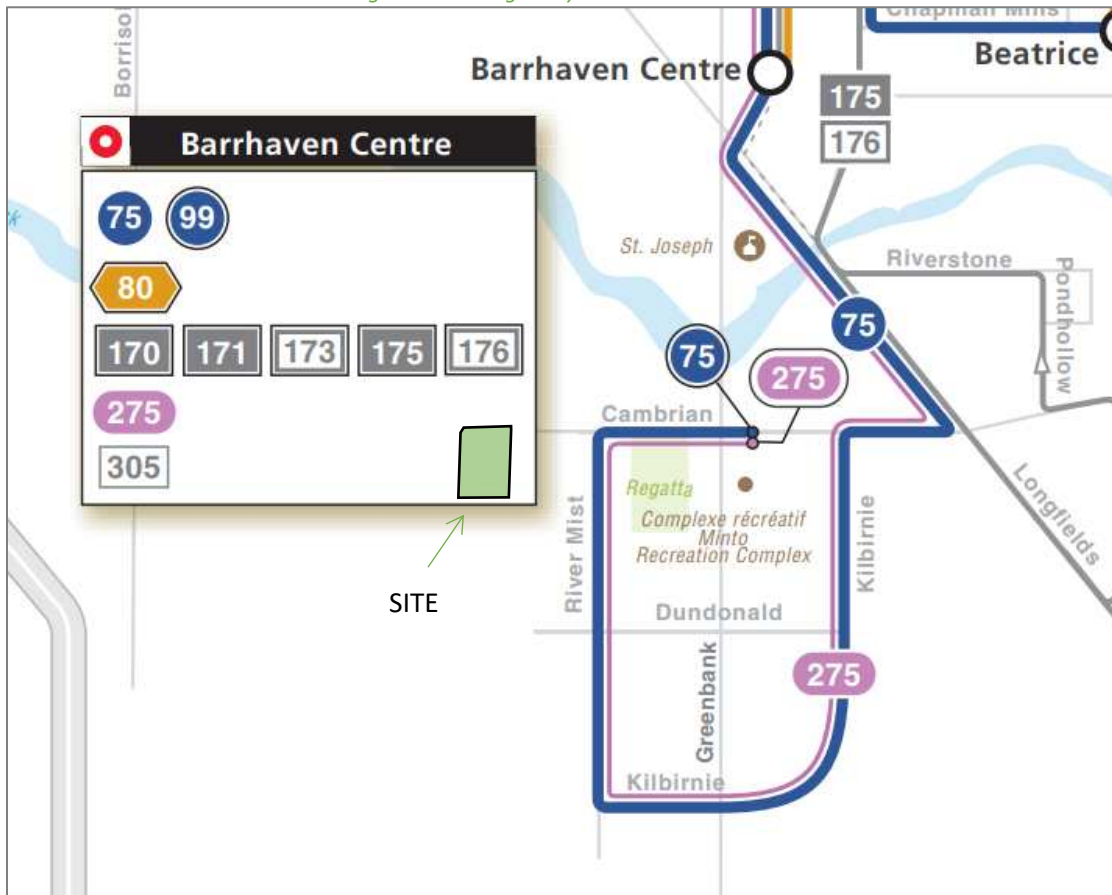
2.2.5 Existing Transit

There is no existing transit service along the subject development boundary on Cambrian Road. East of the Subject Site, Route 75, and Route 275 run along River Mist Road and Cambrian Road. These routes share the same path, with Route 75 stopping at all stops along the path and Route 275 providing an express service. The existing Study Area transit service is presented in Figure 6. In this Figure, the map legend covers the location of the subject development. The transit stops in the Study Area can be seen in Figure 7. While all transit stops in the area are shown, the highlighted stops appear to not be in use. Both figures are excerpts from the OTranspo Network Map. The frequency of these routes within proximity of the proposed site currently are:

- Route # 75 – every 15 minutes during AM and PM weekday peak hours and mid-day weekend peak hours, and every 30 to 60 minutes during all other times.
- Route # 275 – every 5 to 25 minutes from approximately 4PM to 6PM on weekdays and with no operations on Saturdays and Sundays.

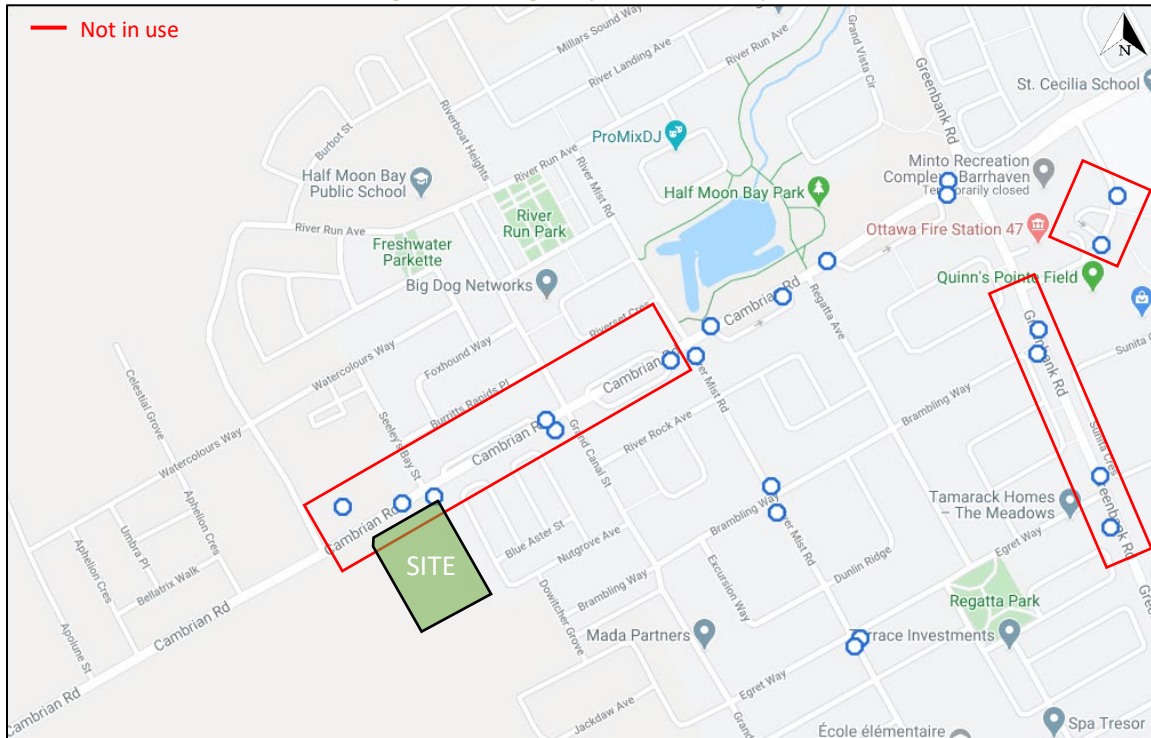
Figure 6 illustrates the transit system map in the Study Area and Figure 7 illustrates nearby transit stops.

Figure 6: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: July 9, 2020

Figure 7: Existing Study Area Transit Stops



Source: <http://www.octranspo.com/> Accessed: July 10, 2020

2.2.6 Existing Area Traffic Management Measures

Within the Study Area, traffic management measures are present on River Mist Road. Using Google Streetview, a desktop review of these measures was undertaken. These measures include a radar feedback sign north of Cambrian Road and centreline collapsible bollards south of Cambrian Road.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from City of Ottawa for the existing Study Area intersections for both the AM and PM peak hours. No Saturday peak hour turning movement counts for the Study Area intersections are available and as a result of the current lockdown measures due to the COVID-19 pandemic, no counts can be collected. As such, PM peak period turning movement counts will also be used as Saturday peak hour volumes. This conservative estimation method has been approved by the City of Ottawa. Table 1 summarizes the intersection count date and data source.

Table 1: Intersection Count Date

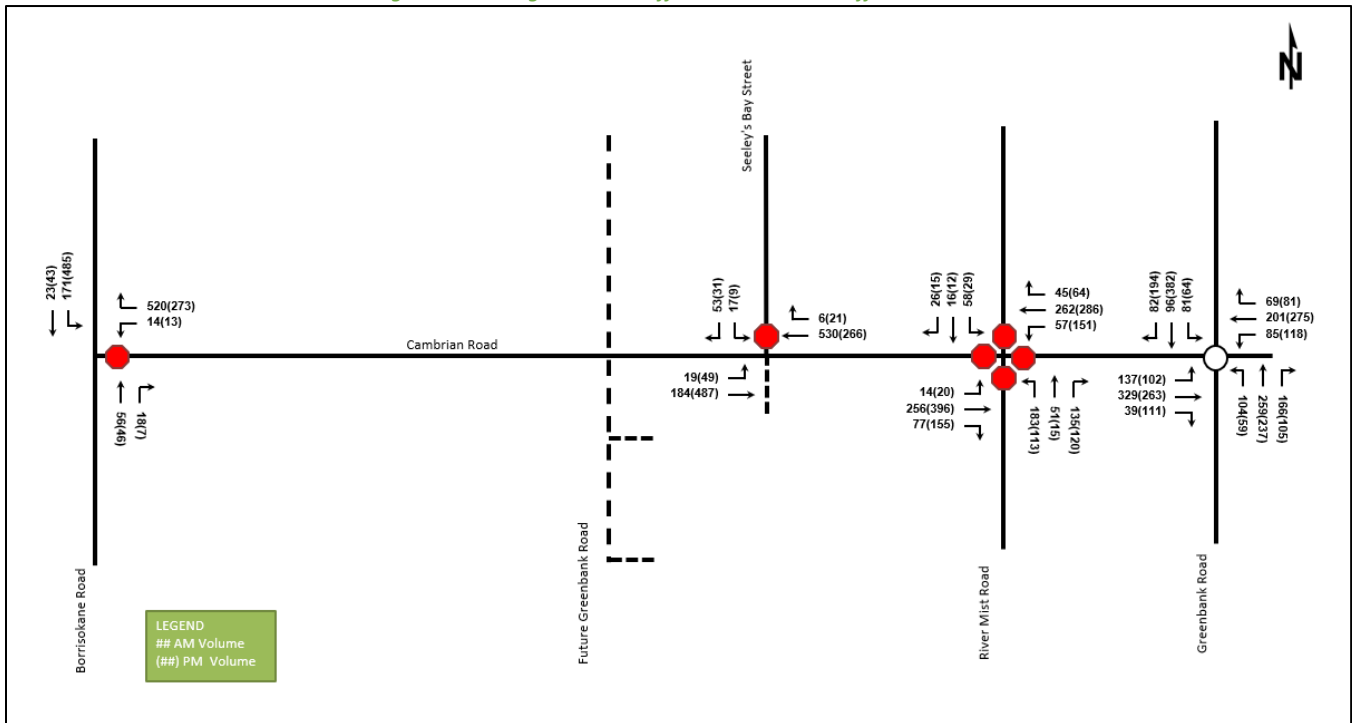
Intersection	Count Date	Data Source
Borrisokane Road at Cambrian Road	Tuesday, February 15, 2018	Meadows Phase 5 TIA
Seeley's Bay Street at Cambrian Road	Wednesday, November 22, 2017	City of Ottawa
River Mist Road at Cambrian Road	Wednesday, October 23, 2019	City of Ottawa
Greenbank Road at Cambrian Road	Wednesday, September 13, 2017	City of Ottawa

Figure 8 illustrates the 2020 existing horizon traffic volumes and Table 2 summarizes the existing intersection operations. As shown above, the turning movement count data has been collected in several different years. Due to the ongoing COVID-19 health crisis undertaking turning movement counts is not possible as the counted volumes would not reflect typical traffic conditions. To understand traffic conditions historical traffic counts have been acquired from the City of Ottawa. Since no turning movement counts were obtained by the City of Ottawa

for the Borriskane Road at Cambrian Road in the last five years, the 2018 turning movement counts from the Tamarack Meadows Phase 5 TIA by IBI are used for this intersection.

To reflect a constant horizon, a 2% background growth rate has been used. This growth rate is consistent with surrounding development Traffic Impact Assessments such as *3285 Borriskane Road Commercial Development Transportation Impact Study (Parsons, 2018)*, *3640 Greenbank Road Transportation Impact Assessment (CGH Transportation, 2018 Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018))*, *The Meadows Phase 5 Transportation Impact Assessment Report (IBI Group 2018)*, and *Quinn’s Pointe 2 Transportation Impact Assessment (Stantec, 2018)*. Additionally, volume balancing has been applied within the Study Area and site-traffic generated by adjacent developments built-out during 2019 and 2020 has been considered. Detailed turning movement count data is included in Appendix B.

Figure 8: Existing Horizon Traffic Volumes and Traffic Controls



Additionally, the collected intersection counts also provided existing pedestrian and cyclist demands at the four Study Area intersections for both AM and PM peak periods. As discussed above, PM peak counts will also be used as Saturday peak hour counts. Figure 9 illustrates the existing pedestrian volumes and Figure 10 illustrates the existing cyclist volumes at the Study Area.

Figure 9: Existing Pedestrian Volumes

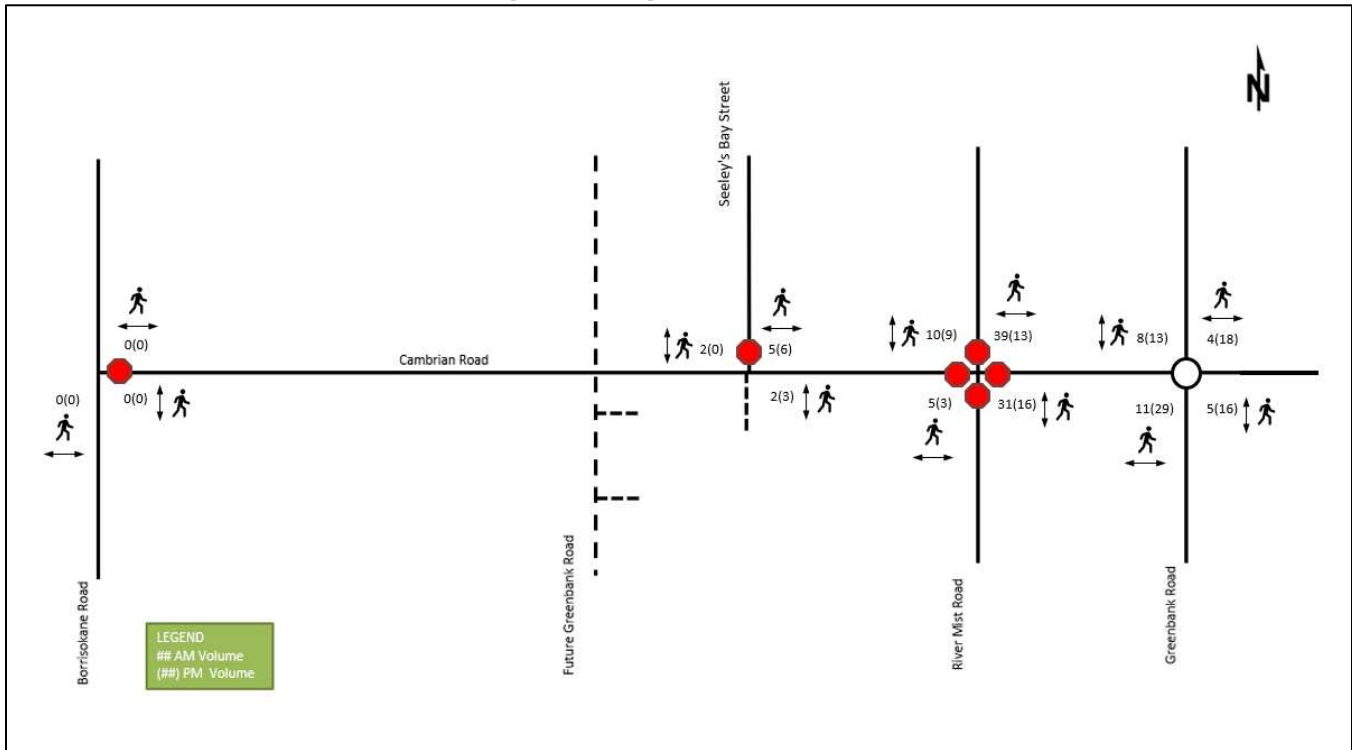
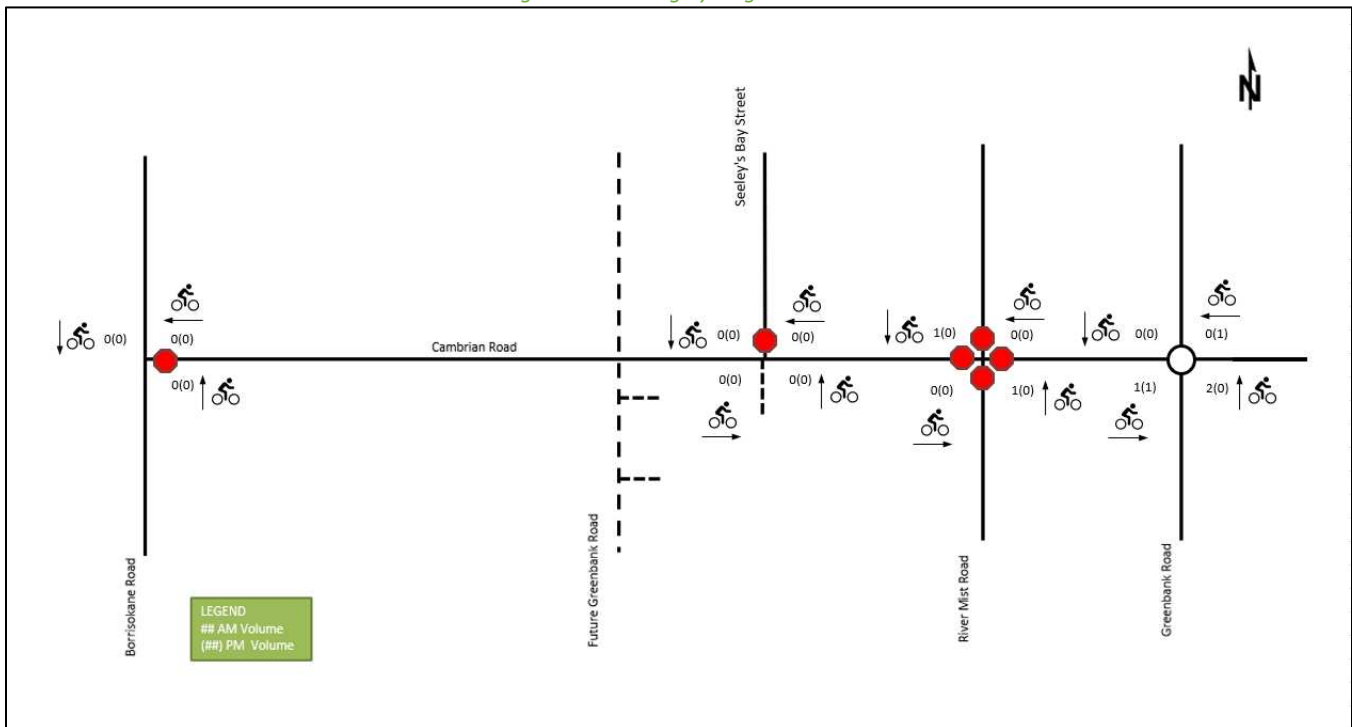


Figure 10: Existing Cycling Volumes

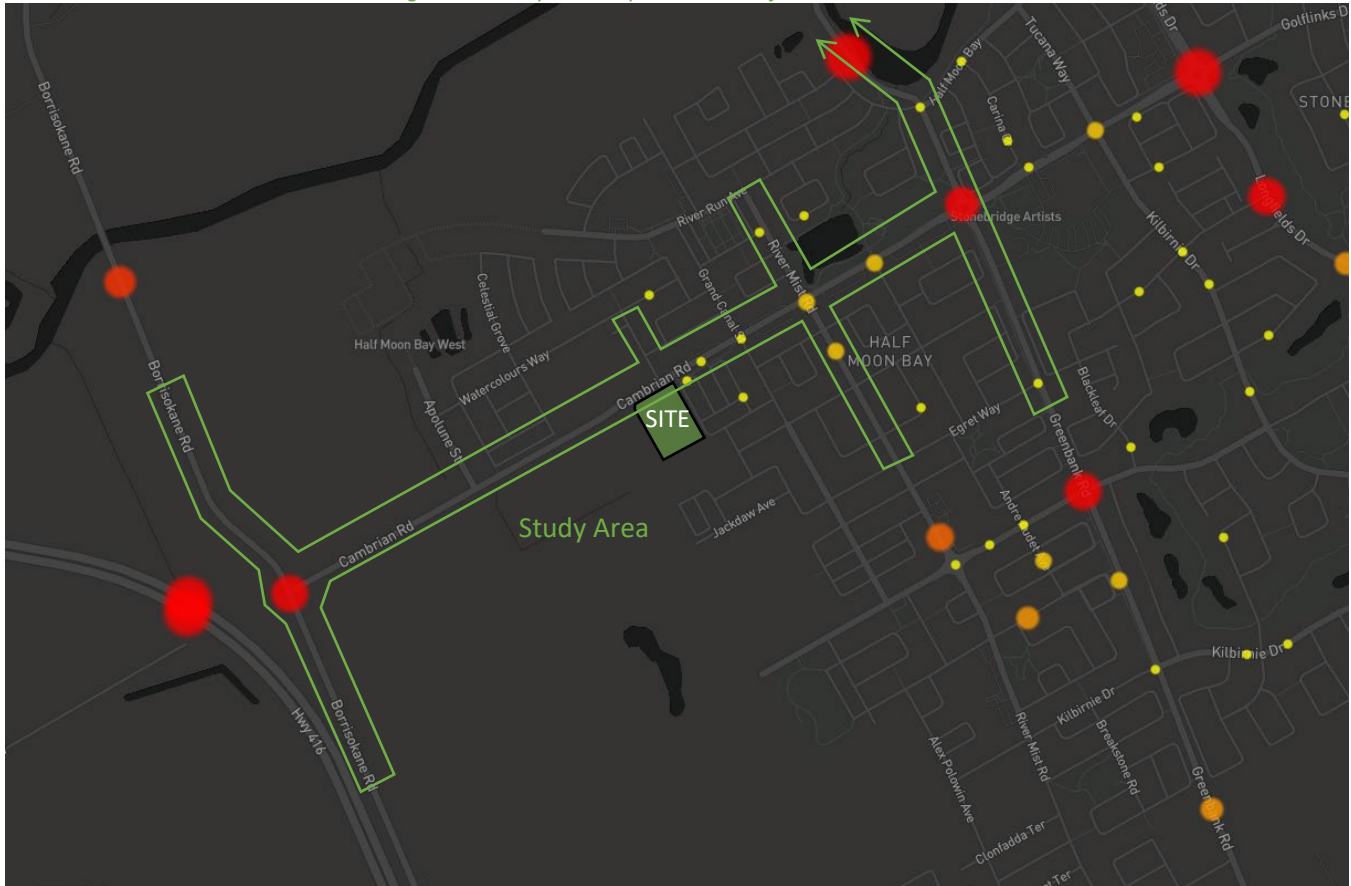


2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa for five years (2014-2018) prior to the commencement of this TIA for the surrounding Study Area road network. Table 2 illustrates the collisions at the intersections and

road segments within the Study Area, and Table 4 summarizes the collision types and conditions of the 105 collisions recorded in the Study Area. Collision data is included in Appendix D.

Figure 11: Study Area Representation of Collision Locations



Source: <https://maps.bikeottawa.ca/collisions/> Accessed: July 13, 2020

Table 2: Summary of Collision Locations, 2014-2018

Intersections / Segments	Number	%
	105	100%
Borrisokane Road (formerly Cedarview) between Barnsdale Road and Cambrian Road	3	3%
Borrisokane Road (formerly Cedarview) between Cambrian Road and Standherd Drive	20	19%
Cambrian Road between Borriskane (formerly Cedarview) Road and Grand Canal Street	3	3%
Cambrian Road between Grand Canal Street and Seeley's Bay Street	1	1%
Seeley's Bay Street between Burritts Rapids Place and Watercolour Way	1	1%
Cambrian Road between Regatta Avenue and Greenbank Road	1	1%
Cambrian Road at Borriskane (formerly Cedarview) Road	10	10%
Cambrian Road at River Mist Road	5	5%
River Mist Road between Brambling Way and River Rock Avenue	3	3%
Cambrian Road at Grand Canal Street	3	3%
Cambrian Road at Regatta Avenue	2	2%
Cambrian Road at Greenbank Road	11	10%
Greenbank Road between Jockvale Road and Cambrian Road	37	35%
Greenbank Road between Cambrian Road and Dundonald Drive	5	5%

Table 3: Collision Summary

		Number	%
Total Collisions		105	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	23	22%
	Property Damage Only	82	78%
Initial Impact Type	Approaching	8	8%
	Angle	10	10%
	Rear End	25	24%
	Sideswipe	2	2%
	Turning Movement	4	4%
	SMV Unattended Vehicle	6	6%
	SMV Other	49	47%
	Other	1	1%
Road Surface Condition	Dry	58	55%
	Wet	16	15%
	Loose Snow	10	10%
	Slush	3	3%
	Packed Snow	3	3%
	Ice	14	13%
	Loose Sand or Gravel	1	1%
Pedestrian Involved		0	0%
Cyclists Involved		3	3%

The Study Area had a total of 105 collisions during the 2014-2018 time period, with 78% involving property damage only and the remaining 22% having non-fatal injuries. The collision types are most represented by SMV Other impact type with 47% of collisions in this category. Weather/road conditions are a contributing factor for 42% of the collisions in this area.

Three of the collisions involved cyclists, one occurring at the intersection of Cambrian Road and Greenbank Road, another occurring along Greenbank Road between Jockvale Road and Cambrian Road and the third collision occurring along Greenbank Road between Cambrian Road and Dundonald Drive. There were no pedestrian collisions in the Study Area.

The segment of Greenbank Road between Jockvale Road and Cambrian Road is noted to have experienced higher collisions than other segments and intersections. This may be attributed to the fact that the Greenbank Road segment north of Cambrian road is the longest (approximately 1.7 km) road segment in the Study Area to which the collision data is assigned to. Sharp turns leading to the Jock River overpass from both north and south approaches could also be a contributing factor to a higher than average collision rate.

Currently, no intersection has been noted to require an in-depth collision analysis.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The subject development is within the Barrhaven South Community Design Plan (CDP) Area. As such, it is subject to the planning policies outlined in the CDP. The CDP provides target population and employment densities in the four Sub-Planning Areas along with the plans for infrastructure to support the community growth. As part of this plan, the right-of-way along the following roads has been protected to accommodate an expansion to a four-lane arterial:

- Re-Aligned Greenbank Road rapid transit corridor north and south of Cambrian Road with a protected right-of-way of 41.5 metres
- Existing Greenbank Road south of Cambrian Road with a protected right-of-way of 37.5 metres
- Borrisokane Road north of Cambrian Road with a protected right-of-way of 37.5 metres
- Cambrian Road between Borrisokane Road and Jockvale Road with a protected right-of-way of 37.5 metres

Re-Aligned Greenbank Road will be located on the west side of the proposed development. While listed within the Transportation Master Plan Affordable Network, it is unknown if Re-Aligned Greenbank Road will be completed to Cambrian Road by 2031. Beyond 2031, Re-Aligned Greenbank Road will extend south of Cambrian Road to Barnsdale Road. The proposed cross-section of Re-Aligned Greenbank Road is a divided 4-lane cross-section including sidewalks, cycletracks, and centre median bus lanes.

Intersection Control Measures outlined in the 2019 Ottawa Development Charges By-Law are expected to be implemented at the following intersections:

- Cambrian Road and Borrisokane Road at a gross project cost of \$1,300,000 (2020-2031)
- Cambrian Road and Apolune Way at a gross project cost of \$1,300,000 (2020-2031)

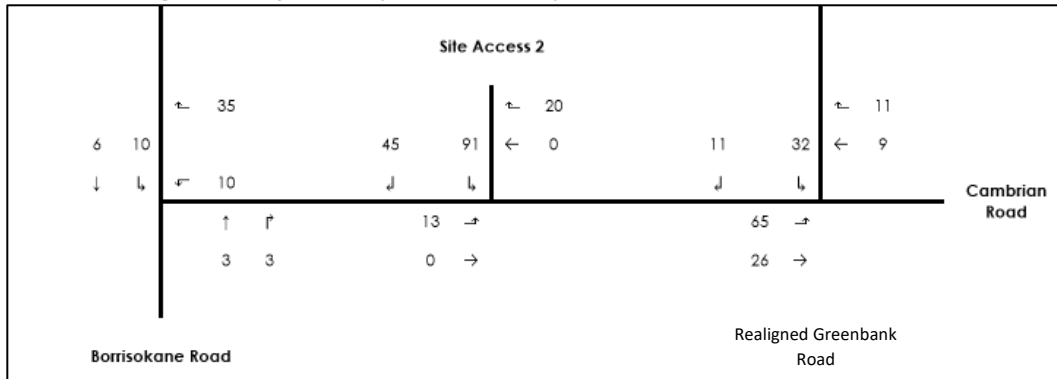
2.3.2 Other Study Area Developments

Several development applications were available for the adjacent properties as listed on the City's Development Application Search tool:

Half Moon Bay West Community

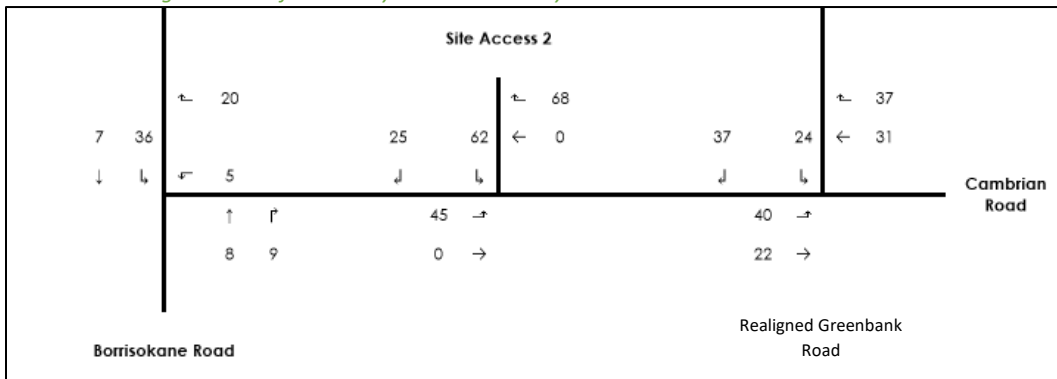
Half Moon Bay West Community is a proposed five-phase residential development located on a 57.42 hectare area north of the Subject Site. According to the 2016 Community Transportation Study (CTS), this site was planned to include 552 single family homes, 464 townhouses and a 5.3 acre commercial land. The projected trip generation is 589 and 725 two-way auto trips during the AM and PM peak hours, respectively. The community full build-out year is 2024. In the 2019 update, the plan was revised to include 154 back-to-back townhouse dwellings, 300 wide lot townhouse dwellings, 447 detached dwellings, and 72 apartment units. The anticipated trip generation from the new plan is 536 and 659 two-way auto trips during the AM and PM peak hours, respectively. The revised plan does not include traffic distribution, however, since the updated plan results in a decrease in community-generated traffic volume, the original site traffic volume diagrams will be used. This will create a conservative estimate of the future background traffic volumes. The generated traffic volume from this community for AM and PM peak periods can be seen in Figure 12 and Figure 13 respectively and are excerpt from the Half Moon Bay West Community Transportation Study by Stantec.

Figure 12: Half Moon Bay West Community Generated Volumes – AM Peak Hour



Source: Half Moon Bay West Community Transportation Study (Stantec, 2016)

Figure 13: Half Moon Bay West Community Generated Volumes – PM Peak Hour



Source: Half Moon Bay West Community Transportation Study (Stantec, 2016)

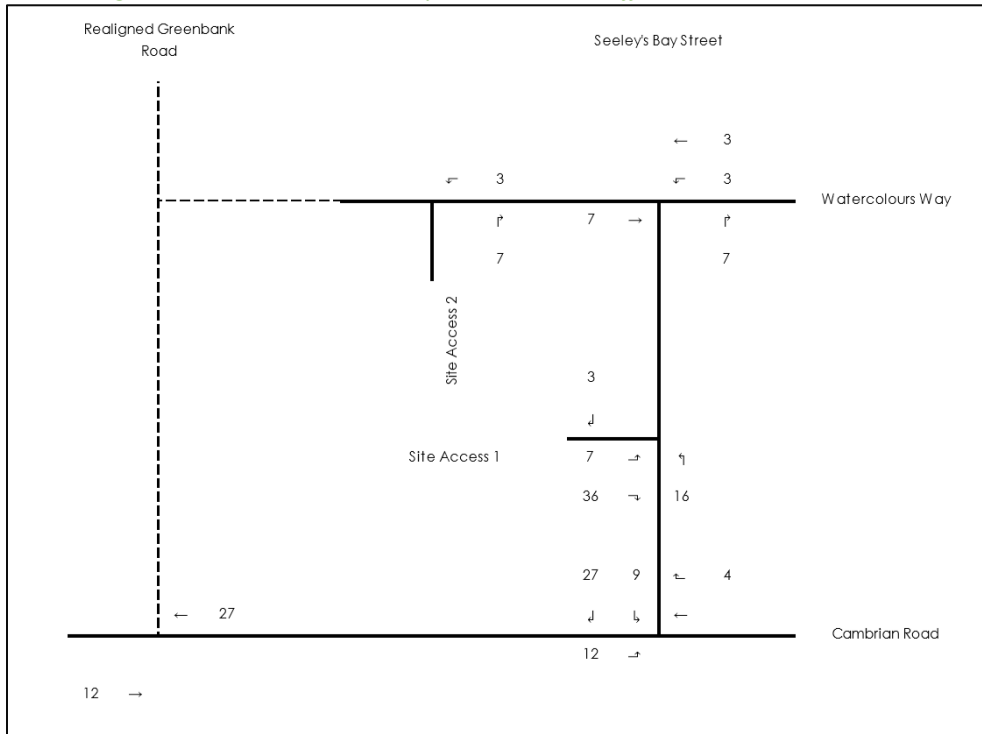
541 Chimney Corner Terrace

541 Chimney Corner Terrace (Half Moon Bay North Phase 8) is a residential development that consists of approximately 100 townhouse units and is located 400 metres north of the Subject Site. As the development has been completed in 2019, there is no TIA available on the City’s Development Application Search Tool, and due to the COVID 19 pandemic, traffic counts representative of average annual daily traffic cannot be obtained. Thus, the 541 Chimney Corner Terrace TIA will be obtained from the City of Ottawa as part of this assessment.

2444 Watercolours Way

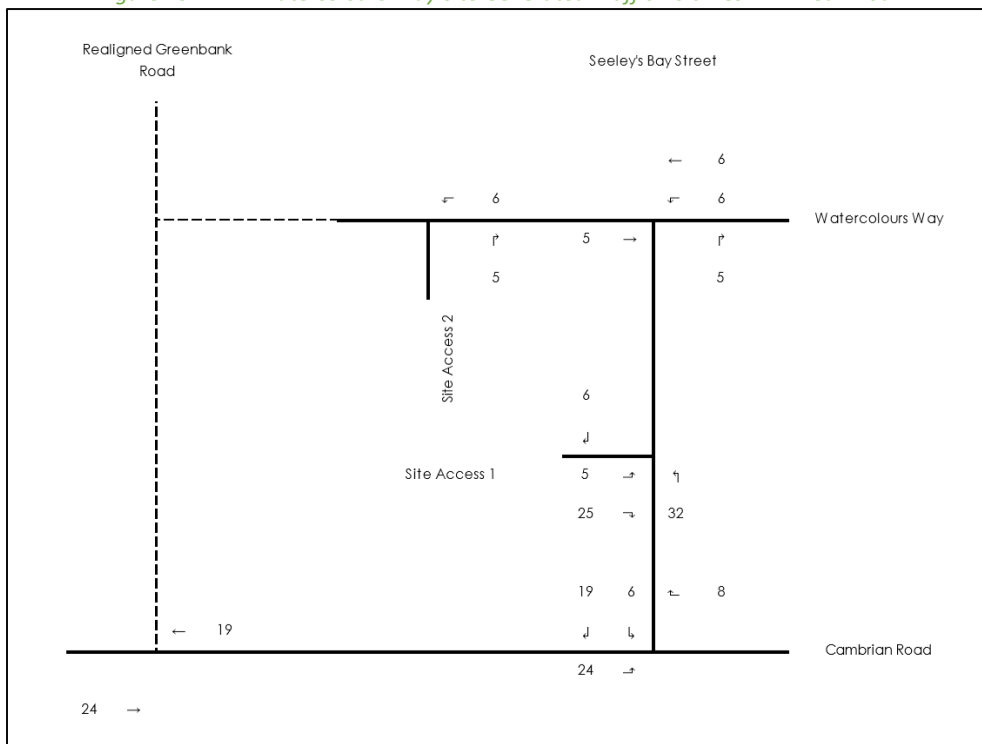
2444 Watercolours Way (Half Moon Bay North Phase 9) is a proposed residential development consisting of 60 stacked house units. This development was completed in 2019. However, this development was not captured in the available TMCs and therefore it has been accounted for explicitly herein. 2444 Watercolours Way is located approximately 250 metres north of the Subject Site and is expected to generate 74 and 80 two-way auto trips during the AM and PM peak hours, respectively. The anticipated trip generation from this site can be seen in Figure 14 and Figure 15 respectively and are excerpt from the Half Moon Bay North Apartment Block Transportation Impact Assessment by Stantec. This study also includes anticipated trip generation for when the future Greenbank Road is built that can be seen in Appendix E.

Figure 14: 2444 Watercolours Way Site Generated Traffic Volumes – AM Peak Hour



Source: Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018)

Figure 15: 2444 Watercolours Way Site Generated Traffic Volumes - PM Peak Hour

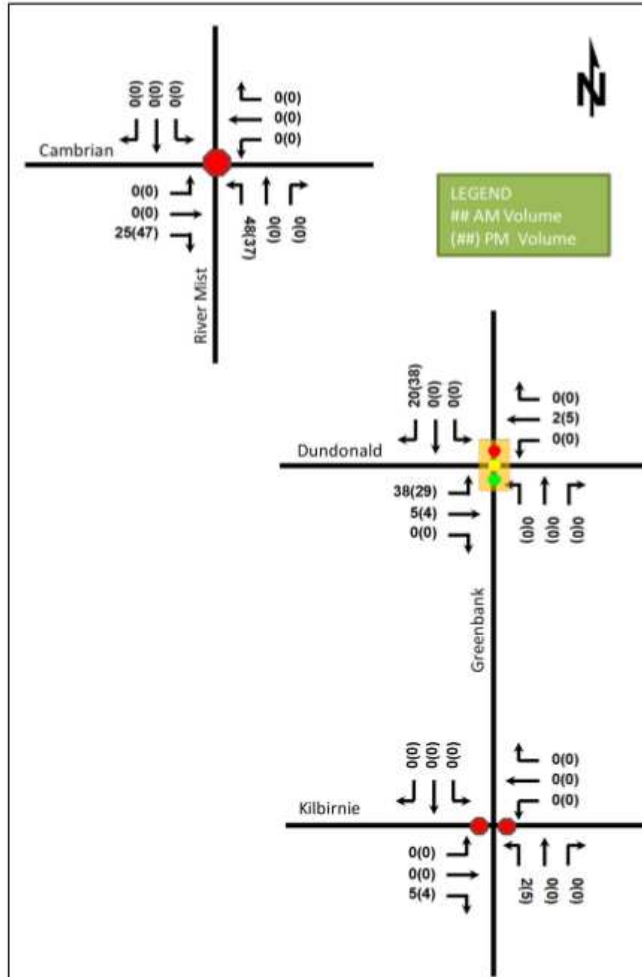


Source: Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018)

3718 Greenbank Road

3718 Greenbank Road is Phase 5 of Mattamy Half Moon Bay South, which is located southeast of the Subject Site and is expected to be built-out in 2020. The development will consist of 67 single detached home units and 97 townhouse units. This development is expected to produce 144 two-way AM peak period auto trips and 165 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen Figure 16 and is an excerpt from the 3718 Greenbank Road – Half Moon Bay South – Phase 5 Transportation Impact Assessment by CGH Transportation.

Figure 16: 3718 Greenbank Road Site Generated Traffic Volumes



Source: 3718 Greenbank Road – Half Moon Bay South – Phase 5 Transportation Impact Assessment (CGH, 2019)

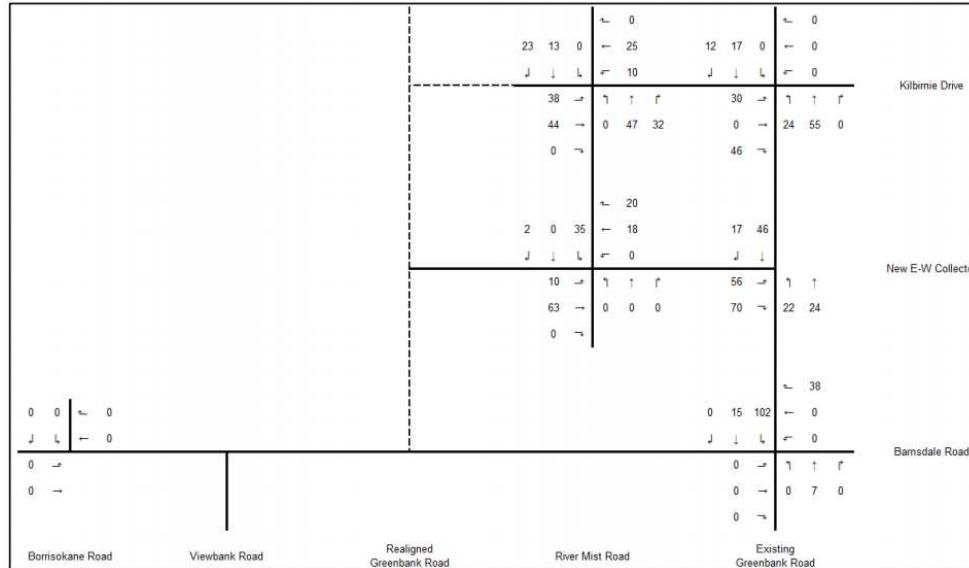
3802/3812 Greenbank Road

3802 and 3812 Greenbank Road is a proposed commercial development located southwest of the Subject Site, with an approximate area of 850 metres squared and 26 surface parking lots. The anticipated build-out year is 2020. This development does not meet trip generation trigger according to the 3802/3812 Greenbank Road Transportation Impact Study by CGH Transportation. Therefore, the impacts of this development are anticipated to be minimal and will be captured within the background growth rate.

3882 Barnsdale Road and 3960 Greenbank Road

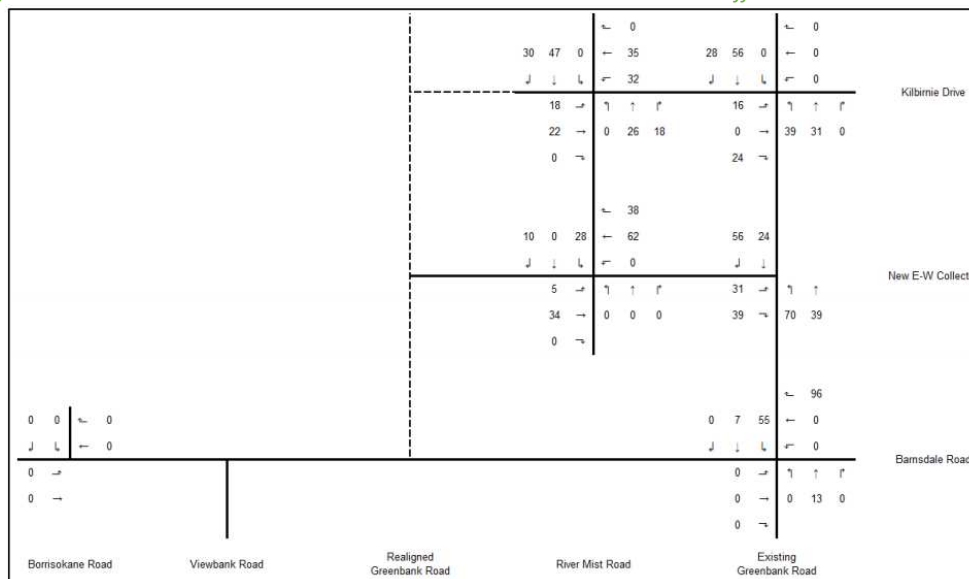
3882 Barnsdale Road and 3960 Greenbank Road (Quinn’s Pointe 2) is a proposed two-phase residential development that will include 536 single-family dwelling units, 493 townhomes, 100 apartment units, and two elementary schools. A total of 749 two-way AM peak period auto trips and 813 two-way PM peak period auto trips are expected from this development upon full build-out. The anticipated trip generation from this site for Phase 1 (2022) can be seen in Figure 17 and Figure 18 and are excerpts from Quinn’s Pointe 2 Transportation Impact Assessment prepared by Stantec. The above-mentioned TIA also includes 2025 background and total traffic volume diagrams, which will be subtracted as part of this study to obtain the 2025 Quinn’s Pointe 2 site generated volume and can be seen in Appendix E.

Figure 17: 3882 Barnsdale and 3960 Greenbank Road 2022 Site Generated Traffic Volumes – AM Peak Hour



Source: Quinn’s Pointe 2 Transportation Impact Assessment (Stantec, 2018)

Figure 18: 3882 Barnsdale and 3960 Greenbank Road 2022 Site Generated Traffic Volumes – PM Peak Hour

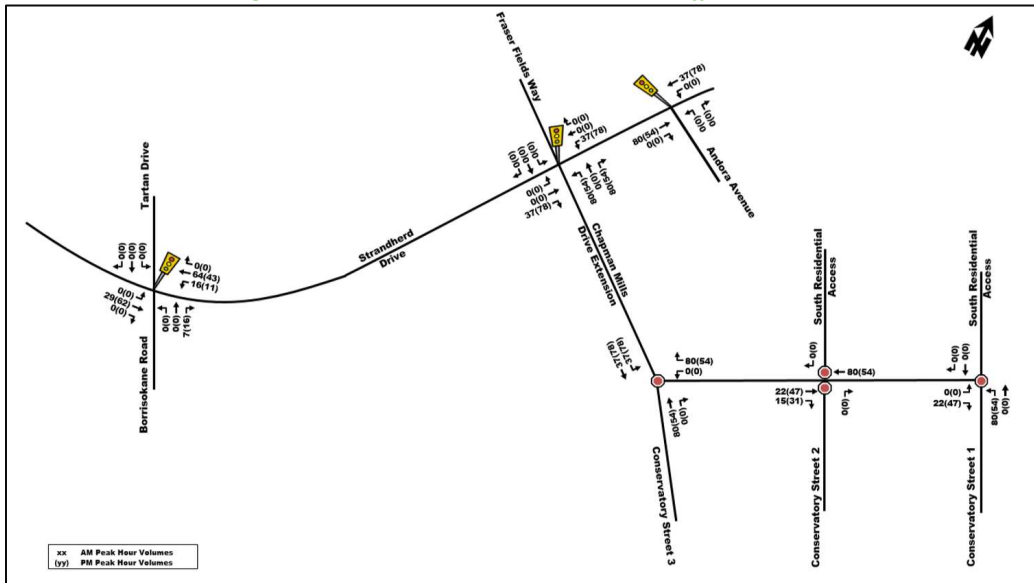


Source: 3718 Greenbank Road – Half Moon Bay South – Phase 5 Transportation Impact Assessment (CGH, 2019)

3285 Borrisokane Road

3285 Borrissokane Road is a proposed residential development located north of the Subject Site and is expected to be built-out in 2020. This development will include 125 single family homes and 75 townhouses. This development is expected to produce 129 two-way AM peak period auto trips and 146 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen Figure 19 and is an excerpt from the 3285 Borrissokane Road Phase 1 Transportation Impact Study by Parsons.

Figure 19: 3285 Borrissokane Site Generated Traffic Volumes

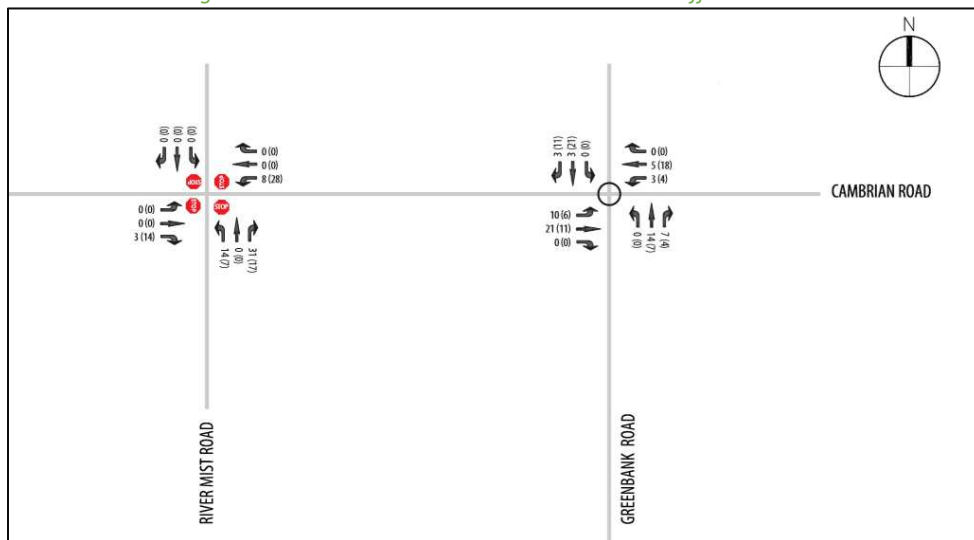


Source: 3285 Borrissokane Road Phase 1 Transportation Impact Study (Parsons, 2018)

The Meadows Phase 4

The Meadows Phase 4 is a residential development located south of the Subject Site and was built out in 2019. This development includes 136 townhouse units and 50 single family units. This development is expected to produce 86 two-way AM peak period auto trips and 107 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen Figure 20 and is excerpt from the Meadows Phase 4 TIA Report by IBI.

Figure 20: The Meadows Phase 4 Site Generated Traffic Volumes

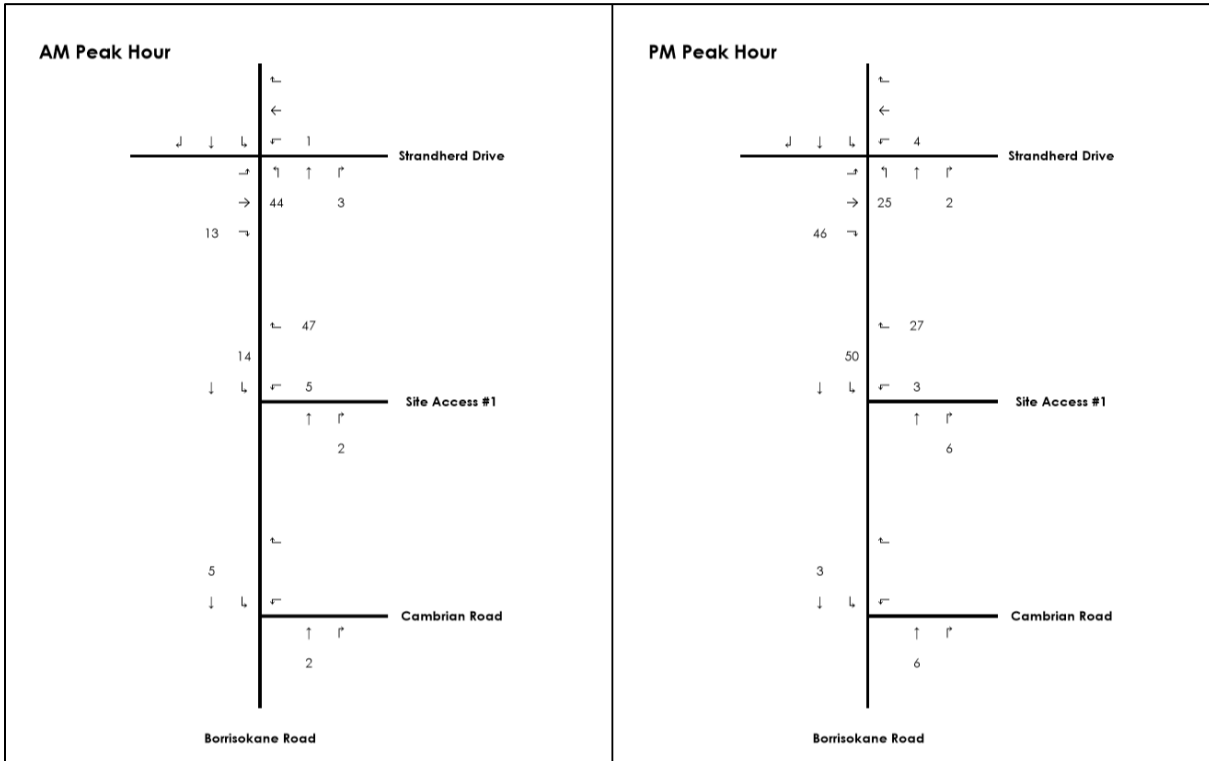


Source: The Meadows Phase 4 TIA Report (IBI, 2018)

3387 Borriskane Road

The Glenview Development of 3387 Borriskane Road is located northwest of the Subject Site and is expected to be built-out in 2022. The development is expected to have 179 single family units and 109 townhouses. The development is anticipated to produce 137 two-way AM peak period auto trips and 174 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen in Figure 21 which is an excerpt from the 3387 Borriskane Road Community Transportation Study by Stantec.

Figure 21: 3387 Borriskane Site Generated Traffic Volumes

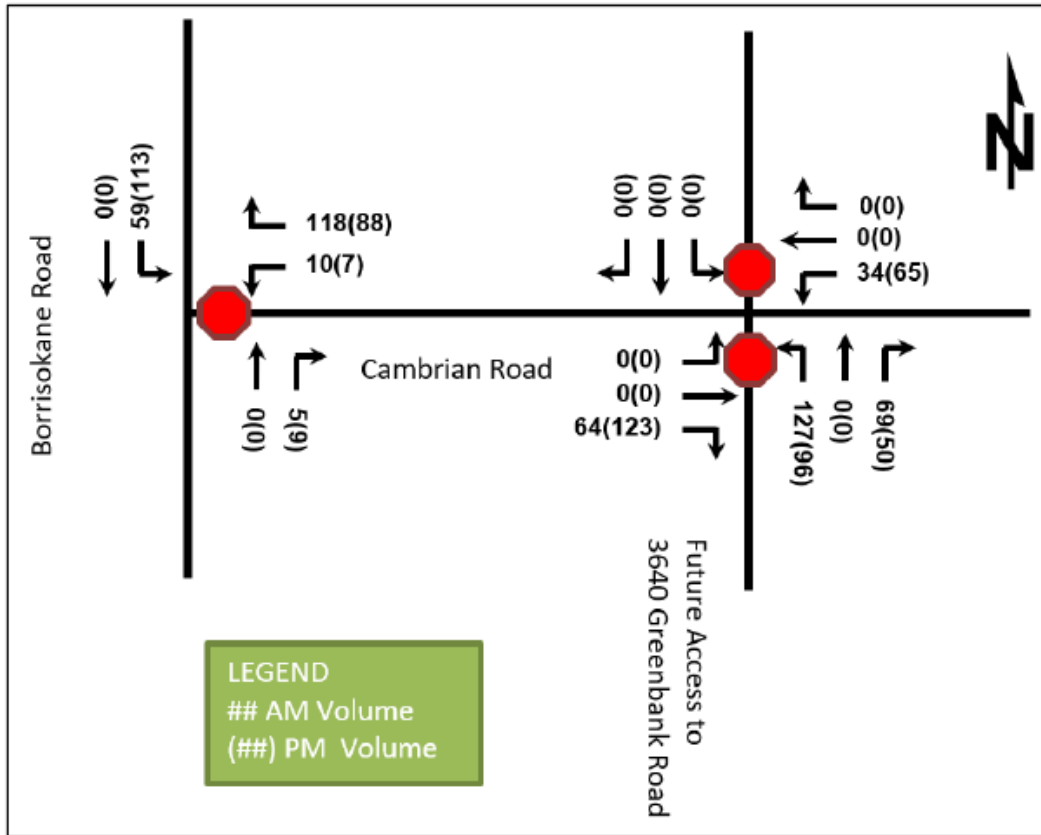


Source: 3387 Borriskane Road Community Transportation Study (Stantec, 2016)

3640 Greenbank Road

3640 Greenbank Road (Meadow’s Phase 5) is a proposed two-phase residential development located west of the Subject Site. The concept plan considers a total of approximately 350 units, split between townhouse and detached units (221 townhouses and 125 detached homes). The anticipated full build-out and occupancy horizon is 2022. The development is anticipated to produce 294 two-way AM peak period auto trips and 334 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen in Figure 22 and is an excerpt from the 3640 Greenbank Road Transportation Impact Assessment by CGH Transportation.

Figure 22: 3640 Greenbank Road Site Generated Traffic Volumes

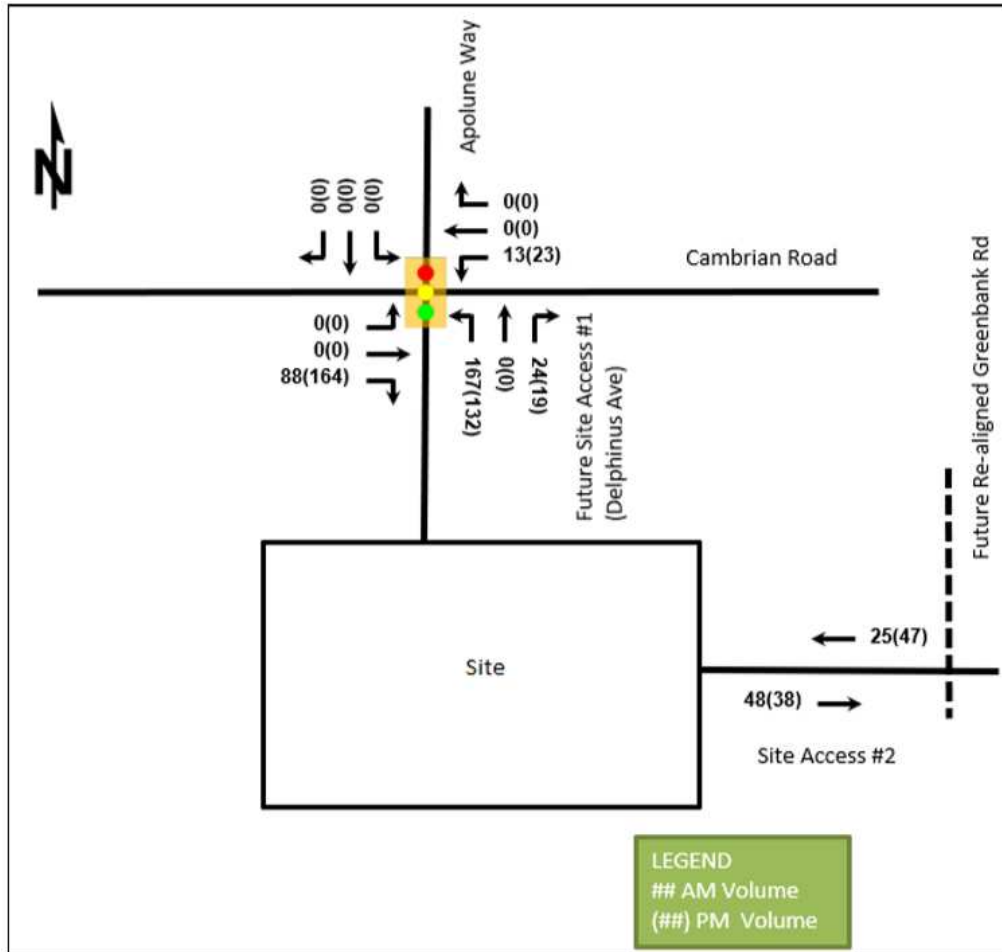


Source: 3640 Greenbank Road Transportation Impact Assessment (CGH, 2018)

3713 Borriskane Road – Residential Component

3713 Borriskane Road is a proposed residential development located southwest of the Subject Site and is expected to be built-out during 2024. This development will include 141 detached homes and 439 townhouses. 3713 Borriskane Road will include a connection to 3809 Borriskane Road and both developments will share an access to Borriskane Road. This development is expected to produce 364 two-way AM peak period auto trips and 423 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen in Figure 23 and is an excerpt from the 3713 Borriskane Road Transportation Impact Assessment by CGH Transportation.

Figure 23: 3713 Borriskane Road (Residential Component) Site Generated Traffic Volumes

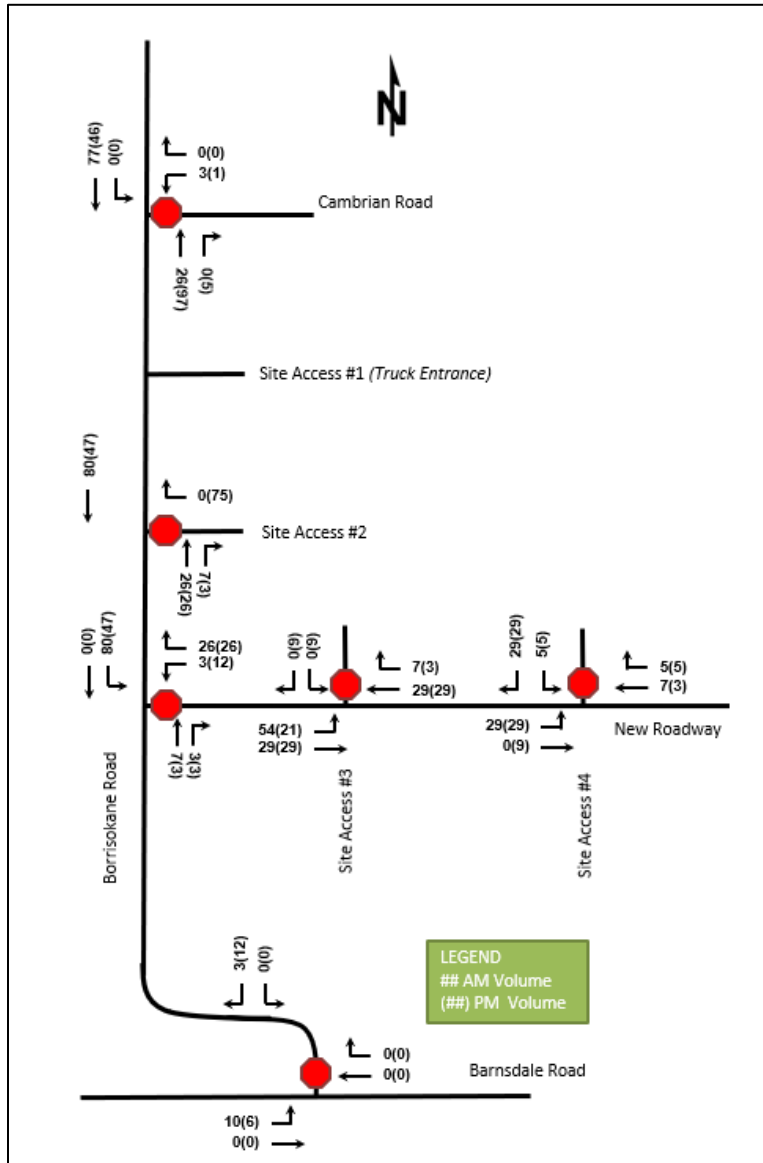


Source: 3713 Borriskane Road Transportation Impact Assessment (CGH, 2020)

3713 Borrisokane Road-Industrial Component

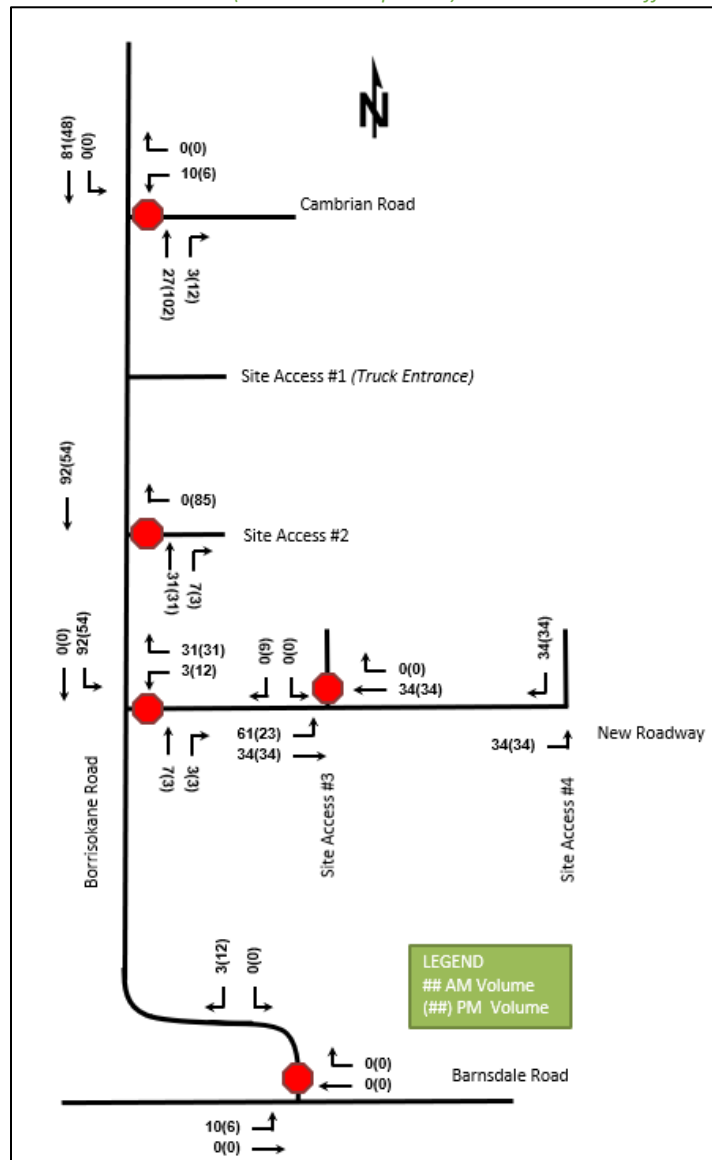
The industrial component of 3713 Borrisokane Road will be built-out in 2 phases, Phase 1 in 2022 and Phase 2 in 2027. The development will include approximately 3,250 square metres of general office space and 9,385 square metres of industrial buildings. This development is expected to produce 112 two-way AM peak period auto trips and 117 two-way PM peak period auto trips. The anticipated trip generation from this site after the completion of Phase 1 and Phase 2 can be seen in Figure 24 and Figure 25 respectively and are excerpts from the 3713 Borrisokane Road – ABIC Manufacturing Facility Transportation Impact Assessment by CGH Transportation.

Figure 24: 3713 Borrisokane Road (Industrial Component) Site Generated Traffic Volumes - 2022



Source: 3713 Borrisokane Road – ABIC Manufacturing Facility Transportation Impact Assessment (CGH, 2020)

Figure 25: 3713 Borrisokane Road (Industrial Component) Site Generated Traffic Volumes – 2027



Source: 3713 Borrisokane Road – ABIC Manufacturing Facility Transportation Impact Assessment (CGH, 2020)

3809 Borrisokane Road

3809 Borrisokane Road is a proposed residential development, which is located southwest of the Subject Site and is expected to be built-out in 2025. This development will include approximately 590 residential units, split between townhouse units and detached home units. The eastern parcel of 3713 Borrisokane Road will include a connection to 3809 Borrisokane Road and both developments will share an access to Borrisokane Road as part of an interim phase only. Approximately 300 units will use this connection prior to the full build-out in 2025 at which time the connection to Borrisokane Road will be closed. This development is expected to produce 401 two-way AM peak period auto trips and 457 two-way PM peak period auto trips. Based on the City of Ottawa comments, the TIA report for this development is being revised and is currently underway. The most recent update to the 2023 and 2025 3809 Borrisokane Road generated volumes is included in the Appendix E.

3 Study Area and Time Periods

3.1 Study Area

The Study Area will include the following intersections:

- Borrisokane Road at Cambrian Road
- Seeley's Bay Street at Cambrian Road
- River Mist Road at Cambrian Road
- Greenbank Road at Cambrian Road

The boundary road of the proposed development is Cambrian Road.

3.2 Time Periods

As the proposed development is composed entirely of commercial developments, the AM, PM, and Saturday peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2023. As a result, the full build-out plus five years horizon year is 2028.

4 Exemption Review

Table 5 summarizes the exemptions for this TIA.

Table 4: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

5 Development-Generated Travel Demand

5.1 Trip Generation and Mode Shares

This TIA has been prepared using the vehicle trip rates from the ITE Trip Generation Manual (10th Edition). Where possible, fitted curve rates were used to estimate the trip generation. This included the PM and Saturday peak hour Supermarket trip generation. The ITE Trip Generation Manual did not provide a fitted curve equation for the AM peak hour Supermarket trip generation, therefore an average trip rate was used for this time period. The fitted curve equation for the Retail Store land use was found to produce values beyond expected average rate for all of the studied time periods. This can be explained by high variance of data at low values of GFA that the fitted curve equations were based on. Thus, average trips rates were also used for Retail Store trip generation for the PM and Saturday peak periods. To estimate person trip generation, a factor of 1.28 has been applied to the ITE rates. Table 5 summarizes the person trip rates for the proposed land uses.

Table 5: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates	Estimation Method
Supermarket	850	AM	3.82	4.89	Average
		PM	9.66	12.36	Fitted Curve
		SAT	11.49	14.71	Fitted Curve
Retail Store	820	AM	0.94	1.2	Average
		PM	3.81	4.88	Average
		SAT	4.5	5.76	Average

Using the above Person Trip rates, the total person trip generation has been estimated. Table 6 below illustrates the total person trip generation by dwelling type.

Table 6: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Supermarket	43,315 sq. ft.	127	85	212	261	251	512	292	281	573
Retail Store	10,000 sq. ft.	7	5	12	24	25	49	30	28	58
Total Person Trips		134	90	224	285	276	561	322	309	631

To account for trips that are made to the site for more than one purpose (i.e. a patron getting groceries and then visiting the retail store before leaving the site), an internal capture rate has been applied to the total person trip generation to the retail store. The ITE Trip Generation Handbook (3^d Edition) provides the internal trip capture rates for trip origins and destinations within a mixed-use development and can be found in Appendix F. As no retail to retail capture rate is provided in this handbook, a 10% capture rate is assumed for the subject development and applied to the trips generated by the Retail Store. This is considered a conservative estimate, as the values in the Trip Generation Handbook range from 0 to 75%.

Table 7: Total Net Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Supermarket	43,315 sq. ft.	127	85	212	261	251	512	292	281	573
Retail Store	10,000 sq. ft.	6	4	11	22	22	44	27	25	52
Total Person Trips		133	89	223	283	273	556	319	306	625

Using the most recent National Capital Region Origin-Destination (OD Survey), the existing mode shares for South Nepean have been summarized in Table 8. The mode shares in the Study Area are expected to align with the OD Survey values, as the Subject Site is located in a typical suburban area with sidewalks connecting to adjacent residential developments. This will allow the closest residents to make frequent non-auto trips to the grocery store, whereas residents living slightly further away will still choose to use auto trips to get their groceries.

Table 8: Mode Shares

Travel Mode	South Nepean Mode Share
Auto Driver	60%
Auto Passenger	15%
Transit	15%
Cycling	1%
Walking	9%
Total	100%

Using the above mode shares and person trip rates, the person trips by mode have been forecasted during the peak hours. Where applicable, pass-by and diverted link trips have been accounted for, and the rates used for each land-use have been summarized in Table 9, as per the ITE Trip Generation Manual (3^d Edition).

Table 9: Land Use Pass-by and Diverted Link Rates

Land Use	Pass-by Rate			Diverted Link Rate		
	AM	PM	SAT	AM	PM	SAT
Supermarket	-	36%	28%	-	38%	41%
Retail Store	-	34%	26%	-	32%	35%

As no Saturday peak pass-by rates were available for the Supermarket, the pass-by rates of a similar land use (Retail Store) were used to estimate the Supermarket Saturday pass-by rate. This is considered conservative as it is likely that the pass-by rates of a Supermarket during the Saturday peak hour could be higher. The Saturday peak hour diverted link rates were also calculated using the same methodology. Once the total pass-by and diverted link trips were estimated using the rates outlined above, the In and Out trips were determined by dividing the total peak hour pass-by and diverted link volumes by two. This is based on the assumption that trips coming into the proposed development will leave the site within the same hour. The pass-by and diverted link reduction rates by land use can be seen in Appendix G and the total pass-by and diverted link reduction can be seen in Table 10 below.

Using the above mode shares and person trip rates, the person trips by mode have been projected. Table 10 summarizes the trip generation by mode.

Table 10: Trip Generation by Mode

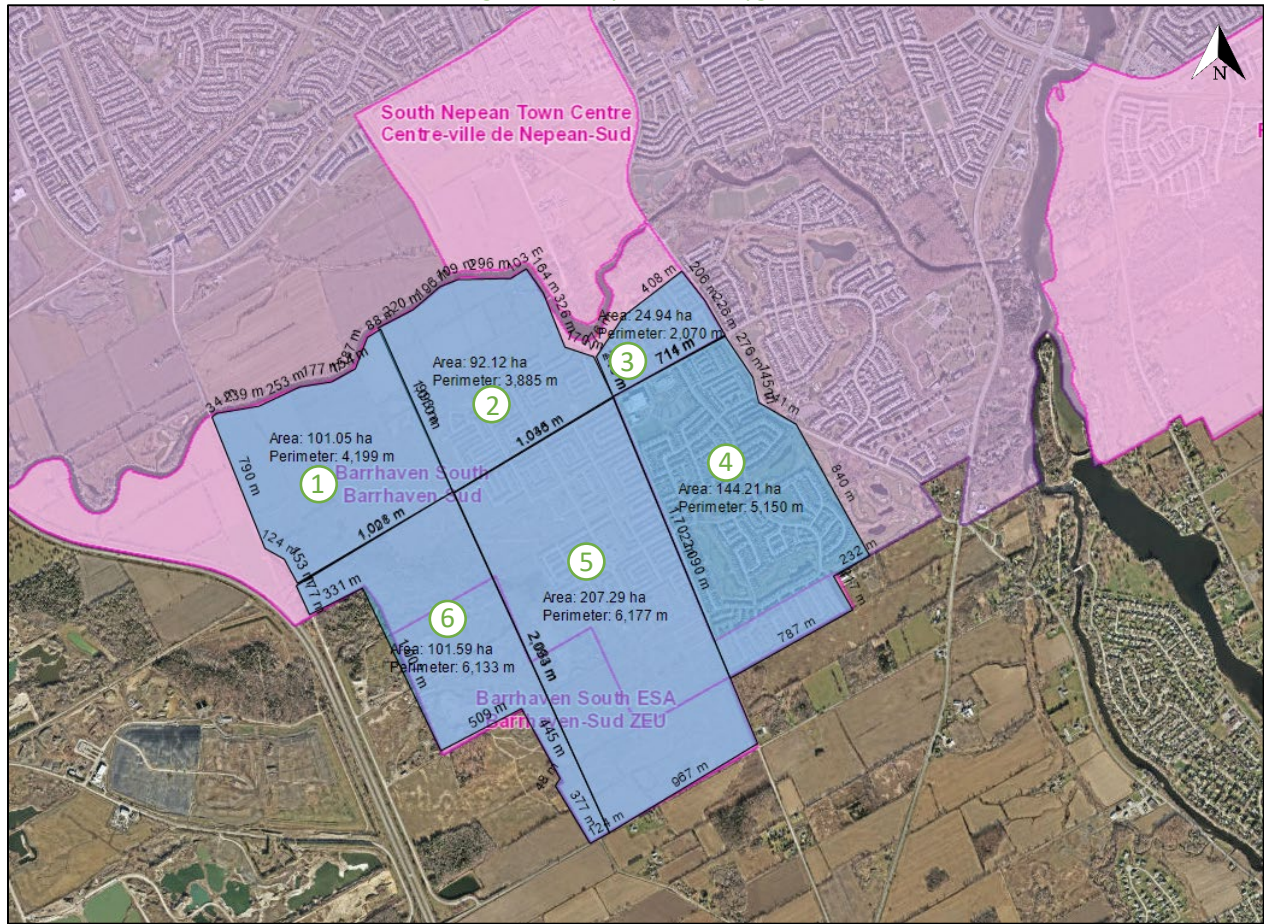
Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Auto Driver	60%	80	53	134	170	164	333	191	184	375
<i>Supermarket Pass-by</i>	-	-	-	-	-55	-56	-111	-48	-48	-96
<i>Retail Store Pass-by</i>	-	-	-	-	-4	-5	-9	-4	-4	-8
<i>Total Pass-by</i>	-	-	-	-	-59	-61	-120	-52	-52	-104
<i>Supermarket Diverted Link</i>	-	-	-	-	-58	-59	-117	-70	-71	-141
<i>Retail Store Diverted Link</i>	-	-	-	-	-4	-4	-8	-5	-6	-11
<i>Total Diverted Link</i>	-	-	-	-	-62	-63	-125	-75	-77	-152
<i>Net New Auto Driver</i>	-	80	53	134	49	40	88	64	55	119
Auto Passenger	15%	20	14	34	42	41	84	48	46	94
Transit	15%	20	14	34	42	41	84	48	46	94
Cycling	1%	1	1	2	3	3	5	3	3	7
Walking	9%	12	7	19	26	24	50	29	27	55
Total	100%	133	89	223	283	273	556	319	306	625

As shown above, 223 AM, 556 PM and 625 Saturday new peak hour two-way person trips are projected as a result of the proposed development out of which 134 AM, 88 PM and 119 Saturday peak hour two way trips are net new auto trips.

5.2 Trip Distribution

To understand the future travel patterns to the subject development, the location of competing grocery stores along with the Barrhaven South CDP boundary and Ottawa Official Plan Urban boundary have been reviewed to determine the anticipated travel patterns in the Study Area. A majority of the trips to the subject development are expected to be generated in an area bound by Jock River to the north, Borrisokane Road to the west, the Urban Boundary to the south, and Longfields Drive to the east. To determine the flow of traffic to and from the subject development, this area was broken down into six polygons and the trips were distributed according to the polygon size. The polygon areas were measured using the advanced tools in geoOttawa website and the OD map along with the area calculation can be seen in Figure 26 and Table 11 , respectively.

Figure 26: Study Area OD Polygons



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: July 24, 2020

Table 11: OD Polygon Area % Calculation

Polygon	Area (ha)	Area (%)
1	101.05	15
2	92.12	14
3	24.94	4
4	144.21	21
5	207.29	31
6	101.59	15
Total	671.2	100

5.3 Trip Assignment

Using the percentages shown in Table 11 the primary, or net new, auto trips were distributed to the Study Area road network. The new site generated volumes are illustrated in Figure 27.

In addition to the primary auto trips it is expected that both pass-by and diverted link trips will also make up a significant portion of the site trip generation.

To assign the pass-by trips to the accesses, a ratio of eastbound trips as a portion of all traffic on Cambrian Road, and westbound trips as a portion of all traffic on Cambrian Road was developed. It was determined that 60% of the total traffic is eastbound and 40% is westbound in both the 2023 PM and 2023 Saturday peak periods. It was

also determined that 60% of the total traffic is eastbound and 40% is westbound in both the 2028 PM and 2028 Saturday peak periods. Using these percentages, the traffic volumes have been logically distributed to the access points. Figure 27 illustrates the site pass-by trip volumes.

To assign the diverted link trips to the accesses, a ratio of southbound trips as a portion of all traffic on Greenbank Road, and northbound trips as a portion of all traffic on Greenbank Road was developed. Based on the minimal number of residential accesses on Borrissokane Road, and the internal road network of those developments, people destined to residential areas outlined in Figure 26 are already captured in pass-by trips. Therefore, southbound and northbound trips on Borrissokane Road were not considered in the diverted link trip assignment. When assigning the diverted link trips from Greenbank Road, it was determined that 60% of the total traffic is southbound and 40% is northbound in both the 2023 PM and 2023 Saturday peak periods. It was also determined that 60% of the total traffic is southbound and 40% is northbound in both the 2028 PM and 2028 Saturday peak periods. Using these percentages, the traffic volumes have been logically distributed to the access points. Figure 29 illustrates the site diverted link trip volumes.

Figure 30 illustrates the combined impact of the net new site trip generation, pass-by trips, and diverted link trips.

Figure 27: New Site Generation Auto Volumes

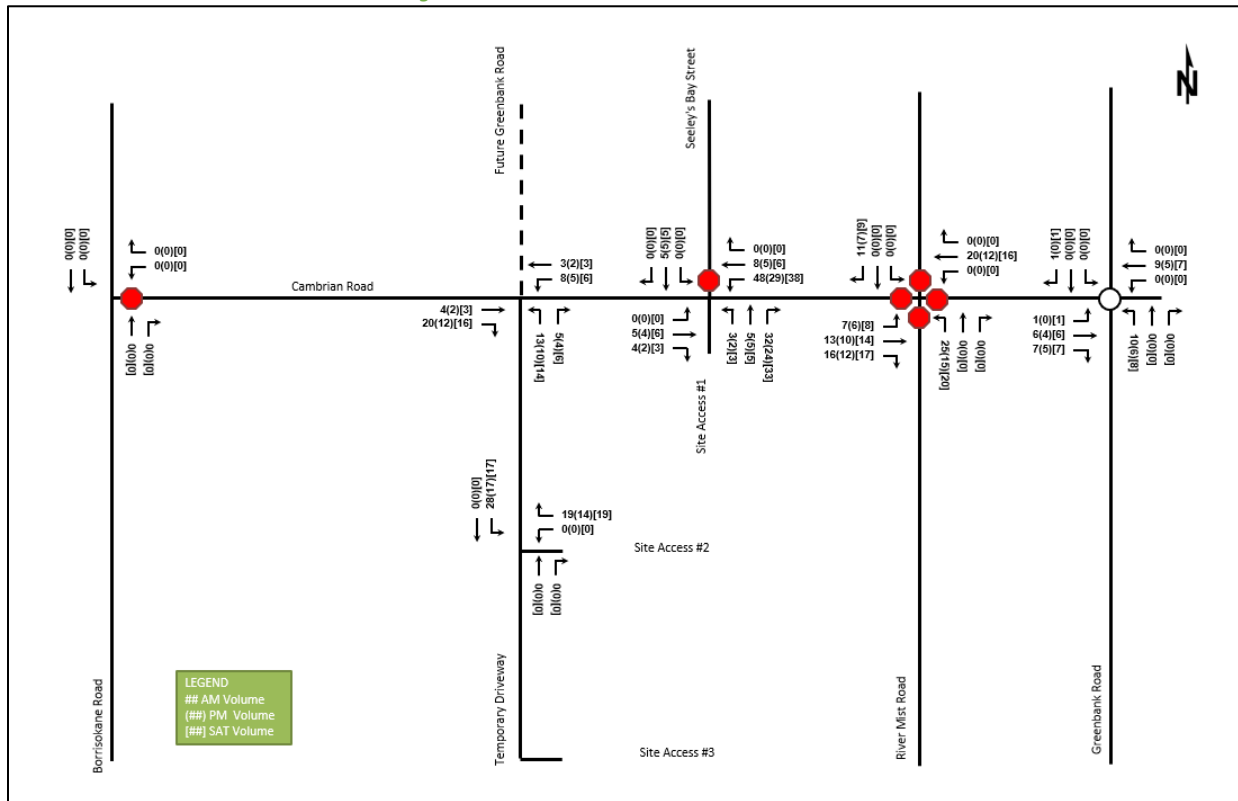


Figure 28: Forecasted Site Pass-by Trip Volumes

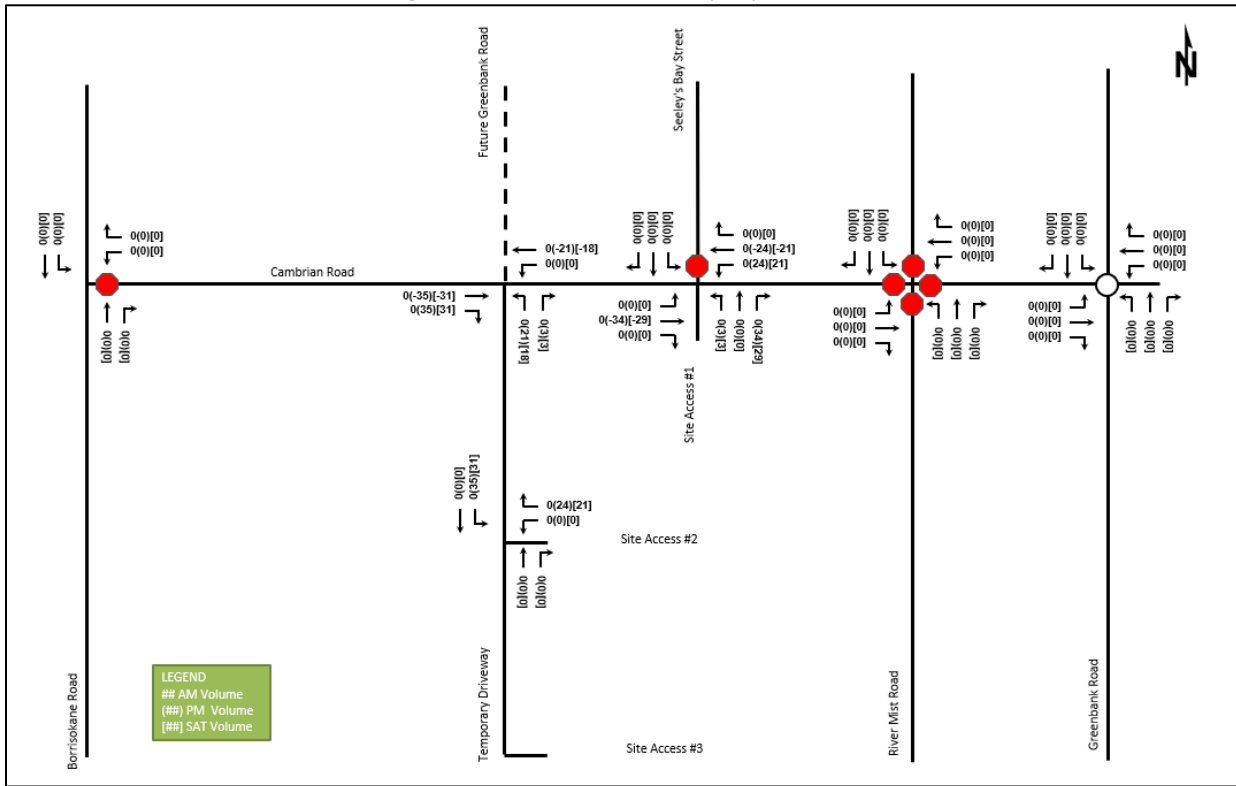


Figure 29: Forecasted Site Diverted Link Volumes

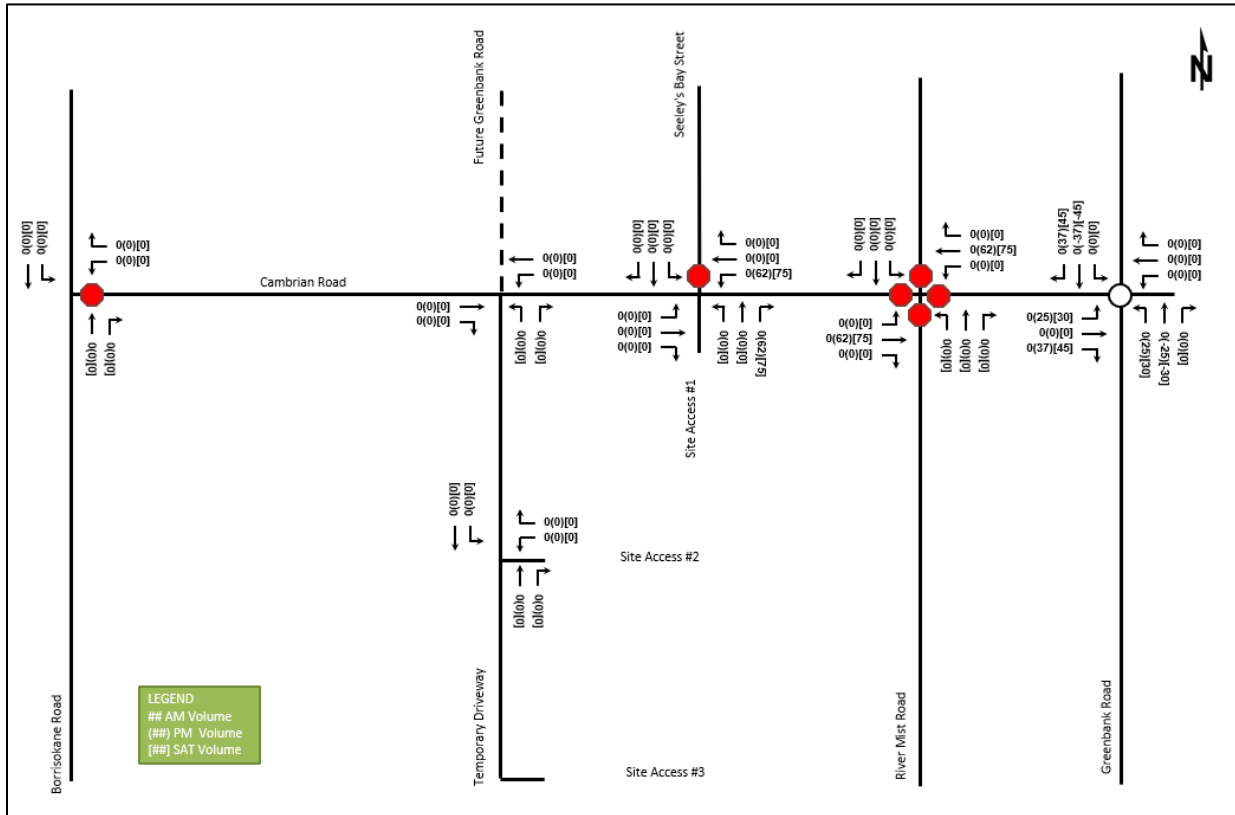
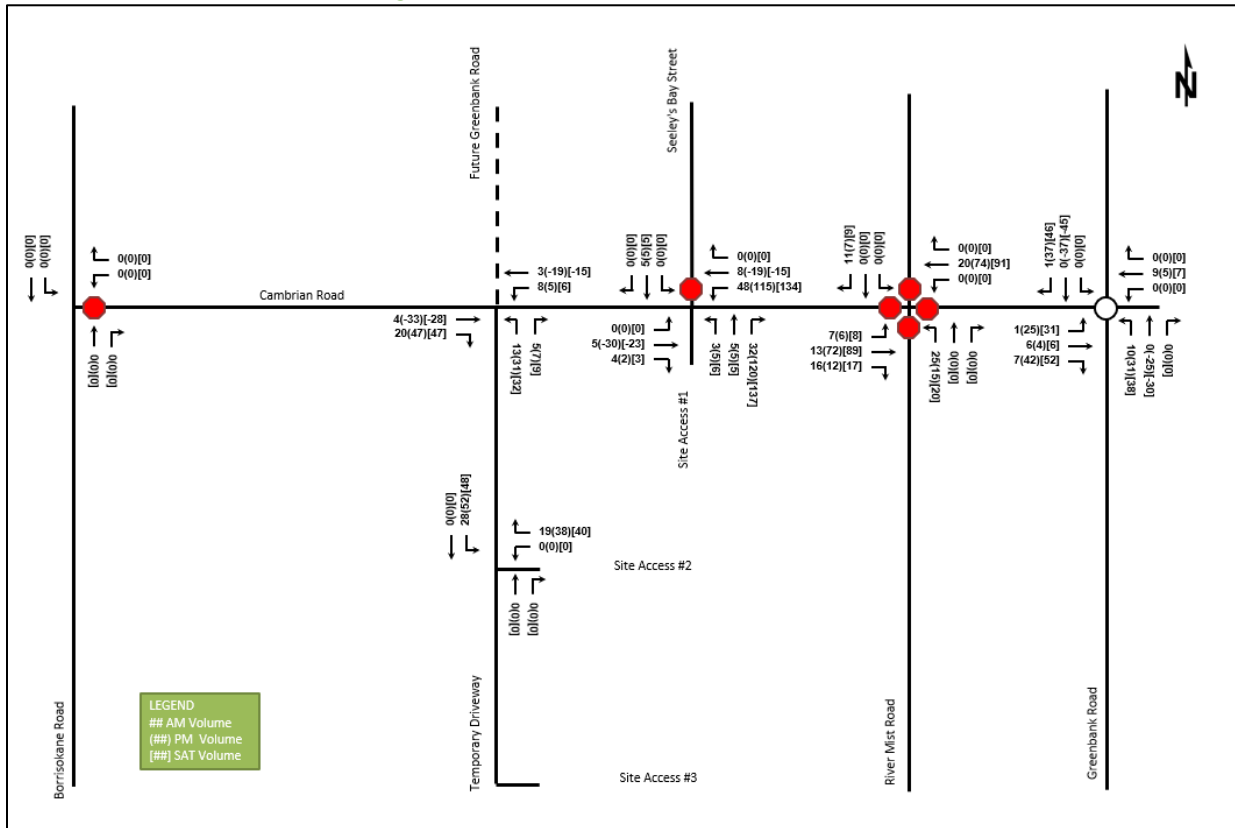


Figure 30: Net New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3.1. The additional capacity provided by these plans will improve the level of service in the Study Area road network, but these changes are not part of the 10-year affordable network. As such, the 2023 and 2028 Synchro model of the Study Area will be based on the existing roadway configuration. Additionally, plans for Intersection Control Measures at Cambrian Road and Borrisokane Road have been outlined in the 2019 Ottawa Development Charged By-Law and will be discussed in Step 4 of this TIA.

6.2 Background Growth and Other Developments

Surrounding development Traffic Impact Assessments have used a 2% traffic growth within the Study Area of this report. As such, an annual background growth of 2% will be used in order to remain consistent with these studies.

The background developments explicitly considered in both the 2023 and 2028 background conditions include:

- Half Moon Bay West Community
- 2444 Watercolours Way
- 3718 Greenbank Road
- 3882 Barnsdale Road and 3960 Greenbank Road
- 3285 Borrisokane Road Meadows Phase 4
- 3387 Borrisokane Road
- 3640 Greenbank Road

- 3713 Borrisokane Road Residential Component
- 3713 Borrisokane Road Industrial Component
- 3809 Borrisokane Road

All of these developments are discussed in Section 2.3.2.

Figure 31 illustrates the 2023 future background volumes and Figure 32 illustrates the 2028 future background volumes.

Figure 31: Future Background 2023 Volumes

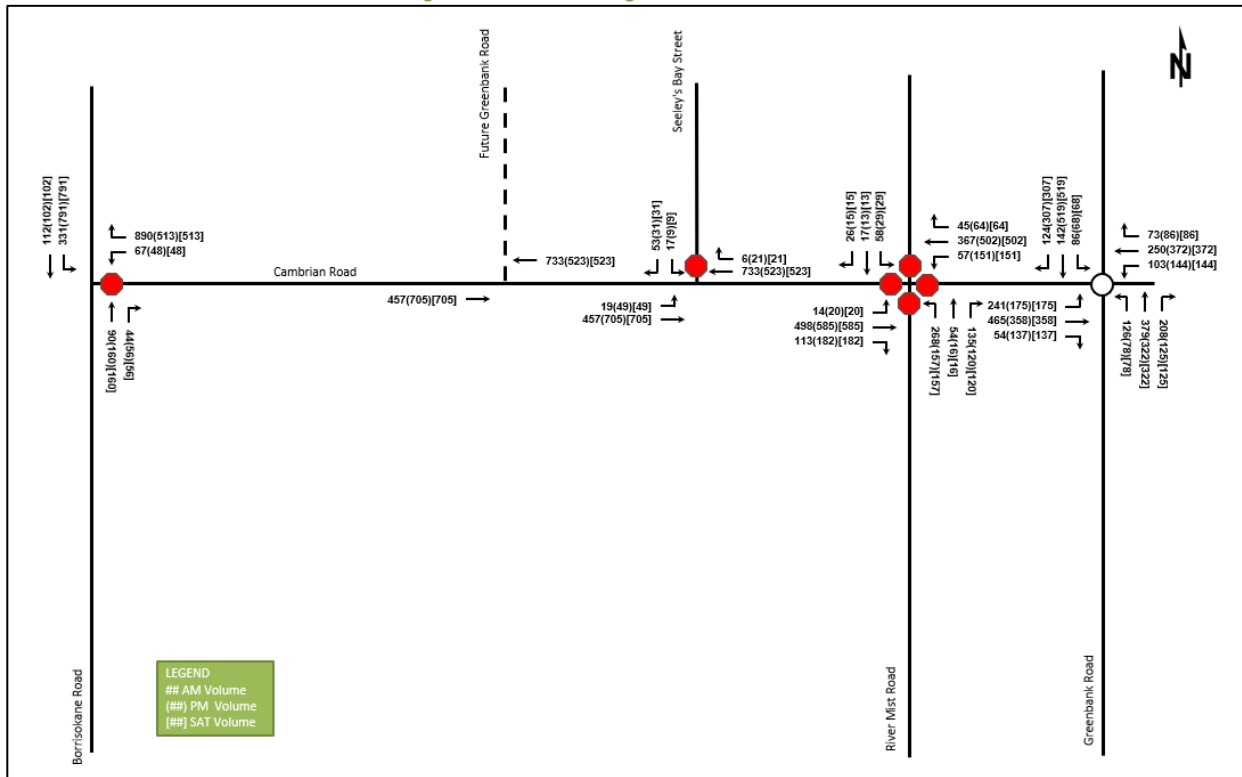
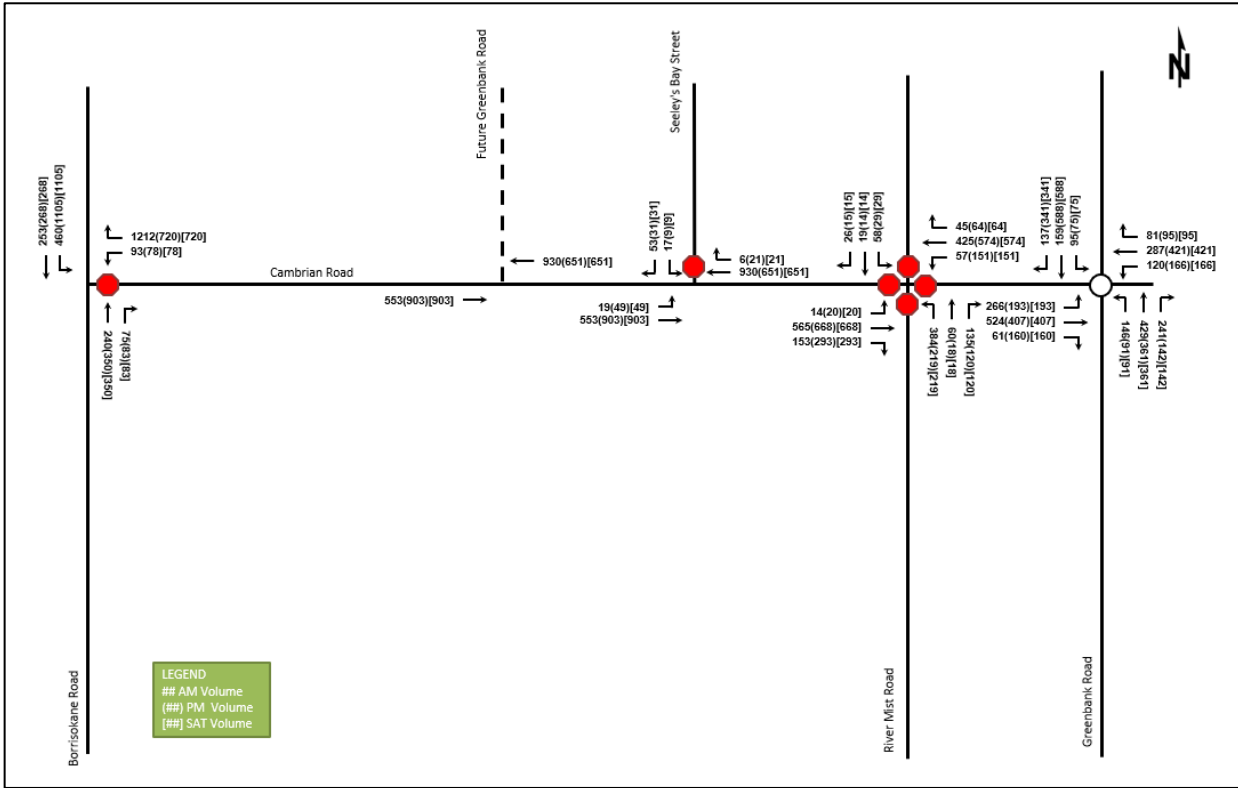


Figure 32: Background 2028 Volumes



7 Demand Rationalization

Based on the Synchro analysis in Section 2.2.7 and the CGH’s experience with other nearby developments, Borrisokane Road at Cambrian Road intersection is anticipated to experience capacity constraints in the near future. It has also been noted that River Mist Road at Cambrian Road intersection is experiencing capacity constraints and high delays. As multiple residential communities are anticipated to be built in the Study Area within next five years, the demand generated by these developments will outgrow the capacity that the current road configuration can provide. This can be seen when looking at the current volumes in Figure 8 and future total background volumes in Figure 32, which show that the total traffic at Borrisokane Road at Cambrian Road intersection will increase by nearly 300% and the total traffic at River Mist Road at Cambrian Road intersection will increase by an estimated 60%. Taking into account this, the existing poor LOS, and a lack of alternative routes, the demand determined in the previous sections of this report should be carried forward into the next step of this TIA to highlight the need for the infrastructure upgrades outlined in the City’s Transportation Master Plan.

The future total 2023 volumes are illustrated in Figure 33 and the future total 2028 volumes are illustrated in Figure 34.

Figure 33: Future Total 2023 Volumes

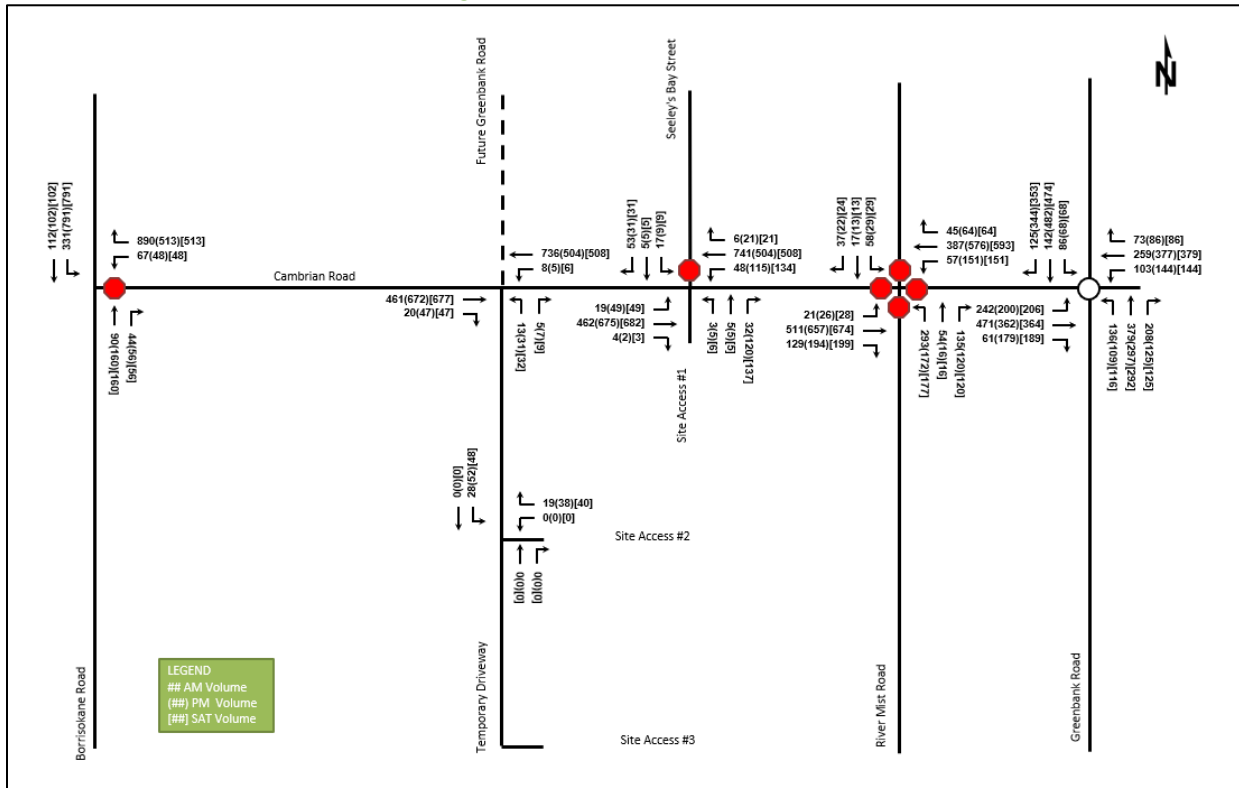
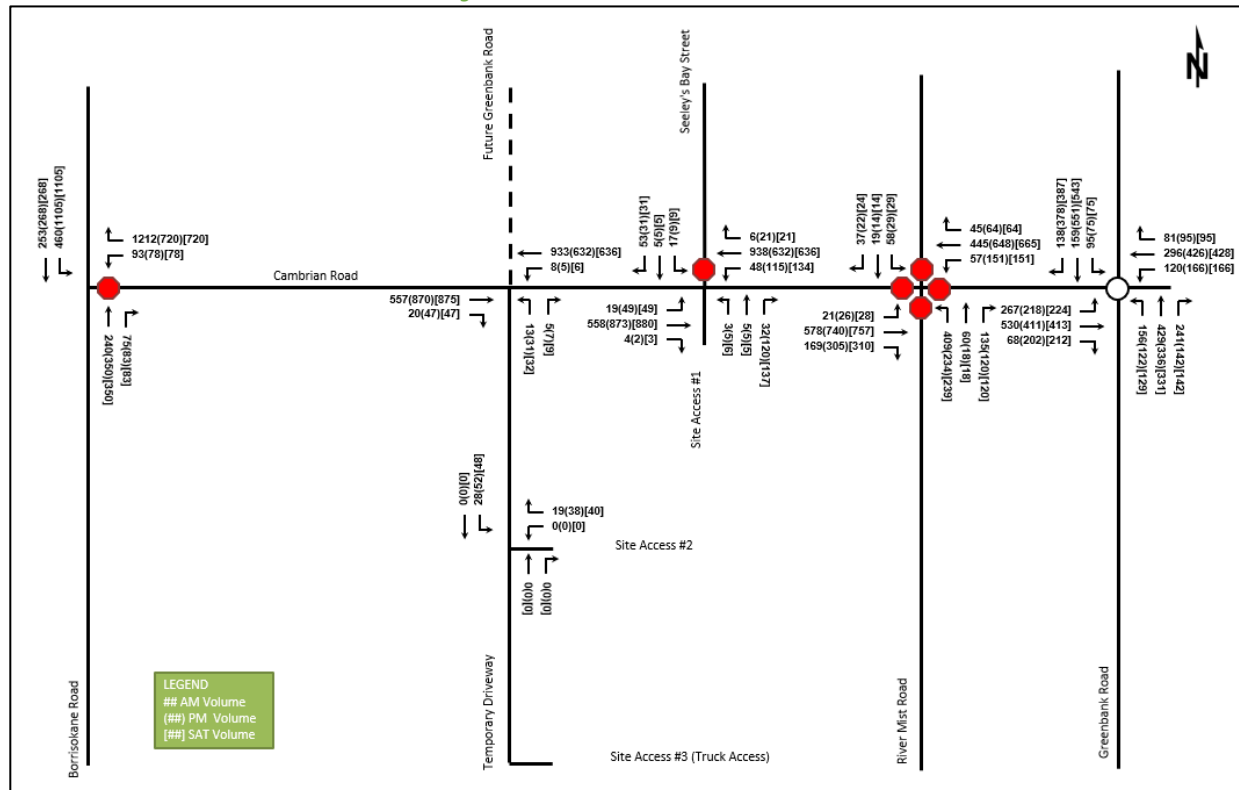


Figure 34: Future Total 2028 Volumes



8 Development Design

8.1 Design for Sustainable Modes

The proposed development is a retail development with surface parking for both automobiles and bicycles.

Pedestrian facilities have been proposed within the development site plan and will connect pedestrians to bike parking, internal surface vehicle parking, and pedestrian network on Cambrian Road. No cycling facilities or connections within the development have been proposed at this time due to the lack of cycling facilities in the surrounding area road network. However, future local and spine cycling routes along Cambrian Road, and future Greenbank Road, respectively, have been approved as part of the City of Ottawa's Ultimate Cycling Network. These local cycling routes will provide cycling access to the development beyond our study horizon.

Additionally, the planned future Bus Rapid Transit facilities along future Greenbank Road is anticipated to improve transit access to and from the proposed development beyond the future study horizons.

Development facilities supportive of sustainable modes in the City of Ottawa's TDM-supportive Development Design and Infrastructure Checklist which are required for zoning and standard site design are recommended. The following additional measures are also recommended:

- Locate building entrances in order to minimize walking distances to sidewalks and transit facilities
- Locate building doors and entrances to ensure visibility of pedestrians from the building
- Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails
- Provide a permanent bike repair station

TDM Checklists can be found in Appendix H.

8.2 Circulation and Access

Access #1 and Access #2 will accommodate passenger vehicles accessing the surface automobile parking. Access #3 is considered the primary entrance to the shipping and loading area and as such will be used exclusively by trucks. Site Access #1 will also serve as a truck exit. Truck volumes entering and exiting the site are expected to be minimal and during off-peak periods. Access #3 and Access #1 are also expected to be used by garbage trucks to access the development.

Turning templates for delivery trucks and garbage trucks can be found in Appendix I.

8.3 New Street Networks

This TIA is exempt from this Module (see Table 4).

9 Parking

9.1 Parking Supply

The parking requirements and provisions for the proposed development are summarized in Table 12.

Table 12: Parking Provisions

Land Use	Parking Rate	Parking Required	Parking Provided
Supermarket	3.4 / 100 m ² GFA	99	220
Retail Store	3.4 / 100 m ² GFA	24	
Total Vehicle Parking		123	
Supermarket & Retail Store (Bicycle)	1 / 250 m ² GFA	15	16
Total Bicycle Parking		15	

Based on the City of Ottawa Zoning By-laws, a minimum of 123 automobile parking spaces are required and a minimum of 15 bicycle parking spaces are required. As can be seen in Table 12, automobile parking space requirements are met in excess of 97 parking spaces. The bicycle parking requirements are met in excess of one parking space.

9.2 Spillover Parking

This TIA is exempt from this Module (see Table 4).

10 Boundary Street Design

Cambrian Road is noted as boundary road for the site in both the 2023 and 2028 future horizons. Cambrian Road is not considered a Complete Street and no plans currently exist to upgrade Cambrian Road within the proposed development's future analysis horizons. The existing pedestrian facilities which terminate east of Seeley's Bay Street will be extended along the frontage of the proposed development along the south side of Cambrian Road upon full-build out of the development. It is expected that the existing pedestrian facilities will also be extended towards the west on the north side of Cambrian Road across from the proposed development in conjunction with the development of the Mattamy's Half Moon Bay West and Half Moon Bay North before the 2028 future horizon.

Cambrian Road Intersection Control Measures outlined in the 2019 Ottawa Development Charges By-Law are expected to be implemented at the following intersections:

- Cambrian Road and Borrisokane Road at a gross project cost of \$1,300,000 (2020-2031)
- Cambrian Road and Apolune Way at a gross project cost of \$1,300,000 (2020-2031)

Additionally, the City of Ottawa TMP and the Barrhaven South CDP indicate that Cambrian Road will be widened to four lanes and future Greenbank Road rapid transit corridor will be built along the west side of the proposed development. The proposed cross-section of Cambrian Road is a divided 4-lane cross-section including sidewalks, bike lanes, boulevards, and a landscaped centre median and can be seen in Appendix J. The proposed cross-section of Re-Aligned Greenbank Road is a divided 4-lane cross-section including sidewalks, cycletracks, and centre median bus lanes and can be seen in Appendix J. As the timing of these infrastructure upgrades is unknown and neither transportation infrastructure upgrade is included in the City of Ottawa's 2031 Affordable Network, it has been assumed that they will occur beyond the proposed development's future analysis horizons. This assumption has been confirmed by the City of Ottawa as part of the comments provided on the Forecasting Report for the proposed development. These comments can be found in Appendix K.

The Segment Multi-Modal Level of Service (MMLOS) is broken down into the Pedestrian Level of Service (PLOS), Bicycle Level of Service (BLOS), Transit Level of Service (TLOS), and Truck Level of Service (TkLOS) and are all recorded in Table 13. As the existing, future background, and future total scenarios are all different, they have been evaluated in their own MMLOS worksheets. The results however are the same across all horizons. Cambrian

Road has been evaluated against the target for a general urban area. The MMLOS Worksheets for each horizon can be found in Appendix L.

Table 13: Boundary Street MMLOS

Road Segment	Horizon	MMLOS							
		PLOS		BLOS		TLOS		TkLOS	
		Actual	Target	Actual	Target	Actual	Target	Actual	Target
Cambrian Road btw Borrisokane Road & Seeley’s Bay Street	Existing	F	C	E	D	-	-	E	E
	2023 FB	F	C	E	D	D	D	E	E
	2023 FT	F	C	E	D	D	D	E	E
	2028 FB	F	C	E	D	D	D	E	E
	2028 FT	F	C	E	D	D	D	E	E

Cambrian Road overall MMLOS was based on the worst-performing Cambrian Road segment in the Study Area, between Borrisokane Road and Seeley’s Bay Street.

This segment does not meet the Pedestrian LOS target due to narrow gravel shoulders, lack of boulevard, and relatively high vehicular volumes and posted speed limit. Future development of residential communities along Cambrian Road as mentioned above, are expected to improve the pedestrian LOS by providing sidewalks along both sides of Cambrian Road. A sidewalk will also be provided along the frontage of the proposed development, on the south side of Cambrian Road. East of Seeley’s Bay Street, Cambrian Road has improved pedestrian facilities with boulevards or lawn areas separating the sidewalks for the vehicular traffic. However, a short section of the road that runs along the 2771 Grand Canal Street property parcel was noticed to have a lower pedestrian LOS. The sidewalk along this section is 1.5 metres wide and is directly adjacent to the roadway with high traffic volumes. This sidewalk section remains unaltered in the proposed Cambrian Road widening and can be seen in Appendix J. It is not clear why this section of Cambrian Road sidewalk was not constructed according to current standards and will not be improved as part of the Cambrian Road widening. It is recommended that City of Ottawa revisits the proposed Cambrian Road widening plan to improve the above-mentioned sidewalk section.

Gravel shoulders on Cambrian Road between Borrisokane Road and Seeley’s Bay Street were used to evaluate the Bicycle LOS in the Study Area, and the resultant lookup table LOS was adjusted down two grades to account for lack of cycling infrastructure. A local cycling route along Cambrian Road is approved as part of the City of Ottawa’s Ultimate Cycling Network and will improve the Bicycle LOS beyond the proposed development’s study horizon.

Transit routes #75 and #275 do not run along the entirety of Cambrian Road segment in the Study Area. As such, the existing Transit LOS has not been evaluated. To evaluate the future Transit LOS, it was assumed that OC Transpo will adjust the paths and schedules of routes #75 and #275 once the new residential developments are built along Cambrian Road, west of Seeley’s Bay Street. As City of Ottawa’s MMLOS Guidelines do not provide Transit LOS targets for roadways that are neither a Rapid Transit Corridor nor a Transit Priority Corridor, a target LOS for Transit Priority Corridor with isolated measures was used as a conservative target for Cambrian Road. The Transit LOS target for general urban area is met.

The Truck LOS targets in the Study Area have been met.

As mentioned above, future developments along Cambrian Road are anticipated to improve the Pedestrian LOS in the Study Area within the study horizon. Beyond the proposed development's study horizon, cycling infrastructure will be provided along Cambrian Road as part of the City's Ultimate Cycling Network. As such, no further improvements to Cambrian Road, beyond the extension of pedestrian facilities along the frontage of the site, are recommended as a result of the boundary street MMLOS analysis.

11 Access Intersections Design

11.1 Location and Design of Access

The site is proposed to have three accesses. Site Access #1, and a temporary driveway leading to Site Access #2 and Site Access #3, are located along Cambrian Road. As a grocery store is a convenience-based trip, providing a full-movement access is critical to the viability of this site. Once the future Greenbank Road centre median bus lanes are built, Site Access #2 and Site Access #3 will be restricted to right-in/right-out access only. Thus, Site Access #1 must be a full-movement access. To maximize the distance between Site Access #1 and future intersection of re-aligned Greenbank Road and Cambrian Road, Access #1 has been located directly across Seeley's Bay Street, approximately 140 metres east of future Greenbank Road, measured from intersection centreline to intersection centerline. The future detailed design of re-aligned Greenbank Road at Cambrian Road will have to further refine the interaction of this access and future Greenbank Road intersection.

The temporary driveway at Cambrian Road will operate as a full-movement access and is located along the centreline of future Greenbank Road. The temporary driveway leads to Site Access #2, located approximately 120 metres south of Cambrian Road, and Site Access #3, located approximately 190 metres south of Cambrian Road, measured from centreline to centreline. Site Access #2 is a left-in/right-out access and Site Access #3 is one-way left-in truck access. As mentioned above, once re-aligned Greenbank Road is built, Site Access #2 and Site Access #3 will have to be restricted to right-in/right-out access only.

11.2 Intersection Control

Using OTM Book 12 Justification 7, and the volume projections herein, the traffic control signal warrant for Access #1 and temporary driveway at Cambrian Road has been examined for 2028 future total horizon. It has been found that signals are not warranted using Justification 7. The signalization warrants for Access #1 and temporary driveway can be found in Appendix M.

As a result, the Site Access #1 and the temporary driveway will have stop-controls on the minor approach for both future total horizons. No further traffic control is warranted to address operational issues.

11.3 Intersection Design

A functional design is anticipated for Site Access #1. For the purposes of this report, the following assumptions surrounding the intersection design of both site accesses have been made:

Left-turn lane warrants for unsignalized intersections were examined at Site Access #1 and temporary driveway for both 2023 and 2028 total future horizons. To determine if a left-turn lane is warranted, the MTO Geometric Design Standards for Ontario Highways, Section E, left-turn lane warrant nomographs were examined.

A westbound left-turn lane at Site Access #1 was found to be warranted during the 2023 and 2028 future total horizons. An eastbound left-turn lane at Site Access #1 was found to be warranted using the existing 2020 traffic volumes.

A high ratio of east-west traffic volumes to westbound left-turning traffic volume has also resulted in westbound left-turn lane warrant being met at the temporary driveway. The westbound traffic turning left at this location is close to one percent of the total intersection traffic volume. This is because vehicle trips generated east of Site Access #1/Seeley’s Bay Street are most likely to enter the site by making a left turn at Site Access #1/Seeley’s Bay Street and Cambrian Road intersection. The number of cars travelling westbound and passing Site Access #1 to enter the proposed development using the temporary driveway will further decrease as a result of a westbound left-turn lane being built at Site Access #1. Therefore, the estimated one percent of intersection traffic volume turning left at temporary driveway and Cambrian Road intersection is likely conservative. Considering this as well as the plans for Greenbank Road re-alignment, a left-turn lane is not required at this location. Left-turn lane warrants have been provided in Appendix N.

The intersection of Site Access #1 and Cambrian Road is an unsignalized four-legged intersection with stop signs on minor approaches. The Seeley’s Bay Street will form the north leg of the intersection and serve as an access to the residential area directly north of the proposed development. The Seeley’s Bay Street has a sidewalk on the west side. The westbound approach will consist of an auxiliary left-turn lane and a through lane, the eastbound approach will be made up of a single shared movement lane, and the northbound approach will consist of a single shared movement lane. Additionally, pedestrian facilities are anticipated to be extended along the proposed development’s frontage on the south side of Cambrian Road as well as on the south side in conjunction with the development of Mattamy’s Half Moon Bay West community.

The preliminary storage and taper lengths for the proposed westbound left-turn lane at Cambrian Road and Seeley’s Bay Street/Site Access #1 are summarized in Table 14 and further discussed below.

Table 14: 2023 and 2028 Site Access #1 at Cambrian Road WBL - Preliminary Design Criteria

Design Standard	Design Speed	Storage	Parallel Lane	Taper Ratio	Taper	Total Lane Length
TAC	60 km/h	30 m	45 m	36:1	130 m	205 m

Using Transportation Association of Canada’s Geometric Design Guide for Canadian Roads (TAC) the storage, parallel lane, and taper lengths were determined for a 60 km/h design speed. For the purposes of determining the taper length it was assumed that this left-turn lane would be constructed as a left-turn on the right side of the centreline with a 3.5 metre turning lane width. The storage length was calculated based on the following formula (TAC Formula 9.14.1):

$$S = \frac{NL}{30}$$

Where:

S = Storage Length (m)

N = Design volume of turning vehicles $\left(\frac{v}{h}\right)$

L = Length (m) occupied by each vehicle = 6 m

The parallel lane length was calculated based on the following formula (TAC Formula 2.5.1):

$$d_b = 0.039 \frac{V^2}{a}$$

Where:

d_b = Braking Distance (m)

V = Design Speed (km/h)

a = Deceleration rate (m/s^2) = 3.4 m/s^2

The preliminary storage and taper lengths for the eastbound left-turn lane warranted during the 2020 existing traffic volumes at Cambrian Road and Seeley's Bay Street/Site Access #1 were calculated using methodology outlined above and are summarized in Table 15.

Table 15: 2023 and 2028 Site Access #1 at Cambrian Road EBL - Preliminary Design Criteria

Design Standard	Design Speed	Storage	Parallel Lane	Taper Ratio	Taper	Total Lane Length
TAC	60 km/h	15 m (min.)	45 m	17:1	60 m	120 m

Due to geometric constraints imposed by future intersection of realigned Greenbank Road and Cambrian Road, the eastbound left-turn lane taper ratio is 17:1, resulting in a 60-metre-long taper.

As such, the westbound auxiliary left-turn lane at Cambrian Road and Seeley's Bay Street/Site Access #1 should be 205 metres long with a storage lane of 30 metres, a parallel lane of 45 metres and a taper of 130 metres. The eastbound auxiliary left-turn lane at Site Access #1 should be 120 metres long with a storage lane of 15 metres, a parallel lane of 45 metres and a taper of 60 metres.

The intersection of the temporary driveway and Cambrian Road is an unsignalized three-legged intersection with a stop sign on the northbound approach. All approaches at this intersection will be made up of a single shared movement lane. The temporary driveway will form the south leg of the intersection and will be located along the future Greenbank Road centreline, serving as an interim connection to Site Access #2 and Site Access #3. Once the future Greenbank Road is built, beyond our study horizon, Site Access #2 and Site Access #3 will be restricted to right-in/right-out access only.

According to Transportation Association of Canada's Geometric Design Guide for Canadian Roads (TAC), Table 8.9.3, the suggested minimum clear throat length for major driveways, for a development of this size, would require a throat length based on each land use and is summarized in the Table 16 below.

Table 16: Throat Length by Land Use

Land Use*	Development Size (s.m.)	Required Clear Throat Length (m)
Supermarket	4,024	40
Shopping Centre	929	15

*Note: Not all land uses are represented in Table 8.9.3. Where an exact match was not available, a reasonable assumption of a comparable land use was used. (i.e. for the proposed retail store Shopping Centre was used).

The throat length of Site Access #1 is 44 metres in the interim site plan, which meets the clear throat length requirements. Once Cambrian Road is widened, the throat length of Site Access #1 will be reduced to 34 metres,

however, due to how clear throat length is measured, the large radii curves for outbound trucks will allow for a greater effective throat length of 48 metres. This will allow the inbound vehicles to be delayed entering the site without impeding the adjacent through traffic.

The throat length of Site Access #2 in the interim is significantly longer than the required clear throat length as a result of the temporary driveway serving as a buffer between parking traffic and through traffic on Cambrian Road. Once the realigned Greenbank Road is constructed, the throat length of Site Access #2 will be equal to 14 metres according to the TAC manual and 25 metres with additional space provided by the curb radii. As Site Access #2 is a minor access and the movements at this access are expected to reduce as a result of right-in/right-out restrictions once the Greenbank Road is built, it is expected that the available effective throat length will provide adequate space for inbound vehicles to queue without impacting the adjacent street traffic.

12 Transportation Demand Management

Transportation Demand Management measures are implemented to encourage the use of non-auto modes of travel. This is aimed at reducing the reliance on single occupant auto trips in the City of Ottawa.

The following measures, consistent with the TDM Checklist included in Appendix H, could be implemented to ensure that the travel mode shares meet the TOD targets.

- Display local area maps with walking/cycling access routes and key destinations at major entrances
- Display relevant transit schedules and route maps at entrances
- Provide a multimodal travel option package to new/relocating employees and students

In addition to these measures, providing more than the minimum bicycle parking required, will help in achieving the mode shares for the proposed development and is recommended.

13 Neighbourhood Traffic Management

This TIA is exempt from this Module (see Table 4).

14 Transit

In Section Table 17, the trip generation by mode was estimated, including the number of transit trips that will be generated by the proposed development. Table 17 summarizes the transit trip generation for both the 2023 and 2028 future horizons.

Table 17: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Transit	15%	20	14	34	42	41	84	48	46	94

Route #75 and #275 are expected to provide adequate transit capacity to support the increase in travel demand by the proposed development. It is assumed that as the Study Area builds out, OC Transpo will evaluate the new demand and provide service along Cambrian Road, west of River Mist Road once it is sustainable to do so. It is also expected that once the future Greenbank Road BRT is constructed, that the transit trips generated by the proposed development would increase. This change in transit mode share has not been examined herein as the BRT is not included in the City of Ottawa TMP 2031 Affordable Network.

15 Intersection Design

15.1 Intersection Control

A signal warrant analysis was performed for the intersection of Cambrian Road and Borrisokane Road as well as Cambrian Road and River Mist Road for the 2023 and 2028 horizons using the OTM Book 12 Justification 7 criteria. Using these criteria, it was found that a signal is warranted at the Cambrian Road and Borrisokane Road intersection during the 2028 future background horizon. It was also found that a signal is warranted at the Cambrian Road and River Mist Road intersection during the 2023 future background horizon. Appendix M includes the signal warrant calculation sheets.

Intersection Control Measures for the Cambrian Road and Borrisokane Road intersection are outlined in the 2019 Ottawa Development Charges By-Law, however, no detailed design is available at this point in time. As such, several assumptions were made about the potential solutions at Cambrian Road and Borrisokane Road intersection for the purpose of this TIA, however the final solution is to be determined by the City.

The intersections of Site Access #1/Seeley's Bay Street and Cambrian Road, and temporary driveway and Cambrian Road will be unsignalized intersections with stop-controls on minor approaches in future horizons.

The intersection methods of control for Cambrian Road at Greenbank Road will remain consistent with existing methods of control at both future horizons.

15.2 Intersection Design

To understand the intersection design, an MMLOS analysis of existing, 2023 future horizon, and 2028 future horizon demands is required. The existing and future segment MMLOS has been discussed in Section 10. The following sections will discuss the vehicle LOS at Study Area intersections which is based on the HCM criteria for average delay at unsignalized intersections. At signalized intersections, the level of service is based on the V/C ratio as required by the City of Ottawa. This will be followed by a discussion of the intersection MMLOS for other modes.

Synchro (Version 11) and Sidra (Version 8.0) were used to model the Study Area intersection. The Heavy Vehicle percentage (HV %) has been calculated for each turning movement at the Study Area intersection. All Heavy Vehicle percentages calculated to be less than 2% were entered into the Synchro model as 2% in order to produce a conservative analysis. These calculations are shown in Appendix C. All parameters have been coded using the City of Ottawa's TIA Guidelines and default parameters.

Additionally, left-turn lane warrants for unsignalized intersections were examined at Cambrian Road and Borrisokane Road intersection at 2023 future background and total future horizons. To determine if a left-turn lane is warranted, the MTO Geometric Design Standards for Ontario Highways, Section E, left-turn lane warrant nomographs were examined. Southbound left-turn lanes were found to be warranted at the intersection of Cambrian Road and Borrisokane Road for 2023 future background and total future horizons. Left-turn lane warrants have been provided in Appendix N.

The southbound left-turn lane at the intersection of Cambrian Road and Borrisokane Road is warranted as a result of the significant volumes generated by future surrounding developments. As such, the left-turn lane has been developed for 2023 and 2028 future background and future total scenario operational analysis purposes only as the intersection is required to be designed by others.

When looking at the signalized intersections, eastbound, westbound and southbound right-turn lanes as well as left-turn lanes at every approach were required to improve the intersection performance at Cambrian Road and

River Mist Road during the 2023 and 2028 future background and total future horizons. Eastbound and westbound right-turn lanes as well as left-turn lanes on all approaches at Cambrian Road and River Mist Road are also shown in the Cambrian Road widening EA and can be seen in Appendix J. A northbound right-turn lane was also required at Cambrian Road and Borrisokane Road during the 2028 future background and total future horizons to improve the intersection LOS. As these lanes were needed during future background scenarios to accommodate the background traffic growth, these lanes are required to be designed by others and have been developed for operational analysis purposed only.

15.2.1 Existing Conditions

The existing intersection volumes have been analyzed to establish a baseline condition and determine the impact of the subject development as well as the surrounding background developments on the Study Area road network. Table 18 summarizes the operational analysis of the 2020 existing conditions. Appendix O contains the 2020 Existing Conditions Synchro Sheets.

Table 18: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour				
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	
Borrisokane Road & Cambrian Road <i>Unsignalized</i>	WBL/R	B	0.62	14.7	33.8	B	0.43	13.6	16.5	B	0.43	13.6	16.5	
	NBT/R	-	-	-	-	-	-	-	-	-	-	-	-	
	SBL/T	A	0.13	7.9	3.8	A	0.35	8.6	12	A	0.35	8.6	12	
Seeley's Bay Street & Cambrian Road <i>Unsignalized</i>	EBL/T	A	0.02	8.8	0.8	A	0.04	8.1	0.8	A	0.04	8.1	0.8	
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-	
	SBL/R	B	0.18	14.9	4.5	B	0.09	12.6	2.3	B	0.09	12.6	2.3	
River Mist Road & Cambrian Road <i>Unsignalized</i>	EBL/T/R	D	0.76	30.2	50.3	F	1.09	90.1	144	F	1.09	90.1	144	
	WBL/T/R	D	0.80	32.9	56.3	F	1.00	54.9	96	F	1.00	54.9	96	
	SBL/T/R	B	0.25	13.9	7.5	B	0.15	13.1	3.8	B	0.15	13.1	3.8	
	NBL/T/R	D	0.79	31.3	54.8	C	0.57	19.1	24.8	C	0.57	19.1	24.8	
	Mitigation Measure: All-way Stop Control Replaced by Two-way Stop Control on the Minor (north/south) Approaches													
	EBL/T/R	A	0.02	8.5	0	A	0.02	8.2	0.8	A	0.02	8.2	0.8	
	WBL/T/R	A	0.06	8.5	1.5	A	0.17	9.5	4.5	A	0.17	9.5	4.5	
	SBL/T/R	F	0.62	53.9	26.3	F	0.64	90.9	23.3	F	0.64	90.9	23.3	
NBL/T/R	F	1.32	199.6	150.8	F	1.65	366.2	142.5	F	1.65	366.2	142.5		
Greenbank Road & Cambrian Road <i>Roundabout</i>	EBL/T/R	C	0.68	16.7	63.4	E	0.88	38.2	96.0	E	0.88	38.2	96.0	
	WBL/T/R	C	0.63	17.9	35.9	C	0.74	21.6	65.5	C	0.74	21.6	65.5	
	SBL/T/R	B	0.41	10.6	14.6	F	1.06	76.4	272.5	F	1.06	76.4	272.5	
	NBL/T/R	F	0.98	57.3	158.5	C	0.65	17.6	42.7	C	0.65	17.6	42.7	
	Overall	D	0.98	29.0	158.5	E	1.06	42.4	272.5	E	1.06	42.4	272.5	
Notes:	Saturation flow rate of 1800 veh/h/lane PHF = 0.90													

As a result of high eastbound and westbound volumes at the intersection of River Mist Road and Cambrian Road, the east and west approaches are performing at LOS F during the PM peak hour. Using the OTM Book 5 methodology, the warrant for an all-way stop-controlled intersection (AWSC) has been reviewed. It has been found that an AWSC is not warranted, using 2020 volumes. The traffic signal warrant is also not met by the existing traffic volumes according to OTM Book 12 Justification 7 and is shown in Appendix M. Traffic signals are included in the Cambrian Road widening EA plan, however the Cambrian Road widening is not part of the Transportation Master Plan 2031 Affordable Network. Therefore, a two-way stop control is recommended in the interim to enable

the east and westbound traffic to flow freely. Synchro scenarios for both AM and PM peak hours were created to quantify the operational improvements as a result of this change. The summary of this analysis can be seen in Table 2 and the complete calculations are shown in Appendix O.

The north and southbound approaches at the intersection of Greenbank Road and Cambrian road are also experiencing poor LOS, with the northbound and southbound approach performing at LOS F during the AM peak hour PM peak hour respectively. The low performance of this intersection in north and south directions is expected and can be explained by the location of the Ottawa CBD relative to the Study Area. The vehicle trips originating in the Study Area are directed towards the CBD (north) during the AM peak hour and back towards the residential communities in the Study Area (south) during the PM peak hour. However, the future realigned Greenbank Road will relieve the pressures from the current Greenbank Road and improve the north and southbound LOS at the intersection of Greenbank Road at Cambrian Road.

15.2.2 2023 Future Background

The 2023 future background intersection volumes and other development traffic have been analyzed to allow a comparison between the future volumes with and without the proposed development. As previously mentioned, a signal warrant was met at Cambrian Road and River Mist Road intersection in 2023 future background horizon. A southbound left-turn lane warrant and an eastbound left-turn lane warrant were also met at Cambrian Road and Borrisokane Road intersection and Cambrian Road and Seeley's Bay Street intersection, respectively. These as well as additional improvements resulting from the operational analysis on the Study Area network were applied to the Synchro model in the 2023 future background horizon and are discussed below. Table 19 summarizes the operational analysis of 2023 future background conditions. Appendix P contains the 2023 Future Background Synchro sheets.

Table 19: 2023 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Borrisokane Road & Cambrian Road <i>Unsignalized</i>	WBL/R	F	1.25	141.9	257.3	F	2.38	665.3	339.8	F	2.38	665.3	339.8
	NBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL	A	0.24	8.5	6.8	B	0.62	12.3	34.5	B	0.62	12.3	34.5
	SBT	-	-	-	-	-	-	-	-	-	-	-	-
Mitigation Measure: Signalization and West-Bound Right-Turn Lane													
Borrisokane Road & Cambrian Road <i>Signalized</i>	WBL	A	0.16	14.1	11.5	A	0.25	38.6	17.4	A	0.25	38.6	17.4
	WBR	D	0.88	13.9	#84.4	C	0.80	14.0	31.1	C	0.80	14.0	31.1
	NBT/R	A	0.18	8.1	15.9	B	0.64	41.1	#66.4	B	0.64	41.1	#66.4
	SBL	B	0.65	21.3	#72.9	E	0.94	33.5	#201.6	E	0.94	33.5	#201.6
	SBT	A	0.21	11.7	18.3	A	0.13	4.4	11.8	A	0.13	4.4	11.8
	Overall	B	0.67	14.8	-	D	0.89	26.9	-	D	0.89	26.9	-
Seeley's Bay Street & Cambrian Road <i>Unsignalized</i>	EBL	A	0.02	9.3	0.7	A	0.05	8.7	1.5	A	0.05	8.7	1.5
	EBT	-	-	-	-	-	-	-	-	-	-	-	-
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL/R	C	0.22	19.4	6.0	C	0.12	16.7	3.0	C	0.12	16.7	3.0
River Mist Road & Cambrian Road <i>Signalized</i>	EBL	A	0.06	11.7	3.9	A	0.10	11.1	4.8	A	0.10	11.1	4.8
	EBT	D	0.89	37.3	#96.3	D	0.89	34.0	#118.3	D	0.89	34.0	#118.3
	EBR	A	0.20	3.8	7.5	A	0.26	2.9	8.6	A	0.26	2.9	8.6
	WBL	A	0.35	19.6	12.7	D	0.90	70.1	#48.7	D	0.90	70.1	#48.7
	WBT	B	0.65	20.7	54.9	C	0.76	23.0	80.9	C	0.76	23.0	80.9
	WBR	A	0.09	4.6	4.8	A	0.11	3.4	5.2	A	0.11	3.4	5.2
	NBL	A	0.56	19.0	43.1	A	0.36	19.6	30.2	A	0.36	19.6	30.2
	NBT	A	0.09	11.4	9.1	A	0.03	15.3	5.0	A	0.03	15.3	5.0
	NBR	A	0.23	3.7	8.3	A	0.22	4.8	9.5	A	0.22	4.8	9.5
	SBL	A	0.13	12.0	10.0	A	0.07	15.8	7.6	A	0.07	15.8	7.6
	SBT/R	A	0.07	6.9	5.9	A	0.05	10.5	5.8	A	0.05	10.5	5.8
Overall	C	0.71	21.3	-	B	0.66	25.7	-	B	0.66	25.7	-	
Greenbank Road & Cambrian Road <i>Roundabout</i>	EBL/T/R	E	0.96	46.5	239.4	F	1.05	74.2	242.8	F	1.05	74.2	242.8
	WBL/T/R	C	0.71	22.7	47.1	F	0.96	51.0	151.3	F	0.96	51.0	151.3
	SBL/T/R	B	0.51	12.8	23.7	F	1.46	236.6	749.2	F	1.46	236.6	749.2
	NBL/T/R	F	1.43	226.6	567.5	D	0.82	30.3	81.2	D	0.82	30.3	81.2
	Overall	F	1.43	93.8	567.5	F	1.46	114.4	749.2	F	1.46	114.4	749.2
Notes:	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# - 95% percentile exceeds capacity												

It has been noted that the 95th percentile cycle exceeds capacity at several approaches and time periods at Cambrian Road and Borrisokane Road intersection and Cambrian Road and River Mist Road intersection. However, as V/C ratio for these movements is less than one, it can be assumed that the 95th percentile queue will rarely be exceeded.

With the addition of background growth to reflect the 2023 horizon as well as traffic generated from surrounding developments, the westbound approach at the Cambrian Road and Borrisokane Road intersection is experiencing high delays and poor LOS. To reduce the westbound delays and improve the overall LOS, this intersection was signalized, and a westbound right-turn lane was implemented. This improved the westbound approach to LOS D during the AM peak period and LOS C during the PM and Saturday peak periods. Although the LOS of the southbound left-turn lane has reduced as a result of this change, this trade-off is considered acceptable, as the volumes at westbound right approach are higher than at the southbound left approach. To improve the traffic

flow in the southbound left-turn lane during the PM and Saturday peak periods, the southbound left-turn movement will operate as a protected and permissive turn.

When signaling Cambrian Road at River Mist Road intersection, left-turn lanes at all approaches as well as right-turn lanes at eastbound, westbound, and northbound approach were found to be required to bring the intersection performance to the City of Ottawa operational thresholds. The eastbound and westbound left-turn lanes are outlined in the future Cambrian Road cross-section as part of the Cambrian Road widening EA and can be seen in Appendix J.

The westbound and eastbound approaches at Greenbank Road and Cambrian Road roundabout have also failed during the PM and Saturday peak periods as a result of background growth and future developments. The southbound and northbound approaches have remained at LOS F. The northbound delay has increased by 390 percent during the AM peak hour and the southbound approach delay has increased by 310 percent during the PM and Saturday peak hours. As high north-south volumes at this roundabout are primarily driven by the location of Ottawa CBD relative to the Study Area, the LOS at these approaches will improve when the realigned Greenbank Road is built. The eastbound and westbound LOS at this roundabout will improve beyond our study horizon as a result of Cambrian Road widening.

15.2.3 2028 Future Background

The 2028 future background intersection volumes and other development traffic have been analyzed to allow a comparison between the future volumes with and without the proposed development. Table 20 summarizes the operational analysis of the 2028 future background conditions. Appendix Q contains the 2028 Future Background Synchro sheets.

Table 20: 2028 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Borrisokane Road & Cambrian Road <i>Signalized</i>	WBL	A	0.14	20.8	23.9	A	0.44	56.4	32.5	A	0.44	56.4	32.5
	WBR	F	1.25	140.7	#389.5	D	0.89	17.6	#49.4	D	0.89	17.6	#49.4
	NBT	A	0.36	25.5	60.4	E	0.96	83.9	#154.7	E	0.96	83.9	#154.7
	NBR	A	0.12	4.9	8.7	A	0.22	9.7	13.2	A	0.22	9.7	13.2
	SBL	F	1.21	148.7	#207.8	F	1.37	198.0	#447.9	F	1.37	198.0	#447.9
	SBT	A	0.52	30.7	72.5	A	0.32	5.7	34.8	A	0.32	5.7	34.8
	Overall	F	1.28	109.4	-	F	1.28	102.8	-	F	1.28	102.8	-
Seeley's Bay Street & Cambrian Road <i>Unsignalized</i>	EBL	B	0.03	10.1	0.8	A	0.05	9.2	1.5	A	0.05	9.2	1.5
	EBT	-	-	-	-	-	-	-	-	-	-	-	-
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL/R	D	0.30	27.4	9.0	C	0.16	22	4.5	C	0.16	22	4.5
River Mist Road & Cambrian Road <i>Signalized</i>	EBL	A	0.06	11.7	4.0	A	0.10	10.5	4.8	A	0.10	10.5	4.8
	EBT	D	0.90	37.2	#122.2	E	0.92	37.2	#145.1	E	0.92	37.2	#145.1
	EBR	A	0.24	3.2	8.7	A	0.37	2.8	10.3	A	0.37	2.8	10.3
	WBL	A	0.36	20.5	14.1	E	0.96	86.2	#53.6	E	0.96	86.2	#53.6
	WBT	B	0.67	21.4	70.5	C	0.79	23.6	98.7	C	0.79	23.6	98.7
	WBR	A	0.08	4.1	4.8	A	0.10	3.0	5.1	A	0.10	3.0	5.1
	NBL	D	0.83	39.5	#99.6	A	0.55	26.8	47.3	A	0.55	26.8	47.3
	NBT	A	0.10	15.4	12.5	A	0.04	17.6	5.8	A	0.04	17.6	5.8
	NBR	A	0.23	4.4	9.8	A	0.24	5.4	10.4	A	0.24	5.4	10.4
	SBL	A	0.13	16.0	12.8	A	0.08	18.2	8.2	A	0.08	18.2	8.2
	SBT/R	A	0.08	9.2	7.6	A	0.06	12.0	6.5	A	0.06	12.0	6.5
	Overall	D	0.86	25.8	-	C	0.79	27.6	-	C	0.79	27.6	-
Greenbank Road & Cambrian Road <i>Roundabout</i>	EBL/T/R	F	1.13	95.6	431.8	F	1.19	121.3	408.6	F	1.19	121.3	408.6
	WBL/T/R	D	0.80	29.3	70.0	F	1.14	104.4	314.9	F	1.14	104.4	314.9
	SBL/T/R	C	0.59	16.0	33.3	F	1.68	329.4	1019.9	F	1.68	329.4	1019.9
	NBL/T/R	F	1.65	320.1	805.7	E	0.92	44.2	134.0	E	0.92	44.2	134.0
		Overall	F	1.65	142.6	805.7	F	1.68	171.2	1019.9	F	1.68	171.2
Notes:	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# - 95% percentile exceeds capacity; queue may be longer												

The 95th percentile cycle exceeds capacity at several approaches and time periods at Cambrian Road and Borrisokane Road intersection and Cambrian Road and River Mist Road intersection. At all approaches except southbound left approach and westbound right approach at Cambrian Road and Borrisokane Road intersection, V/C ratio is less than one during the PM and Saturday peak hours. Thus, it can be assumed that the 95th percentile queue will rarely be exceeded at these approaches.

The signals at Cambrian Road and Borrisokane Road intersection were optimized using the 2028 future background AM, PM, and Saturday peak hour volumes. The southbound left-turn movement was set to operate as a protected and permissive turn during the PM and Saturday peak hours and a right-turn lane was implemented at the northbound approach. However, as a result of background growth and multiple residential communities being built in the study area, westbound-right and southbound-left approaches at this intersection were found to operate at LOS F. Both of these approaches have queues over 350 metres, which indicate that double right- and left-turn lanes are required to bring the intersection to the City of Ottawa operational thresholds. To implement double turning lanes, both Cambrian Road and Borrisokane Road need to be widened to a four-lane cross section.

As Cambrian Road widening is beyond our study horizon and there are no plans for the Borrisokane Road to be widened according to the City of Ottawa TMP, these solutions were not modeled in Synchro as part of this TIA.

The Cambrian Road at Greenbank Road intersection performance has further deteriorated as a result of growth in background traffic. As previously mentioned, the future realigned Greenbank Road will relieve the pressures from the current Greenbank Road beyond our study horizon and improve the north and southbound LOS at the intersection of Greenbank Road at Cambrian Road. The eastbound and westbound LOS at this roundabout will improve beyond our study horizon as a result of Cambrian Road widening.

As a result of the 2028 future background horizon network assessment, it is recommended that the City of Ottawa revisits the timelines for the Cambrian Road widening and construction of realigned Greenbank Road to accommodate the 2028 background traffic volumes at Cambrian Road and Borrisokane Road intersection, and Cambrian Road and Greenbank Road intersection.

15.2.4 2023 Future Total

The 2023 total future intersection volumes, including the site generated traffic and other development traffic, have been analyzed to understand the impact of the subject development on the Study Area intersections. Table 21 summarizes the operational analysis of the 2023 total future conditions. Appendix R contains the 2023 Future Total Synchro Sheets.

Table 21: 2023 Total Future Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour					
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)		
Borrisokane Road & Cambrian Road <i>Signalized</i>	WBL	A	0.16	14.1	11.5	A	0.25	38.6	17.4	A	0.25	38.6	17.4		
	WBR	D	0.88	13.9	#84.4	C	0.80	14.0	31.1	C	0.80	14.0	31.1		
	NBT/R	A	0.18	8.1	15.9	B	0.64	41.1	#66.4	B	0.64	41.1	#66.4		
	SBL	B	0.65	21.3	#72.9	E	0.94	33.5	#201.6	E	0.94	33.5	#201.1		
	SBT	A	0.21	11.7	18.3	A	0.13	4.4	11.8	A	0.13	4.4	11.8		
Overall	B	0.67	14.8	-	-	D	0.89	26.9	-	-	D	0.89	26.9	-	
Temporary Driveway & Cambrian Road <i>Unsignalized</i>	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-		
	WBL/T	A	0.01	8.4	0	A	0.01	9.1	0	A	0.01	9.1	0		
	NBL/R	C	0.08	21.2	1.5	C	0.17	24.5	4.5	C	0.18	24.6	5.3		
Seeley's Bay Street & Cambrian Road <i>Unsignalized</i>	EBL	A	0.02	9.3	0.8	A	0.05	8.7	0.8	A	0.05	8.7	0.8		
	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-		
	WBL	A	0.04	8.4	0.8	A	0.13	9.5	3.0	A	0.15	9.7	3.8		
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-		
	NBL/T/R	C	0.12	17.2	3.0	C	0.39	22.2	13.5	C	0.45	24.9	17.3		
SBL/T/R	D	0.32	27.8	9.8	E	0.28	35.6	8.3	E	0.31	41.0	9.0			
River Mist Road & Cambrian Road <i>Signalized</i>	EBL	A	0.10	12.3	5.1	A	0.14	11.2	5.9	A	0.15	11.5	6.2		
	EBT	D	0.90	38.5	#99.5	E	0.92	36.2	#141.2	E	0.93	37.8	#146.9		
	EBR	A	0.22	3.7	8.1	A	0.26	2.6	8.6	A	0.27	2.5	8.6		
	WBL	A	0.36	20.0	13.0	E	0.94	80.6	#52.9	E	0.97	88.5	#53.9		
	WBT	B	0.67	21.4	58.5	C	0.79	24.2	99.6	D	0.81	25.1	#107.5		
	WBR	A	0.09	4.5	4.8	A	0.10	3.0	5.1	A	0.10	3.0	5.1		
	NBL	B	0.62	21.4	#49.6	A	0.43	23.6	36.5	A	0.45	24.2	37.7		
	NBT	A	0.09	11.5	9.1	A	0.03	17.6	5.5	A	0.03	17.6	5.5		
	NBR	A	0.23	3.7	8.3	A	0.24	5.4	10.4	A	0.24	5.4	10.4		
	SBL	A	0.13	12.2	10.1	A	0.07	18.1	8.2	A	0.08	18.2	8.2		
SBT/R	A	0.09	6.3	6.5	A	0.07	10.7	6.9	A	0.08	10.4	7.1			
Overall	C	0.75	22.0	-	-	C	0.73	27.8	-	-	c	0.75	29.2	-	
Greenbank Road & Cambrian Road <i>Roundabout</i>	EBL/T/R	F	0.98	50.6	261.8	F	1.12	94.5	336.0	F	1.13	100.3	362.1		
	WBL/T/R	C	0.73	23.7	50.1	F	0.98	57.6	168.6	F	0.99	59.7	174.3		
	SBL/T/R	B	0.51	13.2	24.5	F	1.52	261.3	792.5	F	1.53	268.2	805.2		
	NBL/T/R	F	1.46	239.7	597.0	D	0.83	30.9	84.3	D	0.83	31.2	85.5		
	Overall	F	1.46	99.5	597.0	-	-	F	1.52	128.0	-	-	F	1.53	132.0
Notes:	Saturation flow rate of 1800 veh/h/lane														
	PHF = 1.00														
	# - 95% percentile exceeds capacity														

With the addition of the site generated traffic, the Study Area is expected to operate with similar operational characteristics as the 2023 future background conditions. The performance of Cambrian Road and Borrisokane Road intersection does not change from the 2023 future background horizon, as this intersection is not affected by the site-generated traffic.

It has been noted that the 95th percentile cycle exceeds capacity at several approaches and time periods at Cambrian Road and Borrisokane Road intersection and Cambrian Road and River Mist Road intersection. However, as V/C ratio for these movements is less than one, it can be assumed that the 95th percentile queue will rarely be exceeded.

15.2.5 2028 Future Total

The 2028 total future intersection volumes, including the site generated traffic and other development traffic, have been analyzed to understand the impact of the subject development on the Study Area intersections. Table 22 summarizes the operational analysis of the 2028 future total conditions. Appendix S contains the 2028 Future Total Synchro Sheets.

Table 22: 2028 Total Future Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Borrisokane Road & Cambrian Road <i>Signalized</i>	WBL	A	0.14	20.8	23.9	A	0.44	56.4	32.5	A	0.44	56.4	32.5
	WBR	F	1.25	140.7	#389.5	D	0.89	17.6	#49.4	D	0.89	17.6	#49.4
	NBT	A	0.36	25.5	60.4	E	0.96	83.9	#154.7	E	0.96	83.9	#154.7
	NBR	A	0.12	4.9	8.7	A	0.22	9.7	13.2	A	0.22	9.7	13.2
	SBL	F	1.21	148.7	#207.8	F	1.37	198.0	#447.9	F	1.37	198.0	#447.9
	SBT	A	0.52	30.7	72.5	A	0.32	5.7	34.8	A	0.32	5.7	34.8
	Overall	F	1.28	109.4	-	F	1.28	102.8	-	F	1.28	102.8	-
Temporary Driveway & Cambrian Road <i>Unsignalized</i>	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	WBL/T	A	0.01	8.6	0	A	0.01	9.9	0	A	0.01	9.9	0
	NBL/R	D	0.11	29.8	3.0	E	0.26	38.7	7.5	E	0.29	39.7	8.3
Seeley's Bay Street & Cambrian Road <i>Unsignalized</i>	EBL	B	0.03	10.1	0.8	A	0.05	9.1	1.5	A	0.05	9.1	1.5
	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	WBL	A	0.05	8.7	0.8	B	0.15	10.5	3.8	B	0.18	10.7	4.5
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	NBL/T/R	C	0.17	23.1	4.5	E	0.55	37.2	22.5	E	0.66	46.8	30.0
SBL/T/R	E	0.48	48.3	17.3	F	0.50	79.7	16.5	F	0.57	98.8	18.8	
River Mist Road & Cambrian Road <i>Unsignalized</i>	EBL	A	0.10	12.9	5.6	A	0.14	11.2	6.0	A	0.14	9.8	5.9
	EBT	D	0.90	38.7	#131.2	E	0.94	39.7	#173.5	E	0.92	34.8	#181.0
	EBR	A	0.25	3.2	9.2	A	0.36	2.5	10.4	A	0.36	2.2	9.3
	WBL	A	0.37	21.6	14.8	E	0.99	93.9	#58.1	E	0.93	74.1	#59.2
	WBT	B	0.69	22.8	78.2	D	0.82	25.5	#140.1	C	0.80	22.7	122.3
	WBR	A	0.08	4.2	4.9	A	0.09	2.9	5.0	A	0.09	2.4	4.5
	NBL	D	0.89	48.0	#114.6	B	0.64	33.0	#54.9	B	0.70	41.4	#75.0
	NBT	A	0.10	16.2	13.2	A	0.04	19.2	6.3	A	0.04	24.3	7.3
	NBR	A	0.23	4.5	10.3	A	0.25	5.8	10.8	A	0.27	7.0	12.4
	SBL	A	0.13	16.9	13.4	A	0.08	20.0	8.7	A	0.09	25.0	10.4
	SBT	A	0.10	8.6	8.7	A	0.08	11.7	7.6	A	0.09	14.2	9.0
Overall	D	0.90	28.2	-	D	0.86	30.0	-	D	0.84	27.4	-	
Greenbank Road & Cambrian Road <i>Roundabout</i>	EBL/T/R	F	1.15	102.5	460.1	F	1.25	146.5	519.4	F	1.27	153.4	549.5
	WBL/T/R	D	0.82	30.7	74.6	F	1.16	115.5	341.7	F	1.17	117.5	346.0
	SBL/T/R	C	0.60	16.5	34.2	F	1.72	347.7	1048.2	F	1.73	352.4	1056.4
	NBL/T/R	F	1.66	325.2	823.3	E	0.93	45.5	139.9	E	0.93	46.0	142.1
	Overall	F	1.66	146.9	823.3	F	1.72	185.0	1048.2	F	1.73	188.6	1056.4
Notes:	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# - 95% percentile exceeds capacity; queue may be longer												

The volume for the 95th percentile cycle exceeds capacity at several approaches and time periods at Cambrian Road and Borrisokane Road intersection and Cambrian Road and River Mist Road intersection. At all approaches except southbound left approach and westbound right approach at Cambrian Road and Borrisokane Road intersection, V/C ratio is less than one during the PM and Saturday peak hours. Thus, it can be assumed that the 95th percentile queue will rarely be exceeded at these approaches.

With the addition of the site generated traffic, the Study Area is expected to operate with similar operational characteristics as the 2028 future background conditions with the exception of Cambrian Road at Seeley’s Bay Street/Site Access #1 intersection. Although the LOS of the southbound approach at this intersection is F during the PM and Saturday peak periods based on the HCM criteria for average delay at unsignalized intersections, the V/C ratio is 0.50 and 0.57 during the PM and Saturday peak periods, respectively. Using the OTM Book 12 Justification 7, the signal warrant has been reviewed and is shown in Appendix M. It has been found that traffic signals are not warranted using the 2028 total future volumes. Taking this into account as well as the proximity of this intersection to the future intersection of Cambrian Road and realigned Greenbank Road, traffic control signals at this intersection are not recommended.

The performance of Cambrian Road and Borrisokane Road intersection does not change from the 2028 future background horizon, as this intersection is not affected by the site-generated traffic.

15.2.6 Intersection MMLOS

Intersection MMLOS is only undertaken at signalized intersections. The two signalized intersections considered in this study are Cambrian Road at Borrisokane Road, and Cambrian Road at River Mist Road. These intersections are currently stop-controlled and have been signalized in Synchro analysis as a result of a signal warrant being met or as an improvement measure. As such, several conservative assumptions about the intersection configuration were made to evaluate the intersection MMLOS and can be seen in MMLOS worksheets in Appendix L. Table 23 summarizes the MMLOS analysis for these intersections in the Study Area for the existing and future horizons. The analysis is based on the general urban area targets.

Table 23: Study Area Intersection MMLOS Analysis—All Horizons

Intersection	Horizon	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Cambrian Road & Borrisokane Road	2023 FB	C	C	F	D	F(F)(F)	D	E	E	F(F)(F)	D
	2028 FB										
	2023 FT										
	2028 FT										
Cambrian Road & River Mist Road	2023 FB	D	C	F	D	E(E)(E)	D	E	E	D(C)(C)	D
	2028 FB										
	2023 FT										
	2028 FT										
Notes:	AM(PM)(Sat)										

Based on the new intersection configuration assumptions, the pedestrian LOS targets are not met at Cambrian Road and Borrisokane Road intersection due to lack of medians, no pedestrian signal leading interval, and permissive left and right-turns. The bicycle LOS is not met at the network intersections as a result of mixed traffic conditions as well as high operating speeds.

To evaluate the future Transit LOS, it was assumed that OC Transpo will adjust the paths and schedules of routes #75 and #275 once the new residential developments are built along Cambrian Road, west of Seeley’s Bay Street. As City of Ottawa’s MMLOS Guidelines do not provide Transit LOS targets for roadways that are not a Rapid Transit Corridor or a Transit Priority Corridor, a target LOS for Transit Priority Corridor with isolated measures was used as a conservative target for Cambrian Road. This target is not met using future background and total horizons due to intersection delays.

Truck LOS is met at both Study Area intersections. Auto LOS targets are met at Cambrian Road and River Mist Road and are performing below the target LOS at Cambrian Road and Borrisokane Road intersection. Auto LOS has been discussed in greater detail in previous sections of this report.

General urban area targets should inform the future design process for Cambrian Road and Borrisokane Road as well as Cambrian Road and River Mist Road intersections to ensure that these intersections operate safely and efficiently for various types of travel modes in the future.

16 Recommendations

Based on operational analysis of future background traffic volumes, it is recommended that the City of Ottawa revisit the timelines of the Cambrian Road widening and construction of realigned Greenbank Road to support the proposed/approved developments in the Study Area.

The temporary driveway west of the proposed development is located along the centreline of future Greenbank Road and connects the site traffic to Cambrian Road. Both signalization warrants and left-turn lane warrants were examined at the temporary driveway and Cambrian Road intersection and it was found that no signals or turning lanes are warranted at this access.

Signalization and turning lane warrants were also examined at Cambrian Road and Site Access #1/Seeley's Bay Street intersection. It was found that a westbound left-turn lane is required at this intersection during the 2023 and 2028 total future horizons. It was also found that an eastbound left-turn lane is warranted using the Existing 2020 traffic volumes. In addition to the turning lane warrants, a minimum of one full movement is required to make a commercial development viable. Considering the fact that Site Access #2 will be restricted to right-in/right-out access only once the realigned Greenbank BRT is built, a full movement access needs to be located along Cambrian Road. The location of future Greenbank Road as well as Seeley's Bay Street constrain the location of the full-movement access even further. The access should be located as far as possible from future Greenbank Road to have minimum effect on operations of this intersection yet result in a favourable lane alignment with Seeley's Bay Street. As such, the only logical location for Site Access #1 is directly across from Seeley's Bay Street.

The existing pavement cross-section on Cambrian Road is wide enough to accommodate painted left-turn lanes without widening the existing roadway. A conceptual drawing of the eastbound and westbound turning lanes can be seen in Appendix T. Once this concept is approved through the review of this TIA, a functional design will be prepared showing the proposed painted left-turn lanes.

Based on the foregoing, it was established through a consultation with the City of Ottawa staff that an RMA and functional design could follow the approval of this TIA and be undertaken after the development application has been deemed complete.

17 Conclusions

- A. The proposed development, located at 3831 Cambrian Road, is a commercial development consisting of a 4,024 supermarket, a 929 square metre retail store. Approximately 220 vehicle parking spaces and 16 bicycle parking spaces will be provided.
- B. The site is proposed to have three accesses. Site Access #1 is located directly across Seeley's Bay Street and approximately 140 metres east of future Greenbank Road, measured from intersection centreline to intersection centreline. Site Access #2 and Site Access #3 are located 120 metres and 190 metres south of Cambrian Road, respectively. The second and the third site access will connect to a temporary driveway located along the centreline of future Greenbank Road. Once Greenbank Road is built beyond this study horizon, Site Access #2 and Site Access #3 will be restricted to right in / right out access only.
- C. Site Access #1 will be a full movement access with westbound and eastbound left-turn lanes. This intersection will be subject to a future functional design.
- D. The existing Study Area is currently served by bus routes #75, and #275.
- E. The previous five years of collision history at the existing Study Area intersections has been reviewed. No patterns emerged that indicated that mitigation measures or further monitoring was required.
- F. Using the ITE Trip Generation Manual, the supermarket and retail store trip rates were identified. The South Nepean mode shares were used to determine the trip generation by mode. Internal capture, pass by trips, and diverted link trips were accounted for.
- G. It was found that the proposed development can be anticipated to generate 134 AM, 88 PM, and 119 Saturday net new peak hour two-way vehicle trips.
- H. Minimum vehicle parking space requirements are met with an excess of 97 spaces and bicycle parking space requirements are met with an excess of one space.
- I. It was found that the road segments of Cambrian Road do not meet the majority of the MMLOS targets. As future changes to the road network are anticipated to improve the MMLOS of these segments, no resulting improvements to the boundary road, beyond the extension of pedestrian facilities along the frontage of the site, are recommended.
- J. Both signalization warrants and left-turn lane warrants were evaluated at Site Access #1 at Cambrian Road and the temporary driveway at Cambrian Road. Signalization was not warranted at either intersection, however a westbound left-turn lane was warranted at Site Access #1 for both future total horizons. An eastbound left-turn lane was also found to be warranted during the 2020 existing horizon. Preliminary storage and taper lengths have been designed for the eastbound and westbound left-turn lanes for operational analysis purposes, however this design will be further refined in the RMA and functional design.
- K. In the existing conditions operational analysis, eastbound and westbound approaches fail at Cambrian Road and River Mist Road during the PM and Saturday peak periods. The following mitigation was proposed at this intersection as part of the analysis:
 - i. Two-way stop control on the minor approaches replacing the all-way stop control currently in place

Cambrian Road and Greenbank Road southbound and northbound approaches also experience poor LOS. It is expected that the future realigned Greenbank Road will relieve the pressures from the current Greenbank Road and Cambrian Road intersection beyond this study horizon.
- L. In the 2023 future background horizon, a traffic signal warrant was met at Cambrian Road and River Mist Road intersection. This intersection was further optimized in Synchro using optimal cycle length, left-turn lanes on all approaches and right turn lanes on the eastbound, westbound, and northbound approaches.

A southbound left-turn lane was also warranted at Cambrian Road and Borrisokane Road intersection during the 2023 future background horizon. To bring the LOS at Cambrian Road and Borrisokane Road intersection to the City of Ottawa operational thresholds, the following mitigation measures were analyzed:

- i. Signalization of Cambrian Road and Borrisokane Road intersection
- ii. An added westbound right-turn lane
- iii. Protected and permissive phase for the southbound left-turn lane

As a result of the warranted and recommended changes to the Study Area network, most of the Study Area intersections operate satisfactorily during the peak hours in 2023 future background operational analysis. The LOS at Cambrian Road and Greenbank Road roundabout remains poor.

- M. The Study Area intersections are expected to operate with similar operational characteristics as the 2023 future background conditions during the 2023 future total horizon. Site Access #1 is shown to operate within the City's operational thresholds.
- N. In the 2028 future background horizon, the westbound and southbound approaches at Cambrian Road and Borrisokane Road intersection fail and the LOS at Cambrian Road and Greenbank Road further deteriorates as a result of background growth and surrounding developments. However, no further recommendations could be provided due to spatial constraints of a two-lane roadway. However, it is expected that the widening of Cambrian Road to a four-lane arterial beyond our study horizon will improve the east-west connectivity and the construction of realigned Greenbank Road will improve the north-south connectivity in the Study Area.
- O. The Study Area intersections are expected to operate with similar operational characteristics as the 2028 future background conditions during the 2028 future total horizon. The southbound approach at Site Access #1 LOS is F and V/C is 0.50 and 0.57 during the PM and Saturday peak hours respectively. A signal warrant has been reviewed at this intersection and it has been found that signals are not warranted using the 2028 future total volumes. Taking this into account as well as the proximity of this intersection to the future intersection of Cambrian Road and realigned Greenbank Road, signal implementation at this intersection is not recommended.
- P. The PLOS, BLOS, TLOS, and TkLOS were evaluated at two signalized Study Area intersections. In most cases, the MMLOS targets were not met. No intersection alterations or mitigation measures are suggested as it is expected that general urban area MMLOS targets will inform the intersection design and improve the intersection MMLOS at these locations.

The proposed development will function within the Study Area Road Network. It is recommended that, from a transportation perspective, the proposed development application process proceeds.

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Appendix A

TIA Screening Form and PM Certification Form

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 20-Jul-20
Project Number: 2019-54
Project Reference: Metro Greenbank Road

1.1 Description of Proposed Development	
Municipal Address	3831 Cambrian Road
Description of Location	Located at the North-East corner of Cambrian Rd. and future Greenbank Road
Land Use Classification	GM[2340]-h
Development Size	21,125.3 Square Metres
Accesses	One access on Cambrian Road and two accesses on future Greenbank Road
Phase of Development	Assumed 1 Phase for TIA
Buildout Year	2023
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger	
Land Use Type	Destination retail
Development Size	4,953.10 G.F.A
Trip Generation Trigger	Yes

1.3 Location Triggers	
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	Yes
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	No
Location Trigger	Yes

1.4. Safety Triggers	
Are posted speed limits on a boundary street 80 km/hr or greater?	No
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	No
Is the proposed driveway within auxiliary lanes of an intersection?	No
Does the proposed driveway make use of an existing median break that serves an existing site?	No
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No
Does the development include a drive-thru facility?	No
Safety Trigger	No



TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed¹ or registered² professional in good standing, whose field of expertise [check appropriate field(s)] is either transportation engineering or transportation planning .

1,2 License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.


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Dated at Newmarket this 28 day of June, 2018.
(City)

Name: Mark Crockford
(Please Print)

Professional Title: Professional Engineer


Signature of Individual certifier that s/he meets the above four criteria

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Appendix B

Traffic Data

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

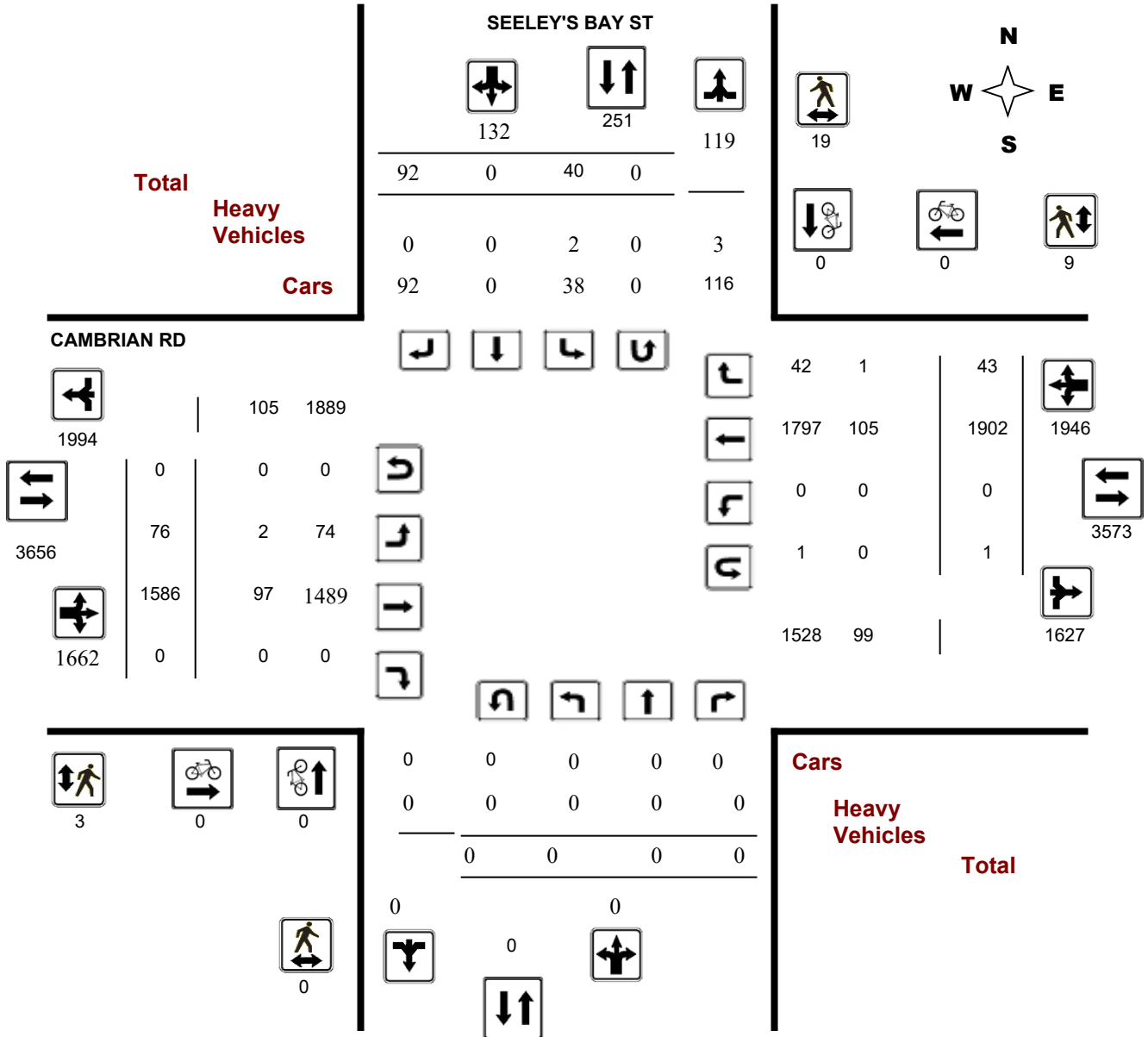
Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

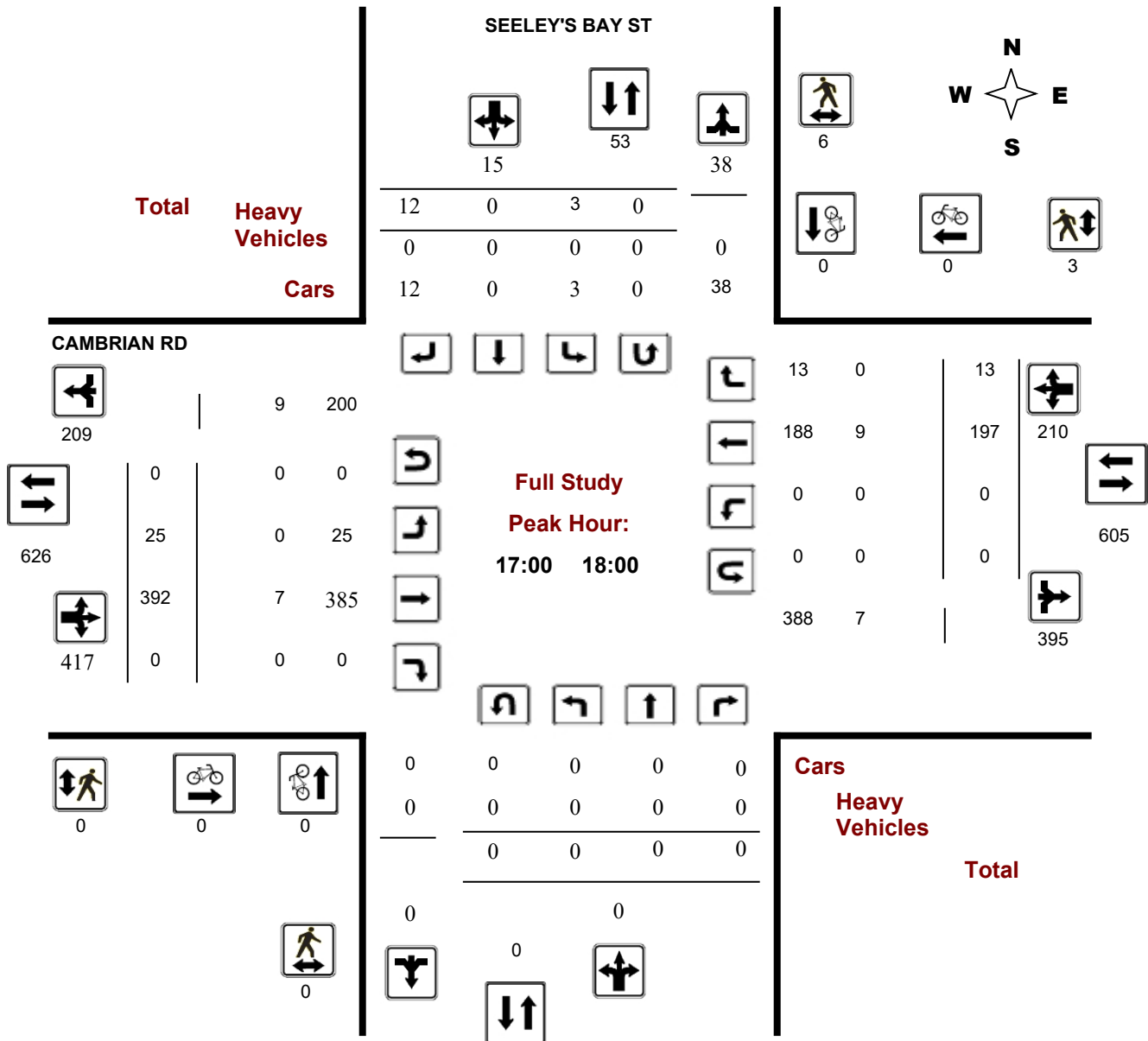
Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

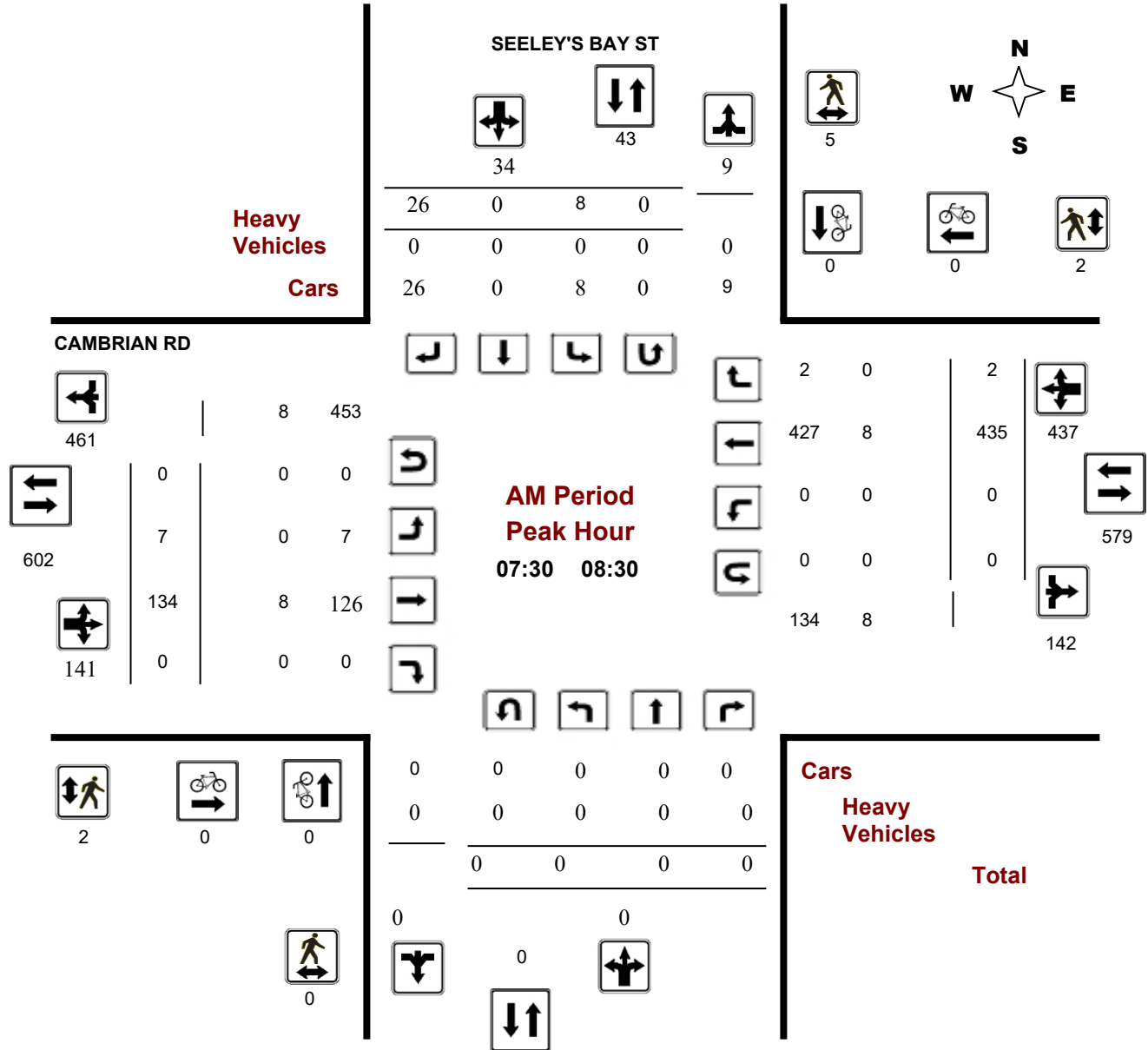
CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

Start Time: 07:00

WO No: 37283

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

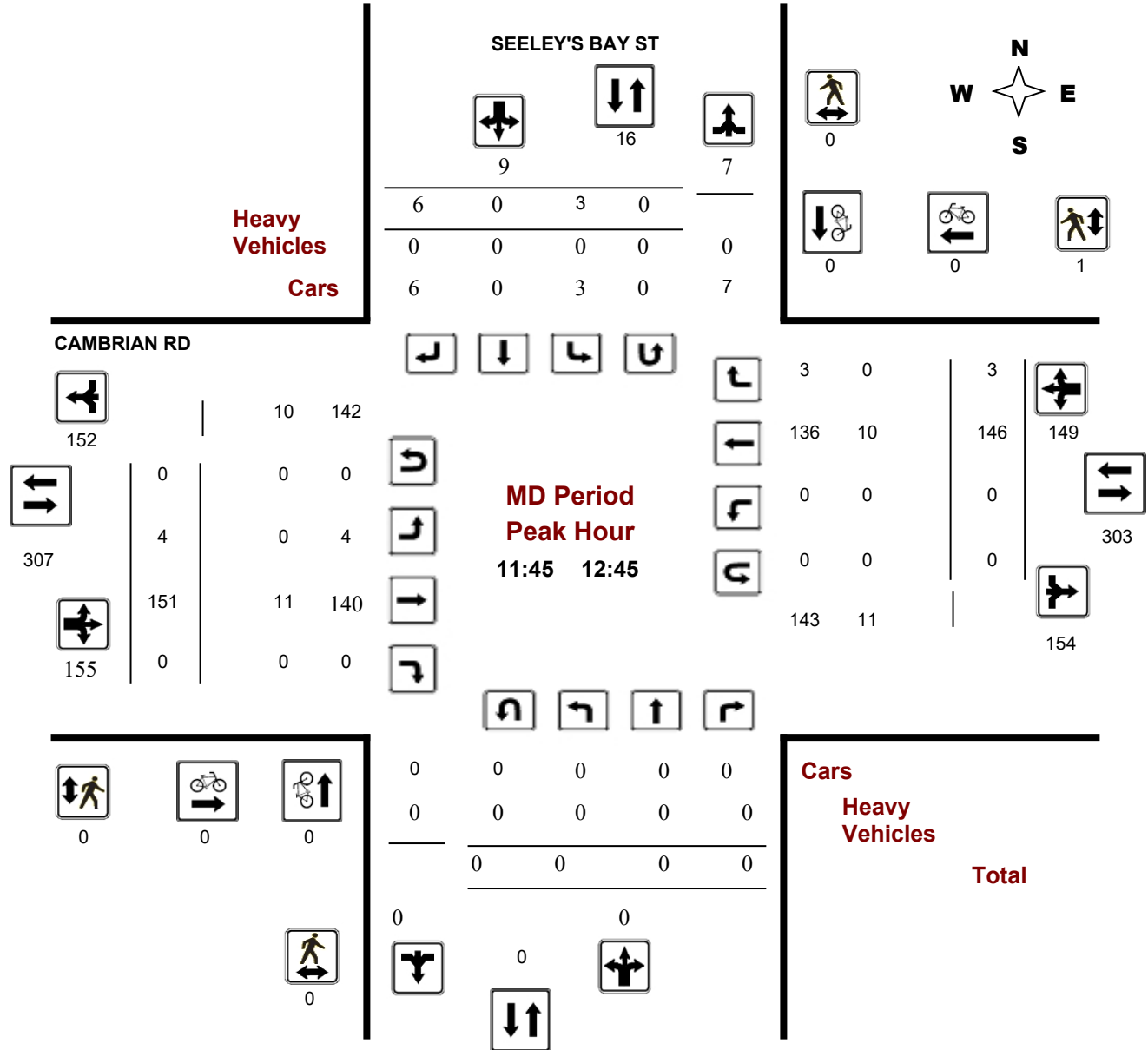
CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

Start Time: 07:00

WO No: 37283

Device: Miovision



Comments

Turning Movement Count - Peak Hour Diagram

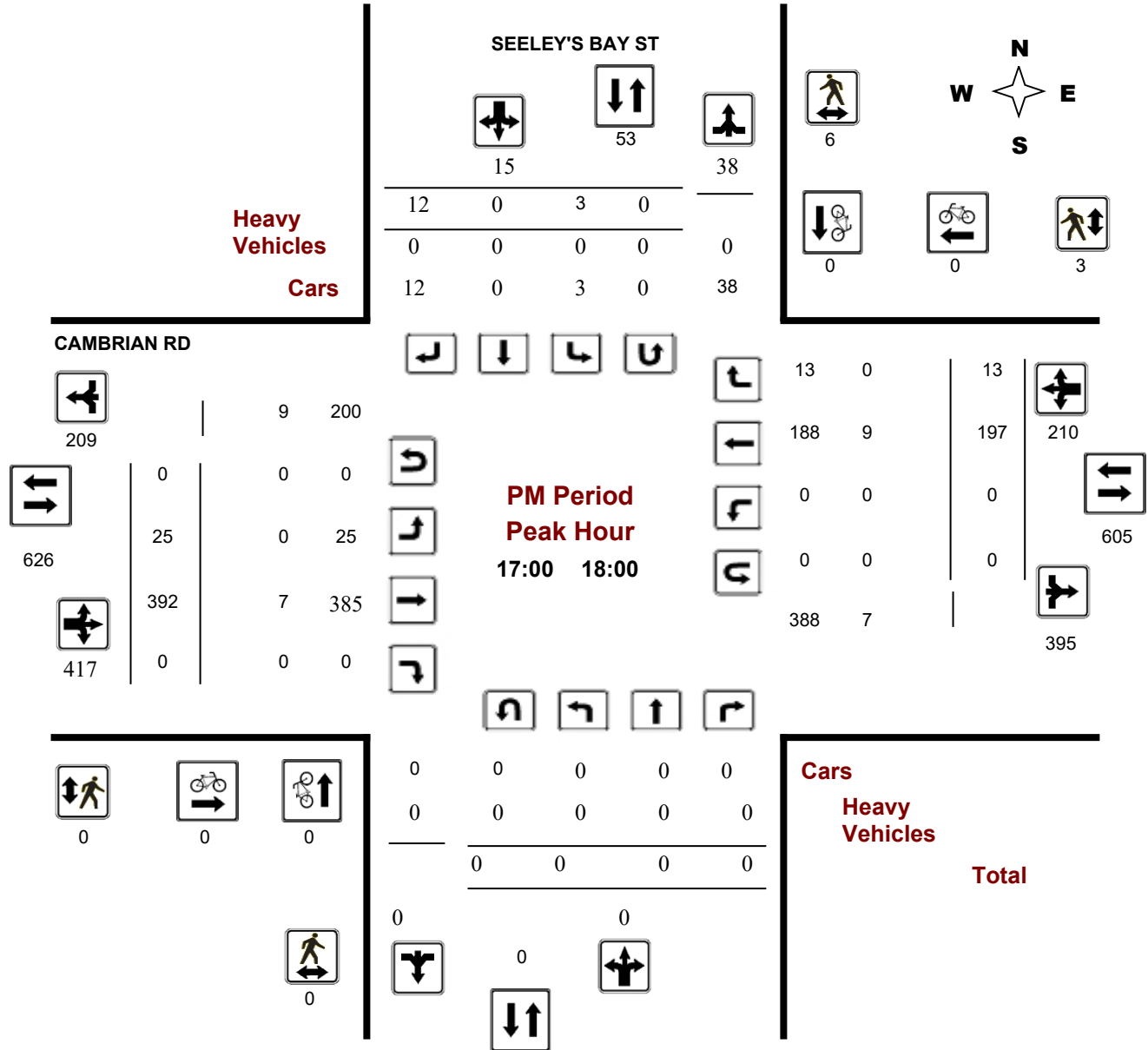
CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

Start Time: 07:00

WO No: 37283

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, November 22, 2017

Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 0 Westbound: 1

AADT Factor

.90

SEELEY'S BAY ST

CAMBRIAN RD

Period	Northbound					Southbound					Eastbound					Westbound					Grand Total
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	0	0	0	0	29	6	0	23	29	29	9	113	0	122	122	0	357	3	360	482	511
08:00 09:00	0	0	0	0	33	10	0	23	33	33	4	127	0	131	131	0	398	3	401	532	565
09:00 10:00	0	0	0	0	13	3	0	10	13	13	1	101	0	102	102	0	248	2	250	352	365
11:30 12:30	0	0	0	0	11	3	0	8	11	11	2	134	0	136	136	0	146	2	148	284	295
12:30 13:30	0	0	0	0	6	3	0	3	6	6	3	148	0	151	151	0	133	4	137	288	294
15:00 16:00	0	0	0	0	9	3	0	6	9	9	18	241	0	259	259	0	178	8	186	445	454
16:00 17:00	0	0	0	0	16	9	0	7	16	16	14	330	0	344	344	0	245	8	253	597	613
17:00 18:00	0	0	0	0	15	3	0	12	15	15	25	392	0	417	417	0	197	13	210	627	642
Sub Total	0	0	0	0	132	40	0	92	132	132	76	1586	0	1662	1662	0	1902	43	1945	3607	3739
U Turns				0	0				0	0				0	0				1	1	1
Total	0	0	0	0	132	40	0	92	132	132	76	1586	0	1662	1662	0	1902	43	1946	3608	3740
EQ 12Hr	0	0	0	0	183	56	0	128	183	183	106	2205	0	2310	2310	0	2644	60	2705	5015	5199
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	1.39				
AVG 12Hr	0	0	0	0	165	47	0	108	165	165	90	1870	0	1959	1959	0	2242	51	2294	4514	4679
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	0.9				
AVG 24Hr	0	0	0	0	204	62	0	142	204	204	117	2450	0	2567	2567	0	2938	66	3006	5573	5777

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

SEELEY'S BAY ST

CAMBRIAN RD

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	0	0	0	0	2	0	7	9	0	1	17	0	18	0	80	1	81	0	108
07:15 07:30	0	0	0	0	1	0	4	5	0	3	32	0	35	0	72	1	73	0	113
07:30 07:45	0	0	0	0	2	0	8	10	0	2	31	0	33	0	102	1	103	0	146
07:45 08:00	0	0	0	0	1	0	4	5	0	3	33	0	36	0	103	0	103	0	144
08:00 08:15	0	0	0	0	3	0	8	11	0	2	30	0	32	0	111	0	111	0	154
08:15 08:30	0	0	0	0	2	0	6	8	0	0	40	0	40	0	119	1	120	0	168
08:30 08:45	0	0	0	0	1	0	6	7	0	1	39	0	40	0	89	1	90	0	137
08:45 09:00	0	0	0	0	4	0	3	7	2	1	18	0	19	0	79	1	80	2	106
09:00 09:15	0	0	0	0	2	0	1	3	0	0	21	0	21	0	92	0	92	0	116
09:15 09:30	0	0	0	0	0	0	2	2	0	1	33	0	34	0	56	1	57	0	93
09:30 09:45	0	0	0	0	0	0	4	4	0	0	24	0	24	0	47	0	47	0	75
09:45 10:00	0	0	0	0	1	0	3	4	0	0	23	0	23	0	53	1	54	0	81
11:30 11:45	0	0	0	0	2	0	3	5	0	0	24	0	24	0	37	0	37	0	66
11:45 12:00	0	0	0	0	1	0	2	3	0	1	32	0	33	0	31	0	31	0	67
12:00 12:15	0	0	0	0	0	0	1	1	0	1	41	0	42	0	44	1	45	0	88
12:15 12:30	0	0	0	0	0	0	2	2	0	0	37	0	37	0	34	1	35	0	74
12:30 12:45	0	0	0	0	2	0	1	3	0	2	41	0	43	0	37	1	38	0	84
12:45 13:00	0	0	0	0	0	0	0	0	0	1	32	0	33	0	30	0	30	0	63
13:00 13:15	0	0	0	0	0	0	2	2	0	0	39	0	39	0	43	1	44	0	85
13:15 13:30	0	0	0	0	1	0	0	1	0	0	36	0	36	0	23	2	25	0	62
15:00 15:15	0	0	0	0	0	0	1	1	0	3	53	0	56	0	44	2	47	0	104
15:15 15:30	0	0	0	0	0	0	0	0	0	5	63	0	68	0	34	3	37	0	105
15:30 15:45	0	0	0	0	3	0	5	8	0	9	60	0	69	0	43	2	45	0	122
15:45 16:00	0	0	0	0	0	0	0	0	0	1	65	0	66	0	57	1	58	0	124
16:00 16:15	0	0	0	0	1	0	0	1	0	3	62	0	65	0	59	1	60	0	126
16:15 16:30	0	0	0	0	4	0	3	7	0	5	92	0	97	0	68	2	70	0	174
16:30 16:45	0	0	0	0	3	0	2	5	0	4	93	0	97	0	63	2	65	0	167
16:45 17:00	0	0	0	0	1	0	2	3	0	2	83	0	85	0	55	3	58	0	146
17:00 17:15	0	0	0	0	0	0	2	2	0	3	87	0	90	0	51	1	52	0	144
17:15 17:30	0	0	0	0	1	0	0	1	0	7	83	0	90	0	46	1	47	0	138
17:30 17:45	0	0	0	0	0	0	7	7	0	7	108	0	115	0	46	7	53	0	175
17:45 18:00	0	0	0	0	2	0	3	5	0	8	114	0	122	0	54	4	58	0	185
Total:	0	0	0	0	40	0	92	132	2	76	1586	0	1662	0	1902	43	1946	2	3,740

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

SEELEY'S BAY ST

CAMBRIAN RD

Time Period		SEELEY'S BAY ST			CAMBRIAN RD			Grand Total
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

SEELEY'S BAY ST

CAMBRIAN RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	3	3	0	3	3	6
07:30 07:45	0	4	4	1	1	2	6
07:45 08:00	0	0	0	1	1	2	2
08:00 08:15	0	1	1	0	0	0	1
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	1	1	0	0	0	1
08:45 09:00	0	1	1	0	0	0	1
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	1	1	1
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	1	1	0	0	0	1
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	1	0	1	1
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	2	2	0	0	0	2
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	1	1	0	0	0	1
17:30 17:45	0	5	5	0	3	3	8
17:45 18:00	0	0	0	0	0	0	0
Total	0	19	19	3	9	12	31



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

SEELEY'S BAY ST

CAMBRIAN RD

Northbound Southbound Eastbound Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	0	0	0	0	0	0	0	0	1	8	0	9	0	1	0	1	10	10
07:15 07:30	0	0	0	0	0	0	0	0	0	0	4	0	4	0	1	0	1	5	5
07:30 07:45	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4
07:45 08:00	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4
08:00 08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
08:15 08:30	0	0	0	0	0	0	0	0	0	0	3	0	3	0	4	0	4	7	7
08:30 08:45	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
08:45 09:00	0	0	0	0	2	0	0	2	2	0	3	0	3	0	7	0	7	10	12
09:00 09:15	0	0	0	0	0	0	0	0	0	0	1	0	1	0	8	0	8	9	9
09:15 09:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	4	0	4	6	6
09:30 09:45	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3
09:45 10:00	0	0	0	0	0	0	0	0	0	0	5	0	5	0	3	0	3	8	8
11:30 11:45	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	0	3	4	4
11:45 12:00	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3
12:00 12:15	0	0	0	0	0	0	0	0	0	0	4	0	4	0	5	0	5	9	9
12:15 12:30	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4
12:30 12:45	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
12:45 13:00	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6	6
13:00 13:15	0	0	0	0	0	0	0	0	0	0	6	0	6	0	3	0	3	9	9
13:15 13:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4
15:00 15:15	0	0	0	0	0	0	0	0	0	0	4	0	4	0	5	0	5	9	9
15:15 15:30	0	0	0	0	0	0	0	0	0	0	4	0	4	0	2	0	2	6	6
15:30 15:45	0	0	0	0	0	0	0	0	0	0	3	0	3	0	7	0	7	10	10
15:45 16:00	0	0	0	0	0	0	0	0	0	0	6	0	6	0	3	0	3	9	9
16:00 16:15	0	0	0	0	0	0	0	0	0	0	7	0	7	0	6	1	7	14	14
16:15 16:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	11	0	11	13	13
16:30 16:45	0	0	0	0	0	0	0	0	0	1	2	0	3	0	4	0	4	7	7
16:45 17:00	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
17:00 17:15	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
17:15 17:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4
17:30 17:45	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3
17:45 18:00	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	0	3	4	4
Total: None	0	0	0	0	2	0	0	2	2	2	97	0	99	0	105	1	106	205	207



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

SEELEY'S BAY ST

CAMBRIAN RD

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	1	1
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	1	1

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

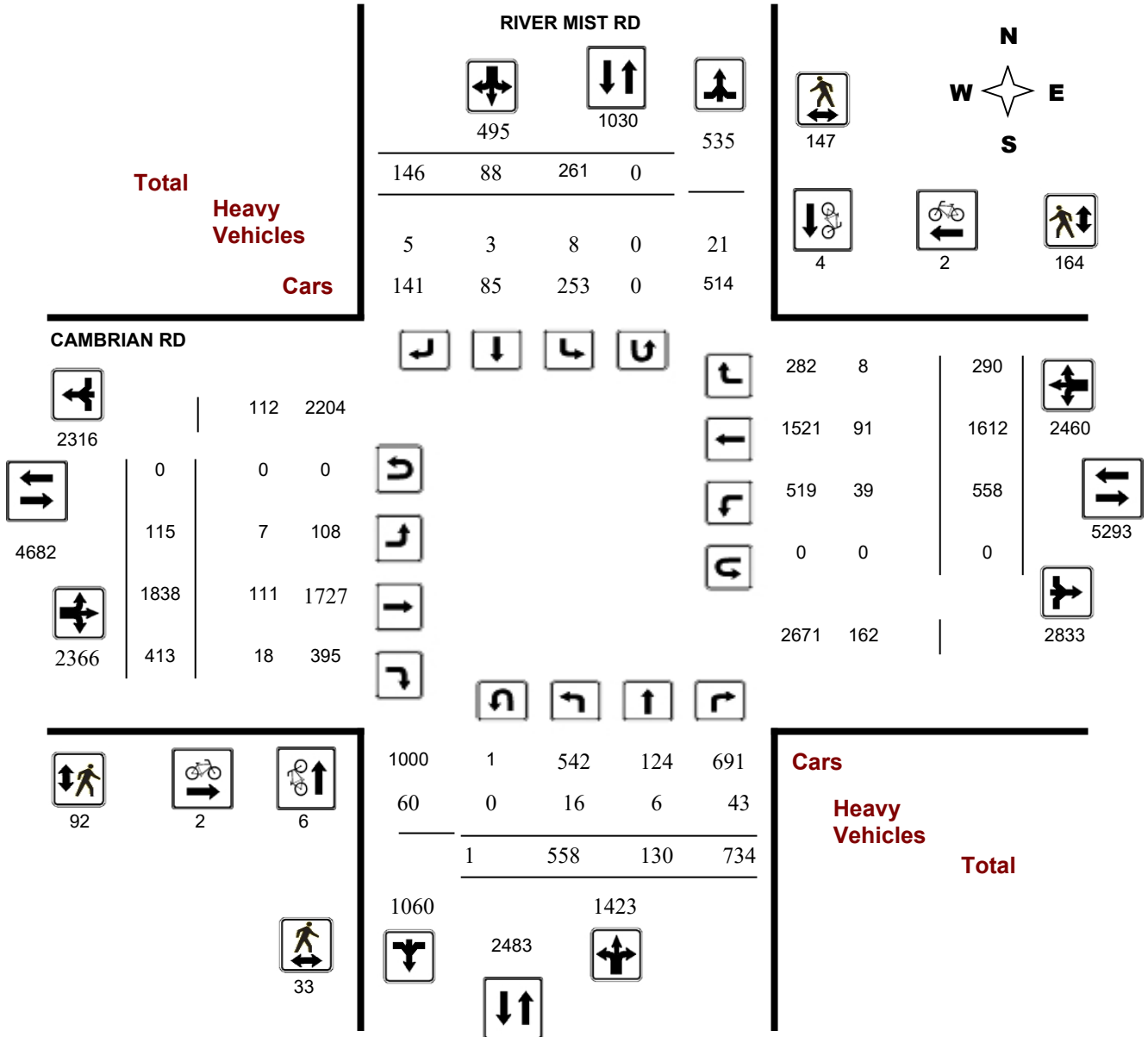
Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

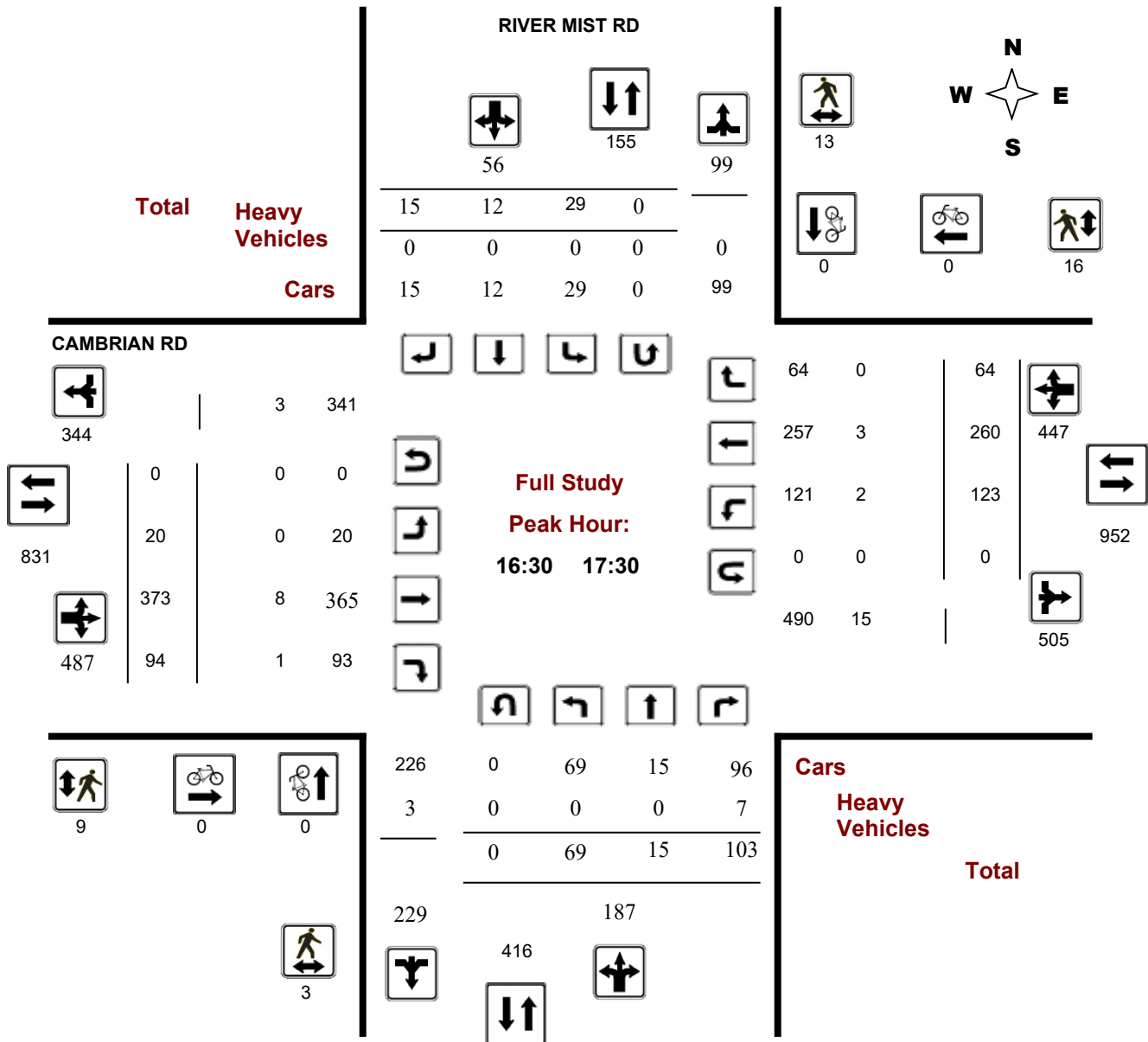
Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

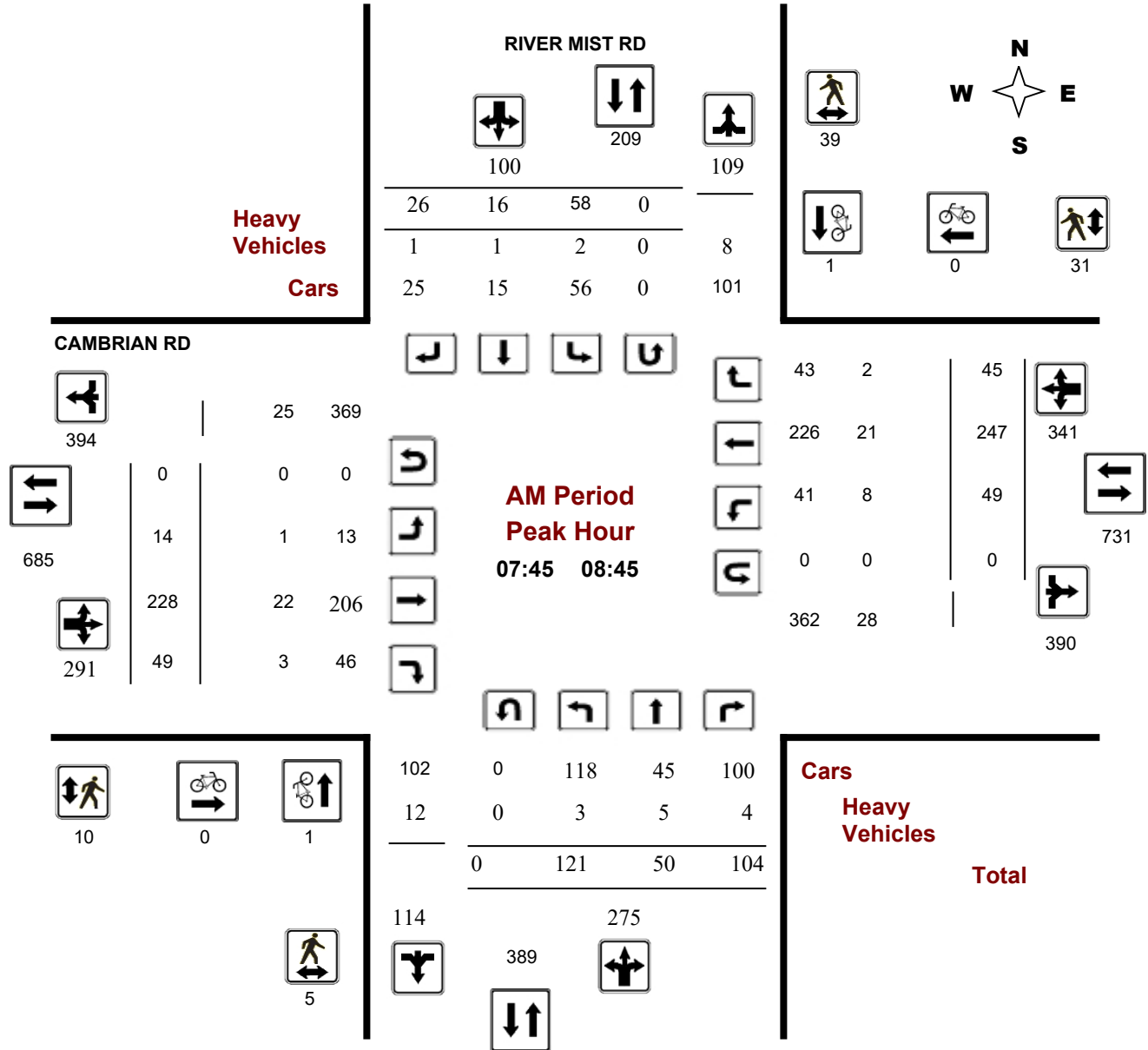
CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

Start Time: 07:00

WO No: 38918

Device: Miovision



Turning Movement Count - Peak Hour Diagram

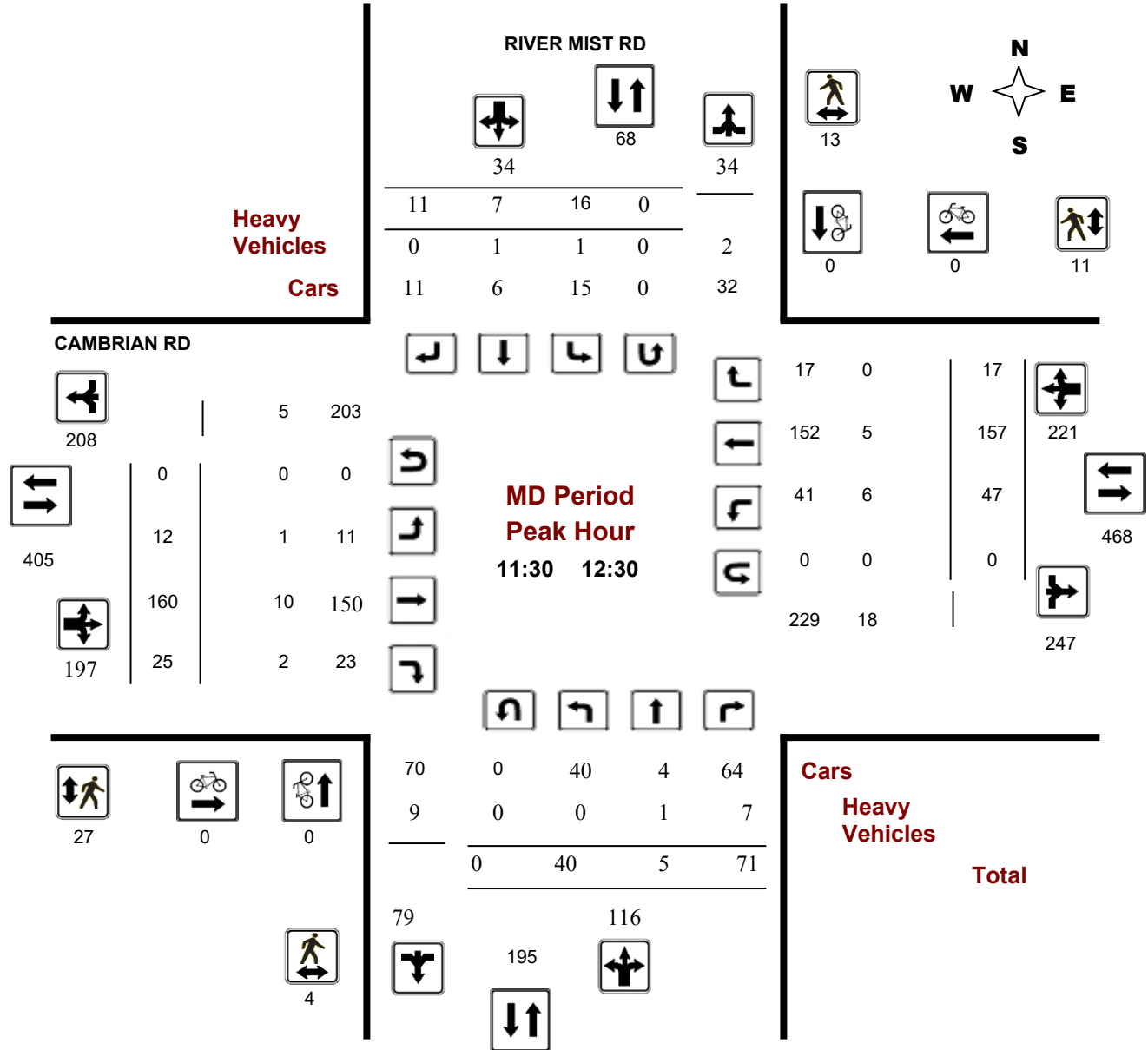
CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

Start Time: 07:00

WO No: 38918

Device: Miovision



Comments

Turning Movement Count - Peak Hour Diagram

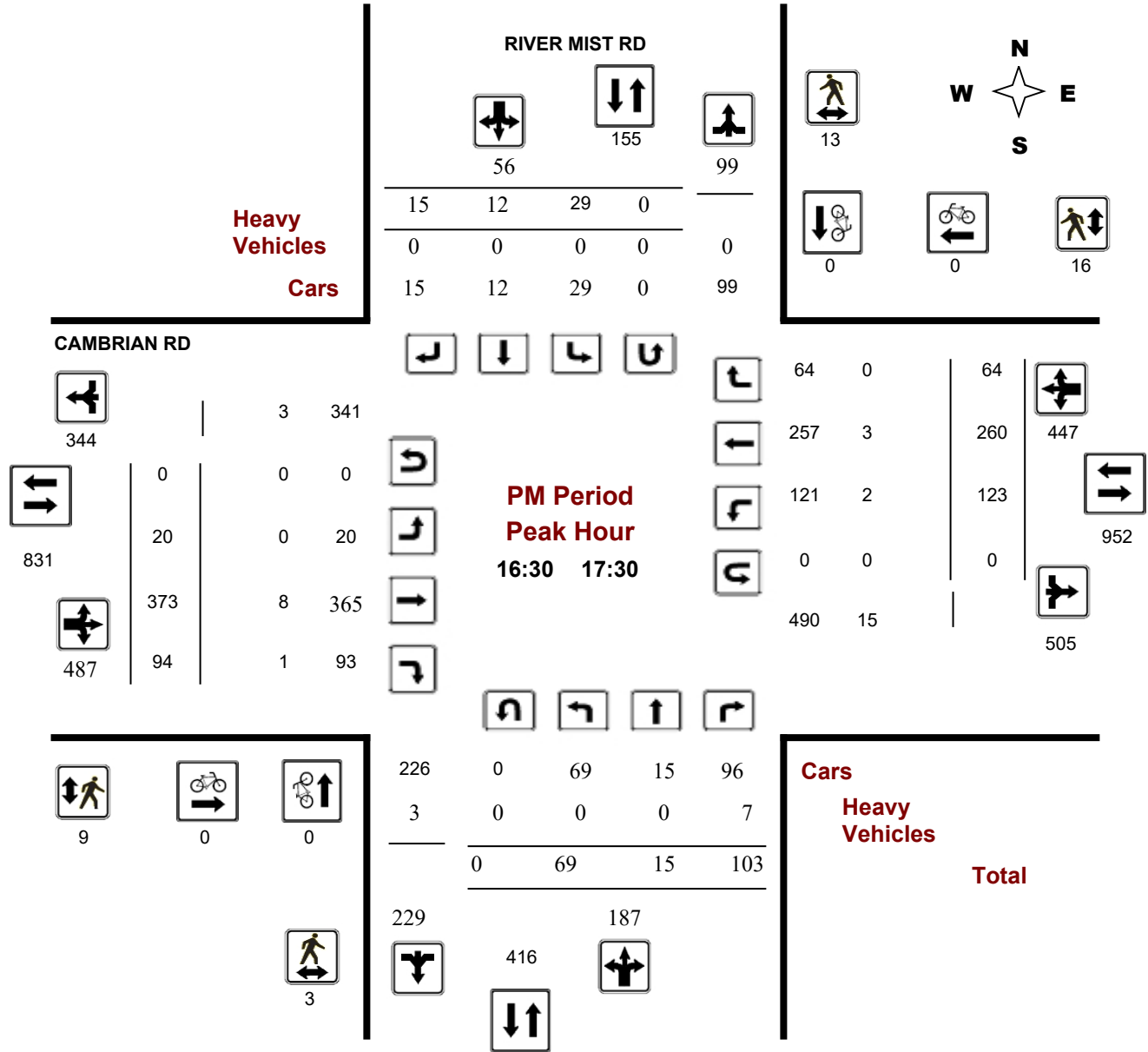
CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

Start Time: 07:00

WO No: 38918

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, October 23, 201

Total Observed U-Turns

AADT Factor

Northbound: 1 Southbound: 0
 Eastbound: 0 Westbound: 0

.90

RIVER MIST RD

CAMBRIAN RD

Period	RIVER MIST RD Northbound					RIVER MIST RD Southbound					CAMBRIAN RD Eastbound					CAMBRIAN RD Westbound					Grand Total
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	112	19	133	264	337	42	6	25	73	337	12	198	38	248	35	227	35	297	545	882	
08:00 09:00	113	47	100	260	358	54	19	25	98	358	13	226	45	284	56	246	36	338	622	980	
09:00 10:00	82	9	107	198	246	22	10	16	48	246	9	149	28	186	46	173	21	240	426	672	
11:30 12:30	40	5	71	116	150	16	7	11	34	150	12	160	25	197	47	157	17	221	418	568	
12:30 13:30	24	6	55	85	111	11	1	14	26	111	8	150	34	192	41	140	26	207	399	510	
15:00 16:00	57	17	80	154	239	50	15	20	85	239	17	229	65	311	85	167	38	290	601	840	
16:00 17:00	61	13	87	161	223	32	15	15	62	223	20	371	76	467	121	254	54	429	896	1119	
17:00 18:00	69	14	101	184	253	34	15	20	69	253	24	355	102	481	127	248	63	438	919	1172	
Sub Total	558	130	734	1422	1917	261	88	146	495	1917	115	1838	413	2366	558	1612	290	2460	4826	6743	
U Turns				1					0	1				0				0	0	1	
Total	558	130	734	1423	1918	261	88	146	495	1918	115	1838	413	2366	558	1612	290	2460	4826	6744	
EQ 12Hr	776	181	1020	1978	2666	363	122	203	688	2666	160	2555	574	3289	776	2241	403	3419	6708	9374	
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	1.39				
AVG 12Hr	658	153	865	1678	2399	308	104	172	584	2399	136	2167	487	2790	658	1901	342	2900	6037	8437	
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	0.9				
AVG 24Hr	862	201	1134	2198	2963	403	136	225	765	2963	178	2839	638	3654	862	2490	448	3799	7453	10416	
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																	1.31				

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

RIVER MIST RD

CAMBRIAN RD

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	24	4	33	61	10	0	4	14	1	3	50	7	60	9	57	2	68	1	203
07:15 07:30	22	5	37	64	10	2	7	19	3	2	53	9	64	11	46	8	65	3	212
07:30 07:45	28	5	30	63	13	2	7	22	2	4	43	11	58	7	61	12	80	2	223
07:45 08:00	38	5	33	76	9	2	7	18	2	3	52	11	66	8	63	13	84	2	244
08:00 08:15	32	12	28	72	9	1	10	20	5	5	57	12	74	12	65	14	91	5	257
08:15 08:30	33	28	22	83	26	6	6	38	5	4	56	10	70	10	58	15	83	5	274
08:30 08:45	18	5	21	44	14	7	3	24	4	2	63	16	81	19	61	3	83	4	232
08:45 09:00	30	2	29	61	5	5	6	16	1	2	50	7	59	15	62	4	81	1	217
09:00 09:15	32	7	52	91	9	5	4	18	4	1	49	12	62	13	66	5	84	4	255
09:15 09:30	18	0	18	36	9	2	3	14	0	5	38	3	46	13	38	5	56	0	152
09:30 09:45	14	1	26	41	2	1	3	6	1	1	37	3	41	13	34	7	54	1	142
09:45 10:00	18	1	11	30	2	2	6	10	1	2	25	10	37	7	35	4	46	1	123
11:30 11:45	16	0	21	37	2	3	5	10	3	2	38	10	50	13	46	2	61	3	158
11:45 12:00	7	1	8	16	5	1	5	11	1	2	39	4	45	10	41	5	56	1	128
12:00 12:15	9	3	20	32	7	2	1	10	1	2	47	5	54	12	41	4	57	1	153
12:15 12:30	8	1	22	31	2	1	0	3	5	6	36	6	48	12	29	6	47	5	129
12:30 12:45	10	2	16	29	2	0	5	7	1	2	41	6	49	8	38	7	53	1	138
12:45 13:00	7	0	7	14	6	1	4	11	1	1	40	12	53	12	36	2	50	1	128
13:00 13:15	2	3	17	22	2	0	4	6	3	3	33	8	44	10	30	6	46	3	118
13:15 13:30	5	1	15	21	1	0	1	2	2	2	36	8	46	11	36	11	58	2	127
15:00 15:15	10	2	11	23	21	3	4	28	7	4	61	11	76	18	37	10	65	7	192
15:15 15:30	7	5	14	26	12	4	10	26	2	3	52	16	71	25	40	9	74	2	197
15:30 15:45	12	2	23	37	8	7	2	17	4	6	67	18	91	16	45	7	68	4	213
15:45 16:00	28	8	32	68	9	1	4	14	3	4	49	20	73	26	45	12	83	3	238
16:00 16:15	18	3	24	45	11	4	3	18	2	7	91	17	115	30	63	14	107	2	285
16:15 16:30	8	3	18	29	8	5	5	18	5	3	75	21	99	27	63	12	102	5	248
16:30 16:45	16	3	23	42	7	5	5	17	0	5	119	18	142	29	65	14	108	0	309
16:45 17:00	19	4	22	45	6	1	2	9	3	5	86	20	111	35	63	14	112	3	277
17:00 17:15	13	5	40	58	8	4	5	17	2	6	83	31	120	24	67	14	105	2	300
17:15 17:30	21	3	18	42	8	2	3	13	2	4	85	25	114	35	65	22	122	2	291
17:30 17:45	12	3	21	36	10	5	9	24	3	5	105	23	133	36	58	16	110	3	303
17:45 18:00	23	3	22	48	8	4	3	15	2	9	82	23	114	32	58	11	101	2	278
Total:	558	130	734	1423	261	88	146	495	81	115	1838	413	2366	558	1612	290	2460	81	6,744

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Time Period	RIVER MIST RD			CAMBRIAN RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	0	0	0	0	1	1	1
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	1	0	1	1	0	1	2
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	1	1	0	0	0	1
08:15 08:30	1	0	1	0	0	0	1
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	1	0	1	1
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	1	1	1
09:30 09:45	1	0	1	0	0	0	1
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	2	2	0	0	0	2
15:15 15:30	1	0	1	0	0	0	1
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	2	0	2	0	0	0	2
16:00 16:15	0	1	1	0	0	0	1
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	0	0	0
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	0	0	0
Total	6	4	10	2	2	4	14



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

RIVER MIST RD

CAMBRIAN RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	2	3	1	4	5	8
07:15 07:30	0	3	3	7	1	8	11
07:30 07:45	0	5	5	1	4	5	10
07:45 08:00	0	6	6	0	0	0	6
08:00 08:15	1	19	20	3	11	14	34
08:15 08:30	0	8	8	0	13	13	21
08:30 08:45	4	6	10	7	7	14	24
08:45 09:00	4	8	12	2	8	10	22
09:00 09:15	0	0	0	0	1	1	1
09:15 09:30	0	1	1	0	3	3	4
09:30 09:45	0	1	1	0	2	2	3
09:45 10:00	1	1	2	0	3	3	5
11:30 11:45	2	2	4	23	4	27	31
11:45 12:00	0	2	2	0	0	0	2
12:00 12:15	2	5	7	2	4	6	13
12:15 12:30	0	4	4	2	3	5	9
12:30 12:45	1	1	2	0	1	1	3
12:45 13:00	2	2	4	1	3	4	8
13:00 13:15	0	4	4	4	3	7	11
13:15 13:30	0	1	1	0	0	0	1
15:00 15:15	3	9	12	6	30	36	48
15:15 15:30	0	3	3	8	5	13	16
15:30 15:45	2	8	10	0	8	8	18
15:45 16:00	1	12	13	8	3	11	24
16:00 16:15	3	6	9	3	6	9	18
16:15 16:30	2	7	9	1	4	5	14
16:30 16:45	1	2	3	4	0	4	7
16:45 17:00	1	9	10	4	4	8	18
17:00 17:15	1	2	3	1	6	7	10
17:15 17:30	0	0	0	0	6	6	6
17:30 17:45	1	6	7	3	10	13	20
17:45 18:00	0	2	2	1	7	8	10
Total	33	147	180	92	164	256	436



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

RIVER MIST RD

CAMBRIAN RD

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	0	1	1	0	0	0	0	1	1	2	1	4	3	4	0	7	11	12
07:15 07:30	0	0	3	3	0	0	0	0	3	0	7	2	9	2	4	1	7	16	19
07:30 07:45	1	0	1	2	0	0	0	0	2	0	3	0	3	1	4	1	6	9	11
07:45 08:00	2	0	0	2	0	0	0	0	2	1	7	2	10	2	5	0	7	17	19
08:00 08:15	0	3	1	4	0	0	1	1	5	0	3	1	4	2	4	1	7	11	16
08:15 08:30	1	2	0	3	2	0	0	2	5	0	5	0	5	1	4	1	6	11	16
08:30 08:45	0	0	3	3	0	1	0	1	4	0	7	0	7	3	8	0	11	18	22
08:45 09:00	1	0	0	1	0	0	0	0	1	1	4	2	7	1	8	0	9	16	17
09:00 09:15	3	0	1	4	0	0	0	0	4	0	0	1	1	1	8	0	9	10	14
09:15 09:30	0	0	0	0	0	0	0	0	0	0	3	0	3	1	1	0	2	5	5
09:30 09:45	0	0	1	1	0	0	0	0	1	0	5	0	5	2	2	1	5	10	11
09:45 10:00	0	0	1	1	0	0	0	0	1	0	4	0	4	2	2	0	4	8	9
11:30 11:45	0	0	2	2	1	0	0	1	3	0	6	1	7	2	1	0	3	10	13
11:45 12:00	0	0	1	1	0	0	0	0	1	0	0	0	0	2	1	0	3	3	4
12:00 12:15	0	0	1	1	0	0	0	0	1	1	3	1	5	1	1	0	2	7	8
12:15 12:30	0	1	3	4	0	1	0	1	5	0	1	0	1	1	2	0	3	4	9
12:30 12:45	0	0	1	1	0	0	0	0	1	0	4	0	4	1	1	1	3	7	8
12:45 13:00	0	0	0	0	0	0	1	1	1	1	4	1	6	1	2	1	4	10	11
13:00 13:15	0	0	2	2	0	0	1	1	3	0	4	1	5	1	0	0	1	6	9
13:15 13:30	1	0	1	2	0	0	0	0	2	1	5	0	6	1	4	0	5	11	13
15:00 15:15	1	0	1	2	5	0	0	5	7	1	4	2	7	1	1	0	2	9	16
15:15 15:30	0	0	1	1	0	0	1	1	2	0	2	1	3	1	2	0	3	6	8
15:30 15:45	1	0	3	4	0	0	0	0	4	0	2	1	3	1	5	0	6	9	13
15:45 16:00	1	0	1	2	0	0	1	1	3	0	7	0	7	1	3	0	4	11	14
16:00 16:15	1	0	1	2	0	0	0	0	2	0	6	0	6	1	3	1	5	11	13
16:15 16:30	2	0	2	4	0	1	0	1	5	0	1	0	1	0	6	0	6	7	12
16:30 16:45	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	0	3	4	4
16:45 17:00	0	0	3	3	0	0	0	0	3	0	2	1	3	0	0	0	0	3	6
17:00 17:15	0	0	2	2	0	0	0	0	2	0	2	0	2	1	1	0	2	4	6
17:15 17:30	0	0	2	2	0	0	0	0	2	0	3	0	3	0	0	0	0	3	5
17:30 17:45	1	0	2	3	0	0	0	0	3	0	2	0	2	1	1	0	2	4	7
17:45 18:00	0	0	2	2	0	0	0	0	2	0	2	0	2	0	1	0	1	3	5
Total: None	16	6	43	65	8	3	5	16	81	7	111	18	136	39	91	8	138	274	355



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

RIVER MIST RD

CAMBRIAN RD

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	1	0	0	0	1
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		1	0	0	0	1

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

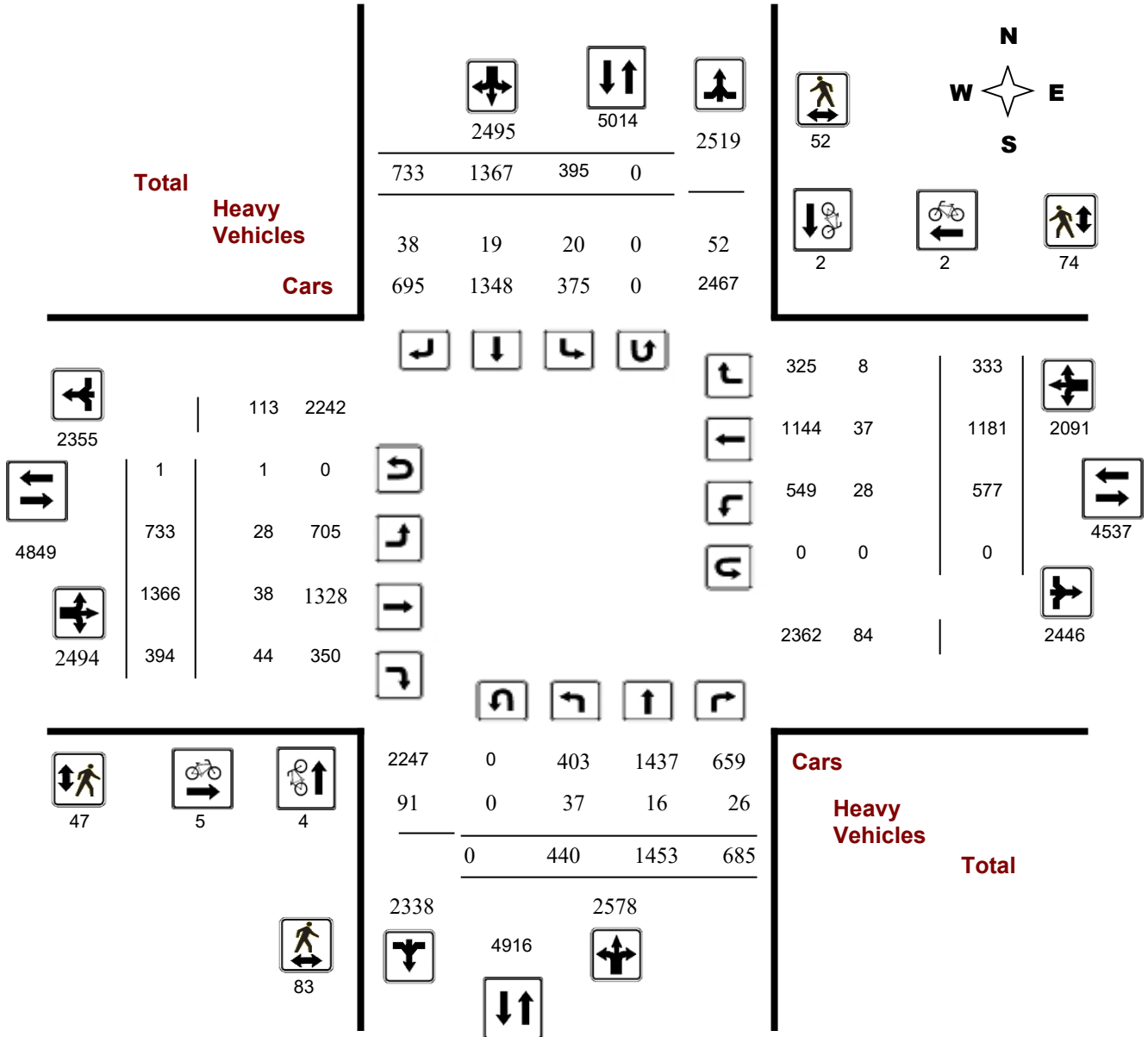
Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

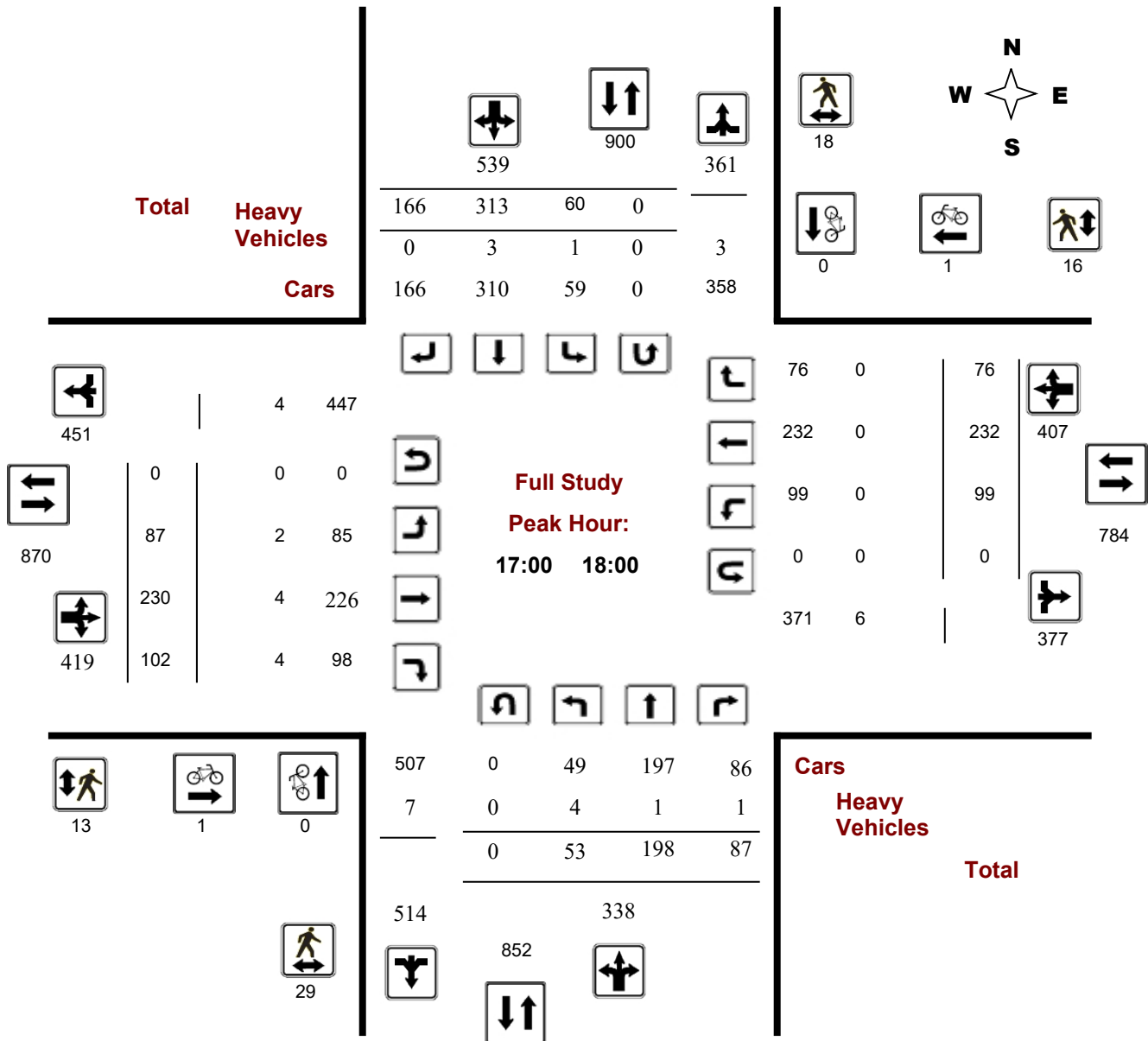
Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



Turning Movement Count - Peak Hour Diagram

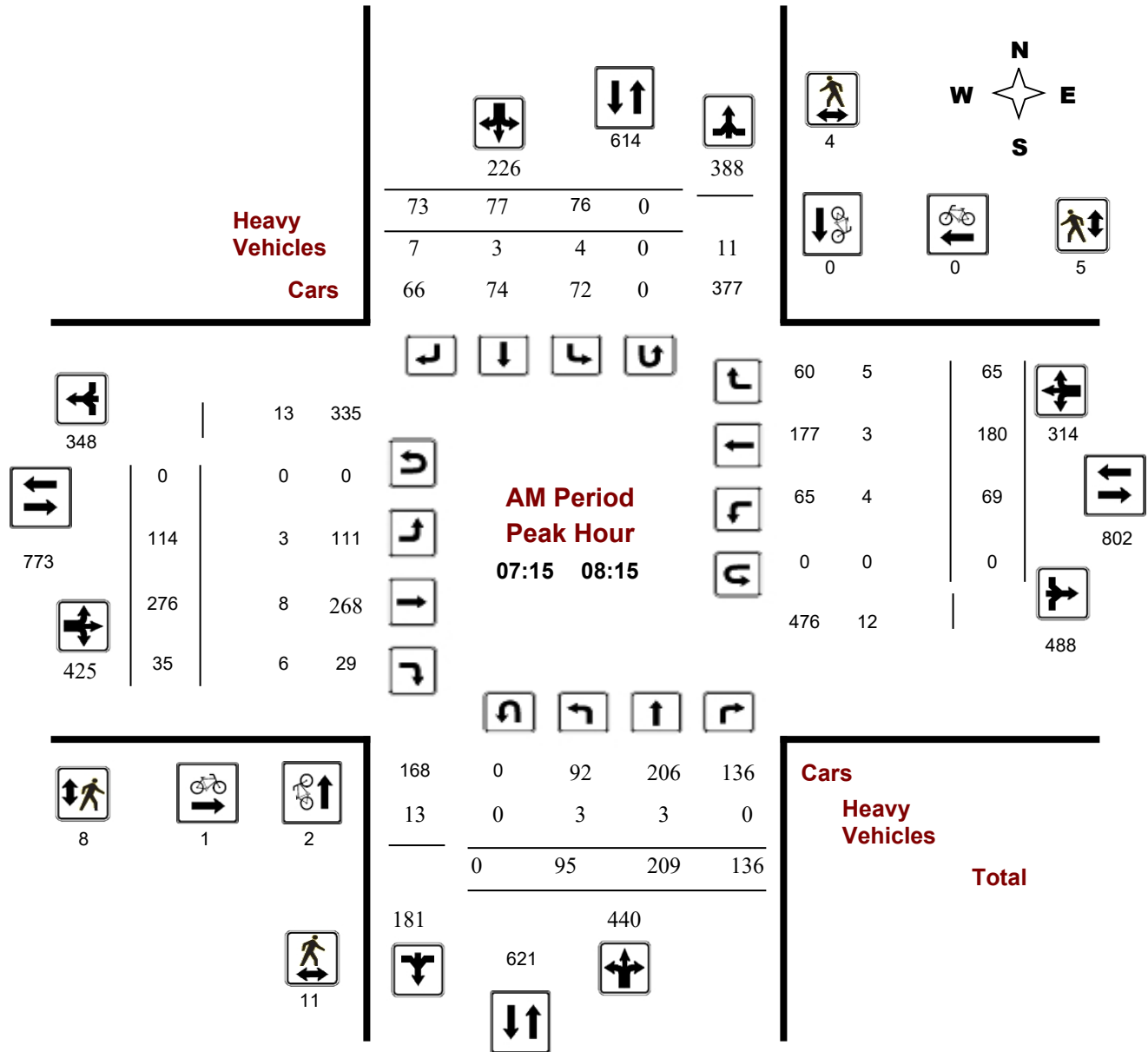
CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

Start Time: 07:00

WO No: 37240

Device: Miovision



Comments

Turning Movement Count - Peak Hour Diagram

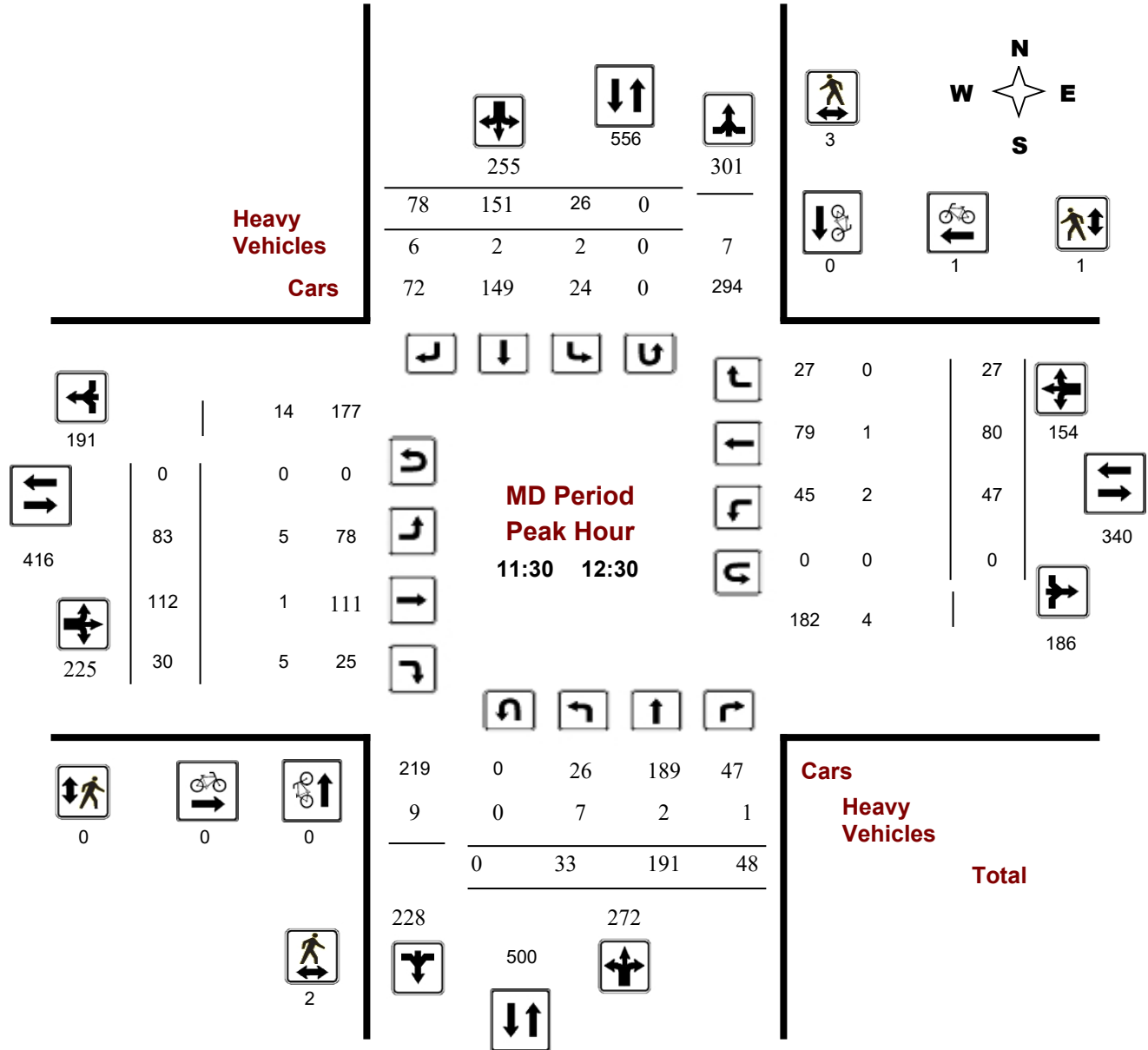
CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

Start Time: 07:00

WO No: 37240

Device: Miovision



Comments

Turning Movement Count - Peak Hour Diagram

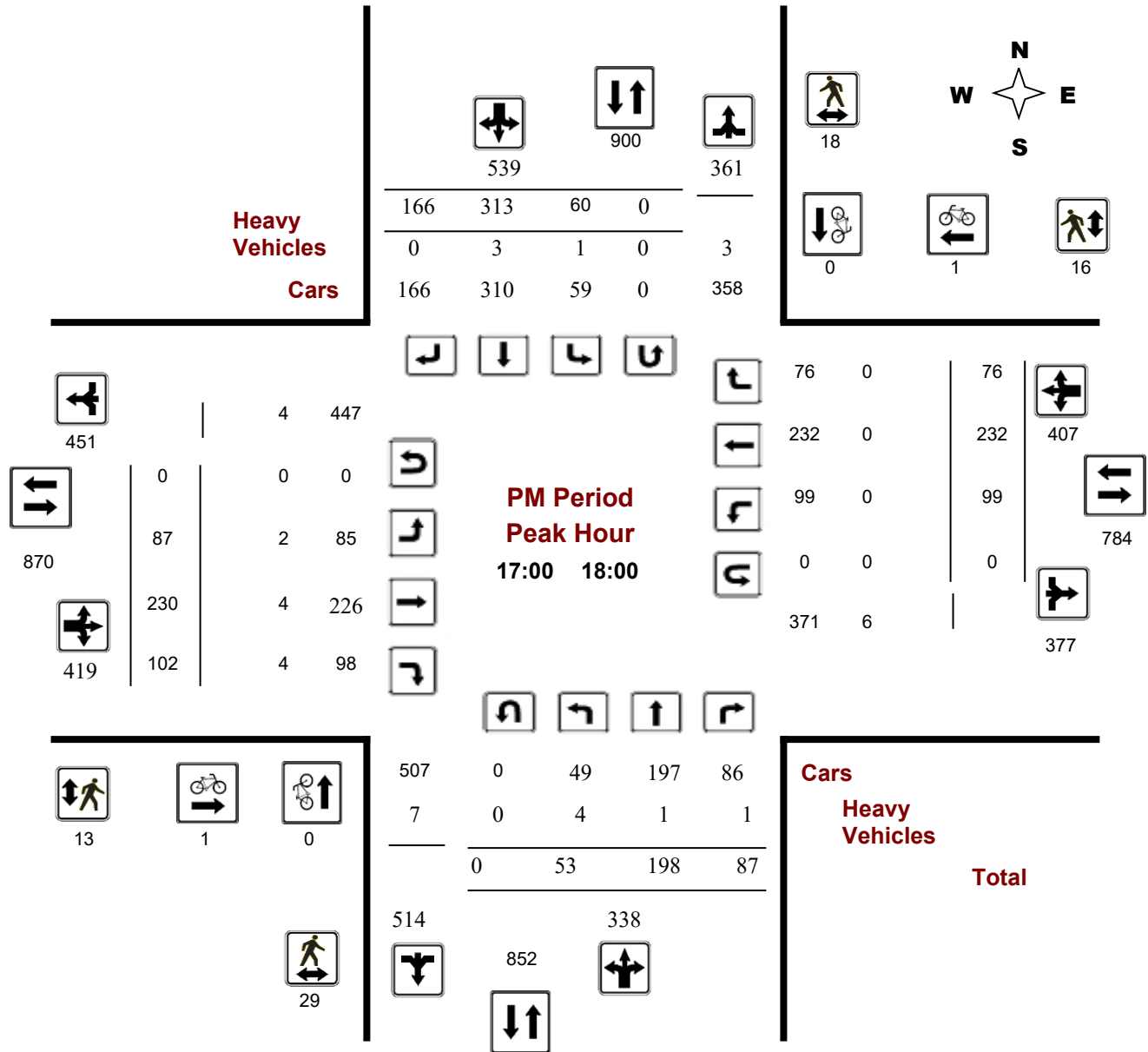
CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

Start Time: 07:00

WO No: 37240

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, September 13, 2017

Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 1 Westbound: 0

AADT Factor
 1.00

Period	Northbound				Southbound				STR TOT	Eastbound				Westbound				STR TOT	Grand Total
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT		LT	ST	RT	EB TOT	LT	ST	RT	WB TOT		
07:00 08:00	80	242	147	469	69	81	68	218	687	136	254	32	422	65	144	60	269	691	1378
08:00 09:00	89	198	117	404	73	101	78	252	656	86	232	46	364	66	190	37	293	657	1313
09:00 10:00	70	174	64	308	33	95	57	185	493	104	110	20	234	56	81	34	171	405	898
11:30 12:30	33	191	48	272	26	151	78	255	527	83	112	30	225	47	80	27	154	379	906
12:30 13:30	25	123	52	200	36	145	63	244	444	58	102	29	189	55	103	13	171	360	804
15:00 16:00	52	148	84	284	47	223	89	359	643	73	146	71	290	83	145	38	266	556	1199
16:00 17:00	38	179	86	303	51	258	134	443	746	106	180	64	350	106	206	48	360	710	1456
17:00 18:00	53	198	87	338	60	313	166	539	877	87	230	102	419	99	232	76	407	826	1703
Sub Total	440	1453	685	2578	395	1367	733	2495	5073	733	1366	394	2493	577	1181	333	2091	4584	9657
U Turns				0				0	0				1				0	1	1
Total	440	1453	685	2578	395	1367	733	2495	5073	733	1366	394	2494	577	1181	333	2091	4585	9658
EQ 12Hr	612	2020	952	3583	549	1900	1019	3468	7051	1019	1899	548	3467	802	1642	463	2906	6373	13425
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													1.39						
AVG 12Hr	576	1903	897	3377	517	1791	960	3268	7051	960	1789	516	3267	756	1547	436	2739	6373	13425
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													1						
AVG 24Hr	755	2493	1176	4424	678	2346	1258	4282	8706	1258	2344	676	4280	990	2027	571	3588	7868	16574
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													1.31						

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

Time Period	Northbound				Southbound				Eastbound				Westbound				Grand Total			
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT		W TOT	STR TOT	
07:00	07:15	11	75	41	127	11	30	13	54	2	35	49	8	92	18	16	8	42	2	315
07:15	07:30	24	71	38	133	26	12	12	50	6	43	64	6	113	17	33	9	59	6	355
07:30	07:45	25	49	35	109	19	17	20	56	8	30	70	11	111	17	41	24	82	8	358
07:45	08:00	20	47	33	100	13	22	23	58	5	28	71	7	106	13	54	19	86	5	350
08:00	08:15	26	42	30	98	18	26	18	62	1	13	71	11	95	22	52	13	87	1	342
08:15	08:30	30	53	30	113	19	23	18	60	10	28	62	9	99	18	52	8	78	10	350
08:30	08:45	17	45	31	93	18	21	24	63	11	21	55	13	89	11	42	9	62	11	307
08:45	09:00	16	58	26	100	18	31	18	67	10	24	44	13	82	15	44	7	66	10	315
09:00	09:15	22	41	15	78	7	29	14	50	2	43	30	3	76	12	21	14	47	2	251
09:15	09:30	22	38	14	74	8	24	18	50	2	32	28	5	65	15	18	12	45	2	234
09:30	09:45	17	55	18	90	9	20	5	34	4	13	29	5	47	15	17	3	35	4	206
09:45	10:00	9	40	17	66	9	22	20	51	2	16	23	7	46	14	25	5	44	2	207
11:30	11:45	12	36	20	68	5	45	18	68	3	16	23	8	47	12	18	8	38	3	221
11:45	12:00	7	49	13	69	3	31	16	50	4	25	26	8	59	17	19	6	42	4	220
12:00	12:15	9	55	7	71	11	42	21	74	5	25	32	9	66	6	16	6	28	5	239
12:15	12:30	5	51	8	64	7	33	23	63	8	17	31	5	53	12	27	7	46	8	226
12:30	12:45	10	30	12	52	14	37	21	72	4	21	22	5	48	18	23	4	45	4	217
12:45	13:00	3	32	10	45	13	42	18	73	9	12	23	9	44	11	28	2	41	9	203
13:00	13:15	6	35	13	54	6	33	13	52	5	10	26	8	44	17	29	2	48	5	198
13:15	13:30	6	26	17	49	3	33	11	47	5	15	31	7	53	9	23	5	37	5	186
15:00	15:15	9	27	22	58	8	41	16	65	5	18	35	19	72	24	32	8	64	5	259
15:15	15:30	11	39	25	75	13	47	25	85	10	14	37	19	70	21	39	8	68	10	298
15:30	15:45	17	36	16	69	15	77	24	116	5	17	35	16	68	14	41	12	67	5	320
15:45	16:00	15	46	21	82	11	58	24	93	6	24	39	17	80	24	33	10	67	6	322
16:00	16:15	12	37	22	71	11	59	32	102	6	28	42	12	82	32	47	11	90	6	345
16:15	16:30	7	41	18	66	13	71	29	113	4	22	47	16	85	28	60	18	106	4	370
16:30	16:45	10	52	20	82	17	57	27	101	1	30	37	24	91	16	54	6	76	1	350
16:45	17:00	9	49	26	84	10	71	46	127	3	26	54	12	92	30	45	13	88	3	391
17:00	17:15	13	40	20	73	14	72	38	124	5	23	63	26	112	31	64	19	114	5	423
17:15	17:30	14	56	24	94	14	73	45	132	1	19	62	27	108	29	58	16	103	1	437
17:30	17:45	11	46	24	81	15	97	38	150	2	24	48	23	95	17	62	21	100	2	426
17:45	18:00	15	56	19	90	17	71	45	133	2	21	57	26	104	22	48	20	90	2	417
Total:		440	1453	685	2578	395	1367	733	2495	156	733	1366	394	2494	577	1181	333	2091	156	9,658

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	1	0	1	0	0	0	1
07:30 07:45	1	0	1	0	0	0	1
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	0	0	1	0	1	1
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	1	1	1
12:30 12:45	0	0	0	2	0	2	2
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	0	0	1	0	1	1
15:45 16:00	2	0	2	0	0	0	2
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	2	2	0	0	0	2
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	1	1	1
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	1	0	1	1
Total	4	2	6	5	2	7	13



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	7	0	7	1	0	1	8
07:30 07:45	3	1	4	1	2	3	7
07:45 08:00	1	3	4	1	3	4	8
08:00 08:15	0	0	0	5	0	5	5
08:15 08:30	2	1	3	2	0	2	5
08:30 08:45	1	0	1	3	0	3	4
08:45 09:00	9	2	11	4	5	9	20
09:00 09:15	4	0	4	1	12	13	17
09:15 09:30	0	1	1	0	6	6	7
09:30 09:45	1	1	2	2	1	3	5
09:45 10:00	0	0	0	2	1	3	3
11:30 11:45	2	1	3	0	1	1	4
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	1	1	0	0	0	1
12:15 12:30	0	1	1	0	0	0	1
12:30 12:45	1	0	1	0	2	2	3
12:45 13:00	1	1	2	0	0	0	2
13:00 13:15	0	1	1	0	1	1	2
13:15 13:30	1	0	1	0	0	0	1
15:00 15:15	0	0	0	0	3	3	3
15:15 15:30	0	4	4	4	3	7	11
15:30 15:45	0	5	5	4	6	10	15
15:45 16:00	7	0	7	4	1	5	12
16:00 16:15	3	2	5	0	1	1	6
16:15 16:30	2	4	6	0	2	2	8
16:30 16:45	5	3	8	0	8	8	16
16:45 17:00	4	2	6	0	0	0	6
17:00 17:15	16	11	27	4	7	11	38
17:15 17:30	1	2	3	3	5	8	11
17:30 17:45	2	1	3	0	4	4	7
17:45 18:00	10	4	14	6	0	6	20
Total	83	52	135	47	74	121	256



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

Time Period	Northbound				Southbound				Eastbound				Westbound				Grand Total		
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT		W TOT	STR TOT
07:00 07:15	0	0	0	0	1	0	1	2	2	0	3	5	8	1	0	0	1	9	11
07:15 07:30	2	2	0	4	0	1	1	2	6	3	1	1	5	2	0	1	3	8	14
07:30 07:45	0	1	0	1	3	2	2	7	8	0	2	1	3	0	1	1	2	5	13
07:45 08:00	1	0	0	1	1	0	3	4	5	0	2	2	4	2	0	1	3	7	12
08:00 08:15	0	0	0	0	0	0	1	1	1	0	3	2	5	0	2	2	4	9	10
08:15 08:30	4	0	2	6	1	1	2	4	10	1	2	1	4	3	3	0	6	10	20
08:30 08:45	0	1	2	3	2	1	5	8	11	2	2	1	5	1	1	0	2	7	18
08:45 09:00	2	0	4	6	1	2	1	4	10	2	4	1	8	3	3	0	6	14	24
09:00 09:15	1	0	1	2	0	0	0	0	2	4	0	0	4	1	1	2	4	8	10
09:15 09:30	1	0	0	1	0	0	1	1	2	0	0	1	1	2	1	0	3	4	6
09:30 09:45	0	0	1	1	2	1	0	3	4	1	0	0	1	0	0	0	0	1	5
09:45 10:00	1	1	0	2	0	0	0	0	2	1	1	2	4	2	1	0	3	7	9
11:30 11:45	1	1	0	2	0	1	0	1	3	1	0	1	2	0	0	0	0	2	5
11:45 12:00	2	0	0	2	0	0	2	2	4	0	0	2	2	1	0	0	1	3	7
12:00 12:15	3	0	0	3	0	0	2	2	5	3	0	1	4	1	0	0	1	5	10
12:15 12:30	1	1	1	3	2	1	2	5	8	1	1	1	3	0	1	0	1	4	12
12:30 12:45	1	0	0	1	0	1	2	3	4	1	0	1	2	1	1	0	2	4	8
12:45 13:00	1	2	1	4	1	0	4	5	9	0	1	2	3	0	4	0	4	7	16
13:00 13:15	1	1	1	3	0	0	2	2	5	1	1	2	4	1	2	0	3	7	12
13:15 13:30	1	1	2	4	0	1	0	1	5	2	1	1	4	2	1	0	3	7	12
15:00 15:15	2	0	2	4	0	0	1	1	5	0	2	3	5	0	2	0	2	7	12
15:15 15:30	4	1	3	8	1	1	0	2	10	0	3	1	4	1	1	0	2	6	16
15:30 15:45	0	3	0	3	1	0	1	2	5	0	0	0	0	1	2	0	3	3	8
15:45 16:00	1	0	1	2	2	1	1	4	6	1	0	4	5	1	3	0	4	9	15
16:00 16:15	1	0	1	2	1	0	3	4	6	1	2	1	4	0	1	1	2	6	12
16:15 16:30	1	0	1	2	0	1	1	2	4	1	2	0	3	0	4	0	4	7	11
16:30 16:45	0	0	1	1	0	0	0	0	1	0	1	2	3	1	1	0	2	5	6
16:45 17:00	1	0	1	2	0	1	0	1	3	0	0	1	1	1	1	0	2	3	6
17:00 17:15	1	1	1	3	1	1	0	2	5	1	2	1	4	0	0	0	0	4	9
17:15 17:30	1	0	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	1	2
17:30 17:45	1	0	0	1	0	1	0	1	2	1	1	1	3	0	0	0	0	3	5
17:45 18:00	1	0	0	1	0	1	0	1	2	0	1	1	2	0	0	0	0	2	4
Total: None	37	16	26	79	20	19	38	77	156	28	38	44	111	28	37	8	73	184	340



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	1	0	1
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	1	0	1

Survey Date: Tuesday February 15 2018
 Weather: Cloudy

TURNING MOVEMENT COUNT SUMMARY - ALL MODES



AM Peak Hour: 7:30 AM to 8:30 AM
 MD Peak Hour: 11:30 AM to 12:30 PM
 PM Peak Hour: 4:45 PM to 5:45 PM

AADT FACTOR: 1.0

Turning Movement Count - Full Study Summary Report (Vehicles)

Time Period	Borrisokane Road					Borrisokane Road					N/S STREET TOTAL	0					Cambrian Road					E/W STREET TOTAL	Grand TOTAL
	Northbound					Southbound						Eastbound					Westbound						
	LT	ST	RT	U-Turns	NB TOTAL	LT	ST	RT	U-Turns	SB TOTAL		LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL		
7:00 8:00	0	28	10	0	38	72	15	0	0	87	125	0	0	0	0	0	8	0	350	0	358	358	483
8:00 9:00	0	48	13	0	61	123	22	0	0	145	206	0	0	0	0	0	5	0	346	0	351	351	557
9:00 10:00	0	24	1	0	25	60	22	0	0	82	107	0	0	0	0	0	1	0	209	0	210	210	317
AVG AM Pk HR	0	33	8	0	41	85	20	0	0	105	146	0	0	0	0	0	5	0	302	0	306	306	452
11:30 12:30	0	54	9	0	63	105	26	0	0	131	194	0	0	0	0	0	4	0	139	0	143	143	337
12:30 13:30	0	48	6	0	54	87	23	0	0	110	164	0	0	0	0	0	2	0	117	0	119	119	283
AVG MD Pk HR	0	51	8	0	59	96	25	0	0	121	179	0	0	0	0	0	3	0	128	0	131	131	310
15:00 16:00	0	40	1	0	41	58	51	0	0	109	150	0	0	0	0	0	13	0	159	0	172	172	322
16:00 17:00	0	25	0	0	25	344	43	0	0	387	412	0	0	0	0	0	11	0	162	0	173	173	585
17:00 18:00	0	22	0	0	22	352	36	0	0	388	410	0	0	0	0	0	14	0	198	0	212	212	622
AVG PM Pk HR	0	29	0	0	29	251	43	0	0	295	324	0	0	0	0	0	13	0	173	0	186	186	510
TOTAL	0	373	56	0	429	1,382	282	0	0	1,664	2,093	0	0	0	0	0	66	0	2,110	0	2,175	2,175	4,268
EQ 12Hr	0	519	77	0	596	1921	392	0	0	2313	2909	0	0	0	0	0	91	0	2932	0	3024	3024	5933
Note: These volumes are calculated by multiplying the totals by the appropriate expansion factor.											1.39												
AVG 12Hr	0	519	77	0	596	1921	392	0	0	2313	2909	0	0	0	0	0	91	0	2932	0	3024	3024	5933
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.											1.0												
AVG 24Hr	0	680	101	0	781	2516	514	0	0	3030	3811	0	0	0	0	0	120	0	3841	0	3961	3961	7772
Note: These volumes are calculated by multiplying the Average Daily 12hr. totals by the 12 to 24 expansion factor.											1.31												

Turning Movement Count - Full Study Summary Report (Pedestrians)

Time Period	Borrisokane Road		Borrisokane Road		N/S STREET TOTAL	0		Cambrian Road		E/W STREET TOTAL	Grand TOTAL
	NB Approach (East or West Crossing)		SB Approach (East or West Crossing)			EB Approach (North or South Crossing)		WB Approach (North or South Crossing)			
7:00 8:00	0		0		0	0		0		0	0
8:00 9:00	0		0		0	0		0		0	0
9:00 10:00	0		0		0	0		1		1	1
11:30 12:30	0		0		0	0		0		0	0
12:30 13:30	0		0		0	0		0		0	0
15:00 16:00	0		0		0	0		0		0	0
16:00 17:00	0		228		228	0		0		0	228
17:00 18:00	0		0		0	0		0		0	0
TOTAL:	0		228		228	0		1		1	229

Turning Movement Count - Full Study Summary Report (Cyclists)

Time Period	Borrisokane Road		N/S STREET TOTAL	0		Cambrian Road		E/W STREET TOTAL	Grand TOTAL
	Northbound	Southbound		Eastbound	Westbound				
7:00 8:00	0	0	0	0	0	0	0	0	
8:00 9:00	0	0	0	0	0	0	0	0	
9:00 10:00	0	0	0	0	0	0	0	0	
11:30 12:30	0	0	0	0	0	0	0	0	
12:30 13:30	0	0	0	0	0	0	0	0	
15:00 16:00	0	0	0	0	0	0	0	0	
16:00 17:00	0	0	0	0	0	0	0	0	
17:00 18:00	0	0	0	0	0	0	0	0	
TOTAL:	0	0	0	0	0	0	0	0	

Turning Movement Count - Full Study Summary Report (Heavy Vehicles)

Time Period	Borrisokane Road					N/S STREET TOTAL	0					E/W STREET TOTAL	Grand TOTAL										
	Northbound						Southbound							Eastbound					Westbound				
	LT	ST	RT	U-Turns	NB TOTAL		LT	ST	RT	U-Turns	SB TOTAL			LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL
7:00 8:00	0	9	0	0	9	16	8	0	0	24	33	0	0	0	0	0	0	5	0	5	5	38	
8:00 9:00	0	10	2	0	12	4	10	0	0	14	26	0	0	0	0	0	2	0	16	0	18	18	44
9:00 10:00	0	12	0	0	12	7	13	0	0	20	32	0	0	0	0	0	0	0	10	0	10	10	42
11:30 12:30	0	11	1	0	12	2	11	0	0	13	25	0	0	0	0	0	1	0	5	0	6	6	31
12:30 13:30	0	10	3	0	13	2	11	0	0	13	26	0	0	0	0	0	0	0	5	0	5	5	31
15:00 16:00	0	2	0	0	2	10	2	0	0	12	14	0	0	0	0	0	1	0	11	0	12	12	26
16:00 17:00	0	1	5	0	6	6	2	0	0	8	14	0	0	0	0	0	4	0	17	0	21	21	35
17:00 18:00	0	2	1	0	3	1	1	0	0	2	5	0	0	0	0	0	2	0	5	0	7	7	12
TOTAL:	0	57	12	0	69	48	58	0	0	106	175	0	0	0	0	0	10	0	74	0	84	84	259

Appendix C

HV% Calculation

[1] Borrisokane Road / Cambrian Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	10	2	16	13	0	0	0	0	2	0	16
Total Volume	0	53	12	103	20	0	0	0	0	11	0	373
HV%	#DIV/0!	19%	17%	16%	65%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	18%	#DIV/0!	4%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	2	5	10	2	0	0	0	0	4	0	17
Total Volume	0	41	6	362	40	0	0	0	0	10	0	192
HV%	#DIV/0!	5%	83%	3%	5%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	40%	#DIV/0!	9%

[2] Seeley's Bay Street / Cambrian Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	0	0	0	0	0	0	8	0	0	8	0
Total Volume	0	0	0	8	0	26	7	134	0	0	435	2
HV%	#DIV/0!	#DIV/0!	#DIV/0!	0%	#DIV/0!	0%	0%	6%	#DIV/0!	#DIV/0!	2%	0%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	0	0	0	0	0	0	7	0	0	9	0
Total Volume	0	0	0	3	0	12	25	392	0	0	197	13
HV%	#DIV/0!	#DIV/0!	#DIV/0!	0%	#DIV/0!	0%	0%	2%	#DIV/0!	#DIV/0!	5%	0%

[3] River Mist Road / Cambrian Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	3	5	4	2	1	1	3	22	1	8	21	2
Total Volume	121	50	104	58	16	26	14	228	49	49	247	45
HV%	2%	10%	4%	3%	6%	4%	21%	10%	2%	16%	9%	4%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	0	7	0	0	0	0	8	1	2	3	0
Total Volume	69	15	103	29	12	15	20	373	94	123	260	64
HV%	0%	0%	7%	0%	0%	0%	0%	2%	1%	2%	1%	0%

[4] Greenbank Road / Cambrian Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	3	3	0	4	3	7	3	8	6	4	3	5
Total Volume	95	209	136	76	77	73	114	276	35	69	180	65
HV%	3%	1%	0%	5%	4%	10%	3%	3%	17%	6%	2%	8%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	4	1	1	1	3	0	2	4	4	0	0	0
Total Volume	53	198	87	60	313	166	87	230	102	99	232	76
HV%	8%	1%	1%	2%	1%	0%	2%	2%	4%	0%	0%	0%

Appendix D

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2015-06-04	2015	15:22	CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2016-04-04	2016	19:59	CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-05-05	2018	9:15	CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD (3ZA1T5)	06 - Strong wind	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2017-05-23	2017	14:40	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	99 - Other	01 - Dry
2017-10-07	2017	10:28	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2017-09-23	2017	21:27	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-12-06	2017	8:10	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2017-02-10	2017	22:39	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	04 - Freezing Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2017-02-06	2017	20:11	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2018-03-07	2018	8:37	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2018-05-15	2018	8:26	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2018-08-02	2018	16:36	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-08-15	2018	11:11	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-08-24	2018	17:17	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2018-09-15	2018	17:30	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-10-08	2018	13:45	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2018-12-01	2018	22:45	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-12-27	2018	12:27	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - Rear end	06 - Ice
2014-03-22	2014	11:54	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2015-04-03	2015	20:09	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-01-09	2015	7:21	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	03 - Dawn	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2015-01-09	2015	7:14	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	03 - Snow	03 - Dawn	10 - No control	03 - P.D. only	07 - SMV other	05 - Packed snow
2016-09-28	2016	13:17	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-03-15	2014	16:05	CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	01 - Approaching	01 - Dry
2015-10-09	2015	0:00	CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	01 - Clear	00 - Unknown	10 - No control	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2016-01-30	2016	4:40	CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	03 - Snow	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	03 - Loose snow

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2016-10-03	2016	17:18	CAMBRIAN RD btwn GRAND CANAL ST & SEELEY'S BAY ST	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	06 - SMV unattended vehicle	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2016-11-23	2016	0:00	SEELEY'S BAY ST btwn BURRITTS RAPIDS PL & WATERCOLOURS WAY	01 - Clear	00 - Unknown	10 - No control	03 - P.D. only	06 - SMV unattended vehicle	06 - Ice

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2016-12-13	2016	15:00	CAMBRIAN RD btwn REGATTA AVE & GREENBANK RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	05 - Turning movement	02 - Wet

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-08-08	2014	15:30	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-07-10	2015	8:58	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2015-01-25	2015	16:43	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	05 - Dusk	02 - Stop sign	03 - P.D. only	07 - SMV other	06 - Ice
2016-06-23	2016	17:10	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	03 - Rear end	01 - Dry
2016-07-29	2016	3:27	CAMBRIAN RD @ CEDARVIEW RD	07 - Fog, mist, smoke, dust	07 - Dark	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2016-07-22	2016	20:56	CAMBRIAN RD @ CEDARVIEW RD	02 - Rain	05 - Dusk	02 - Stop sign	03 - P.D. only	07 - SMV other	02 - Wet
2016-12-11	2016	9:30	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	07 - SMV other	06 - Ice
2017-08-29	2017	13:57	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2017-12-17	2017	8:33	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	07 - SMV other	01 - Dry
2018-06-26	2018	11:51	CAMBRIAN RD @ CEDARVIEW RD (0001571)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	07 - SMV other	08 - Loose sand or gravel

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-06-07	2014	7:48	CAMBRIAN RD @ RIVER MIST RD	01 - Clear	01 - Daylight		03 - P.D. only	05 - Turning movement	01 - Dry
2015-09-04	2015	7:15	CAMBRIAN RD @ RIVER MIST RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	02 - Angle	01 - Dry
2017-01-05	2017	7:34	CAMBRIAN RD @ RIVER MIST RD	01 - Clear	03 - Dawn	02 - Stop sign	03 - P.D. only	02 - Angle	06 - Ice
2018-05-12	2018	14:50	CAMBRIAN RD @ RIVER MIST RD (0014647)	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	04 - Sideswipe	01 - Dry
2018-12-25	2018	15:26	CAMBRIAN RD @ RIVER MIST RD (0014647)	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	02 - Angle	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-11-19	2014	9:53	RIVER MIST RD btwn BRAMBLING WAY & RIVER ROCK AVE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	06 - Ice
2015-06-24	2015	11:06	RIVER MIST RD btwn BRAMBLING WAY & RIVER ROCK AVE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry

2017-07-14	2017	19:51	RIVER MIST RD btwn BRAMBLING WAY & RIVER ROCK AVE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	06 - SMV unattended vehicle	02 - Wet
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Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2016-07-26	2016	18:10	CAMBRIAN RD @ GRAND CANAL ST	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	05 - Turning movement	01 - Dry
2018-06-10	2018	15:29	CAMBRIAN RD @ GRAND CANAL ST (0014646)	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2018-09-17	2018	8:17	CAMBRIAN RD @ GRAND CANAL ST (0014646)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	02 - Angle	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2015-07-05	2015	13:15	CAMBRIAN RD @ REGATTA AVE	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	05 - Turning movement	01 - Dry
2015-08-11	2015	22:06	CAMBRIAN RD @ REGATTA AVE	01 - Clear	07 - Dark	02 - Stop sign	03 - P.D. only	02 - Angle	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-07-02	2014	20:45	CAMBRIAN RD @ GREENBANK RD	01 - Clear	05 - Dusk	03 - Yield sign	02 - Non-fatal injury	03 - Rear end	01 - Dry
2014-08-30	2014	12:58	CAMBRIAN RD @ GREENBANK RD	01 - Clear	01 - Daylight	03 - Yield sign	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2016-02-12	2016	18:18	CAMBRIAN RD @ GREENBANK RD	03 - Snow	07 - Dark	11 - Roundabout	03 - P.D. only	07 - SMV other	04 - Slush
2016-03-13	2016	15:45	CAMBRIAN RD @ GREENBANK RD	01 - Clear	01 - Daylight	11 - Roundabout	03 - P.D. only	03 - Rear end	01 - Dry
2016-04-05	2016	8:27	CAMBRIAN RD @ GREENBANK RD	01 - Clear	01 - Daylight	11 - Roundabout	03 - P.D. only	03 - Rear end	01 - Dry
2016-12-28	2016	17:35	CAMBRIAN RD @ GREENBANK RD	03 - Snow	07 - Dark	11 - Roundabout	03 - P.D. only	02 - Angle	04 - Slush
2017-05-17	2017	7:15	CAMBRIAN RD @ GREENBANK RD	01 - Clear	01 - Daylight	11 - Roundabout	03 - P.D. only	07 - SMV other	01 - Dry
2017-12-12	2017	13:17	CAMBRIAN RD @ GREENBANK RD	03 - Snow	01 - Daylight	11 - Roundabout	03 - P.D. only	02 - Angle	04 - Slush
2018-05-29	2018	22:16	CAMBRIAN RD @ GREENBANK RD (0001095)	01 - Clear	07 - Dark	11 - Roundabout	03 - P.D. only	07 - SMV other	01 - Dry
2018-10-11	2018	16:40	CAMBRIAN RD @ GREENBANK RD (0001095)	01 - Clear	01 - Daylight	11 - Roundabout	03 - P.D. only	03 - Rear end	01 - Dry
2018-10-14	2018	14:35	CAMBRIAN RD @ GREENBANK RD (0001095)	01 - Clear	01 - Daylight	11 - Roundabout	03 - P.D. only	03 - Rear end	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-02-12	2014	10:37	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2014-09-26	2014	14:20	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2014-12-12	2014	8:10	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	03 - Loose snow
2014-08-26	2014	16:15	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-01-20	2015	15:12	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2015-05-07	2015	7:51	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2015-01-30	2015	7:25	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	03 - Snow	03 - Dawn	10 - No control	02 - Non-fatal injury	07 - SMV other	05 - Packed snow
2015-04-09	2015	0:50	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	02 - Rain	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	02 - Wet
2015-09-15	2015	18:27	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2015-05-07	2015	21:33	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-01-17	2015	8:55	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	01 - Approaching	02 - Wet
2015-12-10	2015	1:00	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2016-01-29	2016	10:18	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	01 - Approaching	03 - Loose snow
2016-04-30	2016	11:26	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	06 - SMV unattended vehicle	01 - Dry
2016-06-22	2016	22:43	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	01 - Approaching	02 - Wet
2016-04-06	2016	20:26	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	05 - Packed snow
2016-04-28	2016	21:36	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2016-02-19	2016	18:23	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	01 - Approaching	03 - Loose snow
2017-06-17	2017	2:58	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2017-11-11	2017	12:15	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	02 - Angle	01 - Dry
2017-11-27	2017	8:02	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	05 - Drifting Snow	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	06 - Ice
2017-11-27	2017	8:01	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	02 - Wet
2017-01-15	2017	1:14	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2017-04-23	2017	0:43	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-03-22	2017	11:12	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2018-01-01	2018	12:47	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2018-03-08	2018	7:00	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2018-03-08	2018	19:25	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2018-07-06	2018	7:04	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2018-09-27	2018	8:01	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	02 - Angle	01 - Dry
2018-11-04	2018	14:40	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-11-17	2018	20:12	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2018-12-12	2018	11:06	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	01 - Approaching	06 - Ice
2018-12-12	2018	18:31	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2018-12-13	2018	20:05	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	01 - Approaching	01 - Dry
2018-12-13	2018	17:40	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	03 - Rear end	06 - Ice
2018-12-24	2018	6:16	GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (3ZA2WE)	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	03 - Rear end	03 - Loose snow

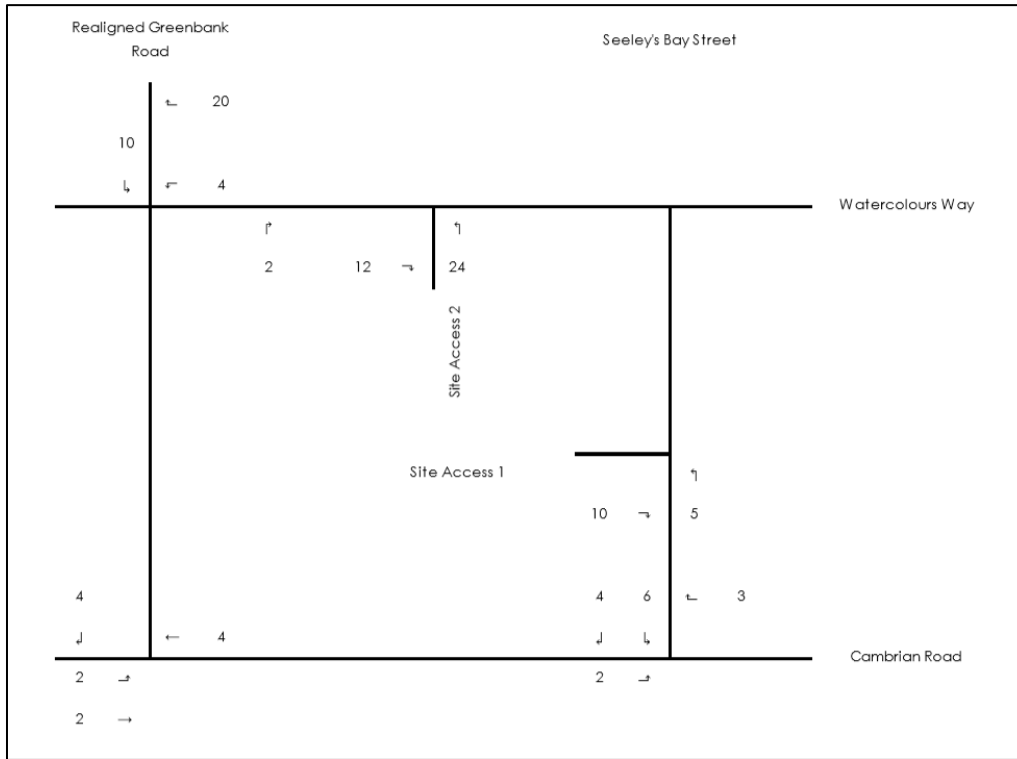
Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2015-01-10	2015	10:40	GREENBANK RD btwn CAMBRIAN RD & DUNDONALD DR	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	01 - Approaching	02 - Wet
2015-01-30	2015	6:09	GREENBANK RD btwn CAMBRIAN RD & DUNDONALD DR	05 - Drifting Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2016-01-10	2016	20:40	GREENBANK RD btwn CAMBRIAN RD & DUNDONALD DR	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	03 - Rear end	02 - Wet
2018-02-14	2018	9:06	GREENBANK RD btwn CAMBRIAN RD & DUNDONALD DR (5DCY38)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	02 - Angle	02 - Wet
2018-09-18	2018	21:22	GREENBANK RD btwn CAMBRIAN RD & DUNDONALD DR (5DCY38)	01 - Clear	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry

LOCATION & GEOID	TOTAL_COLLISIONS	TOTAL_CYCLIST_COLLISIONS	TOTAL_PEDESTRIAN_COLLISIONS
BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (_3ZA1CC)	20	0	0
CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD (_3ZA1T5)	3	0	0
CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST (_7N36UU)	3	0	0
CAMBRIAN RD btwn GRAND CANAL ST & SEELEY'S BAY ST (_8IAYUK)	1	0	0
CAMBRIAN RD btwn REGATTA AVE & GREENBANK RD (_3ZA1YL)	1	0	0
CAMBRIAN RD @ CEDARVIEW RD (0001571)	10	0	0
CAMBRIAN RD @ RIVER MIST RD (0014647)	5	0	0
CAMBRIAN RD @ GRAND CANAL ST (0014646)	3	0	0
CAMBRIAN RD @ REGATTA AVE (0013606)	2	0	0
CAMBRIAN RD @ GREENBANK RD (0001095)	11	1	0
GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (_3ZA2WE)	37	1	0
GREENBANK RD btwn CAMBRIAN RD & DUNDONALD DR (_5DCY38)	5	1	0

Appendix E

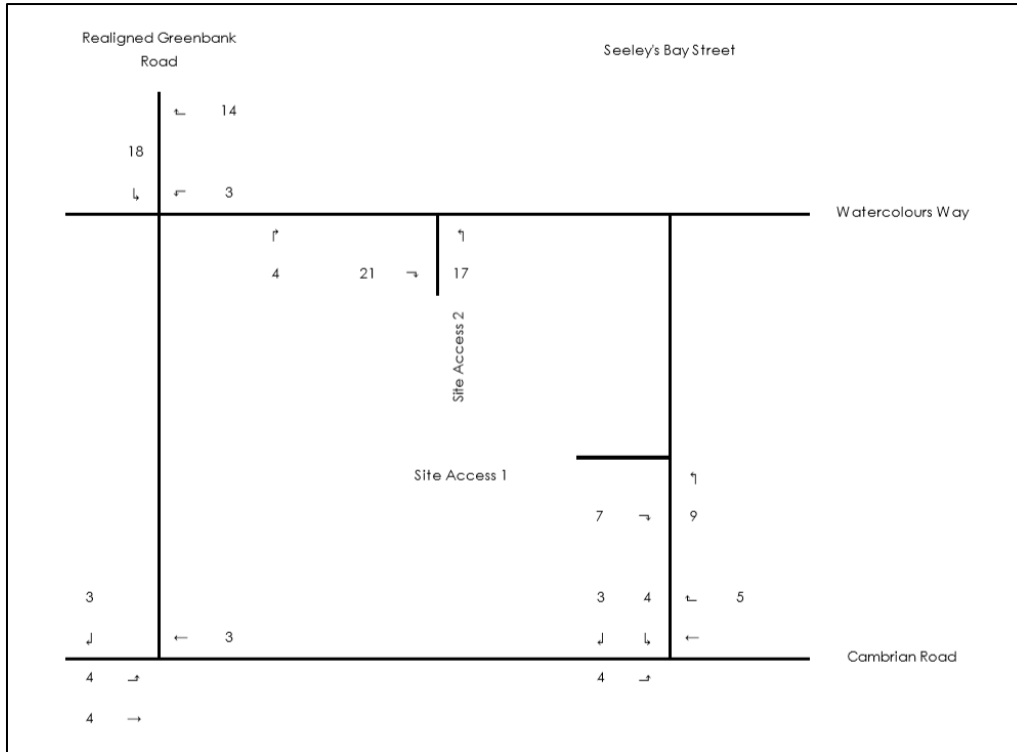
Study Area Developments

2444 Watercolours Way Site Generated Traffic Volumes, Realigned Greenbank Road Scenario, AM Peak Hour



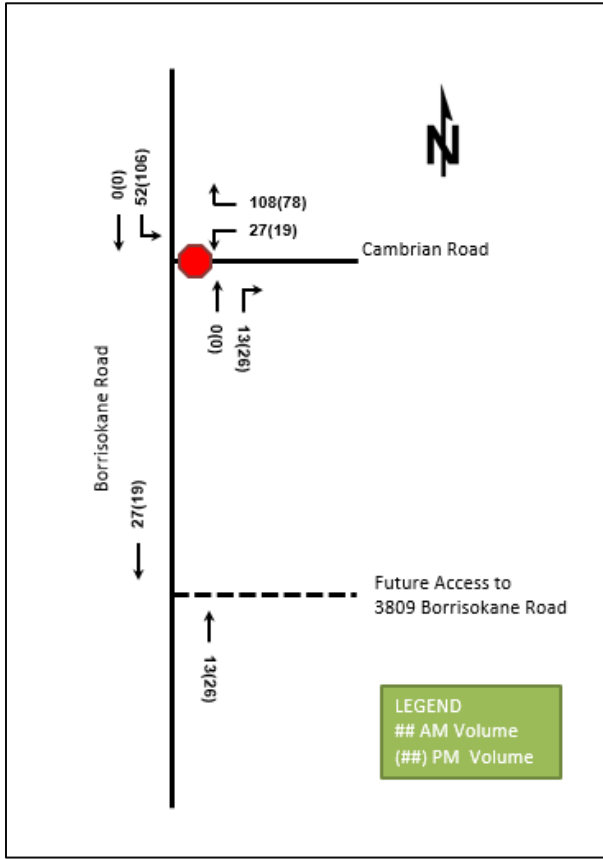
Source: Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018)

2444 Watercolours Way Site Generated Traffic Volumes, Realigned Greenbank Road Scenario, PM Peak Hour



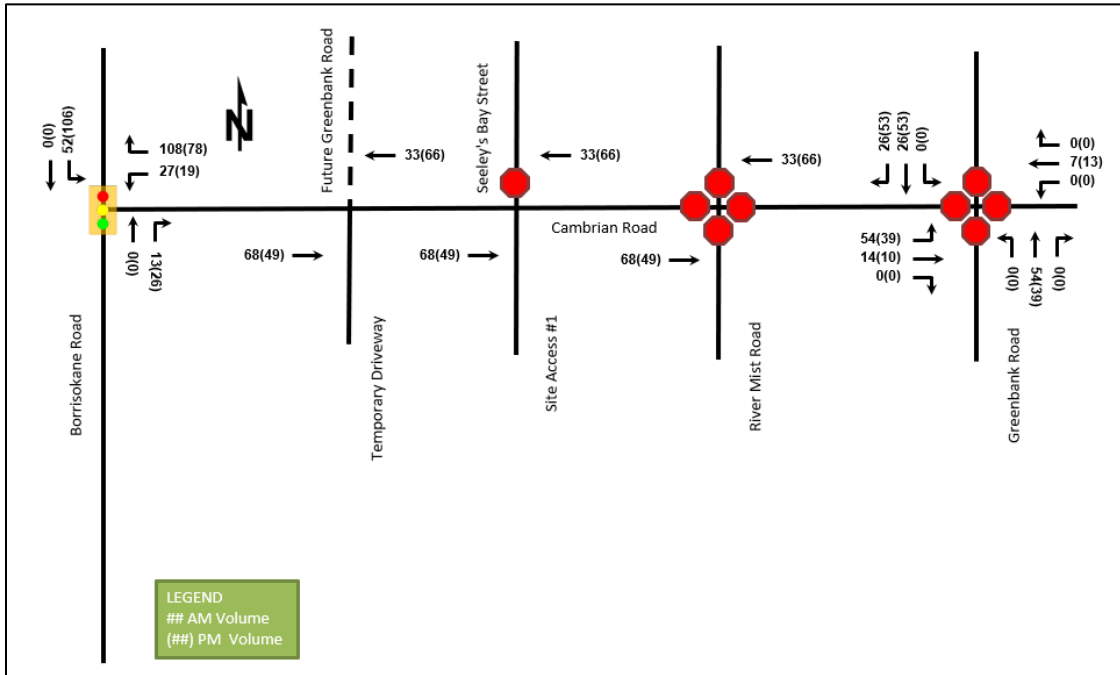
Source: Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018)

3809 Borriskane Road Site Generated Traffic Volumes - 2023



Source: 3809 Borriskane Road Transportation Impact Assessment (CGH, 2020)

3809 Borriskane Road Site Generated Traffic Volumes - 2025



Source: 3809 Borriskane Road Transportation Impact Assessment (CGH, 2020)

3882 Barnsdale and 3960 Greenbank Road 2025 Total Future Traffic Volumes – AM Peak Hour

						26			107					
			45 50 39			72			59 274 29			6		
			↓ ↓ ↓			←			↓ ↓ ↓			←		
			25						66					
			105 →			↑ ↑ ↑			138 →			↑ ↑ ↑		
			145 →			2 147 64			6 →			70 294 11		
			4 →						166 →					
						20								
			23 11 35			← 47			31 494					
			↓ ↓ ↓			← 16			↓ ↓ ↓					
			88 →			↑ ↑ ↑			92 →			↑ ↑ ↑		
			170 →			0 9 12			155 →			53 289		
			0 →											
						134								
45 34			← 27						42 179 428			← 87		
↓ ↓			← 124						↓ ↓ ↓			← 3		
35 →									38 →			↑ ↑ ↑		
112 →									90 →			19 170 0		
									15 →					
Borisokane Road			Viewbank Road			Realigned Greenbank Road			River Mist Road			Existing Greenbank Road		

Source: Quinn's Pointe 2 Transportation Impact Assessment (Stantec, 2018)

3882 Barnsdale and 3960 Greenbank Road 2025 Total Future Traffic Volumes – PM Peak Hour

						45			61					
			97 142 30			139			140 365 89			5		
			↓ ↓ ↓			←			↓ ↓ ↓			←		
			58						23					
			55 →			↑ ↑ ↑			82 →			↑ ↑ ↑		
			78 →			0 82 30			2 →			174 333 66		
			1 →						88 →					
						38								
			89 2 28			← 169			90 393					
			↓ ↓ ↓			← 3			↓ ↓ ↓					
			49 →			↑ ↑ ↑			50 →			↑ ↑ ↑		
			93 →			0 2 4			83 →			148 544		
			0 →											
						448								
65 32			← 60						38 245 192			← 141		
↓ ↓			← 153						↓ ↓ ↓			← 0		
39 →									43 →			↑ ↑ ↑		
113 →									93 →			32 199 0		
									8 →					
Borisokane Road			Viewbank Road			Realigned Greenbank Road			River Mist Road			Existing Greenbank Road		

Source: Quinn's Pointe 2 Transportation Impact Assessment (Stantec, 2018)

3882 Barnsdale and 3960 Greenbank Road 2025 Site Generated Traffic Volumes

Kilbirne/River Mist	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	0	87	0	0	9	0	0	32	8	29	31	0
PM	0	46	0	0	33	0	0	81	30	16	17	0
SAT	0	46	0	0	33	0	0	81	30	16	17	0
	0(0)[0]	87(46)[46]	0(0)[0]	0(0)[0]	9(33)[33]	0(0)[0]	0(0)[0]	32(81)[81]	8(30)[30]	29(16)[16]	31(17)[17]	0(0)[0]

Kilbirne/Greenbank	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	7	36	0	0	0	0	0	14	2	7	0	25
PM	26	19	0	0	0	0	0	34	8	4	0	14
SAT	26	19	0	0	0	0	0	34	8	4	0	14
	7(26)[26]	36(19)[19]	0(0)[0]	0(0)[0]	0(0)[0]	0(0)[0]	0(0)[0]	14(34)[34]	2(8)[8]	7(4)[4]	0(0)[0]	5(14)[14]

Appendix F

Internal Capture Rates

**Table 6.2 Unconstrained Internal Person Trip Capture Rates
for Trip Destinations within a Mixed-Use Development**

		Weekday	
		AM Peak Hour	PM Peak Hour
To OFFICE	From Retail	4%	31%
	From Restaurant	14%	30%
	From Cinema/Entertainment	0%	6%
	From Residential	3%	57%
	From Hotel	3%	0%
To RETAIL	From Office	32%	8%
	From Restaurant	8%	50%
	From Cinema/Entertainment	0%	4%
	From Residential	17%	10%
	From Hotel	4%	2%
To RESTAURANT	From Office	23%	2%
	From Retail	50%	29%
	From Cinema/Entertainment	0%	3%
	From Residential	20%	14%
	From Hotel	6%	5%
To CINEMA/ENTERTAINMENT	From Office	0%	1%
	From Retail	0%	26%
	From Restaurant	0%	32%
	From Residential	0%	0%
	From Hotel	0%	0%
To RESIDENTIAL	From Office	0%	4%
	From Retail	2%	46%
	From Restaurant	5%	16%
	From Cinema/Entertainment	0%	4%
	From Hotel	0%	0%
To HOTEL	From Office	0%	0%
	From Retail	0%	17%
	From Restaurant	4%	71%
	From Cinema/Entertainment	0%	1%
	From Residential	0%	12%

Source: Bochner, B., K. Hooper, B. Sperry, and R. Dunphy. NCHRP Report 684: *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. Washington, DC: Transportation Research Board, Tables 101 and 102, 2011.

**Table 6.1 Unconstrained Internal Person Trip Capture Rates
for Trip Origins within a Mixed-Use Development**

		WEEKDAY	
		AM Peak Hour	PM Peak Hour
From OFFICE	To Retail	28%	20%
	To Restaurant	63%	4%
	To Cinema/Entertainment	0%	0%
	To Residential	1%	2%
	To Hotel	0%	0%
From RETAIL	To Office	29%	2%
	To Restaurant	13%	29%
	To Cinema/Entertainment	0%	4%
	To Residential	14%	26%
	To Hotel	0%	5%
From RESTAURANT	To Office	31%	3%
	To Retail	14%	41%
	To Cinema/Entertainment	0%	8%
	To Residential	4%	18%
	To Hotel	3%	7%
From CINEMA/ENTERTAINMENT	To Office	0%	2%
	To Retail	0%	21%
	To Restaurant	0%	31%
	To Residential	0%	8%
	To Hotel	0%	2%
From RESIDENTIAL	To Office	2%	4%
	To Retail	1%	42%
	To Restaurant	20%	21%
	To Cinema/Entertainment	0%	0%
	To Hotel	0%	3%
From HOTEL	To Office	75%	0%
	To Retail	14%	16%
	To Restaurant	9%	68%
	To Cinema/Entertainment	0%	0%
	To Residential	0%	2%

Source: Bochner, B., K. Hooper, B. Sperry, and R. Dunphy. NCHRP Report 684: *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. Washington, DC: Transportation Research Board, Tables 99 and 100, 2011.

Appendix G

Pass-by and Diverted Link Reduction Rates

**Table E.9 (Cont'd) Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 820—Shopping Center**

SIZE (1,000 SQ. FT. GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIP (%)			ADJ. STREET PEAK HOUR VOLUME	AVERAGE 24-HOUR TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL			
237	W. Windsor Twp, NJ	Winter 1988/89	—	4:00–6:00 p.m.	48	—	—	52	—	46,000	Booz Allen & Hamilton
242	Willow Grove, PA	Winter 1988/89	—	4:00–6:00 p.m.	37	—	—	63	—	26,000	McMahon Associates
297	Whitehall, PA	Winter 1988/89	—	4:00–6:00 p.m.	33	—	—	67	—	26,000	Orth-Rodgers & Assoc. Inc.
360	Broward Cnty., FL	Winter 1988/89	—	4:00–6:00 p.m.	44	—	—	56	—	73,000	McMahon Associates
370	Pittsburgh, PA	Winter 1988/89	—	4:00–6:00 p.m.	19	—	—	81	—	33,000	Wilbur Smith
150	Portland, OR	—	519	4:00–6:00 p.m.	68	6	26	32	—	25,000	Kittelson and Associates
150	Portland, OR	—	655	4:00–6:00 p.m.	65	7	28	35	—	30,000	Kittelson and Associates
760	Calgary, Alberta	Oct.-Dec. 1987	15,436	4:00–6:00 p.m.	20	39	41	80	—	—	City of Calgary DOT
178	Bordentown, NJ	Apr. 1989	154	2:00–6:00 p.m.	35	—	—	65	—	37,980	Raymond Keyes Assoc.
144	Manalapan, NJ	July 1990	176	3:30–6:15 p.m.	32	44	24	68	—	69,347	Raymond Keyes Assoc.
549	Natick, MA	Feb. 1989	—	4:45–5:45 p.m.	33	26	41	67	—	48,782	Raymond Keyes Assoc.

Average Pass-By Trip Percentage: 34

“—” means no data were provided

**Table E.10 Pass-By and Non-Pass-By Trips Saturday, Mid-Day Peak Period
Land Use Code 820—Shopping Center**

SIZE (1,000 SQ. FT. GFA)	LOCATION	SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
						PRIMARY	DIVERTED	TOTAL		
720	Framingham, MA	Feb. 1984	258	11:00 a.m.—4:00 p.m.	23	34	43	77	—	Raymond Keyes Assoc.
600	Brandywine, DE	Apr. 1983	256	10:00 a.m.—3:00 p.m.	17	50	33	83	—	Raymond Keyes Assoc.
880	Christiana, DE	July 1984	198	11:00 a.m.—4:00 p.m.	5	55	40	95	—	Raymond Keyes Assoc.
234	Huntington LI, NY	Nov. 1985	223	11:00 a.m.—3:00 p.m.	39	22	39	61	—	Raymond Keyes Assoc.
658	Wayne, NJ	Sept. 1984	329	11:00 a.m.—4:00 p.m.	46	44	10	54	—	Raymond Keyes Assoc.
622	Ramsey Cnty, MN	Nov. 1985	119	11:00 a.m.—3:00 p.m.	23	21	56	77	—	Raymond Keyes Assoc.
736	Pensacola, FL	Oct. 1985	680	11:00 a.m.—3:00 p.m.	20	31	49	80	—	Raymond Keyes Assoc.
430	Ross, PA	June 1980	425	11:00 a.m.—4:00 p.m.	22	—	—	78	—	Raymond Keyes Assoc.
176	Tampa Springs, FL	May 1986	188	11:00 a.m.—3:00 p.m.	31	42	27	69	—	Raymond Keyes Assoc.
144	Manalapan, NJ	July 1990	264	11:00 a.m.—3:15 p.m.	31	47	22	69	63,362	Raymond Keyes Assoc.
549	Natick, MA	Feb. 1989	—	2:15–3:15 p.m.	28	39	33	72	48,782	Raymond Keyes Assoc.

Average Pass-By Trip Percentage: 26

“—” means no data were provided

**Table E.13 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 850—Supermarket**

SIZE (1,000 SQ. FT. GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			AVERAGE DAILY TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL		
30	Overland Park, KS	1987	40	4:30–5:30 p.m.	32	48	20	68	—	—
<25	Chicago suburbs, IL	1987	155	3:00–6:00 p.m.	56	—	—	44	—	Kenig, O'Hara, Humes, Flock
<25	Chicago suburbs, IL	1987	191	3:00–6:00 p.m.	57	—	—	43	—	Kenig, O'Hara, Humes, Flock
<25	Chicago suburbs, IL	1987	113	3:00–6:00 p.m.	56	—	—	44	—	Kenig, O'Hara, Humes, Flock
34	Omaha, NE	—	—	4:00–6:00 p.m.	44	29	27	56	15,200	University of Nebraska— Lincoln
66	Omaha, NE	—	—	4:00–6:00 p.m.	23	30	47	77	63,000	University of Nebraska— Lincoln
70	Omaha, NE	—	—	4:00–6:00 p.m.	26	30	44	74	34,300	University of Nebraska— Lincoln
31	Omaha, NE	—	—	4:00–6:00 p.m.	19	36	45	81	48,700	University of Nebraska— Lincoln
31	Omaha, NE	—	—	4:00–6:00 p.m.	28	40	32	72	23,500	University of Nebraska— Lincoln
55	Omaha, NE	—	—	4:00–6:00 p.m.	27	35	38	73	27,200	University of Nebraska— Lincoln
65	Omaha, NE	—	—	4:00–6:00 p.m.	25	25	50	75	44,700	University of Nebraska— Lincoln
31	Orlando, FL	1993	440	2:00–6:00 p.m.	35	—	—	65	—	TPD Inc.

Average Pass-By Trip Percentage: 36

“—” means no data were provided

Supermarket										
Travel Mode	Mode Share	In	Out	Total	In	Out	Total	In	Out	Total
Auto Driver	60%	76	51	127	157	151	307	175	169	344
Pass by %	-	-			36%			28%		
Pass by	-				-55	-56	-111	-48	-48	-96
Diverted Link %	-	-			38.00%			41.00%		
Diverted link	-				-58	-59	-117	-70	-71	-141
Net Auto Driver	60%	76	51	127	44	36	79	57	50	107
Auto Passenger	15%	19	13	32	39	38	77	44	42	86
Transit	15%	19	13	32	39	38	77	44	42	86
Bicycle	1%	1	1	2	3	3	5	3	3	6
Walk	9%	12	7	19	23	21	46	26	25	51
Total	100.00%	127	85	212	261	251	512	292	281	573

Shopping Center										
Travel Mode	Mode Share	In	Out	Total	In	Out	Total	In	Out	Total
Auto Driver	60%	4	2	7	13	13	26	16	15	31
Pass by %	-	-			34%			26%		
Pass by	-				-4	-5	-9	-4	-4	-8
Diverted Link %	-	-			32%			35.00%		
Diverted link	-				-4	-4	-8	-5	-6	-11
Net Auto Driver	60%	4	2	7	5	4	9	7	5	12
Auto Passenger	15%	1	1	2	3	3	7	4	4	8
Transit	15%	1	1	2	3	3	7	4	4	8
Bicycle	1%	0	0	0	0	0	0	0	0	1
Walk	9%	0	0	0	3	3	4	3	2	4
Total	100%	6	4	11	22	22	44	27	25	52

Appendix H

TDM Checklists

TDM Measures Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend	
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance
★	The measure is one of the most dependably effective tools to encourage the use of sustainable modes

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
1. TDM PROGRAM MANAGEMENT		
1.1 Program coordinator		
BASIC	★	1.1.1 Designate an internal coordinator, or contract with an external coordinator <input type="checkbox"/>
1.2 Travel surveys		
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress <input type="checkbox"/>
2. WALKING AND CYCLING		
2.1 Information on walking/cycling routes & destinations		
BASIC		2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances <input checked="" type="checkbox"/>
2.2 Bicycle skills training		
<i>Commuter travel</i>		
BETTER	★	2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses <input type="checkbox"/>
2.3 Valet bike parking		
<i>Visitor travel</i>		
BETTER		2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games) <input type="checkbox"/>

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
3. TRANSIT		
3.1 Transit information		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances	<input checked="" type="checkbox"/>
BASIC	3.1.2 Provide online links to OC Transpo and STO information	<input type="checkbox"/>
BETTER	3.1.3 Provide real-time arrival information display at entrances	<input type="checkbox"/>
3.2 Transit fare incentives		
<i>Commuter travel</i>		
BETTER	3.2.1 Offer preloaded PRESTO cards to encourage commuters to use transit	<input type="checkbox"/>
BETTER ★	3.2.2 Subsidize or reimburse monthly transit pass purchases by employees	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.2.3 Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	<input type="checkbox"/>
3.3 Enhanced public transit service		
<i>Commuter travel</i>		
BETTER	3.3.1 Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.3.2 Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	<input type="checkbox"/>
3.4 Private transit service		
<i>Commuter travel</i>		
BETTER	3.4.1 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.4.2 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	<input type="checkbox"/>

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
4. RIDESHARING		
4.1 Ridematching service		
<i>Commuter travel</i>		
BASIC	★ 4.1.1 Provide a dedicated ridematching portal at OttawaRideMatch.com	<input type="checkbox"/>
4.2 Carpool parking price incentives		
<i>Commuter travel</i>		
BETTER	4.2.1 Provide discounts on parking costs for registered carpools	<input type="checkbox"/>
4.3 Vanpool service		
<i>Commuter travel</i>		
BETTER	4.3.1 Provide a vanpooling service for long-distance commuters	<input type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Bikeshare stations & memberships		
BETTER	5.1.1 Contract with provider to install on-site bikeshare station for use by commuters and visitors	<input type="checkbox"/>
<i>Commuter travel</i>		
BETTER	5.1.2 Provide employees with bikeshare memberships for local business travel	<input type="checkbox"/>
5.2 Carshare vehicles & memberships		
<i>Commuter travel</i>		
BETTER	5.2.1 Contract with provider to install on-site carshare vehicles and promote their use by tenants	<input type="checkbox"/>
BETTER	5.2.2 Provide employees with carshare memberships for local business travel	<input type="checkbox"/>
6. PARKING		
6.1 Priced parking		
<i>Commuter travel</i>		
BASIC	★ 6.1.1 Charge for long-term parking (daily, weekly, monthly)	<input type="checkbox"/>
BASIC	6.1.2 Unbundle parking cost from lease rates at multi-tenant sites	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	6.1.3 Charge for short-term parking (hourly)	<input type="checkbox"/>

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
7. TDM MARKETING & COMMUNICATIONS		
7.1 Multimodal travel information		
<i>Commuter travel</i>		
BASIC ★	7.1.1 Provide a multimodal travel option information package to new/relocating employees and students	<input checked="" type="checkbox"/>
<i>Visitor travel</i>		
BETTER ★	7.1.2 Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	<input type="checkbox"/>
7.2 Personalized trip planning		
<i>Commuter travel</i>		
BETTER ★	7.2.1 Offer personalized trip planning to new/relocating employees	<input type="checkbox"/>
7.3 Promotions		
<i>Commuter travel</i>		
BETTER	7.3.1 Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	<input type="checkbox"/>
8. OTHER INCENTIVES & AMENITIES		
8.1 Emergency ride home		
<i>Commuter travel</i>		
BETTER ★	8.1.1 Provide emergency ride home service to non-driving commuters	<input type="checkbox"/>
8.2 Alternative work arrangements		
<i>Commuter travel</i>		
BASIC ★	8.2.1 Encourage flexible work hours	<input type="checkbox"/>
BETTER	8.2.2 Encourage compressed workweeks	<input type="checkbox"/>
BETTER ★	8.2.3 Encourage telework	<input type="checkbox"/>
8.3 Local business travel options		
<i>Commuter travel</i>		
BASIC ★	8.3.1 Provide local business travel options that minimize the need for employees to bring a personal car to work	<input type="checkbox"/>
8.4 Commuter incentives		
<i>Commuter travel</i>		
BETTER	8.4.1 Offer employees a taxable, mode-neutral commuting allowance	<input type="checkbox"/>
8.5 On-site amenities		
<i>Commuter travel</i>		
BETTER	8.5.1 Provide on-site amenities/services to minimize mid-day or mid-commute errands	<input type="checkbox"/>

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend	
REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	<input type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/>
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations <i>(see Official Plan policy 4.3.3)</i>	<input type="checkbox"/>
REQUIRED	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible <i>(see Official Plan policy 4.3.12)</i>	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (<i>see Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (<i>see Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (<i>see Official Plan policy 4.3.11</i>)	<input type="checkbox"/>
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	<input type="checkbox"/>
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	<input type="checkbox"/>
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	<input type="checkbox"/>
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	<input checked="" type="checkbox"/>
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	<input type="checkbox"/>

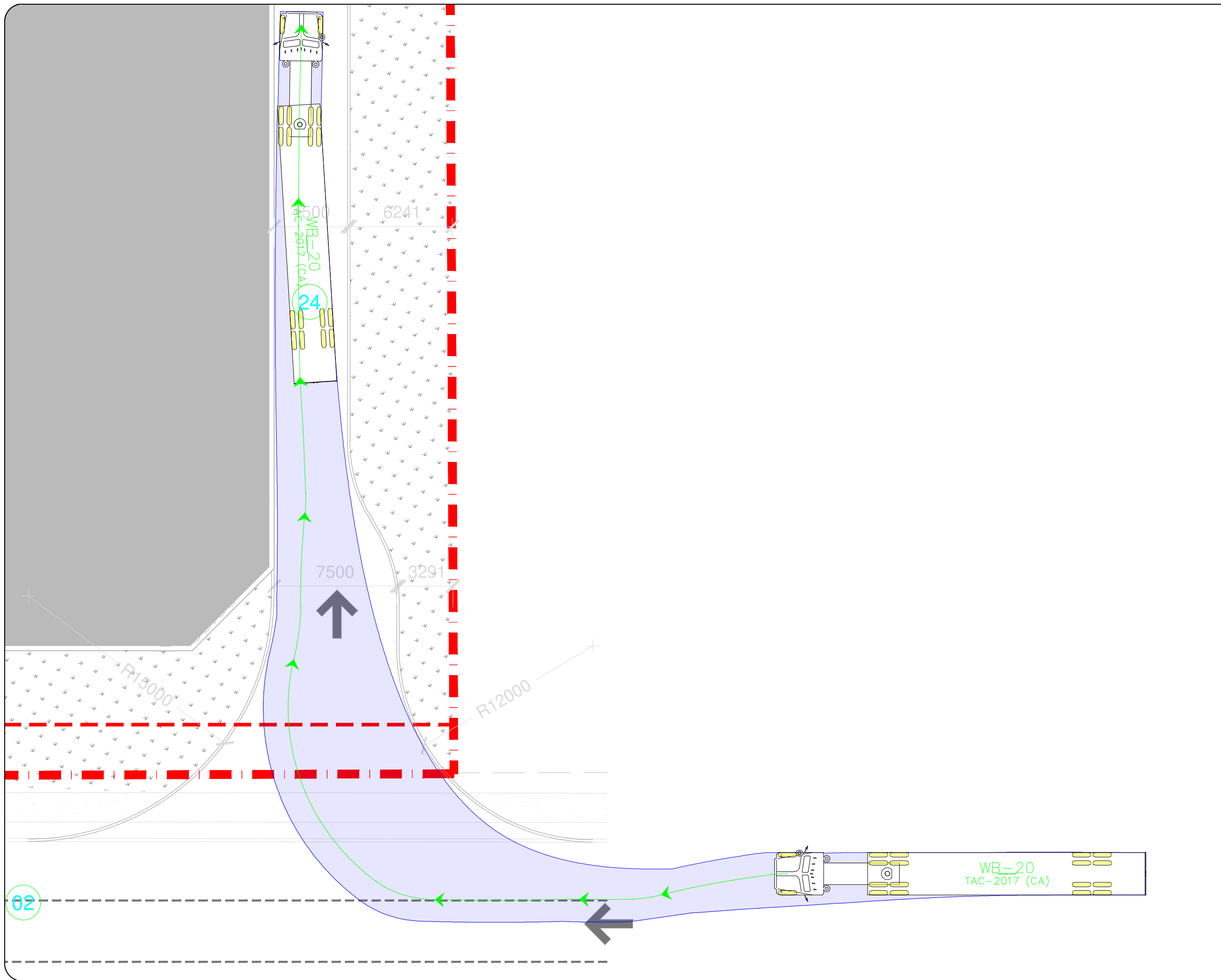
TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (<i>see Official Plan policy 4.3.6</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (<i>see Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (<i>see Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	<input type="checkbox"/>
BETTER	2.1.5 Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	<input type="checkbox"/>
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (<i>see Zoning By-law Section 111</i>)	<input type="checkbox"/>
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	<input type="checkbox"/>
2.3 Shower & change facilities		
BASIC	2.3.1 Provide shower and change facilities for the use of active commuters	<input type="checkbox"/>
BETTER	2.3.2 In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	<input type="checkbox"/>
2.4 Bicycle repair station		
BETTER	2.4.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	<input type="checkbox"/>
4.2 Carpool parking		
BASIC	4.2.1 Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	<input type="checkbox"/>
BETTER	4.2.2 At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	<input type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces (<i>see Zoning By-law Section 94</i>)	<input type="checkbox"/>
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	<input type="checkbox"/>
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (<i>see Zoning By-law Section 104</i>)	<input type="checkbox"/>
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (<i>see Zoning By-law Section 111</i>)	<input type="checkbox"/>
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	<input type="checkbox"/>
7. OTHER		
7.1 On-site amenities to minimize off-site trips		
BETTER	7.1.1 Provide on-site amenities to minimize mid-day or mid-commute errands	<input type="checkbox"/>

Appendix I

Turning Templates



Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
 13 Markham Ave
 Ottawa, ON
 K2G 3Z1
 (343) 999-9117

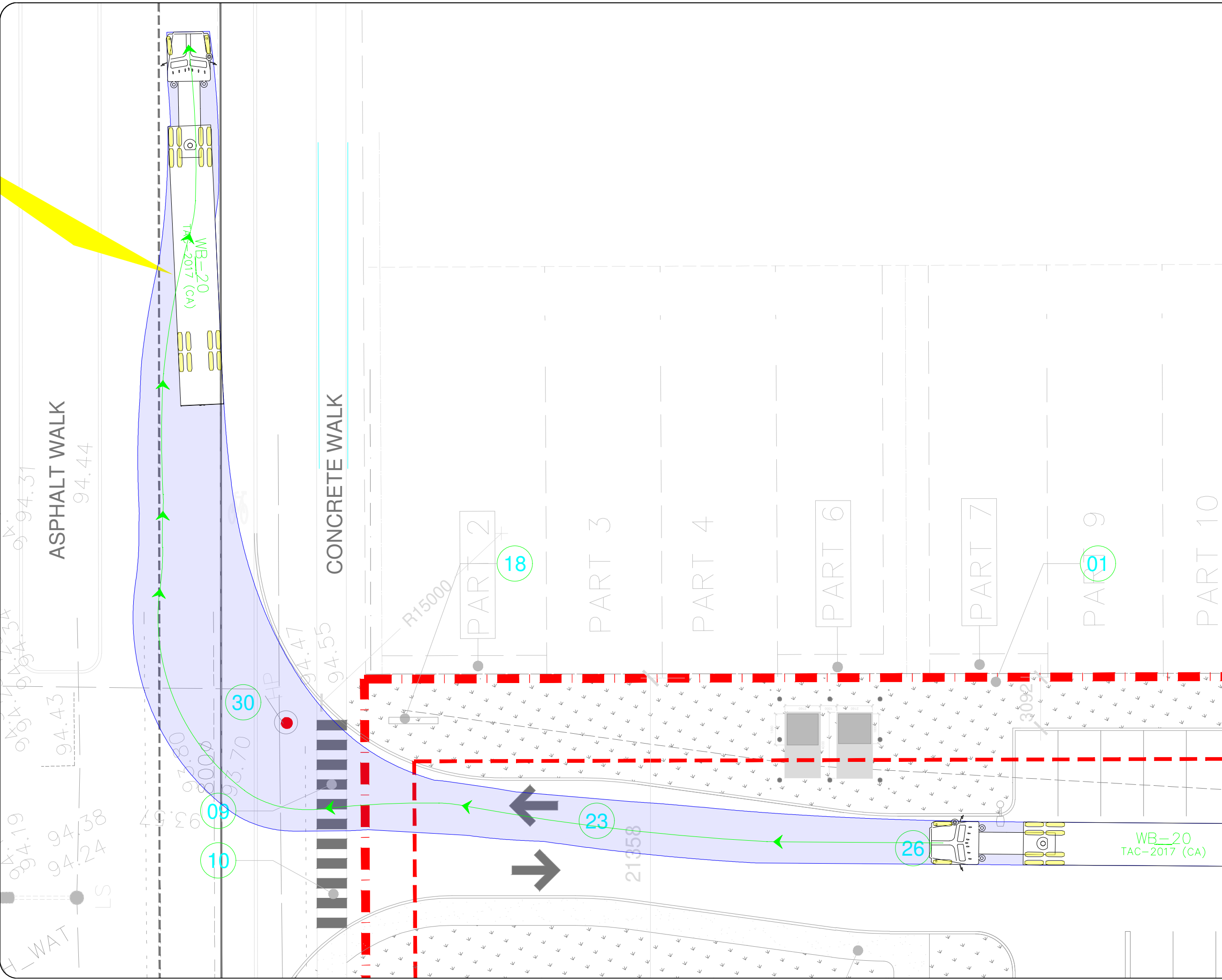
CLIENT: Metro Ontario Inc.
 25 Vickers Road Building A, 2nd Floor
 Etobicoke, ON
 M9B 1C1

ARCHITECT: RLA Architecture
 56 Beech Street
 Ottawa, ON
 K1S3J6

SITE: Metro Cambrian Road

TITLE: South Access

SCALE AT A3: NTS	DATE: 2020-08-27	DRAWN: JK	CHECKED: MC
PROJECT NO: 2019-54	DRAWING NO: 001	REVISION: 03	



Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

 **CGH Transportation**
 13 Markham Ave
 Ottawa, ON
 K2G 3Z1
 (343) 999-9117

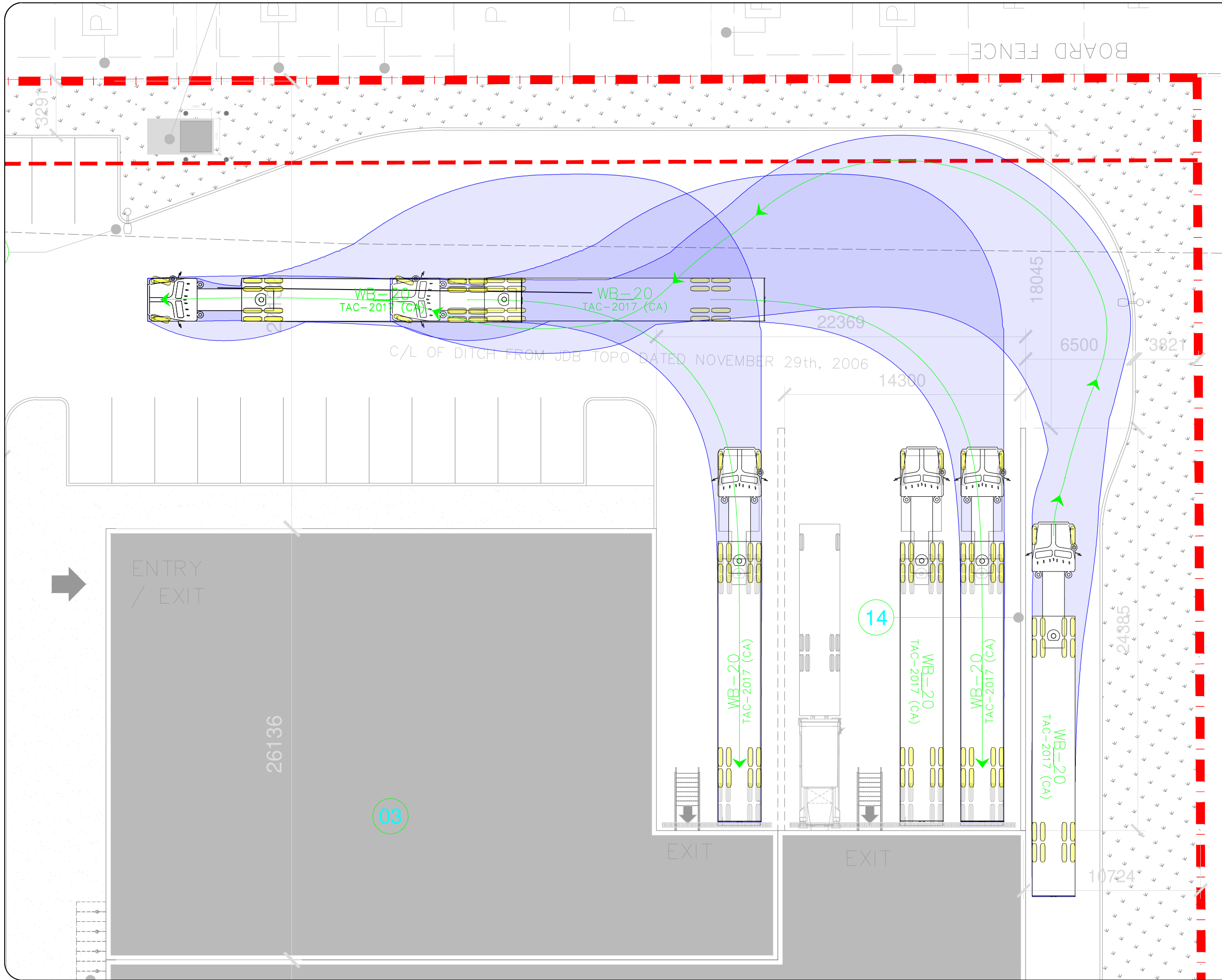
CLIENT: Metro Ontario Inc.
 25 Vickers Road Building A, 2nd Floor
 Etobicoke, ON
 M9B 1C1

ARCHITECT: RLA Architecture
 56 Beech Street
 Ottawa, ON
 K1S 3J6

SITE: Metro Cambrian Road

TITLE: Northeast Access
 (Ultimate)

SCALE AT A3: NTS	DATE: 2020-08-27	DRAWN: JK	CHECKED: MC
PROJECT NO: 2019-54	DRAWING NO: 002	REVISION: 03	



Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
 13 Markham Ave
 Ottawa, ON
 K2G 3Z1
 (343) 999-9117

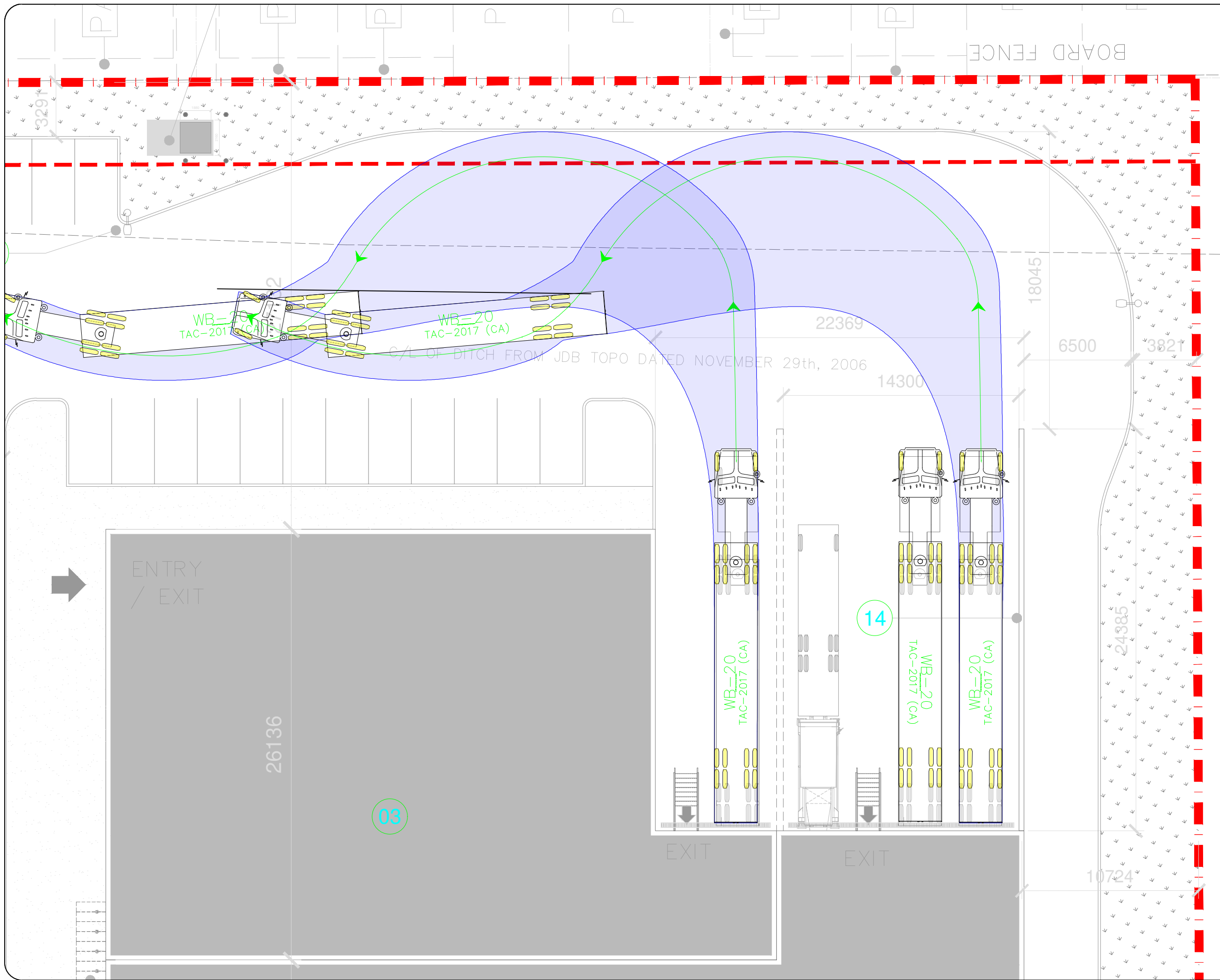
CLIENT: Metro Ontario Inc.
 25 Vickers Road Building A, 2nd Floor
 Etobicoke, ON
 M9B 1C1

ARCHITECT: RLA Architecture
 56 Beech Street
 Ottawa, ON
 K1S3J6

SITE: Metro Cambrian Road

TITLE: Loading Bay Entry

SCALE AT A3: NTS	DATE: 2020-08-27	DRAWN: JK	CHECKED: MC
PROJECT NO: 2019-54	DRAWING NO: 003	REVISION: 03	



Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			


CGH Transportation
 13 Markham Ave
 Ottawa, ON
 K2G 3Z1
 (343) 999-9117

CLIENT: Metro Ontario Inc.
 25 Vickers Road Building A, 2nd Floor
 Etobicoke, ON
 M9B 1C1

ARCHITECT: RLA Architecture
 56 Beech Street
 Ottawa, ON
 K1S3J6

SITE: Metro Cambrian Road

TITLE: Loading Bay Exit

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2020-08-27	JK	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2019-54	004	03	

Appendix J

Future Cambrian Road and Re-aligned Greenbank Road Cross-Sections



CAMBRIAN ROAD

CAMBRIAN ROAD

CAMBRIAN ROAD

3.0m MULTI-USE PATH

CAMBRIAN ROAD

CAMBRIAN ROAD

CAMBRIAN ROAD

JOCKVALE ROAD

RIVER ROCK AVENUE

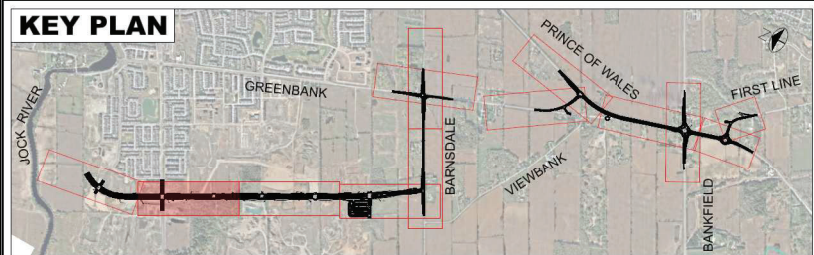
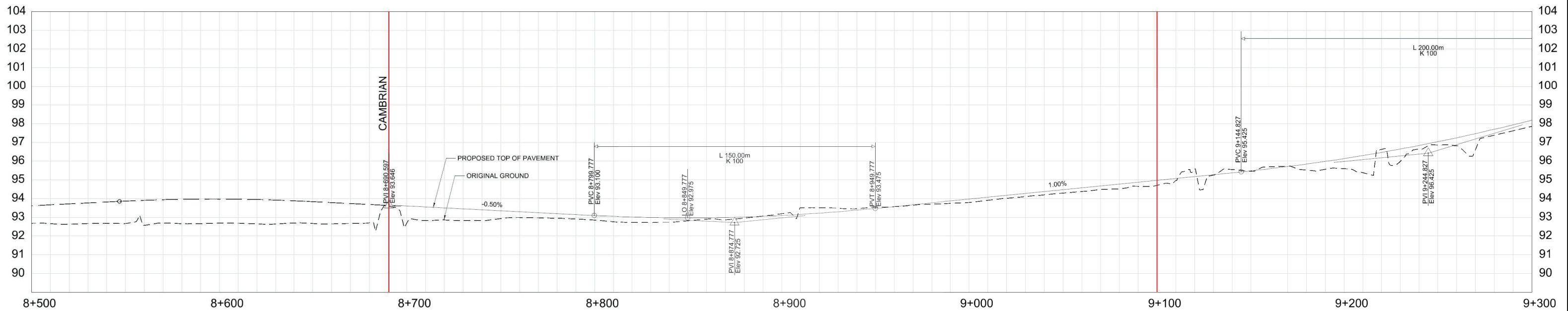
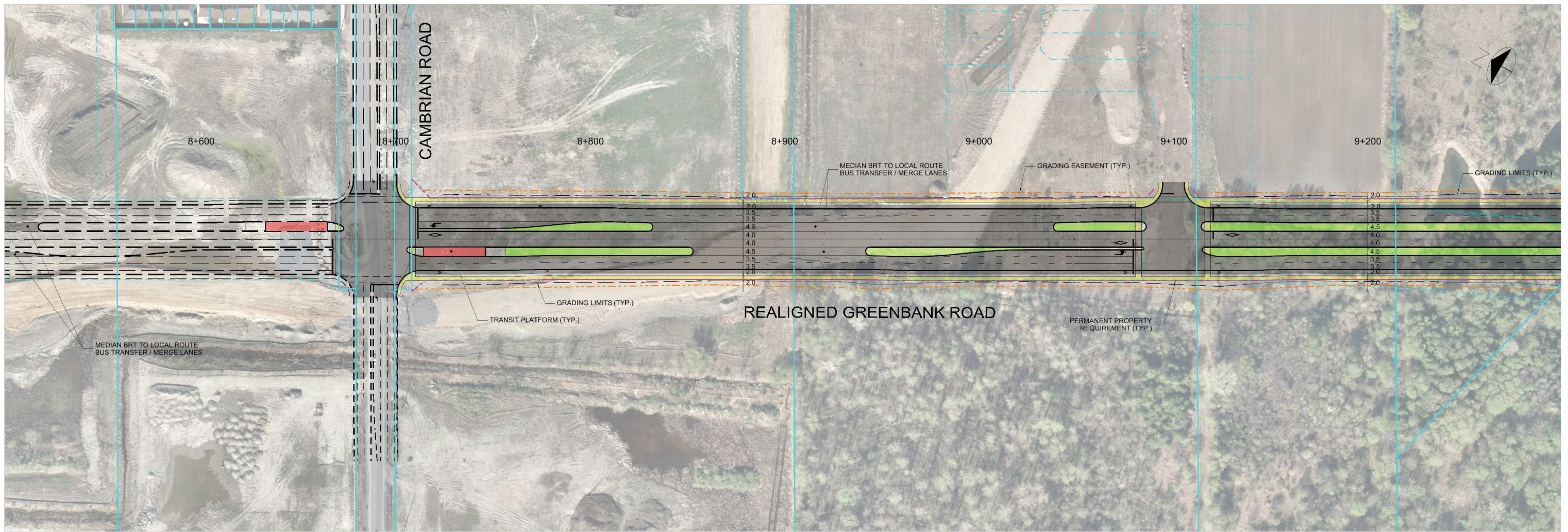
RIVER ROCK AVENUE

SUNSET CAVE CIRCLE

GRAND VISTA CIRCLE

RECREATION COMPLEX

ST. CECILIA CATHOLIC CHURCH



REALIGNED GREENBANK ROAD AND SOUTH WEST TRANSITWAY EXTENSION

RE-ALIGNED GREENBANK ROAD

PLAN AND PROFILE
STA. 8+500 TO STA. 9+300

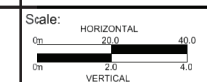
PLATE NO.
PP2



PLANNING AND GROWTH MANAGEMENT DEPARTMENT

Des:	J.Z.	Chkd:	P.H.	Date:	
Dwn:	M.S.	Chkd:	P.H.		

JUNE 2014



Appendix K

City of Ottawa Scoping Report Comments

Viktoriya Zaytseva

From: Giampa, Mike <Mike.Giampa@ottawa.ca>
Sent: July 22, 2020 9:48 AM
To: Mark Crockford
Cc: Viktoriya Zaytseva; Christopher Gordon
Subject: RE: 3831 Cambrian Road - Step 1/2 TIA

Hi Mark,

Nothing has changed regarding the timing of these roads- they are not on the 10-year affordable plan. Any work on these roads will be considered temporary and not DC eligible.

Regarding 541 Chimney Court, there was a part lot control in 2019 but its part of the HMB West 2016 CTS, so you're covered.

Please proceed to step 3, thanks.

Mike

From: Mark Crockford <mark.crockford@cghtransportation.com>
Sent: July 21, 2020 3:20 PM
To: Giampa, Mike <Mike.Giampa@ottawa.ca>
Cc: Viktoriya Zaytseva <viktoriya.zaytseva@cghtransportation.com>; Christopher Gordon <christopher.gordon@cghtransportation.com>
Subject: 3831 Cambrian Road - Step 1/2 TIA

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Attached is our Step 1/2 document for 3831 Cambrian Road.

We do have a few questions that will help inform our Step 3.

As this project is right at the corner of Cambrian Road and future realigned Greenbank Road, we would like to know if there is anymore information, beyond what is in the TMP, regarding the timing of the widening of Cambrian, and the construction of Greenbank Road. The timing of these and how we discuss these relative to our site will be an important aspect of this project.

We also have one development that we believe has been built, but won't be accounted for in our traffic counts, which is 541 Chimney Corner Terrace. This report is not listed on Devapps, but we are hoping you can provide us with a copy.

Thanks and we look forward to your comments.

Thanks,
Mark



Mark Crockford, P.Eng.

CGH Transportation Inc.

P:905-251-4070

E:Mark.Crockford@CGHTransportation.com

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Appendix L

MMLOS Worksheets

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2023 Future Background AM		12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	B	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	D	D	D	
		C				D			
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	C	C	C	-	B	B	B	B	
Level of Service	D	D	F	-	D	F	F	F	
		F				F			
Transit	Average Signal Delay	≤ 20 sec	≤ 10 sec	≤ 20 sec		≤ 10 sec	≤ 20 sec	≤ 20 sec	≤ 40 sec
	Level of Service	C	B	C	-	B	C	C	E
		C				E			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
		E				E			
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.71 - 0.80			
	Level of Service	B				C			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2023 Future Background PM		12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	B	C	-	C	D	D	D
	Cycle Length								
	Effective Walk Time								
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	D	D	D	
		C				D			
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	D	F	-	D	F	F	F	
		F				F			
Transit	Average Signal Delay	≤ 40 sec	> 40 sec	≤ 20 sec		≤ 20 sec	≤ 20 sec	≤ 40 sec	≤ 30 sec
	Level of Service	E	F	C	-	C	C	E	D
		F				E			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
		E				E			
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.61 - 0.70			
	Level of Service	D				B			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2023 Future Background SAT		12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	B	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	D	D	D	
		C				D			
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	D	F	-	D	F	F	F	
		F				F			
Transit	Average Signal Delay	≤ 40 sec	> 40 sec	≤ 20 sec		≤ 20 sec	≤ 20 sec	≤ 40 sec	≤ 30 sec
	Level of Service	E	F	C	-	C	C	E	D
		F				E			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
		E				E			
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.61 - 0.70			
	Level of Service	D				B			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2023 Future Total AM		12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	B	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	D	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	D	F	-	D	F	F	F	
	F				F				
Transit	Average Signal Delay	≤ 20 sec	≤ 10 sec	≤ 20 sec		≤ 10 sec	≤ 20 sec	≤ 20 sec	≤ 40 sec
	Level of Service	C	B	C	-	B	C	C	E
	C				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.71 - 0.80			
	Level of Service	B				C			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2023 Future Total PM		12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	B	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	D	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	D	F	-	D	F	F	F	
	F				F				
Transit	Average Signal Delay	≤ 40 sec	> 40 sec	≤ 20 sec		≤ 20 sec	≤ 20 sec	≤ 40 sec	≤ 30 sec
	Level of Service	E	F	C	-	C	C	E	D
	F				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.71 - 0.80			
	Level of Service	D				C			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2023 Future Total SAT		12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	B	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	D	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	D	F	-	D	F	F	F	
	F				F				
Transit	Average Signal Delay	≤ 40 sec	> 40 sec	≤ 20 sec		≤ 20 sec	≤ 20 sec	≤ 40 sec	≤ 30 sec
	Level of Service	E	F	C	-	C	C	E	D
	F				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.71 - 0.80			
	Level of Service	D				C			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2028 Future Background AM		12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	C	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	C	C	-	C	D	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	F	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	F	F	-	D	F	F	F	
	F				F				
Transit	Average Signal Delay	> 40 sec	≤ 30 sec	> 40 sec		≤ 20 sec	≤ 40 sec	≤ 30 sec	≤ 40 sec
	Level of Service	F	D	F	-	C	E	D	E
	F				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio	> 1.00				0.81 - 0.90			
	Level of Service	F				D			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2028 Future Background PM		12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	C	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	C	C	-	C	D	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	F	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	F	F	-	D	F	F	F	
	F				F				
Transit	Average Signal Delay	> 40 sec	> 40 sec	≤ 30 sec		≤ 20 sec	≤ 30 sec	≤ 40 sec	≤ 30 sec
	Level of Service	F	F	D	-	C	D	E	D
	F				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio	> 1.00				0.71 - 0.80			
	Level of Service	F				C			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2028 Future Background SAT		12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	C	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	C	C	-	C	D	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	F	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	F	F	-	D	F	F	F	
	F				F				
Transit	Average Signal Delay	> 40 sec	> 40 sec	≤ 30 sec		≤ 20 sec	≤ 30 sec	≤ 40 sec	≤ 30 sec
	Level of Service	F	F	D	-	C	D	E	D
	F				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio	> 1.00				0.71 - 0.80			
	Level of Service	F				C			

Multi-Modal Level of Service - Intersections Form

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Scenario
Comments

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2028 Future Total AM

Project
Date

2019-54
12-Aug-20

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	C	C	-	C	D	D	D
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	C	C	-	C	D	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	F	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	F	F	-	D	F	F	F	
	F				F				
Transit	Average Signal Delay	> 40 sec	≤ 30 sec	> 40 sec		≤ 20 sec	≤ 40 sec	≤ 30 sec	≤ 40 sec
	Level of Service	F	D	F	-	C	E	D	E
	F				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio		> 1.00				0.81 - 0.90		
	Level of Service	F				D			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-54
Scenario	2028 Future Total PM	Date	12-Aug-20
Comments			

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	C	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	C	C	-	C	D	D	D	
		C				D			
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	F	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	F	F	-	D	F	F	F	
		F				F			
Transit	Average Signal Delay	> 40 sec	> 40 sec	≤ 30 sec		≤ 20 sec	≤ 30 sec	≤ 40 sec	≤ 30 sec
	Level of Service	F	F	D	-	C	D	E	D
		F				E			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
		E				E			
Auto	Volume to Capacity Ratio		> 1.00				0.81 - 0.90		
	Level of Service		F				D		

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-54
Scenario	2028 Future Total SAT	Date	12-Aug-20
Comments			

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	4	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	53	53	53
	Ped. Exposure to Traffic LoS	B	C	C	-	C	D	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	C	C	-	C	D	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	> 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	F	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	F	F	-	D	F	F	F	
	F				F				
Transit	Average Signal Delay	> 40 sec	> 40 sec	≤ 30 sec		≤ 20 sec	≤ 30 sec	≤ 40 sec	≤ 30 sec
	Level of Service	F	F	D	-	C	D	E	D
	F				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio	> 1.00				0.81 - 0.90			
	Level of Service	F				D			

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2020 Existing
Comments	

Project	2019-54
Date	04-Aug-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street 1	Cambrian Road - Seeley's Bay Street to Greenbank Road 2
Pedestrian	Sidewalk Width	F	< 1.5 m	1.5 m
	Boulevard Width		n/a	< 0.5 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000
	Operating Speed		> 60 km/h	> 30 to 50 km/h
	On-Street Parking		no	no
	Exposure to Traffic PLoS		F	E
	Effective Sidewalk Width		1.2 m	1.5 m
	Pedestrian Volume		250 ped/hr	250 ped/hr
Crowding PLoS	B	B		
Level of Service	F	E		
Bicycle	Type of Cycling Facility	C	Curbside Bike Lane	Mixed Traffic
	Number of Travel Lanes		≤ 1 each direction	≤ 2 (no centreline)
	Operating Speed		>50 to 70 km/h	>40 to <50 km/h
	# of Lanes & Operating Speed LoS		C	B
	Bike Lane (+ Parking Lane) Width		≥ 1.2 to <1.5 m	
	Bike Lane Width LoS		C	-
	Bike Lane Blockages		Rare	
	Blockage LoS		A	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h		
Unsignalized Crossing - Lowest LoS	B	A		
Level of Service	C	B		
Transit	Facility Type	-		
	Friction or Ratio Transit:Posted Speed			
	Level of Service		-	-
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m
	Travel Lanes per Direction		1	1
	Level of Service		E	B
Auto	Level of Service	Not Applicable		

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2023 Future Background
Comments	

Project	2019-54
Date	04-Aug-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street 1	Cambrian Road - Seeley's Bay Street to Greenbank Road 2
Pedestrian	Sidewalk Width	F	< 1.5 m	1.5 m
	Boulevard Width		n/a	< 0.5 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000
	Operating Speed		> 60 km/h	> 30 to 50 km/h
	On-Street Parking		no	no
	Exposure to Traffic PLoS		F	E
	Effective Sidewalk Width		1.2 m	1.5 m
	Pedestrian Volume		250 ped/hr	250 ped/hr
Crowding PLoS	B	B		
Level of Service	F	E		
Bicycle	Type of Cycling Facility	C	Curbside Bike Lane	Mixed Traffic
	Number of Travel Lanes		≤ 1 each direction	≤ 2 (no centreline)
	Operating Speed		>50 to 70 km/h	>40 to <50 km/h
	# of Lanes & Operating Speed LoS		C	B
	Bike Lane (+ Parking Lane) Width		≥ 1.2 to <1.5 m	
	Bike Lane Width LoS		C	-
	Bike Lane Blockages		Rare	
	Blockage LoS		A	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h		
Unsignalized Crossing - Lowest LoS	B	A		
Level of Service	C	B		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
	Level of Service		D	D
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m
	Travel Lanes per Direction		1	1
	Level of Service		E	B
Auto	Level of Service	Not Applicable		

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2023 Future Total
Comments	

Project	2019-54
Date	04-Aug-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street 1	Cambrian Road - Seeley's Bay Street to Greenbank Road 2
Pedestrian	Sidewalk Width	F	< 1.5 m	1.5 m
	Boulevard Width		n/a	< 0.5 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000
	Operating Speed		> 60 km/h	> 30 to 50 km/h
	On-Street Parking		no	no
	Exposure to Traffic PLoS		F	E
	Effective Sidewalk Width		1.2 m	1.5 m
	Pedestrian Volume		250 ped/hr	250 ped/hr
Crowding PLoS	B	B		
Level of Service	F	E		
Bicycle	Type of Cycling Facility	C	Curbside Bike Lane	Mixed Traffic
	Number of Travel Lanes		≤ 1 each direction	≤ 2 (no centreline)
	Operating Speed		>50 to 70 km/h	>40 to <50 km/h
	# of Lanes & Operating Speed LoS		C	B
	Bike Lane (+ Parking Lane) Width		≥ 1.2 to <1.5 m	
	Bike Lane Width LoS		C	-
	Bike Lane Blockages		Rare	
	Blockage LoS		A	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h		
Unsignalized Crossing - Lowest LoS	B	A		
Level of Service	C	B		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
Level of Service	D	D		
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m
	Travel Lanes per Direction		1	1
Level of Service	E	B		
Auto	Level of Service	Not Applicable		

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2028 Future Background
Comments	

Project Date	2019-54
	04-Aug-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street 1	Cambrian Road - Seeley's Bay Street to Greenbank Road 2
Pedestrian	Sidewalk Width	F	< 1.5 m	1.5 m
	Boulevard Width		n/a	< 0.5 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000
	Operating Speed		> 60 km/h	> 30 to 50 km/h
	On-Street Parking		no	no
	Exposure to Traffic PLoS		F	E
	Effective Sidewalk Width		1.2 m	1.5 m
	Pedestrian Volume		250 ped/hr	250 ped/hr
Crowding PLoS	B	B		
Level of Service	F	E		
Bicycle	Type of Cycling Facility	C	Curbside Bike Lane	Mixed Traffic
	Number of Travel Lanes		≤ 1 each direction	≤ 2 (no centreline)
	Operating Speed		>50 to 70 km/h	>40 to <50 km/h
	# of Lanes & Operating Speed LoS		C	B
	Bike Lane (+ Parking Lane) Width		≥ 1.2 to <1.5 m	
	Bike Lane Width LoS		C	-
	Bike Lane Blockages		Rare	
	Blockage LoS		A	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h		
Unsignalized Crossing - Lowest LoS	B	A		
Level of Service	C	B		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
Level of Service	D	D		
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m
	Travel Lanes per Direction		1	1
Level of Service	E	B		
Auto	Level of Service	Not Applicable		

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2028 Future Total
Comments	

Project	2019-54
Date	04-Aug-20

2019-54
04-Aug-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street 1	Cambrian Road - Seeley's Bay Street to Greenbank Road 2
Pedestrian	Sidewalk Width	F	< 1.5 m	1.5 m
	Boulevard Width		n/a	< 0.5 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000
	Operating Speed		> 60 km/h	> 30 to 50 km/h
	On-Street Parking		no	no
	Exposure to Traffic PLoS		F	E
	Effective Sidewalk Width		1.2 m	1.5 m
	Pedestrian Volume		250 ped/hr	250 ped/hr
Crowding PLoS	B	B		
Level of Service	F	E		
Bicycle	Type of Cycling Facility	C	Curbside Bike Lane	Mixed Traffic
	Number of Travel Lanes		≤ 1 each direction	≤ 2 (no centreline)
	Operating Speed		>50 to 70 km/h	>40 to <50 km/h
	# of Lanes & Operating Speed LoS		C	B
	Bike Lane (+ Parking Lane) Width		≥ 1.2 to <1.5 m	
	Bike Lane Width LoS		C	-
	Bike Lane Blockages		Rare	
	Blockage LoS		A	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h		
Unsignalized Crossing - Lowest LoS	B	A		
Level of Service	C	B		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
Level of Service	D	D		
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m
	Travel Lanes per Direction		1	1
Level of Service	E	B		
Auto	Level of Service	Not Applicable		

Appendix M

Signal Warrants

Cambrian Rd at Borrisokane Road
2023 FB

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	776	108%	108%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	569	335%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	397	55%	55%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	169	225%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

Cambrian Rd at Borrisokane Road
2023 FT

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	801	111%	111%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	569	335%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	422	59%	59%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	169	225%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2 \text{ or } (AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

Cambrian Rd at Borrisokane Road
2028 FB

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1234	171%	171%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	789	464%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	709	98%	98%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	238	318%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

Cambrian Rd at Borrisokane Road
2028 FT

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1234	171%	171%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	789	464%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	709	98%	98%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	238	318%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

Temporary Driveway @ Cambrian Road
 FT 2028

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	782	109%	12%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	21	12%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	768	107%	15%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	11	15%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

Site Access #1/Seeley's Bay Street @ Cambrian Road
 FT 2028

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	889	123%	43%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	73	43%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	816	113%	15%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	11	15%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
2020 Existing Conditions

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	639	89%	89%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	193	114%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	446	62%	62%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	112	150%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
2023 Future Background

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	877	122%	122%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	227	134%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	650	90%	90%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	146	194%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2 \text{ or } (AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
2023 Future Total Conditions

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	946	131%	131%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	242	142%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	705	98%	98%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	156	207%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2 \text{ or } (AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
2028 Future Background Conditions

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1032	143%	143%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	274	161%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	757	105%	105%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	192	256%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
2028 Future Total Conditions

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1101	153%	153%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	289	170%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	812	113%	113%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	202	269%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

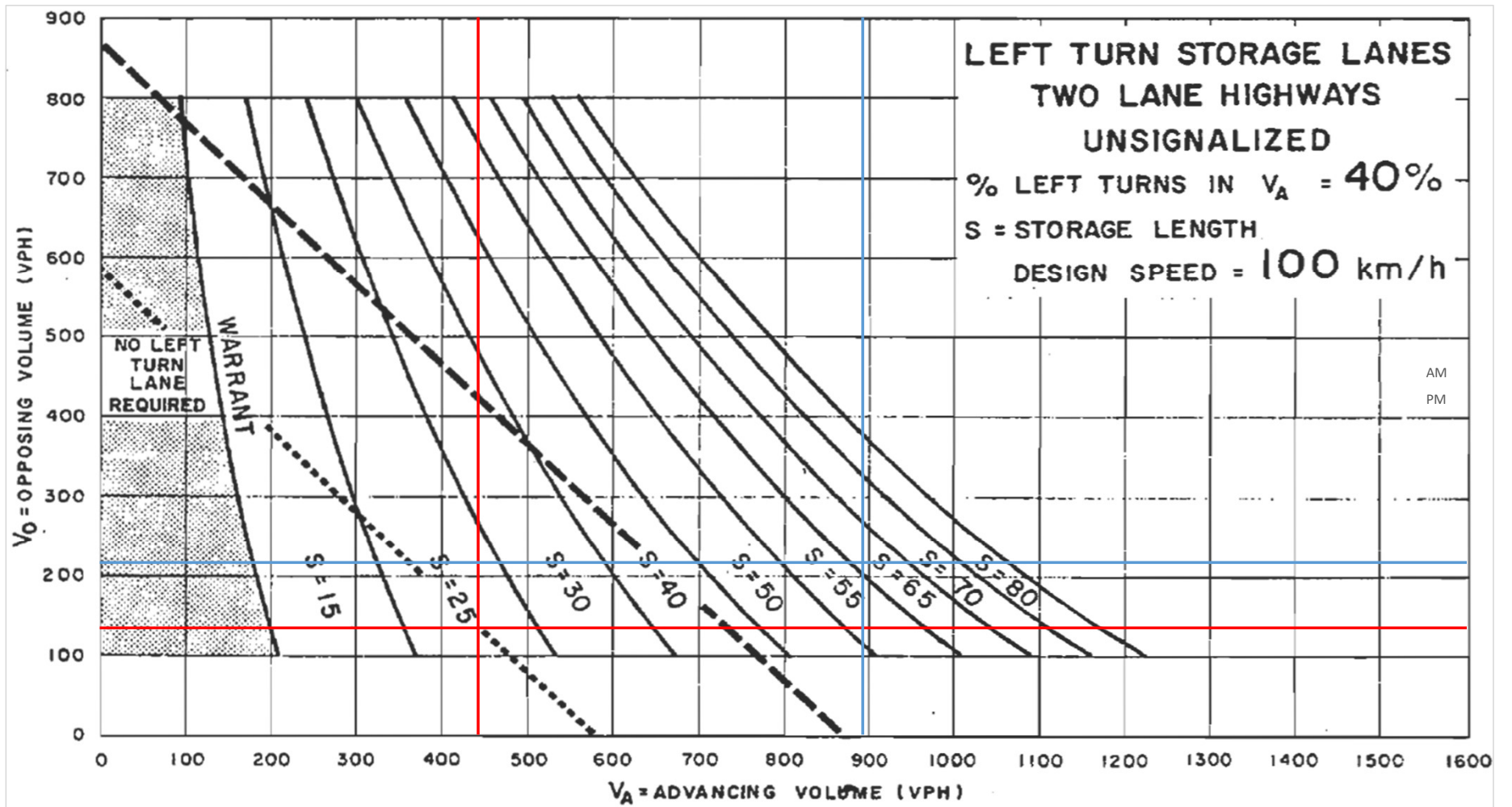
Appendix N

Left-turn Lane Warrants

Cambrian Rd @ Borrisokane Rd

FB 2023

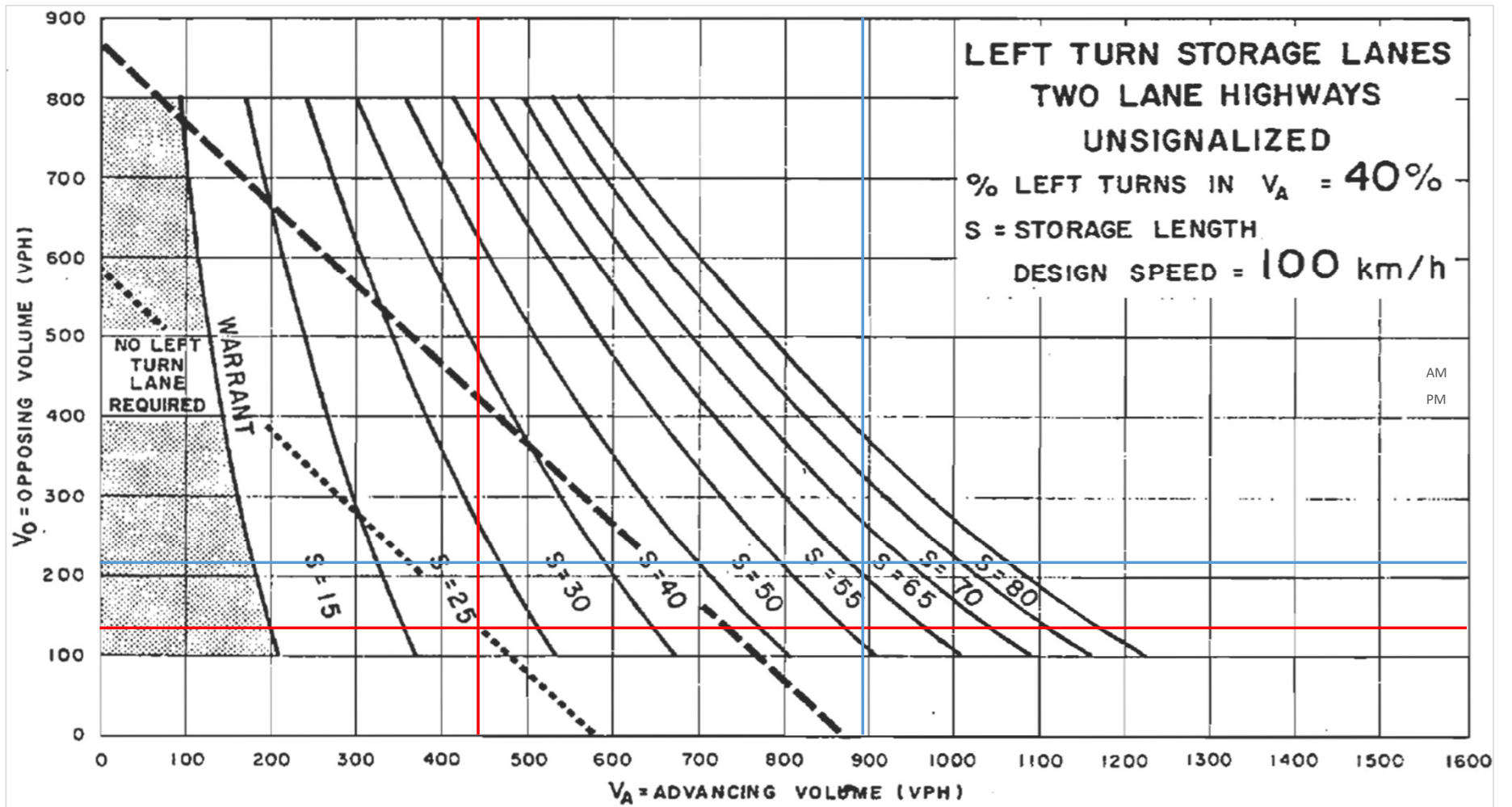
Design Speed	Southbound Left													Yes	%Left Turn	Volume Advancing	Volume Opposing
100 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
AM	0	0	0	67	0	890	0	90	44	331	112	0	74.7%	443	134		
PM	0	0	0	48	0	513	0	160	56	791	102	0	88.6%	893	216		



Cambrian Rd @ Borrisokane Rd

FT 2023

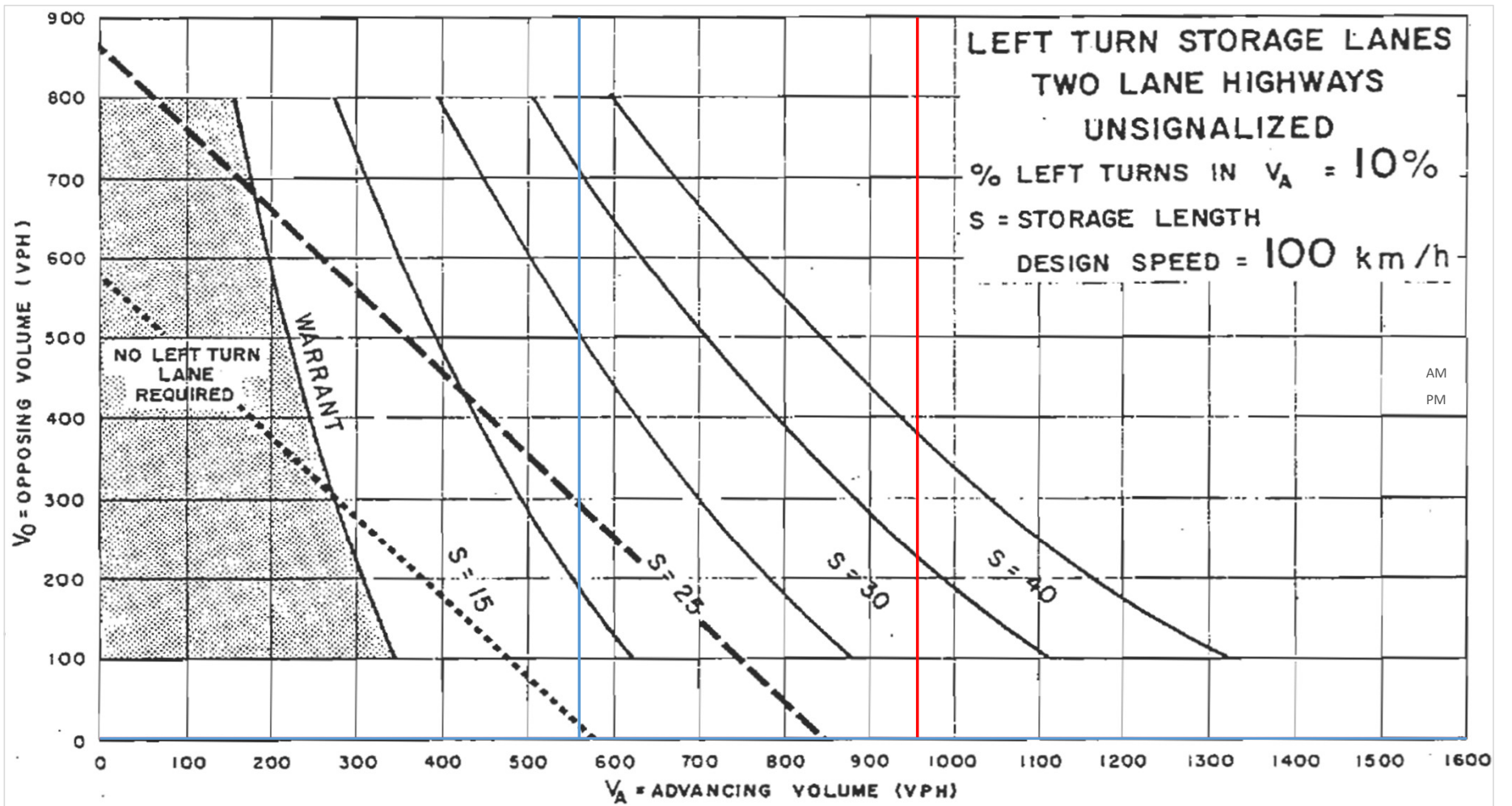
Design Speed 100 km/h	Southbound Left											Yes			
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	0	0	67	0	890	0	90	44	331	112	0	74.7%	443	134
PM	0	0	0	48	0	513	0	160	56	791	102	0	88.6%	893	216



Cambrian Rd @ Borrisokane Rd

FB 2023

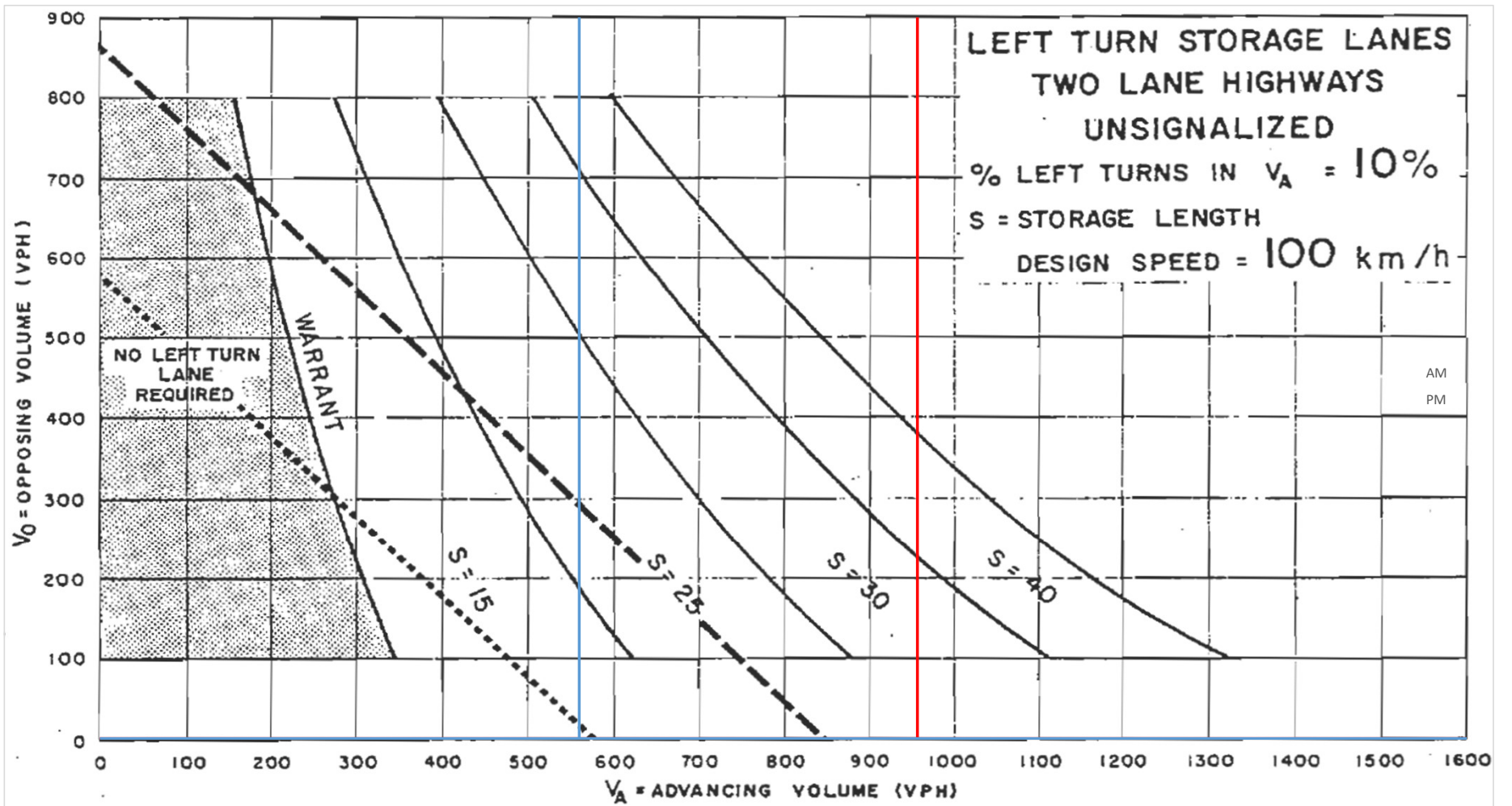
Design Speed 100 km/h	Westbound Left			Yes									%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
AM	0	0	0	67	0	890	0	90	44	331	112	0	7.0%	957	0
PM	0	0	0	48	0	513	0	16	56	791	102	0	8.6%	561	0



Cambrian Rd @ Borrisokane Rd

2023 FT

Design Speed 100 km/h	Westbound Left			Yes									%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
AM	0	0	0	67	0	890	0	90	44	331	112	0	7.0%	957	0
PM	0	0	0	48	0	513	0	160	56	791	102	0	8.6%	561	0



Cambrian Rd @ temporary Driveway
 2023 FT

Design Speed	Westbound Left			Yes										%Left Turn	Volume Advancing	Volume Opposing
60 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
AM	0	461	20	8	736	0	13	0	5	0	0	0	0	1.1%	744	481
PM	0	672	47	5	504	0	31	0	7	0	0	0	0	1.0%	509	719

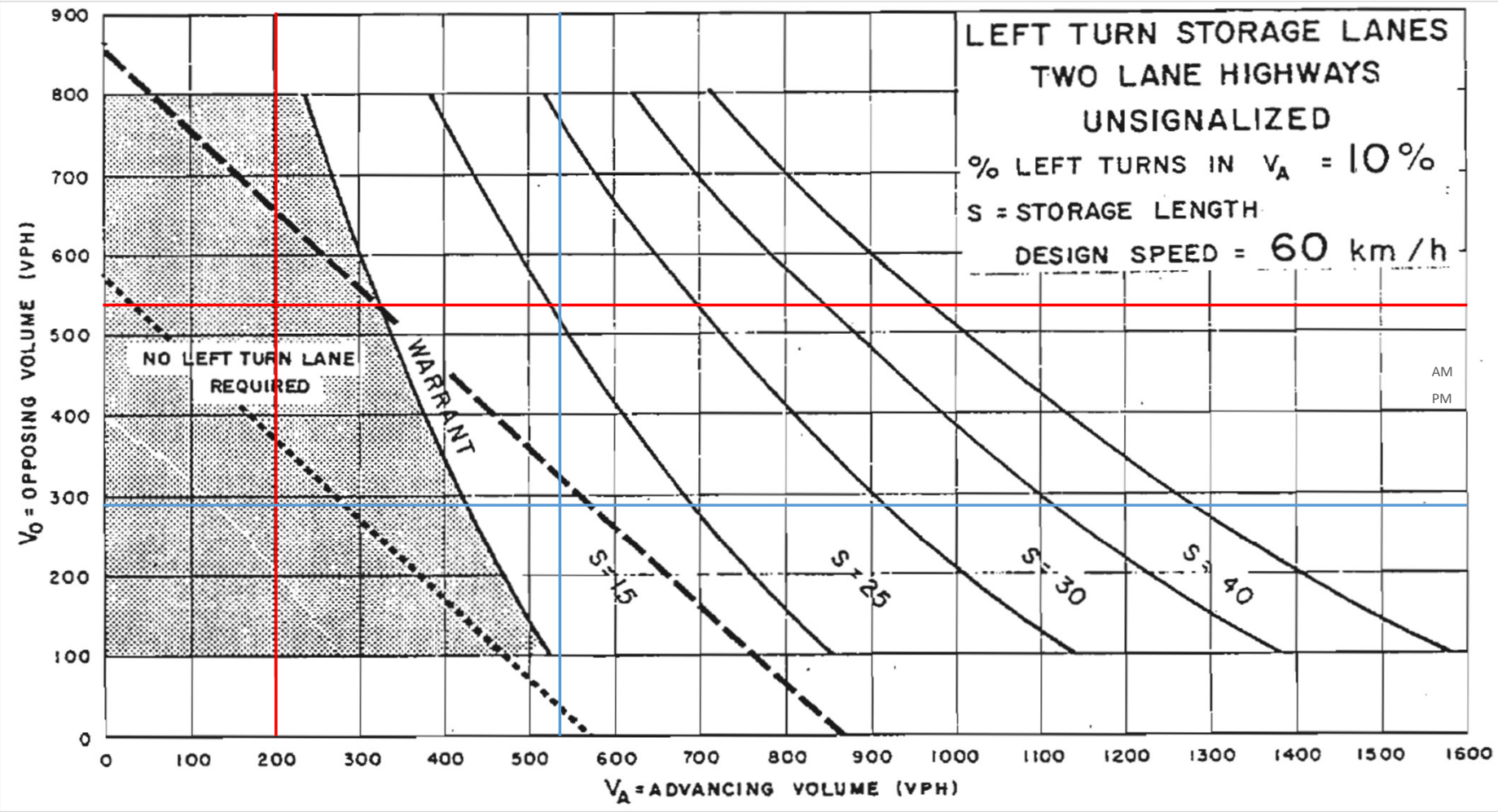
Cambrian Rd @ temporary Driveway
 FT 2028

Design Speed	Westbound Left			Yes										%Left Turn	Volume Advancing	Volume Opposing
60 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
AM	0	557	20	8	933	0	13	0	5	0	0	0	0	0.9%	941	577
PM	0	870	47	5	632	0	31	0	7	0	0	0	0	0.8%	637	917

Cambrian Rd @ Seeley's Bay St/Site Access #1
 Existing 2020

Design Speed	Eastbound Left	Yes												%Left Turn	Volume Advancing	Volume Opposing
60 km/h	EBL	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
AM	19	184	0	0	530	6	0	0	0	0	17	0	53	9.4%	203	536
PM	49	487	0	0	266	21	0	0	0	0	9	0	31	9.1%	536	287

LEFT TURN STORAGE LANES
 TWO LANE HIGHWAYS
 UNSIGNALIZED
 % LEFT TURNS IN $V_A = 10\%$
 S = STORAGE LENGTH
 DESIGN SPEED = 60 km/h



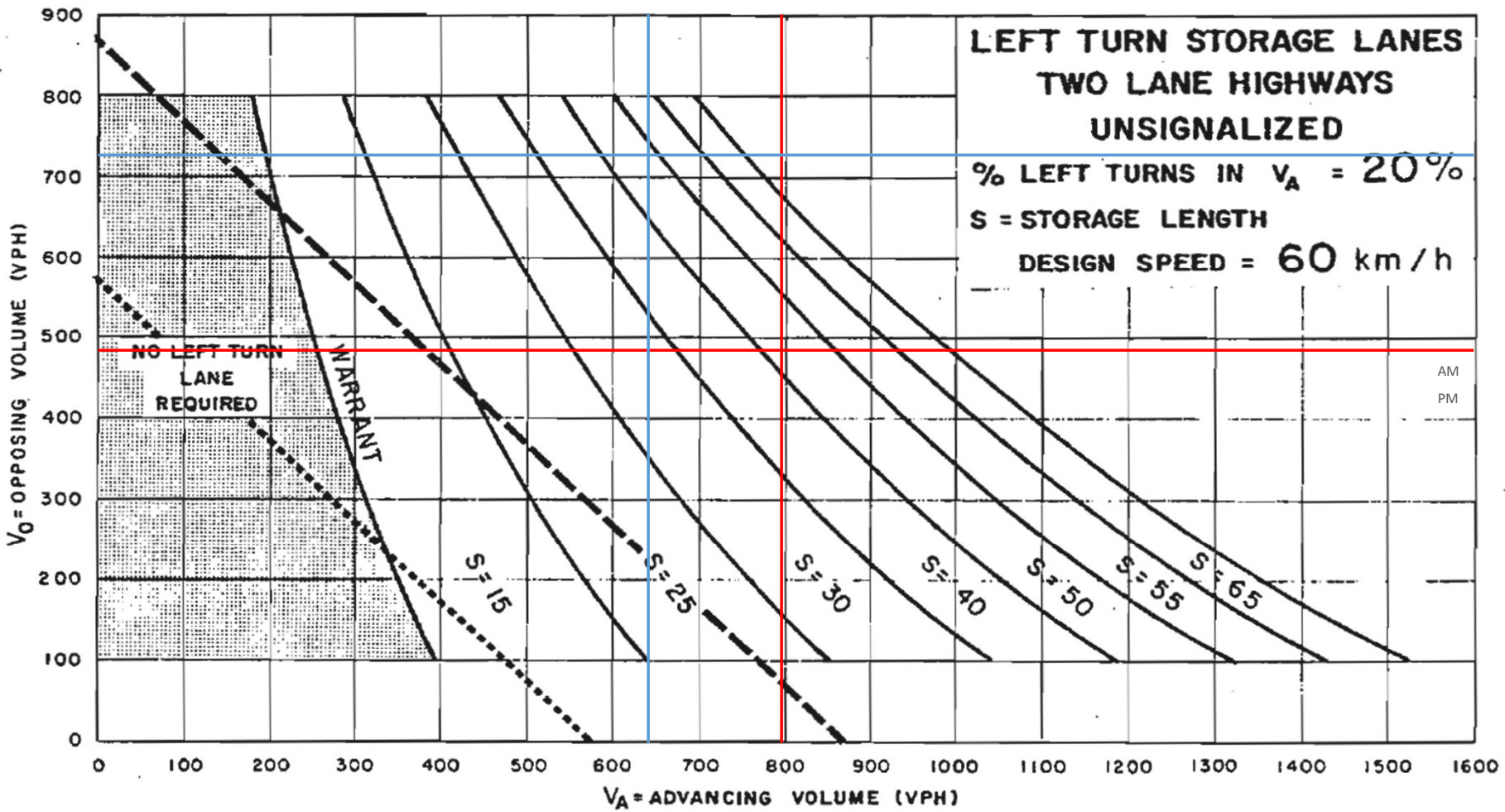
Cambrian Rd @ Seeley's Bay St/Site Access #1

FT 2023

Design Speed 60 km/h	Westbound Left			Yes									%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
AM	19	462	4	48	741	6	3	5	32	17	5	53	6.0%	795	485
PM	49	675	2	115	504	21	5	5	120	9	5	31	18.0%	640	726

**LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED**

% LEFT TURNS IN v_A = 20%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h



Cambrian RRd @ Seeley's Bay St/Site Access #1
 FT 2028

Design Speed 60 km/h	Westbound Left			Yes										%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
AM	19	558	4	48	938	6	3	5	32	17	5	53	4.8%	992	581	
PM	49	873	2	115	632	21	5	5	120	9	5	31	15.0%	768	924	

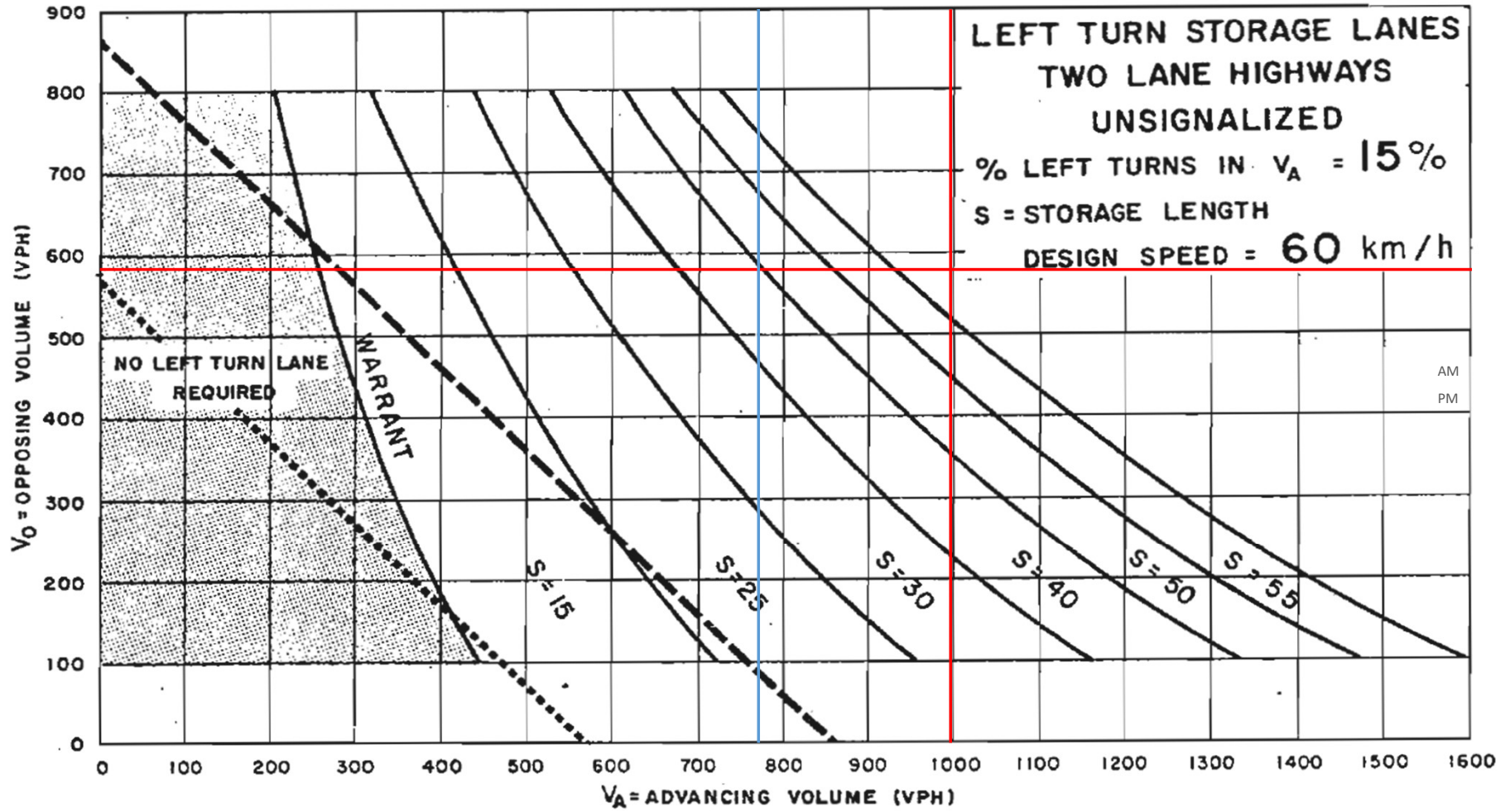
**LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS**

UNSIGNALIZED

% LEFT TURNS IN $V_A = 15\%$

S = STORAGE LENGTH

DESIGN SPEED = 60 km/h



AM
PM

Appendix O

Synchro and Sidra Intersection Worksheets – Existing Conditions and Mitigation Measures

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2020 Existing - AM
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	14	520	56	18	171	23
Future Volume (vph)	14	520	56	18	171	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.869		0.967			
Flt Protected	0.999					0.958
Satd. Flow (prot)	1480	0	1452	0	0	1399
Flt Permitted	0.999					0.958
Satd. Flow (perm)	1480	0	1452	0	0	1399
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	16	578	62	20	190	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	594	0	82	0	0	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.4%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	11.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	14	520	56	18	171	23
Future Vol, veh/h	14	520	56	18	171	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	16	578	62	20	190	26

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	478	72	0	0	82
Stage 1	72	-	-	-	-
Stage 2	406	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	518	985	-	-	1431
Stage 1	912	-	-	-	-
Stage 2	640	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	448	985	-	-	1431
Mov Cap-2 Maneuver	448	-	-	-	-
Stage 1	912	-	-	-	-
Stage 2	554	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.7	0	7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	955	1431
HCM Lane V/C Ratio	-	-	0.621	0.133
HCM Control Delay (s)	-	-	14.7	7.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	4.5	0.5

Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2020 Existing - AM
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	184	530	6	17	53
Future Volume (vph)	19	184	530	6	17	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.898	
Flt Protected		0.995			0.988	
Satd. Flow (prot)	0	1677	1567	0	1393	0
Flt Permitted		0.995			0.988	
Satd. Flow (perm)	0	1677	1567	0	1393	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	21	204	589	7	19	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	225	596	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.7%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	19	184	530	6	17	53
Future Vol, veh/h	19	184	530	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	21	204	589	7	19	59

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	601	0	-	0	846 600
Stage 1	-	-	-	-	598 -
Stage 2	-	-	-	-	248 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	976	-	-	-	333 501
Stage 1	-	-	-	-	549 -
Stage 2	-	-	-	-	793 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	971	-	-	-	322 498
Mov Cap-2 Maneuver	-	-	-	-	322 -
Stage 1	-	-	-	-	533 -
Stage 2	-	-	-	-	789 -

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	971	-	-	-	440
HCM Lane V/C Ratio	0.022	-	-	-	0.177
HCM Control Delay (s)	8.8	0	-	-	14.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	14	256	77	57	262	45	183	51	135	58	16	26
Future Volume (vph)	14	256	77	57	262	45	183	51	135	58	16	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.970			0.983			0.951			0.965	
Flt Protected		0.998			0.992			0.976			0.972	
Satd. Flow (prot)	0	1427	0	0	1427	0	0	1432	0	0	1448	0
Flt Permitted		0.998			0.992			0.976			0.972	
Satd. Flow (perm)	0	1427	0	0	1427	0	0	1432	0	0	1448	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	16	284	86	63	291	50	203	57	150	64	18	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	386	0	0	404	0	0	410	0	0	111	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	76.7%
ICU Level of Service	D
Analysis Period (min)	15

Intersection	
Intersection Delay, s/veh	30
Intersection LOS	D

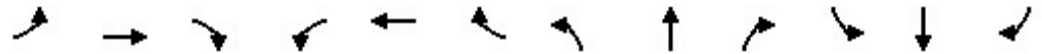
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	14	256	77	57	262	45	183	51	135	58	16	26
Future Vol, veh/h	14	256	77	57	262	45	183	51	135	58	16	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	21	10	2	16	9	4	2	10	4	3	6	4
Mvmt Flow	16	284	86	63	291	50	203	57	150	64	18	29
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	30.2	32.9	31.3	13.9
HCM LOS	D	D	D	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	4%	16%	58%
Vol Thru, %	14%	74%	72%	16%
Vol Right, %	37%	22%	12%	26%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	369	347	364	100
LT Vol	183	14	57	58
Through Vol	51	256	262	16
RT Vol	135	77	45	26
Lane Flow Rate	410	386	404	111
Geometry Grp	1	1	1	1
Degree of Util (X)	0.789	0.767	0.799	0.251
Departure Headway (Hd)	6.932	7.161	7.113	8.133
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	521	505	510	440
Service Time	4.985	5.22	5.17	6.217
HCM Lane V/C Ratio	0.787	0.764	0.792	0.252
HCM Control Delay	31.3	30.2	32.9	13.9
HCM Lane LOS	D	D	D	B
HCM 95th-tile Q	7.3	6.7	7.5	1

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	137	329	39	85	201	69	104	259	166	81	96	82
Future Volume (vph)	137	329	39	85	201	69	104	259	166	81	96	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.974			0.958			0.957	
Flt Protected		0.987			0.988			0.990			0.985	
Satd. Flow (prot)	0	1504	0	0	1481	0	0	1652	0	0	1580	0
Flt Permitted		0.987			0.988			0.990			0.985	
Satd. Flow (perm)	0	1504	0	0	1481	0	0	1652	0	0	1580	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	152	366	43	94	223	77	116	288	184	90	107	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	561	0	0	394	0	0	588	0	0	288	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	83.4%
ICU Level of Service	E
Analysis Period (min)	15

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2020 Existing - AM - River Mist Improvements
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	14	520	56	18	171	23
Future Volume (vph)	14	520	56	18	171	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.869		0.967			
Flt Protected	0.999					0.958
Satd. Flow (prot)	1480	0	1452	0	0	1399
Flt Permitted	0.999					0.958
Satd. Flow (perm)	1480	0	1452	0	0	1399
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	16	578	62	20	190	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	594	0	82	0	0	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.4%
	ICU Level of Service B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	11.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	14	520	56	18	171	23
Future Vol, veh/h	14	520	56	18	171	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	16	578	62	20	190	26

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	478	72	0	0	82
Stage 1	72	-	-	-	-
Stage 2	406	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	518	985	-	-	1431
Stage 1	912	-	-	-	-
Stage 2	640	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	448	985	-	-	1431
Mov Cap-2 Maneuver	448	-	-	-	-
Stage 1	912	-	-	-	-
Stage 2	554	-	-	-	-

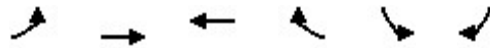
Approach	WB	NB	SB
HCM Control Delay, s	14.7	0	7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	955	1431
HCM Lane V/C Ratio	-	-	0.621	0.133
HCM Control Delay (s)	-	-	14.7	7.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	4.5	0.5

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2020 Existing - AM - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Volume (vph)	19	184	530	6	17	53
Future Volume (vph)	19	184	530	6	17	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.898	
Flt Protected		0.995			0.988	
Satd. Flow (prot)	0	1677	1567	0	1393	0
Flt Permitted		0.995			0.988	
Satd. Flow (perm)	0	1677	1567	0	1393	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	21	204	589	7	19	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	225	596	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.7%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	19	184	530	6	17	53
Future Vol, veh/h	19	184	530	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	21	204	589	7	19	59

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	601	0	-	0	846 600
Stage 1	-	-	-	-	598 -
Stage 2	-	-	-	-	248 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	976	-	-	-	333 501
Stage 1	-	-	-	-	549 -
Stage 2	-	-	-	-	793 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	971	-	-	-	322 498
Mov Cap-2 Maneuver	-	-	-	-	322 -
Stage 1	-	-	-	-	533 -
Stage 2	-	-	-	-	789 -

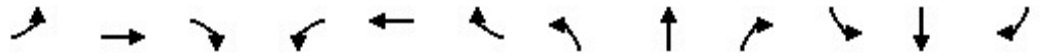
Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	971	-	-	-	440
HCM Lane V/C Ratio	0.022	-	-	-	0.177
HCM Control Delay (s)	8.8	0	-	-	14.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - AM - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	14	256	77	57	262	45	183	51	135	58	16	26
Future Volume (vph)	14	256	77	57	262	45	183	51	135	58	16	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.970			0.983			0.951			0.965	
Flt Protected		0.998			0.992			0.976			0.972	
Satd. Flow (prot)	0	1427	0	0	1427	0	0	1432	0	0	1448	0
Flt Permitted		0.998			0.992			0.976			0.972	
Satd. Flow (perm)	0	1427	0	0	1427	0	0	1432	0	0	1448	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	16	284	86	63	291	50	203	57	150	64	18	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	386	0	0	404	0	0	410	0	0	111	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	76.7%
ICU Level of Service	D
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	67.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	14	256	77	57	262	45	183	51	135	58	16	26
Future Vol, veh/h	14	256	77	57	262	45	183	51	135	58	16	26
Conflicting Peds, #/hr	39	0	5	5	0	39	10	0	31	31	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	21	10	2	16	9	4	2	10	4	3	6	4
Mvmt Flow	16	284	86	63	291	50	203	57	150	64	18	29

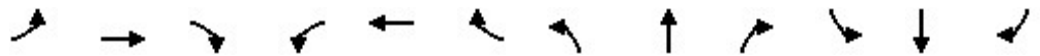
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	380	0	0	375	0	0	840	870	363	975	888	365
Stage 1	-	-	-	-	-	-	364	364	-	481	481	-
Stage 2	-	-	-	-	-	-	476	506	-	494	407	-
Critical Hdwy	4.31	-	-	4.26	-	-	7.12	6.6	6.24	7.13	6.56	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.6	-	6.13	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.6	-	6.13	5.56	-
Follow-up Hdwy	2.389	-	-	2.344	-	-	3.518	4.09	3.336	3.527	4.054	3.336
Pot Cap-1 Maneuver	1082	-	-	1111	-	-	285	281	677	230	279	676
Stage 1	-	-	-	-	-	-	655	610	-	564	547	-
Stage 2	-	-	-	-	-	-	570	527	-	555	590	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1043	-	-	1106	-	-	236	245	654	127	244	645
Mov Cap-2 Maneuver	-	-	-	-	-	-	236	245	-	127	244	-
Stage 1	-	-	-	-	-	-	639	595	-	532	490	-
Stage 2	-	-	-	-	-	-	483	472	-	368	575	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			1.3			199.6			53.9		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	310	1043	-	-	1106	-	-	178
HCM Lane V/C Ratio	1.323	0.015	-	-	0.057	-	-	0.624
HCM Control Delay (s)	199.6	8.5	0	-	8.5	0	-	53.9
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	20.1	0	-	-	0.2	-	-	3.5

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - AM - River Mist Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	137	329	39	85	201	69	104	259	166	81	96	82
Future Volume (vph)	137	329	39	85	201	69	104	259	166	81	96	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.974			0.958			0.957	
Flt Protected		0.987			0.988			0.990			0.985	
Satd. Flow (prot)	0	1504	0	0	1481	0	0	1652	0	0	1580	0
Flt Permitted		0.987			0.988			0.990			0.985	
Satd. Flow (perm)	0	1504	0	0	1481	0	0	1652	0	0	1580	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	152	366	43	94	223	77	116	288	184	90	107	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	561	0	0	394	0	0	588	0	0	288	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary
 Area Type: Other
 Control Type: Roundabout
 Intersection Capacity Utilization 83.4% ICU Level of Service E
 Analysis Period (min) 15

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2020 Existing - PM
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	273	46	7	485	43
Future Volume (vph)	13	273	46	7	485	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871		0.982			
Flt Protected	0.998					0.956
Satd. Flow (prot)	1402	0	1512	0	0	1649
Flt Permitted	0.998					0.956
Satd. Flow (perm)	1402	0	1512	0	0	1649
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1551.9
Travel Time (s)	58.5		13.1			69.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	40%	9%	5%	83%	3%	5%
Adj. Flow (vph)	14	303	51	8	539	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	0	59	0	0	587
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.7%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	9.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	273	46	7	485	43
Future Vol, veh/h	13	273	46	7	485	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	40	9	5	83	3	5
Mvmt Flow	14	303	51	8	539	48

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1181	55	0	0	59
Stage 1	55	-	-	-	-
Stage 2	1126	-	-	-	-
Critical Hdwy	6.8	6.29	-	-	4.13
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.86	3.381	-	-	2.227
Pot Cap-1 Maneuver	177	992	-	-	1538
Stage 1	879	-	-	-	-
Stage 2	262	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	113	992	-	-	1538
Mov Cap-2 Maneuver	113	-	-	-	-
Stage 1	879	-	-	-	-
Stage 2	168	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	7.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1538
HCM Lane V/C Ratio	-	-	0.434	0.35
HCM Control Delay (s)	-	-	13.6	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	2.2	1.6

Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2020 Existing - PM
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	487	266	21	9	31
Future Volume (vph)	49	487	266	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.990		0.896	
Flt Protected		0.995			0.989	
Satd. Flow (prot)	0	1736	1514	0	1392	0
Flt Permitted		0.995			0.989	
Satd. Flow (perm)	0	1736	1514	0	1392	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	6			6	3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	54	541	296	23	10	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	595	319	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.4%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	49	487	266	21	9	31
Future Vol, veh/h	49	487	266	21	9	31
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	5	2	2	2
Mvmt Flow	54	541	296	23	10	34

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	325	0	-	0	966 314
Stage 1	-	-	-	-	314 -
Stage 2	-	-	-	-	652 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1235	-	-	-	282 726
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1228	-	-	-	261 722
Mov Cap-2 Maneuver	-	-	-	-	261 -
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	515 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1228	-	-	-	517
HCM Lane V/C Ratio	0.044	-	-	-	0.086
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Future Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.963			0.983			0.935			0.963	
Flt Protected		0.998			0.985			0.978			0.975	
Satd. Flow (prot)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Flt Permitted		0.998			0.985			0.978			0.975	
Satd. Flow (perm)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	13		3	3		13	9		16	16		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	440	172	168	318	71	126	17	133	32	13	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	634	0	0	557	0	0	276	0	0	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	91.0%						ICU Level of Service F					
Analysis Period (min)	15											

Intersection	
Intersection Delay, s/veh	61.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Future Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	7	2	2	2
Mvmt Flow	22	440	172	168	318	71	126	17	133	32	13	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	90.1	54.9	19.1	13.1
HCM LOS	F	F	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	46%	4%	30%	52%
Vol Thru, %	6%	69%	57%	21%
Vol Right, %	48%	27%	13%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	248	571	501	56
LT Vol	113	20	151	29
Through Vol	15	396	286	12
RT Vol	120	155	64	15
Lane Flow Rate	276	634	557	62
Geometry Grp	1	1	1	1
Degree of Util (X)	0.548	1.095	0.962	0.144
Departure Headway (Hd)	7.428	6.215	6.545	8.681
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	488	584	557	416
Service Time	5.428	4.242	4.545	6.681
HCM Lane V/C Ratio	0.566	1.086	1	0.149
HCM Control Delay	19.1	90.1	54.9	13.1
HCM Lane LOS	C	F	F	B
HCM 95th-tile Q	3.3	19.2	12.8	0.5

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Future Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.969			0.977			0.965			0.959	
Flt Protected		0.989			0.988			0.993			0.995	
Satd. Flow (prot)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Flt Permitted		0.989			0.988			0.993			0.995	
Satd. Flow (perm)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	18		29	29		18	13		16	16		13
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	113	292	123	131	306	90	66	263	117	71	424	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	0	0	527	0	0	446	0	0	711	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	91.5%
ICU Level of Service	F
Analysis Period (min)	15

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2020 Existing - PM - River Mist Improvements
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	273	46	7	485	43
Future Volume (vph)	13	273	46	7	485	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871		0.982			
Flt Protected	0.998					0.956
Satd. Flow (prot)	1402	0	1512	0	0	1649
Flt Permitted	0.998					0.956
Satd. Flow (perm)	1402	0	1512	0	0	1649
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1551.9
Travel Time (s)	58.5		13.1			69.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	40%	9%	5%	83%	3%	5%
Adj. Flow (vph)	14	303	51	8	539	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	0	59	0	0	587
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.7%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	9.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	273	46	7	485	43
Future Vol, veh/h	13	273	46	7	485	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	40	9	5	83	3	5
Mvmt Flow	14	303	51	8	539	48

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1181	55	0	0	59
Stage 1	55	-	-	-	-
Stage 2	1126	-	-	-	-
Critical Hdwy	6.8	6.29	-	-	4.13
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.86	3.381	-	-	2.227
Pot Cap-1 Maneuver	177	992	-	-	1538
Stage 1	879	-	-	-	-
Stage 2	262	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	113	992	-	-	1538
Mov Cap-2 Maneuver	113	-	-	-	-
Stage 1	879	-	-	-	-
Stage 2	168	-	-	-	-

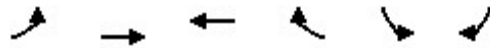
Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	7.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1538
HCM Lane V/C Ratio	-	-	0.434	0.35
HCM Control Delay (s)	-	-	13.6	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	2.2	1.6

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2020 Existing - PM - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	487	266	21	9	31
Future Volume (vph)	49	487	266	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.990		0.896	
Flt Protected		0.995			0.989	
Satd. Flow (prot)	0	1736	1514	0	1392	0
Flt Permitted		0.995			0.989	
Satd. Flow (perm)	0	1736	1514	0	1392	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	6			6	3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	54	541	296	23	10	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	595	319	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.4%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	49	487	266	21	9	31
Future Vol, veh/h	49	487	266	21	9	31
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	5	2	2	2
Mvmt Flow	54	541	296	23	10	34

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	325	0	-	0	966 314
Stage 1	-	-	-	-	314 -
Stage 2	-	-	-	-	652 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1235	-	-	-	282 726
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1228	-	-	-	261 722
Mov Cap-2 Maneuver	-	-	-	-	261 -
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	515 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1228	-	-	-	517
HCM Lane V/C Ratio	0.044	-	-	-	0.086
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - PM - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Future Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.963			0.983			0.935			0.963	
Flt Protected		0.998			0.985			0.978			0.975	
Satd. Flow (prot)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Flt Permitted		0.998			0.985			0.978			0.975	
Satd. Flow (perm)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	13		3	3		13	9		16	16		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	440	172	168	318	71	126	17	133	32	13	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	634	0	0	557	0	0	276	0	0	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	91.0%
ICU Level of Service	F
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	70.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Future Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Conflicting Peds, #/hr	13	0	3	3	0	13	9	0	16	16	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	7	2	2	2
Mvmt Flow	22	440	172	168	318	71	126	17	133	32	13	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	402	0	0	615	0	0	1287	1311	545	1364	1362	376
Stage 1	-	-	-	-	-	-	573	573	-	703	703	-
Stage 2	-	-	-	-	-	-	714	738	-	661	659	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.27	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.363	3.518	4.018	3.318
Pot Cap-1 Maneuver	1157	-	-	965	-	-	141	159	529	125	148	670
Stage 1	-	-	-	-	-	-	505	504	-	428	440	-
Stage 2	-	-	-	-	-	-	422	424	-	452	461	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1143	-	-	962	-	-	~ 100	118	520	66	110	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 100	118	-	66	110	-
Stage 1	-	-	-	-	-	-	488	487	-	410	337	-
Stage 2	-	-	-	-	-	-	304	325	-	310	446	-

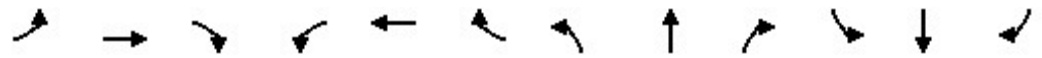
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			2.9			\$ 366.2			90.9		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	167	1143	-	-	962	-	-	98
HCM Lane V/C Ratio	1.65	0.019	-	-	0.174	-	-	0.635
HCM Control Delay (s)	\$ 366.2	8.2	0	-	9.5	0	-	90.9
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	19	0.1	-	-	0.6	-	-	3.1

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - PM - River Mist Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Future Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.969			0.977			0.965			0.959	
Flt Protected		0.989			0.988			0.993			0.995	
Satd. Flow (prot)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Flt Permitted		0.989			0.988			0.993			0.995	
Satd. Flow (perm)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	18		29	29		18	13		16	16		13
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	113	292	123	131	306	90	66	263	117	71	424	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	0	0	527	0	0	446	0	0	711	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	91.5%
ICU Level of Service	F
Analysis Period (min)	15

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2020 Existing - Saturday
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	273	46	7	485	43
Future Volume (vph)	13	273	46	7	485	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871		0.982			
Flt Protected	0.998					0.956
Satd. Flow (prot)	1402	0	1512	0	0	1649
Flt Permitted	0.998					0.956
Satd. Flow (perm)	1402	0	1512	0	0	1649
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1551.9
Travel Time (s)	58.5		13.1			69.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	40%	9%	5%	83%	3%	5%
Adj. Flow (vph)	14	303	51	8	539	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	0	59	0	0	587
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.7%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	9.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	273	46	7	485	43
Future Vol, veh/h	13	273	46	7	485	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	40	9	5	83	3	5
Mvmt Flow	14	303	51	8	539	48

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1181	55	0	0	59
Stage 1	55	-	-	-	-
Stage 2	1126	-	-	-	-
Critical Hdwy	6.8	6.29	-	-	4.13
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.86	3.381	-	-	2.227
Pot Cap-1 Maneuver	177	992	-	-	1538
Stage 1	879	-	-	-	-
Stage 2	262	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	113	992	-	-	1538
Mov Cap-2 Maneuver	113	-	-	-	-
Stage 1	879	-	-	-	-
Stage 2	168	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	7.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1538
HCM Lane V/C Ratio	-	-	0.434	0.35
HCM Control Delay (s)	-	-	13.6	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	2.2	1.6

Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2020 Existing - Saturday
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	487	266	21	9	31
Future Volume (vph)	49	487	266	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.990		0.896	
Flt Protected		0.995			0.989	
Satd. Flow (prot)	0	1736	1514	0	1392	0
Flt Permitted		0.995			0.989	
Satd. Flow (perm)	0	1736	1514	0	1392	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	6			6	3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	54	541	296	23	10	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	595	319	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.4%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	49	487	266	21	9	31
Future Vol, veh/h	49	487	266	21	9	31
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	5	2	2	2
Mvmt Flow	54	541	296	23	10	34

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	325	0	-	0	966 314
Stage 1	-	-	-	-	314 -
Stage 2	-	-	-	-	652 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1235	-	-	-	282 726
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1228	-	-	-	261 722
Mov Cap-2 Maneuver	-	-	-	-	261 -
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	515 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1228	-	-	-	517
HCM Lane V/C Ratio	0.044	-	-	-	0.086
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - Saturday
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Future Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.963			0.983			0.935			0.963	
Flt Protected		0.998			0.985			0.978			0.975	
Satd. Flow (prot)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Flt Permitted		0.998			0.985			0.978			0.975	
Satd. Flow (perm)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	13		3	3		13	9		16	16		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	440	172	168	318	71	126	17	133	32	13	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	634	0	0	557	0	0	276	0	0	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	91.0%
ICU Level of Service	F
Analysis Period (min)	15

Intersection	
Intersection Delay, s/veh	61.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Future Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	7	2	2	2
Mvmt Flow	22	440	172	168	318	71	126	17	133	32	13	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	90.1	54.9	19.1	13.1
HCM LOS	F	F	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	46%	4%	30%	52%
Vol Thru, %	6%	69%	57%	21%
Vol Right, %	48%	27%	13%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	248	571	501	56
LT Vol	113	20	151	29
Through Vol	15	396	286	12
RT Vol	120	155	64	15
Lane Flow Rate	276	634	557	62
Geometry Grp	1	1	1	1
Degree of Util (X)	0.548	1.095	0.962	0.144
Departure Headway (Hd)	7.428	6.215	6.545	8.681
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	488	584	557	416
Service Time	5.428	4.242	4.545	6.681
HCM Lane V/C Ratio	0.566	1.086	1	0.149
HCM Control Delay	19.1	90.1	54.9	13.1
HCM Lane LOS	C	F	F	B
HCM 95th-tile Q	3.3	19.2	12.8	0.5

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - Saturday
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Future Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.969			0.977			0.965			0.959	
Flt Protected		0.989			0.988			0.993			0.995	
Satd. Flow (prot)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Flt Permitted		0.989			0.988			0.993			0.995	
Satd. Flow (perm)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	18		29	29		18	13		16	16		13
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	113	292	123	131	306	90	66	263	117	71	424	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	0	0	527	0	0	446	0	0	711	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	91.5%
ICU Level of Service	F
Analysis Period (min)	15



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	273	46	7	485	43
Future Volume (vph)	13	273	46	7	485	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871		0.982			
Flt Protected	0.998					0.956
Satd. Flow (prot)	1402	0	1512	0	0	1649
Flt Permitted	0.998					0.956
Satd. Flow (perm)	1402	0	1512	0	0	1649
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1551.9
Travel Time (s)	58.5		13.1			69.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	40%	9%	5%	83%	3%	5%
Adj. Flow (vph)	14	303	51	8	539	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	0	59	0	0	587
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.7%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	9.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	273	46	7	485	43
Future Vol, veh/h	13	273	46	7	485	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	40	9	5	83	3	5
Mvmt Flow	14	303	51	8	539	48

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1181	55	0	0	59
Stage 1	55	-	-	-	-
Stage 2	1126	-	-	-	-
Critical Hdwy	6.8	6.29	-	-	4.13
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.86	3.381	-	-	2.227
Pot Cap-1 Maneuver	177	992	-	-	1538
Stage 1	879	-	-	-	-
Stage 2	262	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	113	992	-	-	1538
Mov Cap-2 Maneuver	113	-	-	-	-
Stage 1	879	-	-	-	-
Stage 2	168	-	-	-	-

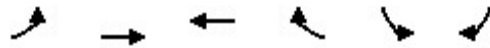
Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	7.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1538
HCM Lane V/C Ratio	-	-	0.434	0.35
HCM Control Delay (s)	-	-	13.6	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	2.2	1.6

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2020 Existing - Saturday - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	487	266	21	9	31
Future Volume (vph)	49	487	266	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.990		0.896	
Flt Protected		0.995			0.989	
Satd. Flow (prot)	0	1736	1514	0	1392	0
Flt Permitted		0.995			0.989	
Satd. Flow (perm)	0	1736	1514	0	1392	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	6			6	3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	54	541	296	23	10	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	595	319	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.4%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	49	487	266	21	9	31
Future Vol, veh/h	49	487	266	21	9	31
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	5	2	2	2
Mvmt Flow	54	541	296	23	10	34

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	325	0	-	0	966 314
Stage 1	-	-	-	-	314 -
Stage 2	-	-	-	-	652 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1235	-	-	-	282 726
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1228	-	-	-	261 722
Mov Cap-2 Maneuver	-	-	-	-	261 -
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	515 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1228	-	-	-	517
HCM Lane V/C Ratio	0.044	-	-	-	0.086
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - Saturday - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Future Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.963			0.983			0.935			0.963	
Flt Protected		0.998			0.985			0.978			0.975	
Satd. Flow (prot)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Flt Permitted		0.998			0.985			0.978			0.975	
Satd. Flow (perm)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	13		3	3		13	9		16	16		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	440	172	168	318	71	126	17	133	32	13	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	634	0	0	557	0	0	276	0	0	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	91.0%
ICU Level of Service	F
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	70.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Future Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Conflicting Peds, #/hr	13	0	3	3	0	13	9	0	16	16	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	7	2	2	2
Mvmt Flow	22	440	172	168	318	71	126	17	133	32	13	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	402	0	0	615	0	0	1287	1311	545	1364	1362	376
Stage 1	-	-	-	-	-	-	573	573	-	703	703	-
Stage 2	-	-	-	-	-	-	714	738	-	661	659	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.27	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.363	3.518	4.018	3.318
Pot Cap-1 Maneuver	1157	-	-	965	-	-	141	159	529	125	148	670
Stage 1	-	-	-	-	-	-	505	504	-	428	440	-
Stage 2	-	-	-	-	-	-	422	424	-	452	461	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1143	-	-	962	-	-	~ 100	118	520	66	110	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 100	118	-	66	110	-
Stage 1	-	-	-	-	-	-	488	487	-	410	337	-
Stage 2	-	-	-	-	-	-	304	325	-	310	446	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			2.9			\$ 366.2			90.9		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	167	1143	-	-	962	-	-	98
HCM Lane V/C Ratio	1.65	0.019	-	-	0.174	-	-	0.635
HCM Control Delay (s)	\$ 366.2	8.2	0	-	9.5	0	-	90.9
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	19	0.1	-	-	0.6	-	-	3.1

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - Saturday - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Future Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.969			0.977			0.965			0.959	
Flt Protected		0.989			0.988			0.993			0.995	
Satd. Flow (prot)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Flt Permitted		0.989			0.988			0.993			0.995	
Satd. Flow (perm)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	18		29	29		18	13		16	16		13
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	113	292	123	131	306	90	66	263	117	71	424	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	0	0	527	0	0	446	0	0	711	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	91.5%
ICU Level of Service	F
Analysis Period (min)	15

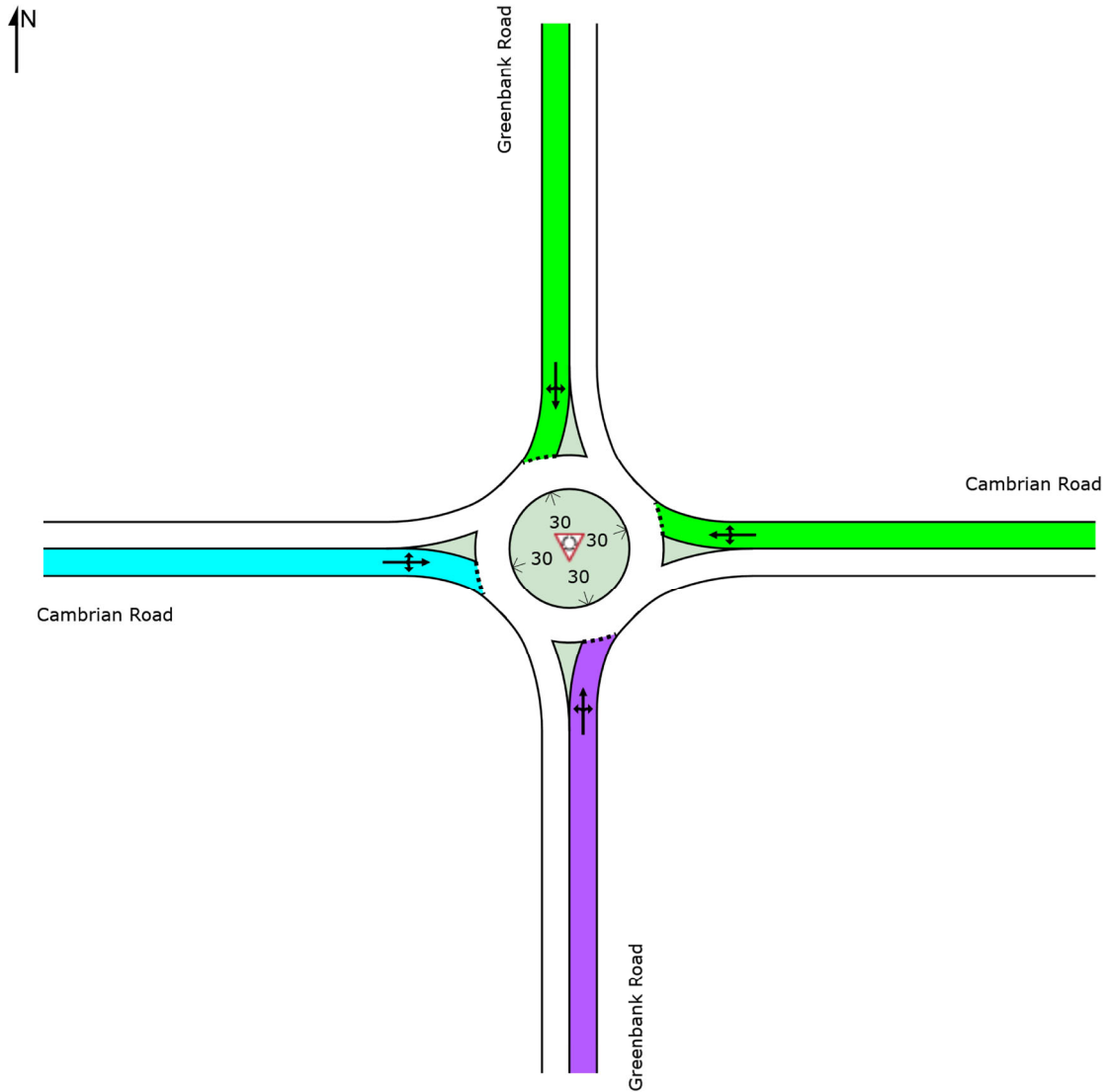
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

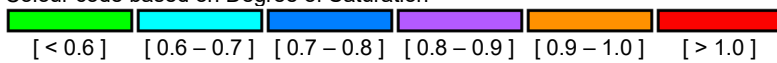
 Site: 101 [Cambrian and Greenbank 2020 Existing AM]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.89	0.57	0.38	0.63	0.89



Colour code based on Degree of Saturation



DELAY (CONTROL)

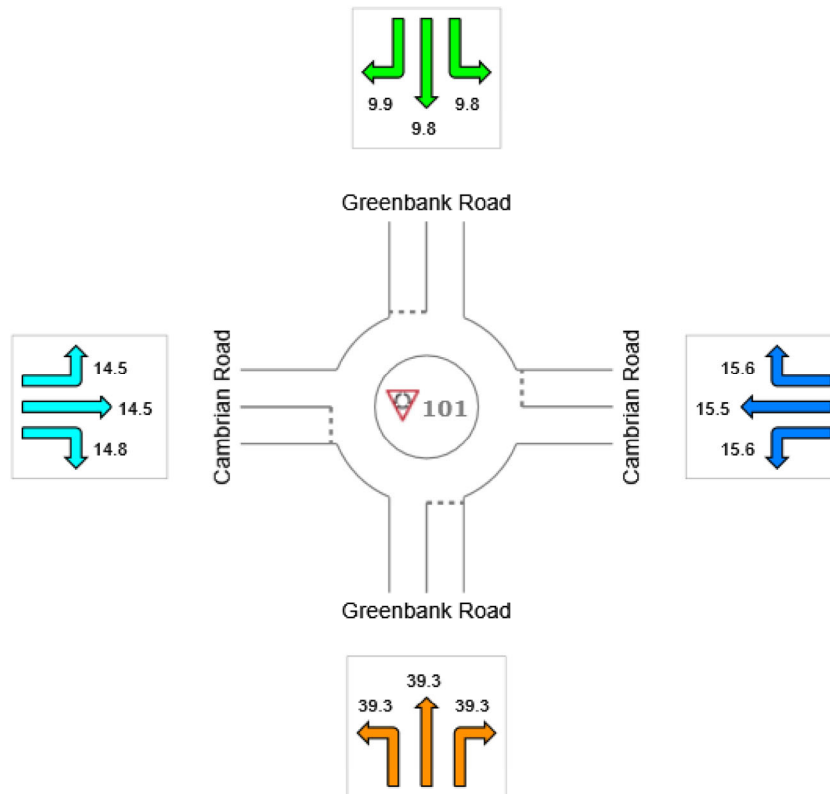
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Cambrian and Greenbank 2020 Existing AM]**

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	39.3	15.5	9.8	14.5	22.0
LOS	E	C	A	B	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

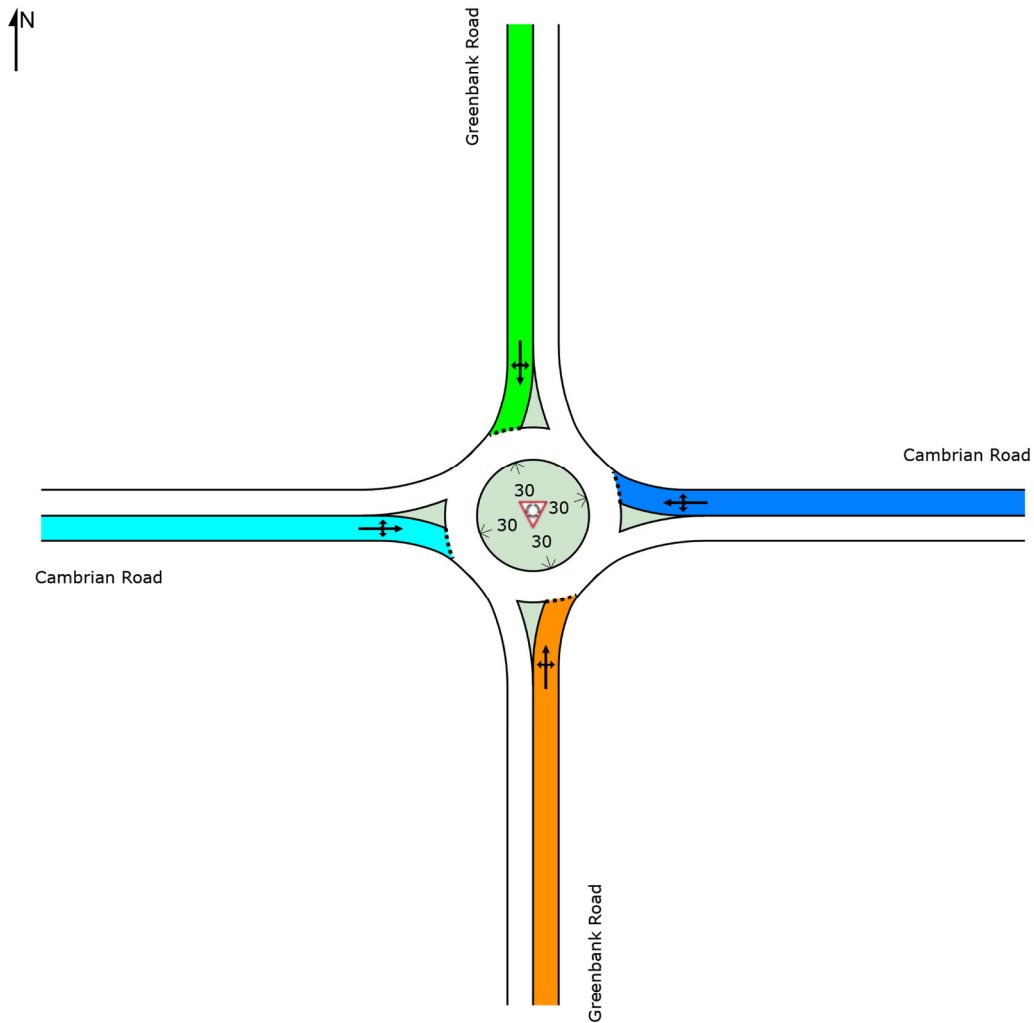
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2020 Existing AM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	C	A	B	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2020 Existing AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	108	3.0	0.889	39.3	LOS E	15.1	107.4	0.97	1.60	2.83	22.5
2	T1	273	2.0	0.889	39.3	LOS E	15.1	107.4	0.97	1.60	2.83	23.4
3	R2	175	2.0	0.889	39.3	LOS E	15.1	107.4	0.97	1.60	2.83	19.0
Approach		556	2.2	0.889	39.3	LOS E	15.1	107.4	0.97	1.60	2.83	21.9
East: Cambrian Road												
4	L2	89	6.0	0.572	15.6	LOS C	4.1	29.9	0.70	0.90	1.18	31.0
5	T1	211	2.0	0.572	15.5	LOS C	4.1	29.9	0.70	0.90	1.18	33.0
6	R2	73	8.0	0.572	15.6	LOS C	4.1	29.9	0.70	0.90	1.18	32.9
Approach		373	4.1	0.572	15.5	LOS C	4.1	29.9	0.70	0.90	1.18	32.6
North: Greenbank Road												
7	L2	85	5.0	0.375	9.8	LOS A	1.6	11.9	0.56	0.55	0.58	39.9
8	T1	101	4.0	0.375	9.8	LOS A	1.6	11.9	0.56	0.55	0.58	40.0
9	R2	85	10.0	0.375	9.9	LOS A	1.6	11.9	0.56	0.55	0.58	39.0
Approach		272	6.2	0.375	9.8	LOS A	1.6	11.9	0.56	0.55	0.58	39.6
West: Cambrian Road												
10	L2	142	3.0	0.630	14.5	LOS B	6.7	48.8	0.65	0.79	1.05	37.3
11	T1	342	3.0	0.630	14.5	LOS B	6.7	48.8	0.65	0.79	1.05	33.7
12	R2	41	17.0	0.630	14.8	LOS B	6.7	48.8	0.65	0.79	1.05	32.1
Approach		525	4.1	0.630	14.5	LOS B	6.7	48.8	0.65	0.79	1.05	34.6
All Vehicles		1725	3.8	0.889	22.0	LOS C	15.1	107.4	0.75	1.04	1.58	29.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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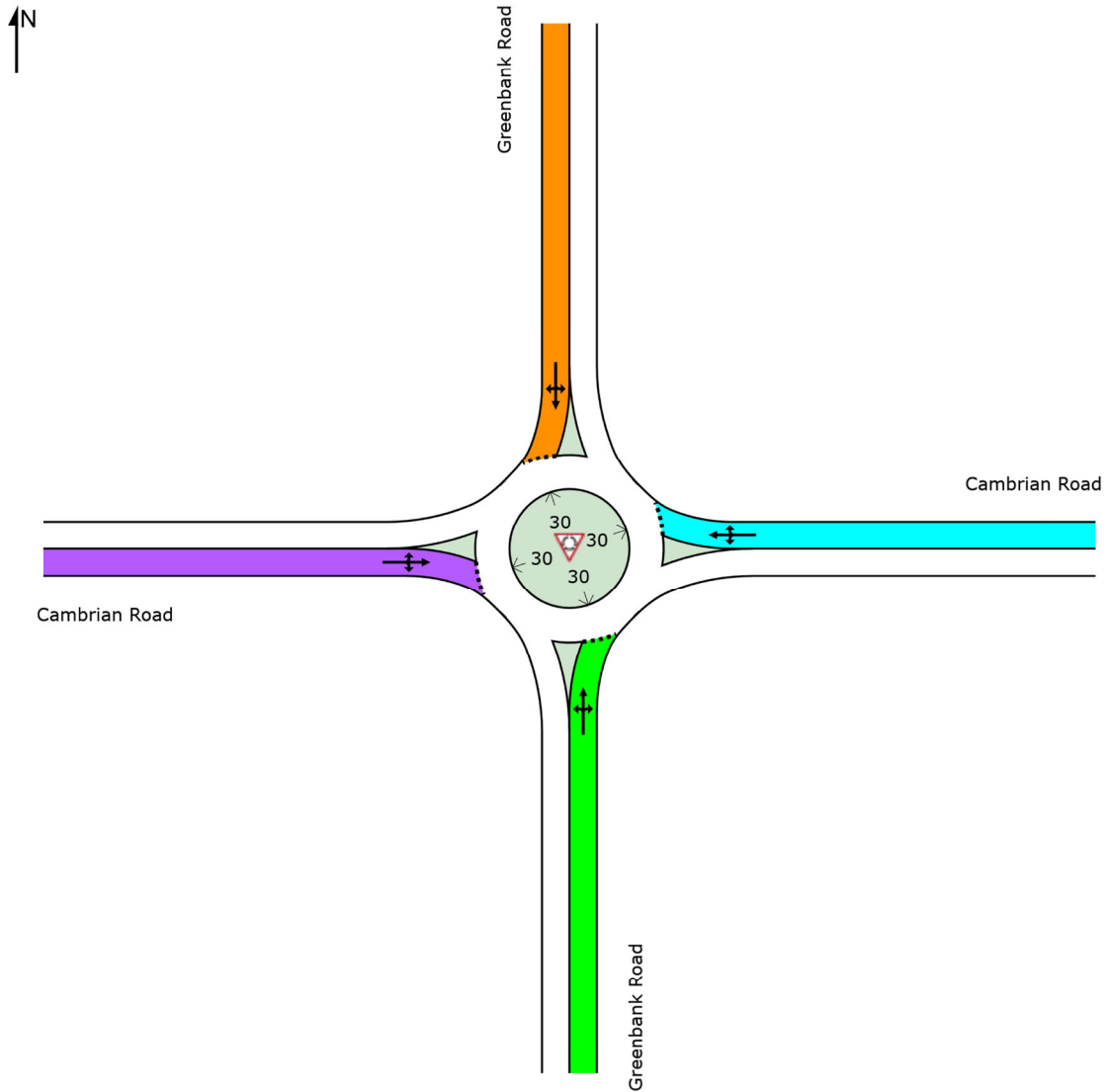
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

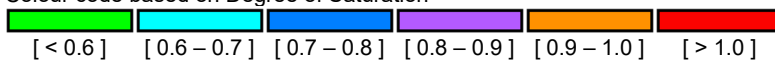
 Site: 101 [Cambrian and Greenbank 2020 Existing PM]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.60	0.68	0.97	0.81	0.97



Colour code based on Degree of Saturation



DELAY (CONTROL)

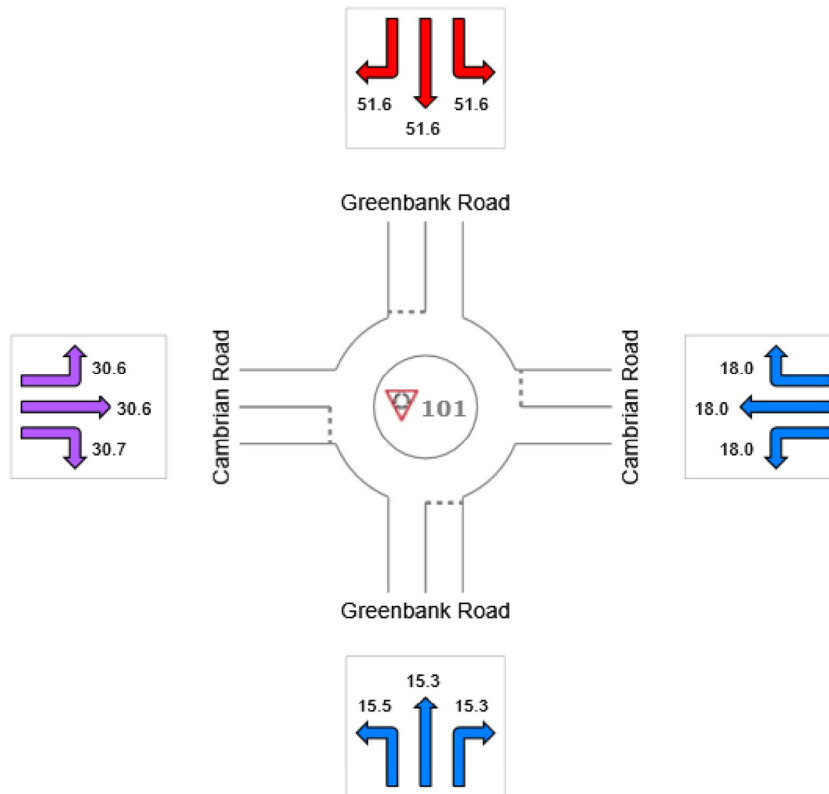
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2020 Existing PM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	15.4	18.0	51.6	30.6	31.3
LOS	C	C	F	D	D



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

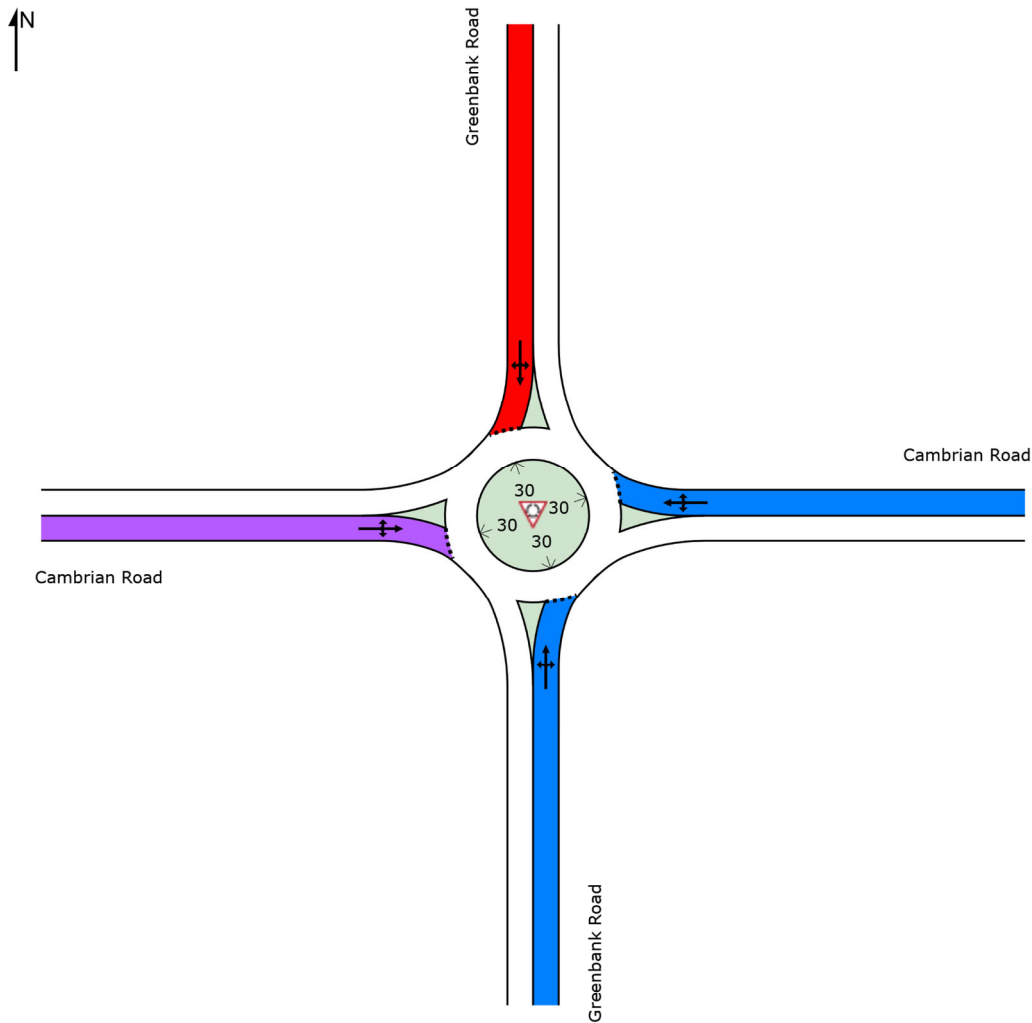
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2020 Existing PM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	F	D	D



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2020 Existing PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	61	8.0	0.597	15.5	LOS C	4.9	35.3	0.70	0.88	1.19	34.6
2	T1	249	2.0	0.597	15.3	LOS C	4.9	35.3	0.70	0.88	1.19	36.0
3	R2	111	2.0	0.597	15.3	LOS C	4.9	35.3	0.70	0.88	1.19	30.0
Approach		421	2.9	0.597	15.4	LOS C	4.9	35.3	0.70	0.88	1.19	34.3
East: Cambrian Road												
4	L2	124	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	29.5
5	T1	286	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.3
6	R2	85	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.8
Approach		496	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.0
North: Greenbank Road												
7	L2	67	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.0
8	T1	402	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.0
9	R2	202	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	21.4
Approach		672	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.4
West: Cambrian Road												
10	L2	105	2.0	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	28.6
11	T1	276	2.0	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	25.0
12	R2	117	4.0	0.814	30.7	LOS D	10.3	73.8	0.89	1.40	2.21	24.5
Approach		498	2.5	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	25.7
All Vehicles		2086	2.3	0.971	31.3	LOS D	26.6	189.7	0.86	1.40	2.30	25.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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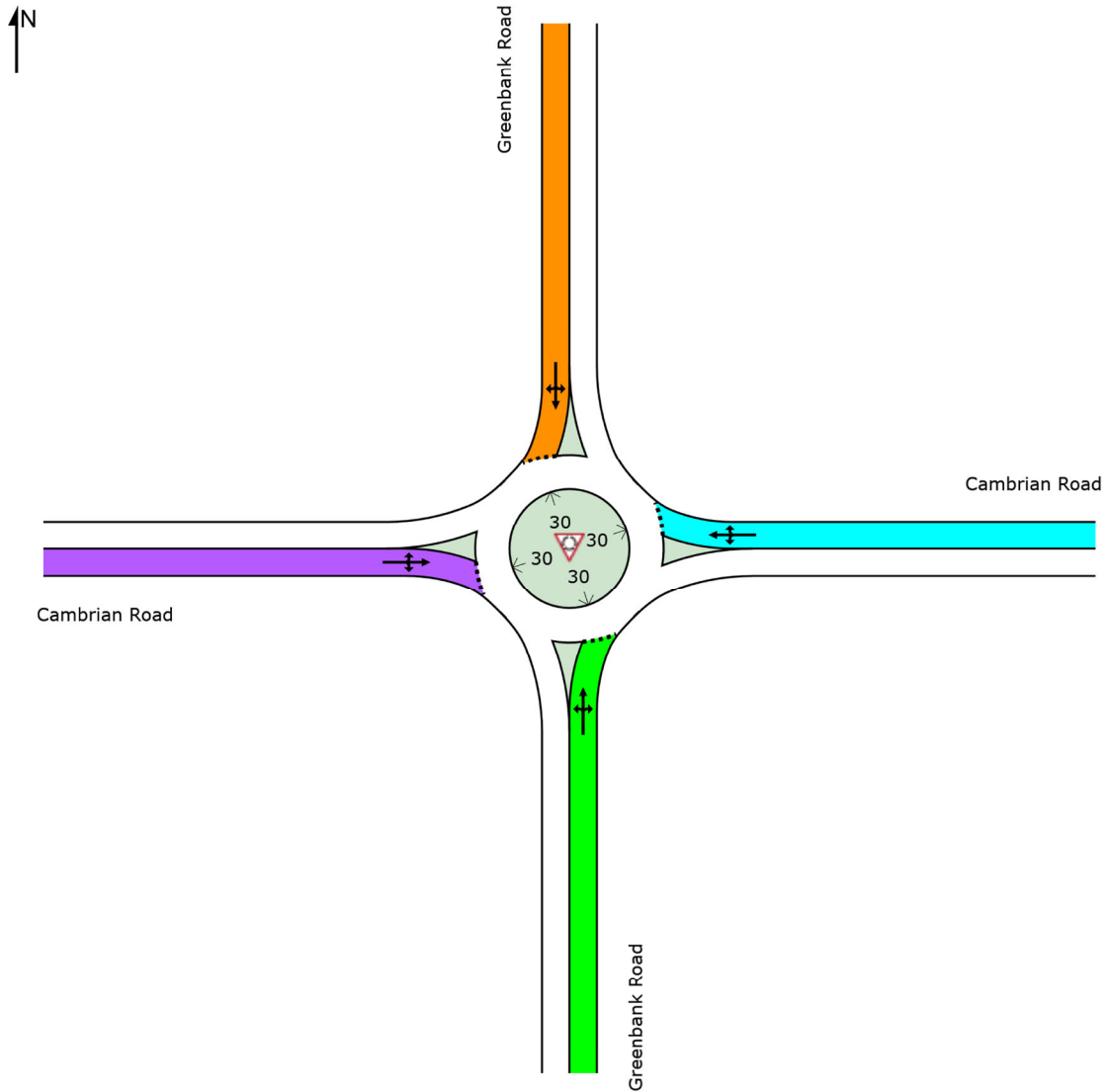
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

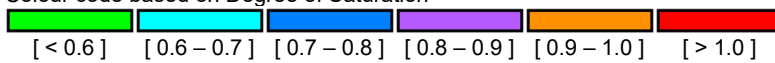
 Site: 101 [Cambrian and Greenbank 2020 Existing Sat]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.60	0.68	0.97	0.81	0.97



Colour code based on Degree of Saturation



DELAY (CONTROL)

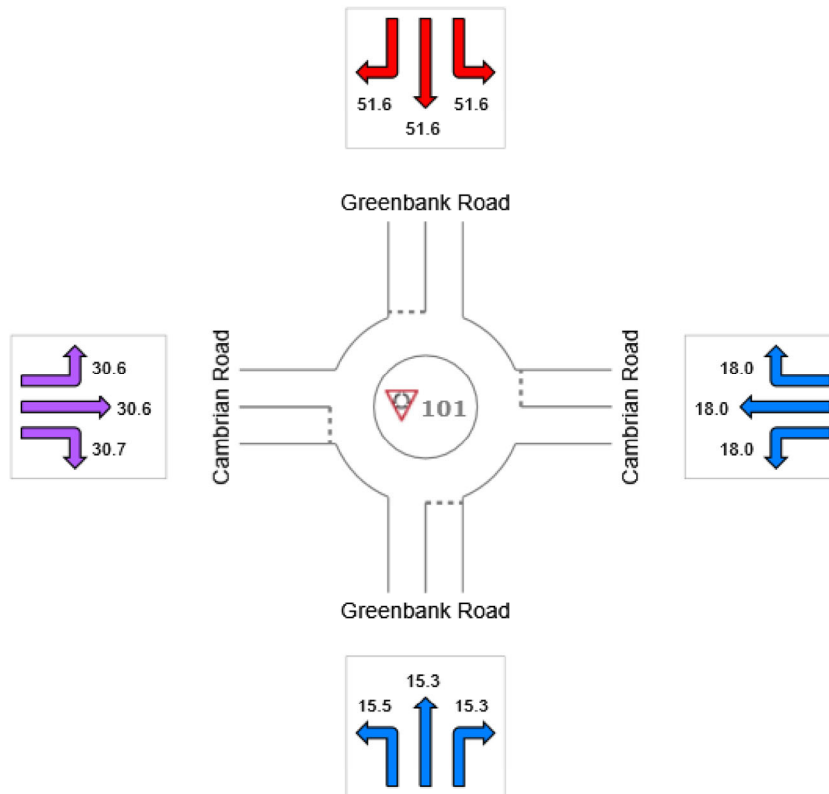
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Cambrian and Greenbank 2020 Existing Sat]**

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	15.4	18.0	51.6	30.6	31.3
LOS	C	C	F	D	D



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

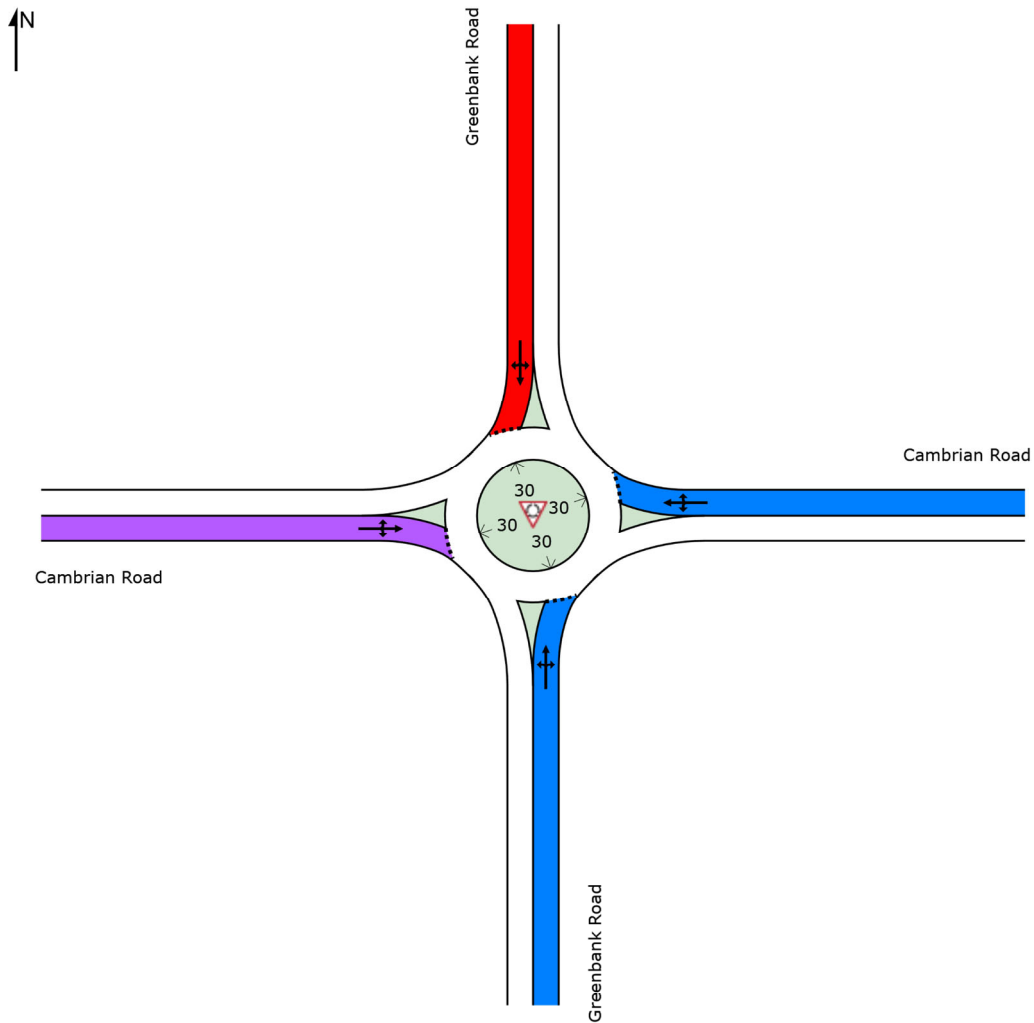
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2020 Existing Sat]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	F	D	D



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2020 Existing Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	61	8.0	0.597	15.5	LOS C	4.9	35.3	0.70	0.88	1.19	34.6
2	T1	249	2.0	0.597	15.3	LOS C	4.9	35.3	0.70	0.88	1.19	36.0
3	R2	111	2.0	0.597	15.3	LOS C	4.9	35.3	0.70	0.88	1.19	30.0
Approach		421	2.9	0.597	15.4	LOS C	4.9	35.3	0.70	0.88	1.19	34.3
East: Cambrian Road												
4	L2	124	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	29.5
5	T1	286	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.3
6	R2	85	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.8
Approach		496	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.0
North: Greenbank Road												
7	L2	67	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.0
8	T1	402	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.0
9	R2	202	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	21.4
Approach		672	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.4
West: Cambrian Road												
10	L2	105	2.0	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	28.6
11	T1	276	2.0	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	25.0
12	R2	117	4.0	0.814	30.7	LOS D	10.3	73.8	0.89	1.40	2.21	24.5
Approach		498	2.5	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	25.7
All Vehicles		2086	2.3	0.971	31.3	LOS D	26.6	189.7	0.86	1.40	2.30	25.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Appendix P

Synchro and Sidra Intersection Worksheets – 2023 Future Background Conditions and Mitigation Measures

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FB - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	67	890	90	44	331	112
Future Volume (vph)	67	890	90	44	331	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	275.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.874		0.956			
Flt Protected	0.997				0.950	
Satd. Flow (prot)	1477	0	1438	0	1458	1079
Flt Permitted	0.997				0.950	
Satd. Flow (perm)	1477	0	1438	0	1458	1079
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	67	890	90	44	331	112
Shared Lane Traffic (%)						
Lane Group Flow (vph)	957	0	134	0	331	112
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	99.2%
ICU Level of Service	F
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	90.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	67	890	90	44	331	112
Future Vol, veh/h	67	890	90	44	331	112
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	2750	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	67	890	90	44	331	112

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	886	112	0	0	134
Stage 1	112	-	-	-	-
Stage 2	774	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	295	936	-	-	1369
Stage 1	874	-	-	-	-
Stage 2	428	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	224	936	-	-	1369
Mov Cap-2 Maneuver	224	-	-	-	-
Stage 1	874	-	-	-	-
Stage 2	324	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	141.9	0	6.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	766	1369
HCM Lane V/C Ratio	-	-	1.249	0.242
HCM Control Delay (s)	-	-	141.9	8.5
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	34.3	0.9

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2023 FB - AM
3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	457	733	6	17	53
Future Volume (vph)	19	457	733	6	17	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.898	
Flt Protected	0.950				0.988	
Satd. Flow (prot)	1658	1679	1569	0	1393	0
Flt Permitted	0.950				0.988	
Satd. Flow (perm)	1658	1679	1569	0	1393	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	19	457	733	6	17	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	457	739	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	52.9%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	19	457	733	6	17	53
Future Vol, veh/h	19	457	733	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	19	457	733	6	17	53

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	744	0	-	0	1238 743
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	497 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	864	-	-	-	194 415
Stage 1	-	-	-	-	471 -
Stage 2	-	-	-	-	611 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	860	-	-	-	188 412
Mov Cap-2 Maneuver	-	-	-	-	188 -
Stage 1	-	-	-	-	458 -
Stage 2	-	-	-	-	608 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	19.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	860	-	-	-	320
HCM Lane V/C Ratio	0.022	-	-	-	0.219
HCM Control Delay (s)	9.3	-	-	-	19.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	498	113	57	367	45	268	54	135	58	17	26
Future Volume (vph)	14	498	113	57	367	45	268	54	135	58	17	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97		0.97	1.00		0.93	0.99		0.94	0.96	0.98	
Frt			0.850			0.850			0.850		0.909	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1362	0
Flt Permitted	0.455			0.307			0.729			0.722		
Satd. Flow (perm)	586	1456	1300	423	1470	1221	1131	1456	1232	1083	1362	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			113			45			135			26
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	14	498	113	57	367	45	268	54	135	58	17	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	498	113	57	367	45	268	54	135	58	43	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	22.4	22.4	22.4	22.4	22.4	22.4	24.6	24.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.42	0.42	0.42	0.42	0.42	0.42
v/c Ratio	0.06	0.89	0.20	0.35	0.65	0.09	0.56	0.09	0.23	0.13	0.07	
Control Delay	11.7	37.3	3.8	19.6	20.7	4.6	19.0	11.4	3.7	12.0	6.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	37.3	3.8	19.6	20.7	4.6	19.0	11.4	3.7	12.0	6.9	
LOS	B	D	A	B	C	A	B	B	A	B	A	
Approach Delay		30.6			19.0			13.6				9.8
Approach LOS		C			B			B				A
Queue Length 50th (m)	0.9	47.2	0.0	4.1	30.5	0.0	21.9	3.5	0.0	3.8	1.1	
Queue Length 95th (m)	3.9	#96.3	7.5	12.7	54.9	4.8	43.1	9.1	8.3	10.0	5.9	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		
Base Capacity (vph)	248	617	616	179	623	543	479	617	599	459	592	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.81	0.18	0.32	0.59	0.08	0.56	0.09	0.23	0.13	0.07	

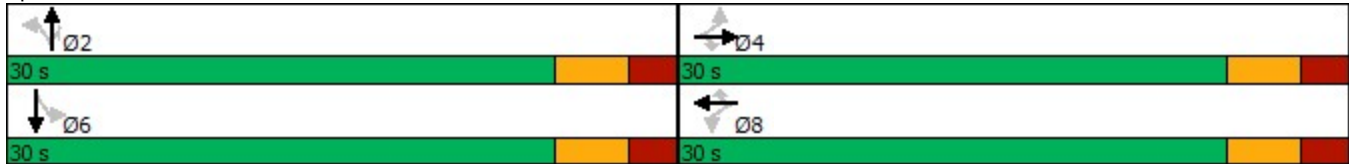
Intersection Summary
 Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 58
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.89

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM
3831 Cambrian Road

Intersection Signal Delay: 21.3	Intersection LOS: C
Intersection Capacity Utilization 72.1%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
3: River Mist Road & Cambrian Road

2023 FB - AM
3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	498	113	57	367	45	268	54	135	58	17	26
Future Volume (veh/h)	14	498	113	57	367	45	268	54	135	58	17	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.95	0.99		0.95	0.97		0.94	0.97		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	14	498	113	57	367	45	268	54	135	58	17	26
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	305	657	508	220	662	500	646	692	523	580	221	338
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	809	1660	1285	710	1674	1265	1317	1660	1254	1152	530	810
Grp Volume(v), veh/h	14	498	113	57	367	45	268	54	135	58	0	43
Grp Sat Flow(s),veh/h/ln	809	1660	1285	710	1674	1265	1317	1660	1254	1152	0	1340
Q Serve(g_s), s	0.8	15.2	3.4	4.4	10.0	1.3	9.0	1.2	4.1	1.9	0.0	1.1
Cycle Q Clear(g_c), s	10.8	15.2	3.4	19.6	10.0	1.3	10.2	1.2	4.1	3.0	0.0	1.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	305	657	508	220	662	500	646	692	523	580	0	559
V/C Ratio(X)	0.05	0.76	0.22	0.26	0.55	0.09	0.41	0.08	0.26	0.10	0.00	0.08
Avail Cap(c_a), veh/h	323	692	536	235	698	527	646	692	523	580	0	559
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.9	15.3	11.8	23.8	13.7	11.1	13.4	10.3	11.2	11.2	0.0	10.3
Incr Delay (d2), s/veh	0.1	4.6	0.2	0.6	0.9	0.1	2.0	0.2	1.2	0.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	7.0	1.1	0.8	4.2	0.4	3.3	0.5	1.4	0.6	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.0	19.9	12.0	24.4	14.6	11.2	15.3	10.5	12.4	11.6	0.0	10.6
LnGrp LOS	B	B	B	C	B	B	B	B	B	B	A	B
Approach Vol, veh/h		625			469			457			101	
Approach Delay, s/veh		18.5			15.5			13.9			11.2	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		28.7		30.0		28.7				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		24.5		24.5		24.5				
Max Q Clear Time (g_c+I1), s		12.2		17.2		5.0		21.6				
Green Ext Time (p_c), s		1.9		2.6		0.5		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				15.9								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FB - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	241	465	54	103	250	73	126	379	208	86	142	124
Future Volume (vph)	241	465	54	103	250	73	126	379	208	86	142	124
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.977			0.961			0.952	
Flt Protected		0.984			0.988			0.991			0.988	
Satd. Flow (prot)	0	1501	0	0	1487	0	0	1659	0	0	1574	0
Flt Permitted		0.984			0.988			0.991			0.988	
Satd. Flow (perm)	0	1501	0	0	1487	0	0	1659	0	0	1574	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	241	465	54	103	250	73	126	379	208	86	142	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	760	0	0	426	0	0	713	0	0	352	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	122.2%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2023 FB - PM
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	513	160	56	791	102
Future Volume (vph)	48	513	160	56	791	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	275.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.877		0.965			
Flt Protected	0.996				0.950	
Satd. Flow (prot)	1478	0	1450	0	1458	1079
Flt Permitted	0.996				0.950	
Satd. Flow (perm)	1478	0	1450	0	1458	1079
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	48	513	160	56	791	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	561	0	216	0	791	102
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	105.0%
ICU Level of Service	G
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	229.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	513	160	56	791	102
Future Vol, veh/h	48	513	160	56	791	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	2750	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	48	513	160	56	791	102

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1872	188	0	0	216
Stage 1	188	-	-	-	-
Stage 2	1684	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	72	849	-	-	1275
Stage 1	807	-	-	-	-
Stage 2	151	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 27	849	-	-	1275
Mov Cap-2 Maneuver	~ 27	-	-	-	-
Stage 1	807	-	-	-	-
Stage 2	57	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	\$ 665.3	0	10.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	236	1275
HCM Lane V/C Ratio	-	-	2.377	0.62
HCM Control Delay (s)	-	-	\$ 665.3	12.3
HCM Lane LOS	-	-	F	B
HCM 95th %tile Q(veh)	-	-	45.3	4.6

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2023 FB - PM
3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	705	523	21	9	31
Future Volume (vph)	49	705	523	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1563	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1563	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	705	523	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	705	544	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	705	523	21	9	31
Future Vol, veh/h	49	705	523	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	705	523	21	9	31

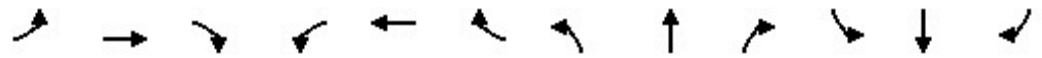
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	549	0	-	0	1344 541
Stage 1	-	-	-	-	539 -
Stage 2	-	-	-	-	805 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1021	-	-	-	167 541
Stage 1	-	-	-	-	585 -
Stage 2	-	-	-	-	440 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1016	-	-	-	157 537
Mov Cap-2 Maneuver	-	-	-	-	157 -
Stage 1	-	-	-	-	554 -
Stage 2	-	-	-	-	438 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1016	-	-	-	348
HCM Lane V/C Ratio	0.048	-	-	-	0.115
HCM Control Delay (s)	8.7	-	-	-	16.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Future Volume (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99		0.93	0.96	0.98	
Frt			0.850			0.850			0.850		0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1378	0
Flt Permitted	0.345			0.269			0.739			0.747		
Satd. Flow (perm)	446	1456	1299	371	1470	1210	1144	1456	1224	1110	1378	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			64			120			15
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	585	182	151	502	64	157	16	120	29	28	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	57.1%	57.1%	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%
Maximum Green (s)	34.5	34.5	34.5	34.5	34.5	34.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	29.6	29.6	29.6	29.6	29.6	29.6	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.45	0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.10	0.89	0.26	0.90	0.76	0.11	0.36	0.03	0.22	0.07	0.05	
Control Delay	11.1	34.0	2.9	70.1	23.0	3.4	19.6	15.3	4.8	15.8	10.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	34.0	2.9	70.1	23.0	3.4	19.6	15.3	4.8	15.8	10.5	
LOS	B	C	A	E	C	A	B	B	A	B	B	
Approach Delay		26.2			31.1			13.3				13.2
Approach LOS		C			C			B				B
Queue Length 50th (m)	1.3	60.9	0.0	15.9	47.5	0.0	15.2	1.4	0.0	2.5	1.1	
Queue Length 95th (m)	4.8	#118.3	8.6	#48.7	80.9	5.2	30.2	5.0	9.5	7.6	5.8	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		
Base Capacity (vph)	237	774	776	197	782	673	432	550	537	419	530	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.76	0.23	0.77	0.64	0.10	0.36	0.03	0.22	0.07	0.05	

Intersection Summary

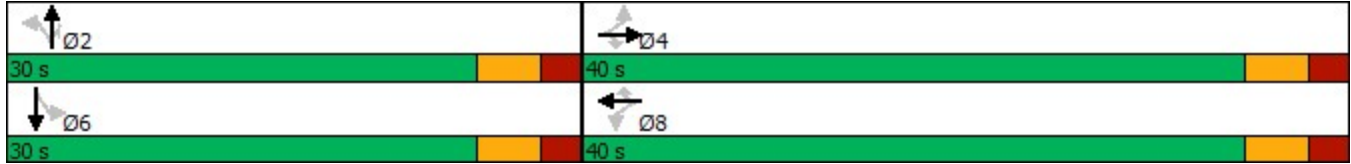
Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 65.4
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.90

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - PM
3831 Cambrian Road

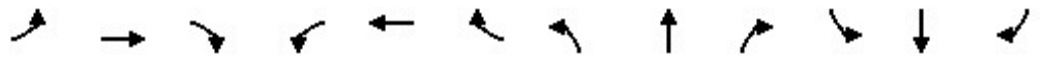
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 3: River Mist Road & Cambrian Road

2023 FB - PM
 3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	585	182	151	502	64	157	16	120	29	13	15
Future Volume (veh/h)	20	585	182	151	502	64	157	16	120	29	13	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	0.96		0.94	0.96		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	20	585	182	151	502	64	157	16	120	29	13	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	299	818	640	237	825	630	548	581	436	515	220	254
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	712	1660	1298	621	1674	1277	1324	1660	1244	1198	629	726
Grp Volume(v), veh/h	20	585	182	151	502	64	157	16	120	29	0	28
Grp Sat Flow(s),veh/h/ln	712	1660	1298	621	1674	1277	1324	1660	1244	1198	0	1355
Q Serve(g_s), s	1.5	19.3	5.8	15.2	15.2	1.9	6.2	0.4	4.9	1.1	0.0	1.0
Cycle Q Clear(g_c), s	16.7	19.3	5.8	34.5	15.2	1.9	7.2	0.4	4.9	1.6	0.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	299	818	640	237	825	630	548	581	436	515	0	474
V/C Ratio(X)	0.07	0.72	0.28	0.64	0.61	0.10	0.29	0.03	0.28	0.06	0.00	0.06
Avail Cap(c_a), veh/h	299	818	640	237	825	630	548	581	436	515	0	474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	13.9	10.5	28.2	12.9	9.5	17.5	14.9	16.4	15.5	0.0	15.1
Incr Delay (d2), s/veh	0.1	3.0	0.2	5.5	1.3	0.1	1.3	0.1	1.6	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	8.5	1.9	3.1	6.5	0.6	2.3	0.2	1.7	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	16.9	10.7	33.7	14.2	9.5	18.8	15.0	17.9	15.7	0.0	15.3
LnGrp LOS	B	B	B	C	B	A	B	B	B	B	A	B
Approach Vol, veh/h		787			717			293				57
Approach Delay, s/veh		15.5			17.9			18.2				15.5
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		40.0		30.0		40.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		34.5		24.5		34.5				
Max Q Clear Time (g_c+I1), s		9.2		21.3		3.6		36.5				
Green Ext Time (p_c), s		1.2		4.8		0.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				16.9								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FB - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Future Volume (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.972			0.981			0.968			0.954	
Flt Protected		0.987			0.988			0.993			0.996	
Satd. Flow (prot)	0	1452	0	0	1496	0	0	1675	0	0	1594	0
Flt Permitted		0.987			0.988			0.993			0.996	
Satd. Flow (perm)	0	1452	0	0	1496	0	0	1675	0	0	1594	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	670	0	0	602	0	0	525	0	0	894	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	121.5%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FB - SAT
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	513	160	56	791	102
Future Volume (vph)	48	513	160	56	791	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	275.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.877		0.965			
Flt Protected	0.996				0.950	
Satd. Flow (prot)	1478	0	1450	0	1458	1079
Flt Permitted	0.996				0.950	
Satd. Flow (perm)	1478	0	1450	0	1458	1079
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	48	513	160	56	791	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	561	0	216	0	791	102
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	105.0%
Analysis Period (min)	15
	ICU Level of Service G

Intersection						
Int Delay, s/veh	229.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖↗		↖↗		↖↗	↖↗
Traffic Vol, veh/h	48	513	160	56	791	102
Future Vol, veh/h	48	513	160	56	791	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	2750	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	48	513	160	56	791	102

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1872	188	0	0	216
Stage 1	188	-	-	-	-
Stage 2	1684	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	72	849	-	-	1275
Stage 1	807	-	-	-	-
Stage 2	151	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 27	849	-	-	1275
Mov Cap-2 Maneuver	~ 27	-	-	-	-
Stage 1	807	-	-	-	-
Stage 2	57	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	\$ 665.3	0	10.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	236	1275
HCM Lane V/C Ratio	-	-	2.377	0.62
HCM Control Delay (s)	-	-	\$ 665.3	12.3
HCM Lane LOS	-	-	F	B
HCM 95th %tile Q(veh)	-	-	45.3	4.6

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2023 FB - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	705	523	21	9	31
Future Volume (vph)	49	705	523	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1563	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1563	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	705	523	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	705	544	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	705	523	21	9	31
Future Vol, veh/h	49	705	523	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	705	523	21	9	31

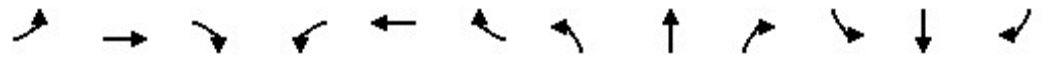
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	549	0	-	0	1344 541
Stage 1	-	-	-	-	539 -
Stage 2	-	-	-	-	805 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1021	-	-	-	167 541
Stage 1	-	-	-	-	585 -
Stage 2	-	-	-	-	440 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1016	-	-	-	157 537
Mov Cap-2 Maneuver	-	-	-	-	157 -
Stage 1	-	-	-	-	554 -
Stage 2	-	-	-	-	438 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1016	-	-	-	348
HCM Lane V/C Ratio	0.048	-	-	-	0.115
HCM Control Delay (s)	8.7	-	-	-	16.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Future Volume (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99		0.93	0.96	0.98	
Frt			0.850			0.850			0.850		0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1378	0
Flt Permitted	0.345			0.269			0.739			0.747		
Satd. Flow (perm)	446	1456	1299	371	1470	1210	1144	1456	1224	1110	1378	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			64			120			15
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	585	182	151	502	64	157	16	120	29	28	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	57.1%	57.1%	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%
Maximum Green (s)	34.5	34.5	34.5	34.5	34.5	34.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	29.6	29.6	29.6	29.6	29.6	29.6	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.45	0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.10	0.89	0.26	0.90	0.76	0.11	0.36	0.03	0.22	0.07	0.05	
Control Delay	11.1	34.0	2.9	70.1	23.0	3.4	19.6	15.3	4.8	15.8	10.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	34.0	2.9	70.1	23.0	3.4	19.6	15.3	4.8	15.8	10.5	
LOS	B	C	A	E	C	A	B	B	A	B	B	
Approach Delay		26.2			31.1			13.3				13.2
Approach LOS		C			C			B				B
Queue Length 50th (m)	1.3	60.9	0.0	15.9	47.5	0.0	15.2	1.4	0.0	2.5	1.1	
Queue Length 95th (m)	4.8	#118.3	8.6	#48.7	80.9	5.2	30.2	5.0	9.5	7.6	5.8	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		
Base Capacity (vph)	237	774	776	197	782	673	432	550	537	419	530	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.76	0.23	0.77	0.64	0.10	0.36	0.03	0.22	0.07	0.05	

Intersection Summary

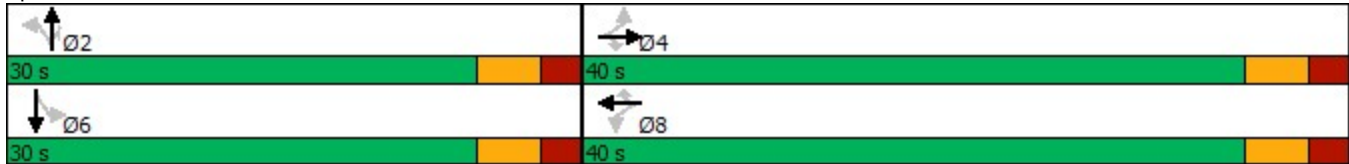
Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 65.4
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.90

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

2023 FB - SAT
 3831 Cambrian Road

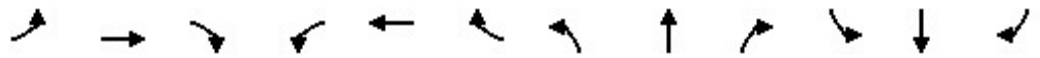
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 3: River Mist Road & Cambrian Road

2023 FB - SAT
 3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	585	182	151	502	64	157	16	120	29	13	15
Future Volume (veh/h)	20	585	182	151	502	64	157	16	120	29	13	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	0.96		0.94	0.96		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	20	585	182	151	502	64	157	16	120	29	13	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	299	818	640	237	825	630	548	581	436	515	220	254
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	712	1660	1298	621	1674	1277	1324	1660	1244	1198	629	726
Grp Volume(v), veh/h	20	585	182	151	502	64	157	16	120	29	0	28
Grp Sat Flow(s),veh/h/ln	712	1660	1298	621	1674	1277	1324	1660	1244	1198	0	1355
Q Serve(g_s), s	1.5	19.3	5.8	15.2	15.2	1.9	6.2	0.4	4.9	1.1	0.0	1.0
Cycle Q Clear(g_c), s	16.7	19.3	5.8	34.5	15.2	1.9	7.2	0.4	4.9	1.6	0.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	299	818	640	237	825	630	548	581	436	515	0	474
V/C Ratio(X)	0.07	0.72	0.28	0.64	0.61	0.10	0.29	0.03	0.28	0.06	0.00	0.06
Avail Cap(c_a), veh/h	299	818	640	237	825	630	548	581	436	515	0	474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	13.9	10.5	28.2	12.9	9.5	17.5	14.9	16.4	15.5	0.0	15.1
Incr Delay (d2), s/veh	0.1	3.0	0.2	5.5	1.3	0.1	1.3	0.1	1.6	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	8.5	1.9	3.1	6.5	0.6	2.3	0.2	1.7	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	16.9	10.7	33.7	14.2	9.5	18.8	15.0	17.9	15.7	0.0	15.3
LnGrp LOS	B	B	B	C	B	A	B	B	B	B	A	B
Approach Vol, veh/h		787			717			293				57
Approach Delay, s/veh		15.5			17.9			18.2				15.5
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		40.0		30.0		40.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		34.5		24.5		34.5				
Max Q Clear Time (g_c+I1), s		9.2		21.3		3.6		36.5				
Green Ext Time (p_c), s		1.2		4.8		0.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				16.9								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FB - SAT
3831 Cambrian Road














Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Future Volume (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.972			0.981			0.968			0.954	
Flt Protected		0.987			0.988			0.993			0.996	
Satd. Flow (prot)	0	1452	0	0	1496	0	0	1675	0	0	1594	0
Flt Permitted		0.987			0.988			0.993			0.996	
Satd. Flow (perm)	0	1452	0	0	1496	0	0	1675	0	0	1594	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	670	0	0	602	0	0	525	0	0	894	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	121.5%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	67	890	90	44	331	112
Future Volume (vph)	67	890	90	44	331	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	295.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.956			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1438	0	1458	1079
Flt Permitted	0.950				0.671	
Satd. Flow (perm)	1433	1455	1438	0	1030	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		830	44			
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	67	890	90	44	331	112
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	890	134	0	331	112
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road



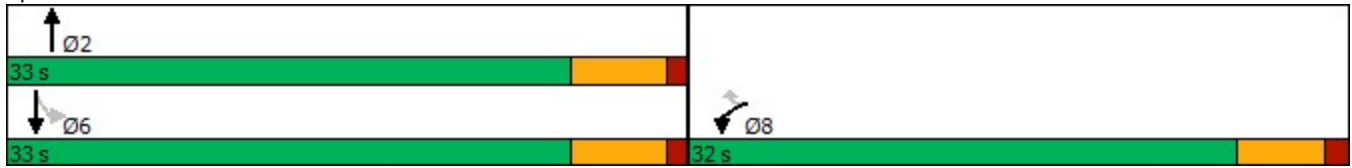
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.5	25.5	25.7		25.7	25.7
Total Split (s)	32.0	32.0	33.0		33.0	33.0
Total Split (%)	49.2%	49.2%	50.8%		50.8%	50.8%
Maximum Green (s)	26.5	26.5	27.3		27.3	27.3
Yellow Time (s)	4.2	4.2	4.6		4.6	4.6
All-Red Time (s)	1.3	1.3	1.1		1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.7		5.7	5.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		Max	Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	16.5	16.5	27.8		27.8	27.8
Actuated g/C Ratio	0.30	0.30	0.50		0.50	0.50
v/c Ratio	0.16	0.88	0.18		0.65	0.21
Control Delay	14.1	13.9	8.1		21.3	11.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	14.1	13.9	8.1		21.3	11.7
LOS	B	B	A		C	B
Approach Delay	13.9		8.1			18.9
Approach LOS	B		A			B
Queue Length 50th (m)	4.8	4.3	3.8		19.2	4.9
Queue Length 95th (m)	11.5	#84.4	15.9		#72.9	18.3
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		295.0			275.0	
Base Capacity (vph)	694	1132	739		513	538
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.10	0.79	0.18		0.65	0.21

Intersection Summary	
Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	55.7
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	14.8
Intersection LOS:	B
Intersection Capacity Utilization:	75.8%
ICU Level of Service:	D
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2023 FB - AM Improvements
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	67	890	90	44	331	112
Future Volume (veh/h)	67	890	90	44	331	112
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1533	1575	887
Adj Flow Rate, veh/h	67	890	90	44	331	112
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	19	16	65
Cap, veh/h	0	0	804	393	1122	734
Arrive On Green	0.00	0.00	0.83	0.83	0.83	0.83
Sat Flow, veh/h	0		972	475	1116	887
Grp Volume(v), veh/h	0.0		0	134	331	112
Grp Sat Flow(s),veh/h/ln			0	1448	1116	887
Q Serve(g_s), s			0.0	0.6	2.6	0.8
Cycle Q Clear(g_c), s			0.0	0.6	3.2	0.8
Prop In Lane				0.33	1.00	
Lane Grp Cap(c), veh/h			0	1198	1122	734
V/C Ratio(X)			0.00	0.11	0.30	0.15
Avail Cap(c_a), veh/h			0	1198	1122	734
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(l)			0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			0.0	0.5	0.8	0.6
Incr Delay (d2), s/veh			0.0	0.2	0.7	0.4
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			0.0	0.1	0.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			0.0	0.7	1.5	1.0
LnGrp LOS			A	A	A	A
Approach Vol, veh/h			134			443
Approach Delay, s/veh			0.7			1.4
Approach LOS			A			A
Timer - Assigned Phs		2				6
Phs Duration (G+Y+Rc), s		33.0				33.0
Change Period (Y+Rc), s		* 5.7				* 5.7
Max Green Setting (Gmax), s		* 27				* 27
Max Q Clear Time (g_c+I1), s		2.6				5.2
Green Ext Time (p_c), s		0.8				2.9
Intersection Summary						
HCM 6th Ctrl Delay			1.2			
HCM 6th LOS			A			

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	457	733	6	17	53
Future Volume (vph)	19	457	733	6	17	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.898	
Flt Protected	0.950				0.988	
Satd. Flow (prot)	1658	1679	1569	0	1393	0
Flt Permitted	0.950				0.988	
Satd. Flow (perm)	1658	1679	1569	0	1393	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	19	457	733	6	17	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	457	739	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	52.9%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	19	457	733	6	17	53
Future Vol, veh/h	19	457	733	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	19	457	733	6	17	53

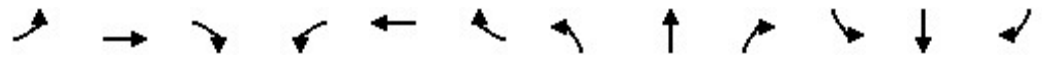
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	744	0	-	0	1238 743
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	497 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	864	-	-	-	194 415
Stage 1	-	-	-	-	471 -
Stage 2	-	-	-	-	611 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	860	-	-	-	188 412
Mov Cap-2 Maneuver	-	-	-	-	188 -
Stage 1	-	-	-	-	458 -
Stage 2	-	-	-	-	608 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	19.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	860	-	-	-	320
HCM Lane V/C Ratio	0.022	-	-	-	0.219
HCM Control Delay (s)	9.3	-	-	-	19.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	498	113	57	367	45	268	54	135	58	17	26
Future Volume (vph)	14	498	113	57	367	45	268	54	135	58	17	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97		0.97	1.00		0.93	0.99		0.94	0.96	0.98	
Frt			0.850			0.850			0.850		0.909	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1362	0
Flt Permitted	0.455			0.307			0.729			0.722		
Satd. Flow (perm)	586	1456	1300	423	1470	1221	1131	1456	1232	1083	1362	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			113			45			135			26
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	14	498	113	57	367	45	268	54	135	58	17	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	498	113	57	367	45	268	54	135	58	43	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road



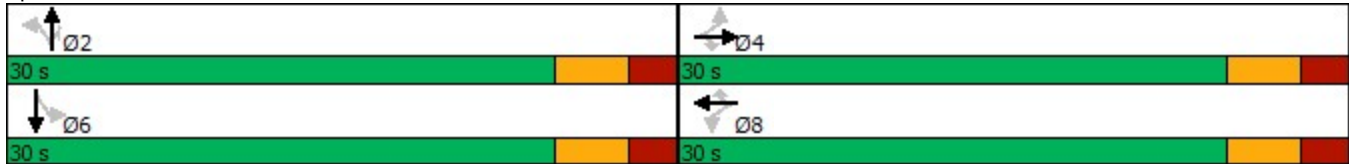
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	22.4	22.4	22.4	22.4	22.4	22.4	24.6	24.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.42	0.42	0.42	0.42	0.42	0.42
v/c Ratio	0.06	0.89	0.20	0.35	0.65	0.09	0.56	0.09	0.23	0.13	0.07	
Control Delay	11.7	37.3	3.8	19.6	20.7	4.6	19.0	11.4	3.7	12.0	6.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	37.3	3.8	19.6	20.7	4.6	19.0	11.4	3.7	12.0	6.9	
LOS	B	D	A	B	C	A	B	B	A	B	A	
Approach Delay		30.6			19.0			13.6			9.8	
Approach LOS		C			B			B			A	
Queue Length 50th (m)	0.9	47.2	0.0	4.1	30.5	0.0	21.9	3.5	0.0	3.8	1.1	
Queue Length 95th (m)	3.9	#96.3	7.5	12.7	54.9	4.8	43.1	9.1	8.3	10.0	5.9	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		
Base Capacity (vph)	248	617	616	179	623	543	479	617	599	459	592	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.81	0.18	0.32	0.59	0.08	0.56	0.09	0.23	0.13	0.07	

Intersection Summary	
Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	58
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.89

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

Intersection Signal Delay: 21.3	Intersection LOS: C
Intersection Capacity Utilization 72.1%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
3: River Mist Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	498	113	57	367	45	268	54	135	58	17	26
Future Volume (veh/h)	14	498	113	57	367	45	268	54	135	58	17	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.95	0.99		0.95	0.97		0.94	0.97		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	14	498	113	57	367	45	268	54	135	58	17	26
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	305	657	508	220	662	500	646	692	523	580	221	338
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	809	1660	1285	710	1674	1265	1317	1660	1254	1152	530	810
Grp Volume(v), veh/h	14	498	113	57	367	45	268	54	135	58	0	43
Grp Sat Flow(s),veh/h/ln	809	1660	1285	710	1674	1265	1317	1660	1254	1152	0	1340
Q Serve(g_s), s	0.8	15.2	3.4	4.4	10.0	1.3	9.0	1.2	4.1	1.9	0.0	1.1
Cycle Q Clear(g_c), s	10.8	15.2	3.4	19.6	10.0	1.3	10.2	1.2	4.1	3.0	0.0	1.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	305	657	508	220	662	500	646	692	523	580	0	559
V/C Ratio(X)	0.05	0.76	0.22	0.26	0.55	0.09	0.41	0.08	0.26	0.10	0.00	0.08
Avail Cap(c_a), veh/h	323	692	536	235	698	527	646	692	523	580	0	559
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.9	15.3	11.8	23.8	13.7	11.1	13.4	10.3	11.2	11.2	0.0	10.3
Incr Delay (d2), s/veh	0.1	4.6	0.2	0.6	0.9	0.1	2.0	0.2	1.2	0.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	7.0	1.1	0.8	4.2	0.4	3.3	0.5	1.4	0.6	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.0	19.9	12.0	24.4	14.6	11.2	15.3	10.5	12.4	11.6	0.0	10.6
LnGrp LOS	B	B	B	C	B	B	B	B	B	B	A	B
Approach Vol, veh/h		625			469			457			101	
Approach Delay, s/veh		18.5			15.5			13.9			11.2	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		28.7		30.0		28.7				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		24.5		24.5		24.5				
Max Q Clear Time (g_c+I1), s		12.2		17.2		5.0		21.6				
Green Ext Time (p_c), s		1.9		2.6		0.5		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				15.9								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road












2023 FB - AM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	241	465	54	103	250	73	126	379	208	86	142	124
Future Volume (vph)	241	465	54	103	250	73	126	379	208	86	142	124
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.977			0.961			0.952	
Flt Protected		0.984			0.988			0.991			0.988	
Satd. Flow (prot)	0	1501	0	0	1487	0	0	1659	0	0	1574	0
Flt Permitted		0.984			0.988			0.991			0.988	
Satd. Flow (perm)	0	1501	0	0	1487	0	0	1659	0	0	1574	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	241	465	54	103	250	73	126	379	208	86	142	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	760	0	0	426	0	0	713	0	0	352	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	122.2%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	513	160	56	791	102
Future Volume (vph)	48	513	160	56	791	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	295.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.965			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1450	0	1458	1079
Flt Permitted	0.950				0.391	
Satd. Flow (perm)	1433	1455	1450	0	600	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		513	16			
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	48	513	160	56	791	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	513	216	0	791	102
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road



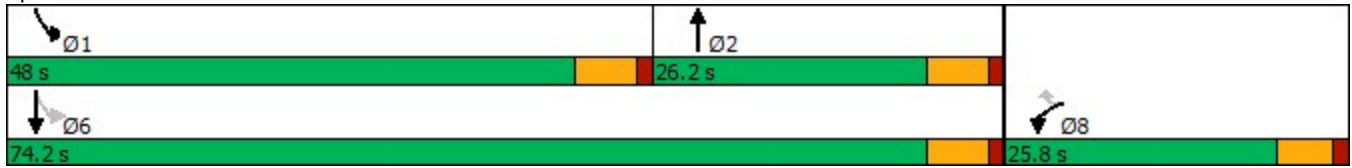
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	25.5	25.5	25.7		10.7	25.7
Total Split (s)	25.8	25.8	26.2		48.0	74.2
Total Split (%)	25.8%	25.8%	26.2%		48.0%	74.2%
Maximum Green (s)	20.3	20.3	20.5		42.3	68.5
Yellow Time (s)	4.2	4.2	4.6		4.6	4.6
All-Red Time (s)	1.3	1.3	1.1		1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.0	13.0	13.0			13.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	12.4	12.4	20.5		68.6	68.6
Actuated g/C Ratio	0.13	0.13	0.22		0.74	0.74
v/c Ratio	0.25	0.80	0.64		0.94	0.13
Control Delay	38.6	14.0	41.1		33.5	4.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	38.6	14.0	41.1		33.5	4.4
LOS	D	B	D		C	A
Approach Delay	16.1		41.1			30.2
Approach LOS	B		D			C
Queue Length 50th (m)	7.7	0.0	31.2		78.8	3.6
Queue Length 95th (m)	17.4	31.1	#66.4		#201.6	11.8
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		295.0			275.0	
Base Capacity (vph)	316	721	335		840	802
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.15	0.71	0.64		0.94	0.13

Intersection Summary	
Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	92.2
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	26.9
Intersection LOS:	C
Intersection Capacity Utilization:	81.2%
ICU Level of Service:	D
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2023 FB - PM Improvements
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	48	513	160	56	791	102
Future Volume (veh/h)	48	513	160	56	791	102
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1533	1575	887
Adj Flow Rate, veh/h	48	513	160	56	791	102
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	19	16	65
Cap, veh/h	0	0	662	232	1014	819
Arrive On Green	0.00	0.00	0.61	0.61	0.24	0.92
Sat Flow, veh/h	0		1085	380	1500	887
Grp Volume(v), veh/h	0.0		0	216	791	102
Grp Sat Flow(s),veh/h/ln			0	1465	1500	887
Q Serve(g_s), s			0.0	5.0	10.5	0.7
Cycle Q Clear(g_c), s			0.0	5.0	10.5	0.7
Prop In Lane				0.26	1.00	
Lane Grp Cap(c), veh/h			0	894	1014	819
V/C Ratio(X)			0.00	0.24	0.78	0.12
Avail Cap(c_a), veh/h			0	894	1515	819
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			0.0	6.6	2.7	0.2
Incr Delay (d2), s/veh			0.0	0.6	1.6	0.3
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			0.0	1.8	2.2	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			0.0	7.3	4.2	0.6
LnGrp LOS			A	A	A	A
Approach Vol, veh/h			216			893
Approach Delay, s/veh			7.3			3.8
Approach LOS			A			A
Timer - Assigned Phs	1	2				6
Phs Duration (G+Y+Rc), s	23.2	51.0				74.2
Change Period (Y+Rc), s	* 5.7	* 5.7				* 5.7
Max Green Setting (Gmax), s	* 42	* 21				* 69
Max Q Clear Time (g_c+I1), s	12.5	7.0				2.7
Green Ext Time (p_c), s	5.0	1.1				0.9

Intersection Summary

HCM 6th Ctrl Delay			4.5			
HCM 6th LOS			A			

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	705	523	21	9	31
Future Volume (vph)	49	705	523	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1563	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1563	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	705	523	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	705	544	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	705	523	21	9	31
Future Vol, veh/h	49	705	523	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	705	523	21	9	31

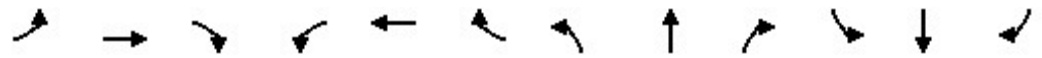
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	549	0	-	0	1344 541
Stage 1	-	-	-	-	539 -
Stage 2	-	-	-	-	805 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1021	-	-	-	167 541
Stage 1	-	-	-	-	585 -
Stage 2	-	-	-	-	440 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1016	-	-	-	157 537
Mov Cap-2 Maneuver	-	-	-	-	157 -
Stage 1	-	-	-	-	554 -
Stage 2	-	-	-	-	438 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1016	-	-	-	348
HCM Lane V/C Ratio	0.048	-	-	-	0.115
HCM Control Delay (s)	8.7	-	-	-	16.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Future Volume (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99		0.93	0.96	0.98	
Frt			0.850			0.850			0.850		0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1378	0
Flt Permitted	0.345			0.269			0.739			0.747		
Satd. Flow (perm)	446	1456	1299	371	1470	1210	1144	1456	1224	1110	1378	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			64			120			15
Link Speed (k/h)		50			50			50				50
Link Distance (m)		449.3			477.1			575.8				329.8
Travel Time (s)		32.3			34.4			41.5				23.7
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	585	182	151	502	64	157	16	120	29	28	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	57.1%	57.1%	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%
Maximum Green (s)	34.5	34.5	34.5	34.5	34.5	34.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	29.6	29.6	29.6	29.6	29.6	29.6	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.45	0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.10	0.89	0.26	0.90	0.76	0.11	0.36	0.03	0.22	0.07	0.05	
Control Delay	11.1	34.0	2.9	70.1	23.0	3.4	19.6	15.3	4.8	15.8	10.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	34.0	2.9	70.1	23.0	3.4	19.6	15.3	4.8	15.8	10.5	
LOS	B	C	A	E	C	A	B	B	A	B	B	
Approach Delay		26.2			31.1			13.3				13.2
Approach LOS		C			C			B				B
Queue Length 50th (m)	1.3	60.9	0.0	15.9	47.5	0.0	15.2	1.4	0.0	2.5	1.1	
Queue Length 95th (m)	4.8	#118.3	8.6	#48.7	80.9	5.2	30.2	5.0	9.5	7.6	5.8	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		
Base Capacity (vph)	237	774	776	197	782	673	432	550	537	419	530	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.76	0.23	0.77	0.64	0.10	0.36	0.03	0.22	0.07	0.05	

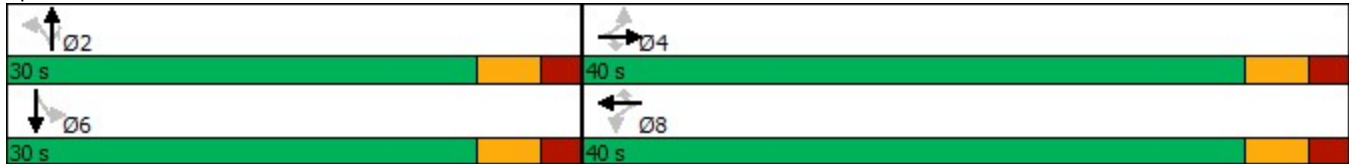
Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 65.4
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.90

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

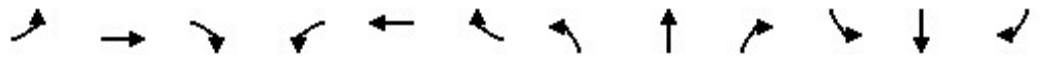
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 3: River Mist Road & Cambrian Road

2023 FB - PM Improvements
 3831 Cambrian Road

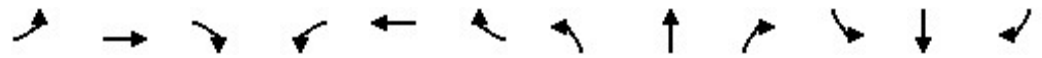


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	585	182	151	502	64	157	16	120	29	13	15
Future Volume (veh/h)	20	585	182	151	502	64	157	16	120	29	13	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	0.96		0.94	0.96		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	20	585	182	151	502	64	157	16	120	29	13	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	299	818	640	237	825	630	548	581	436	515	220	254
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	712	1660	1298	621	1674	1277	1324	1660	1244	1198	629	726
Grp Volume(v), veh/h	20	585	182	151	502	64	157	16	120	29	0	28
Grp Sat Flow(s),veh/h/ln	712	1660	1298	621	1674	1277	1324	1660	1244	1198	0	1355
Q Serve(g_s), s	1.5	19.3	5.8	15.2	15.2	1.9	6.2	0.4	4.9	1.1	0.0	1.0
Cycle Q Clear(g_c), s	16.7	19.3	5.8	34.5	15.2	1.9	7.2	0.4	4.9	1.6	0.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	299	818	640	237	825	630	548	581	436	515	0	474
V/C Ratio(X)	0.07	0.72	0.28	0.64	0.61	0.10	0.29	0.03	0.28	0.06	0.00	0.06
Avail Cap(c_a), veh/h	299	818	640	237	825	630	548	581	436	515	0	474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	13.9	10.5	28.2	12.9	9.5	17.5	14.9	16.4	15.5	0.0	15.1
Incr Delay (d2), s/veh	0.1	3.0	0.2	5.5	1.3	0.1	1.3	0.1	1.6	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	8.5	1.9	3.1	6.5	0.6	2.3	0.2	1.7	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	16.9	10.7	33.7	14.2	9.5	18.8	15.0	17.9	15.7	0.0	15.3
LnGrp LOS	B	B	B	C	B	A	B	B	B	B	A	B
Approach Vol, veh/h		787			717			293				57
Approach Delay, s/veh		15.5			17.9			18.2				15.5
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		40.0		30.0		40.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		34.5		24.5		34.5				
Max Q Clear Time (g_c+I1), s		9.2		21.3		3.6		36.5				
Green Ext Time (p_c), s		1.2		4.8		0.2		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		16.9
HCM 6th LOS		B

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FB - PM Improvements
3831 Cambrian Road














Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Future Volume (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.972			0.981			0.968			0.954	
Flt Protected		0.987			0.988			0.993			0.996	
Satd. Flow (prot)	0	1452	0	0	1496	0	0	1675	0	0	1594	0
Flt Permitted		0.987			0.988			0.993			0.996	
Satd. Flow (perm)	0	1452	0	0	1496	0	0	1675	0	0	1594	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	670	0	0	602	0	0	525	0	0	894	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary
 Area Type: Other
 Control Type: Roundabout
 Intersection Capacity Utilization 121.5% ICU Level of Service H
 Analysis Period (min) 15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FB - SAT Improvements
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	513	160	56	791	102
Future Volume (vph)	48	513	160	56	791	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	295.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.965			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1450	0	1458	1079
Flt Permitted	0.950				0.391	
Satd. Flow (perm)	1433	1455	1450	0	600	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		513	16			
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	48	513	160	56	791	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	513	216	0	791	102
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	25.5	25.5	25.7		10.7	25.7
Total Split (s)	25.8	25.8	26.2		48.0	74.2
Total Split (%)	25.8%	25.8%	26.2%		48.0%	74.2%
Maximum Green (s)	20.3	20.3	20.5		42.3	68.5
Yellow Time (s)	4.2	4.2	4.6		4.6	4.6
All-Red Time (s)	1.3	1.3	1.1		1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.0	13.0	13.0			13.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	12.4	12.4	20.5		68.6	68.6
Actuated g/C Ratio	0.13	0.13	0.22		0.74	0.74
v/c Ratio	0.25	0.80	0.64		0.94	0.13
Control Delay	38.6	14.0	41.1		33.5	4.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	38.6	14.0	41.1		33.5	4.4
LOS	D	B	D		C	A
Approach Delay	16.1		41.1			30.2
Approach LOS	B		D			C
Queue Length 50th (m)	7.7	0.0	31.2		78.8	3.6
Queue Length 95th (m)	17.4	31.1	#66.4		#201.6	11.8
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		295.0			275.0	
Base Capacity (vph)	316	721	335		840	802
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.15	0.71	0.64		0.94	0.13

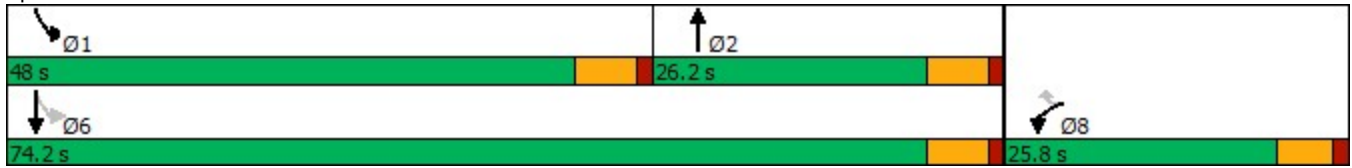
Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	92.2
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	26.9
Intersection LOS:	C
Intersection Capacity Utilization:	81.2%
ICU Level of Service:	D
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2023 FB - SAT Improvements
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↶		↷	↶
Traffic Volume (veh/h)	48	513	160	56	791	102
Future Volume (veh/h)	48	513	160	56	791	102
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1533	1575	887
Adj Flow Rate, veh/h	48	513	160	56	791	102
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	19	16	65
Cap, veh/h	0	0	662	232	1014	819
Arrive On Green	0.00	0.00	0.61	0.61	0.24	0.92
Sat Flow, veh/h	0		1085	380	1500	887
Grp Volume(v), veh/h	0.0		0	216	791	102
Grp Sat Flow(s),veh/h/ln			0	1465	1500	887
Q Serve(g_s), s			0.0	5.0	10.5	0.7
Cycle Q Clear(g_c), s			0.0	5.0	10.5	0.7
Prop In Lane				0.26	1.00	
Lane Grp Cap(c), veh/h			0	894	1014	819
V/C Ratio(X)			0.00	0.24	0.78	0.12
Avail Cap(c_a), veh/h			0	894	1515	819
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			0.0	6.6	2.7	0.2
Incr Delay (d2), s/veh			0.0	0.6	1.6	0.3
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			0.0	1.8	2.2	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			0.0	7.3	4.2	0.6
LnGrp LOS			A	A	A	A
Approach Vol, veh/h			216			893
Approach Delay, s/veh			7.3			3.8
Approach LOS			A			A
Timer - Assigned Phs	1	2				6
Phs Duration (G+Y+Rc), s	23.2	51.0				74.2
Change Period (Y+Rc), s	* 5.7	* 5.7				* 5.7
Max Green Setting (Gmax), s	* 42	* 21				* 69
Max Q Clear Time (g_c+I1), s	12.5	7.0				2.7
Green Ext Time (p_c), s	5.0	1.1				0.9

Intersection Summary

HCM 6th Ctrl Delay			4.5			
HCM 6th LOS			A			

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	705	523	21	9	31
Future Volume (vph)	49	705	523	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1563	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1563	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	705	523	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	705	544	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.8%
	ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	705	523	21	9	31
Future Vol, veh/h	49	705	523	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	705	523	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	549	0	-	0	1344 541
Stage 1	-	-	-	-	539 -
Stage 2	-	-	-	-	805 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1021	-	-	-	167 541
Stage 1	-	-	-	-	585 -
Stage 2	-	-	-	-	440 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1016	-	-	-	157 537
Mov Cap-2 Maneuver	-	-	-	-	157 -
Stage 1	-	-	-	-	554 -
Stage 2	-	-	-	-	438 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1016	-	-	-	348
HCM Lane V/C Ratio	0.048	-	-	-	0.115
HCM Control Delay (s)	8.7	-	-	-	16.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Future Volume (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99		0.93	0.96	0.98	
Frt			0.850			0.850			0.850		0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1378	0
Flt Permitted	0.345			0.269			0.739			0.747		
Satd. Flow (perm)	446	1456	1299	371	1470	1210	1144	1456	1224	1110	1378	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			64			120			15
Link Speed (k/h)		50			50			50				50
Link Distance (m)		449.3			477.1			575.8				329.8
Travel Time (s)		32.3			34.4			41.5				23.7
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	585	182	151	502	64	157	16	120	29	13	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	585	182	151	502	64	157	16	120	29	28	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	57.1%	57.1%	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%
Maximum Green (s)	34.5	34.5	34.5	34.5	34.5	34.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	29.6	29.6	29.6	29.6	29.6	29.6	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.45	0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.10	0.89	0.26	0.90	0.76	0.11	0.36	0.03	0.22	0.07	0.05	
Control Delay	11.1	34.0	2.9	70.1	23.0	3.4	19.6	15.3	4.8	15.8	10.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	34.0	2.9	70.1	23.0	3.4	19.6	15.3	4.8	15.8	10.5	
LOS	B	C	A	E	C	A	B	B	A	B	B	
Approach Delay		26.2			31.1			13.3				13.2
Approach LOS		C			C			B				B
Queue Length 50th (m)	1.3	60.9	0.0	15.9	47.5	0.0	15.2	1.4	0.0	2.5	1.1	
Queue Length 95th (m)	4.8	#118.3	8.6	#48.7	80.9	5.2	30.2	5.0	9.5	7.6	5.8	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		
Base Capacity (vph)	237	774	776	197	782	673	432	550	537	419	530	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.76	0.23	0.77	0.64	0.10	0.36	0.03	0.22	0.07	0.05	

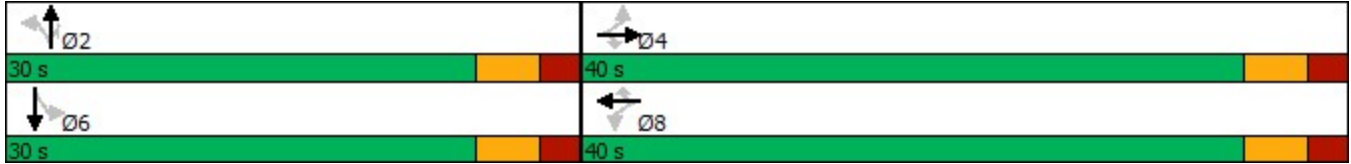
Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 65.4
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.90

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

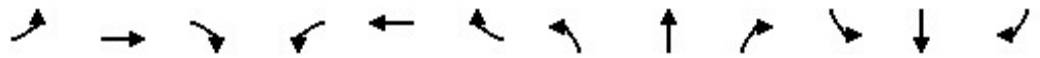
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 3: River Mist Road & Cambrian Road

2023 FB - SAT Improvements
 3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	585	182	151	502	64	157	16	120	29	13	15
Future Volume (veh/h)	20	585	182	151	502	64	157	16	120	29	13	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	0.96		0.94	0.96		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	20	585	182	151	502	64	157	16	120	29	13	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	299	818	640	237	825	630	548	581	436	515	220	254
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	712	1660	1298	621	1674	1277	1324	1660	1244	1198	629	726
Grp Volume(v), veh/h	20	585	182	151	502	64	157	16	120	29	0	28
Grp Sat Flow(s),veh/h/ln	712	1660	1298	621	1674	1277	1324	1660	1244	1198	0	1355
Q Serve(g_s), s	1.5	19.3	5.8	15.2	15.2	1.9	6.2	0.4	4.9	1.1	0.0	1.0
Cycle Q Clear(g_c), s	16.7	19.3	5.8	34.5	15.2	1.9	7.2	0.4	4.9	1.6	0.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	299	818	640	237	825	630	548	581	436	515	0	474
V/C Ratio(X)	0.07	0.72	0.28	0.64	0.61	0.10	0.29	0.03	0.28	0.06	0.00	0.06
Avail Cap(c_a), veh/h	299	818	640	237	825	630	548	581	436	515	0	474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	13.9	10.5	28.2	12.9	9.5	17.5	14.9	16.4	15.5	0.0	15.1
Incr Delay (d2), s/veh	0.1	3.0	0.2	5.5	1.3	0.1	1.3	0.1	1.6	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	8.5	1.9	3.1	6.5	0.6	2.3	0.2	1.7	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	16.9	10.7	33.7	14.2	9.5	18.8	15.0	17.9	15.7	0.0	15.3
LnGrp LOS	B	B	B	C	B	A	B	B	B	B	A	B
Approach Vol, veh/h		787			717			293				57
Approach Delay, s/veh		15.5			17.9			18.2				15.5
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		40.0		30.0		40.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		34.5		24.5		34.5				
Max Q Clear Time (g_c+l1), s		9.2		21.3		3.6		36.5				
Green Ext Time (p_c), s		1.2		4.8		0.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				16.9								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Future Volume (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.972			0.981			0.968			0.954	
Flt Protected		0.987			0.988			0.993			0.996	
Satd. Flow (prot)	0	1452	0	0	1496	0	0	1675	0	0	1594	0
Flt Permitted		0.987			0.988			0.993			0.996	
Satd. Flow (perm)	0	1452	0	0	1496	0	0	1675	0	0	1594	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	175	358	137	144	372	86	78	322	125	68	519	307
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	670	0	0	602	0	0	525	0	0	894	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	121.5%
ICU Level of Service	H
Analysis Period (min)	15

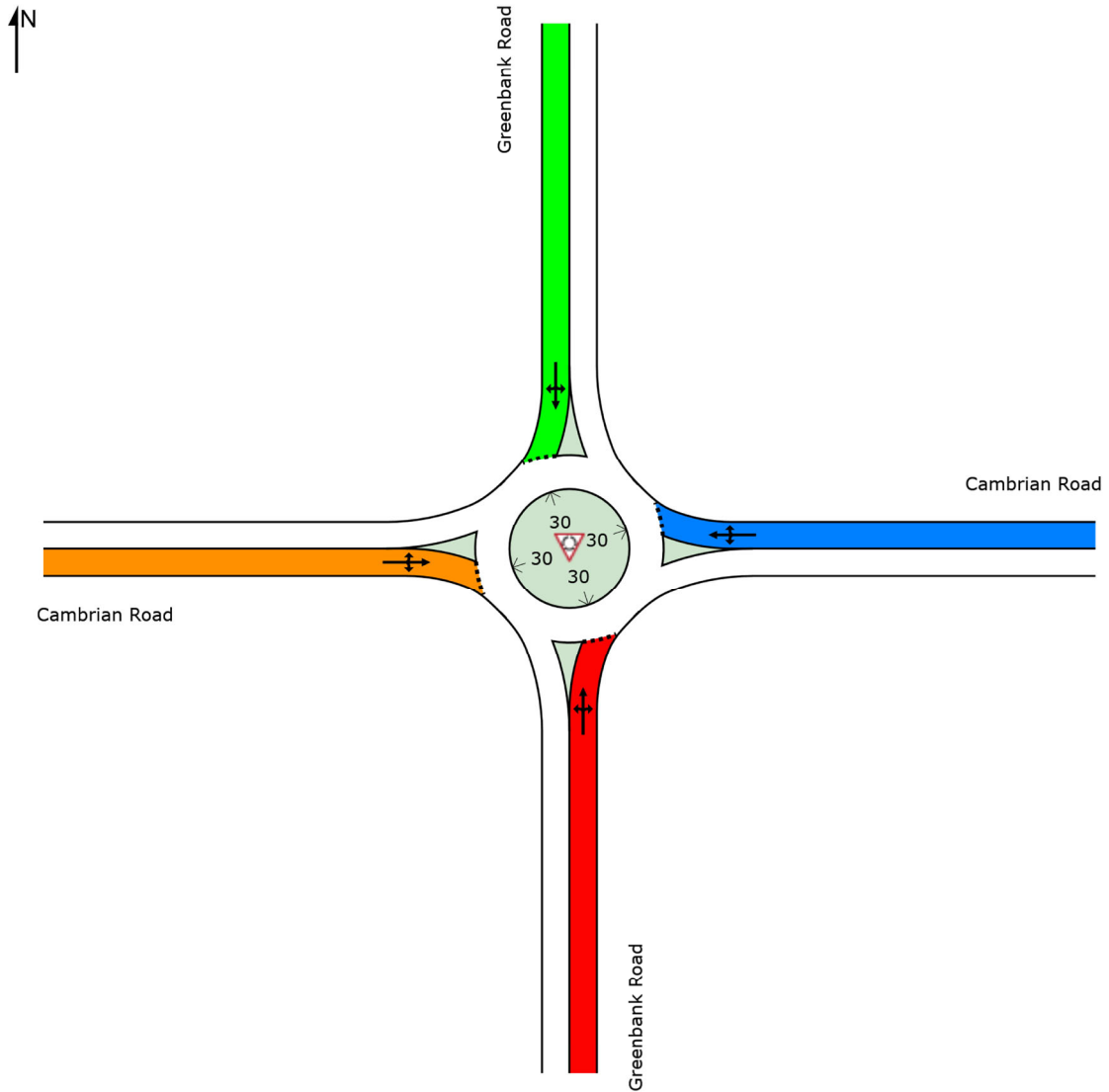
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

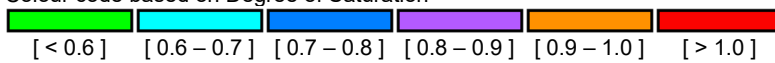
 Site: 101 [Cambrian and Greenbank 2023 FB AM]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	1.43	0.71	0.50	0.96	1.43



Colour code based on Degree of Saturation



DELAY (CONTROL)

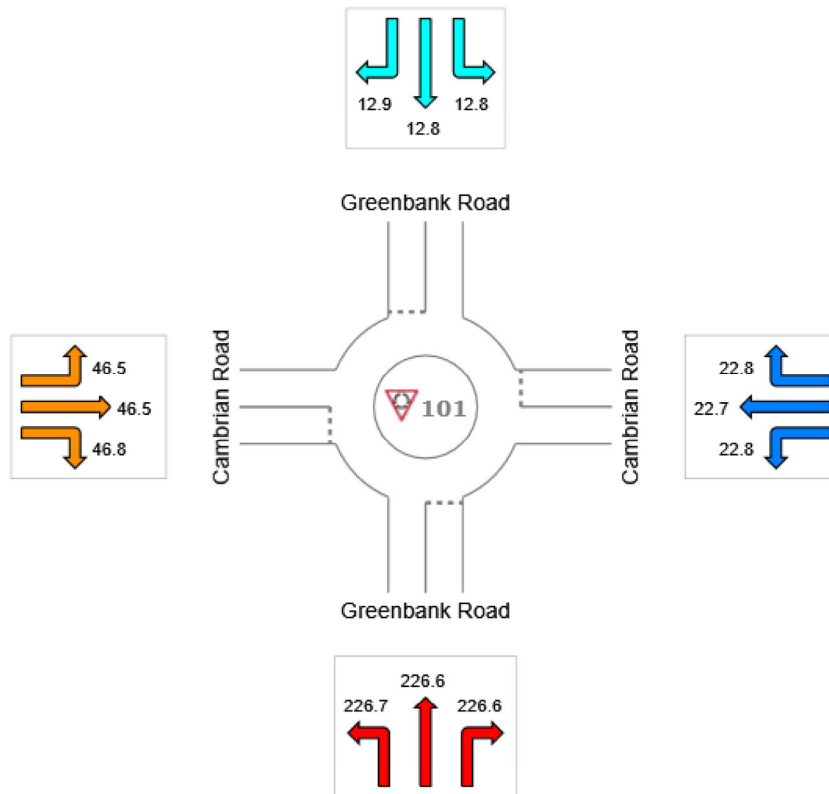
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FB AM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	226.6	22.7	12.8	46.5	93.8
LOS	F	C	B	E	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

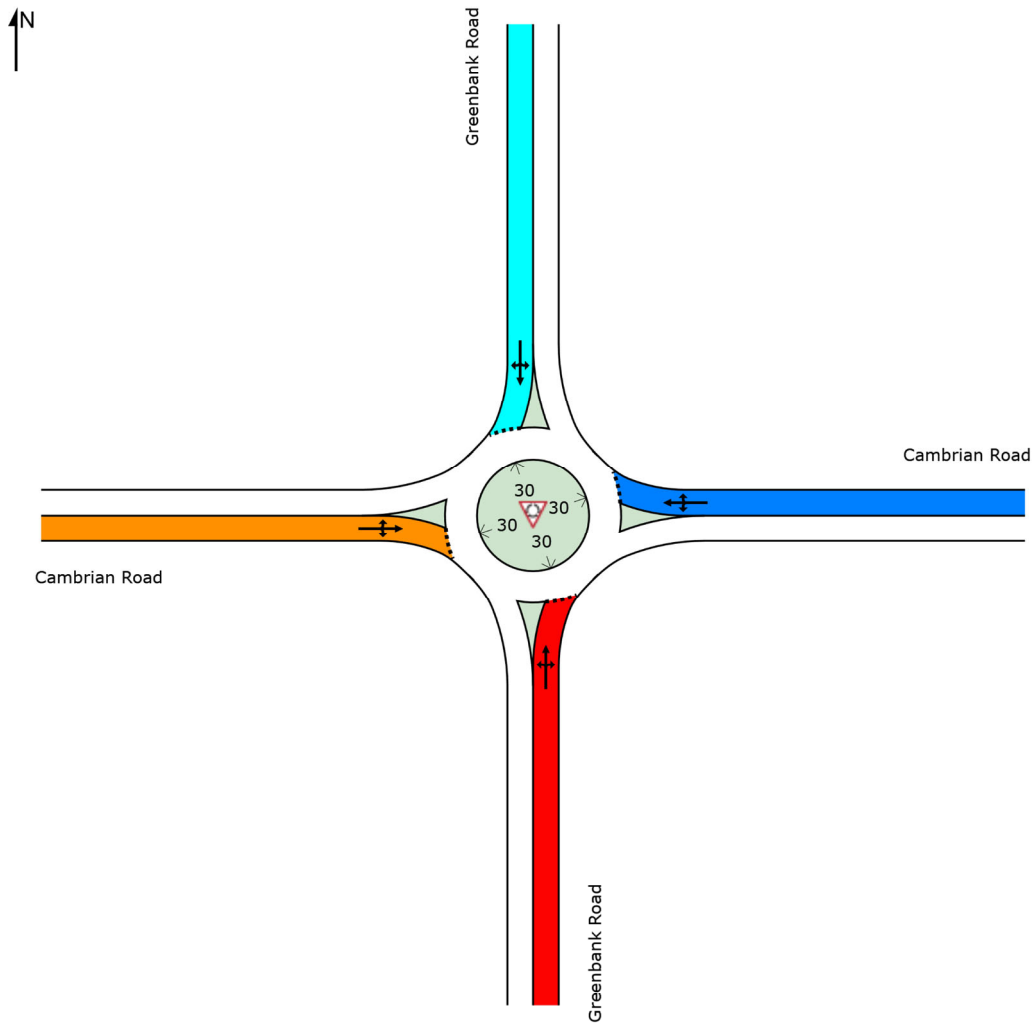
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2023 FB AM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	C	B	E	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FB AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	126	3.0	1.428	226.7	LOS F	79.6	567.5	1.00	4.26	11.74	6.1
2	T1	379	2.0	1.428	226.6	LOS F	79.6	567.5	1.00	4.26	11.74	6.3
3	R2	208	2.0	1.428	226.6	LOS F	79.6	567.5	1.00	4.26	11.74	4.9
Approach		713	2.2	1.428	226.6	LOS F	79.6	567.5	1.00	4.26	11.74	5.9
East: Cambrian Road												
4	L2	103	6.0	0.709	22.8	LOS C	6.5	47.1	0.80	1.14	1.66	26.4
5	T1	250	2.0	0.709	22.7	LOS C	6.5	47.1	0.80	1.14	1.66	28.7
6	R2	73	8.0	0.709	22.8	LOS C	6.5	47.1	0.80	1.14	1.66	28.7
Approach		426	4.0	0.709	22.7	LOS C	6.5	47.1	0.80	1.14	1.66	28.2
North: Greenbank Road												
7	L2	86	5.0	0.505	12.8	LOS B	3.2	23.7	0.64	0.75	0.94	37.4
8	T1	142	4.0	0.505	12.8	LOS B	3.2	23.7	0.64	0.75	0.94	37.6
9	R2	124	10.0	0.505	12.9	LOS B	3.2	23.7	0.64	0.75	0.94	37.0
Approach		352	6.4	0.505	12.8	LOS B	3.2	23.7	0.64	0.75	0.94	37.3
West: Cambrian Road												
10	L2	241	3.0	0.964	46.5	LOS E	33.1	239.4	1.00	2.13	3.37	23.2
11	T1	465	3.0	0.964	46.5	LOS E	33.1	239.4	1.00	2.13	3.37	20.0
12	R2	54	17.0	0.964	46.8	LOS E	33.1	239.4	1.00	2.13	3.37	19.4
Approach		760	4.0	0.964	46.5	LOS E	33.1	239.4	1.00	2.13	3.37	21.0
All Vehicles		2251	3.8	1.428	93.8	LOS F	79.6	567.5	0.91	2.40	5.31	12.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Organisation: CGH TRANSPORTATION | Processed: August 10, 2020 9:47:15 AM

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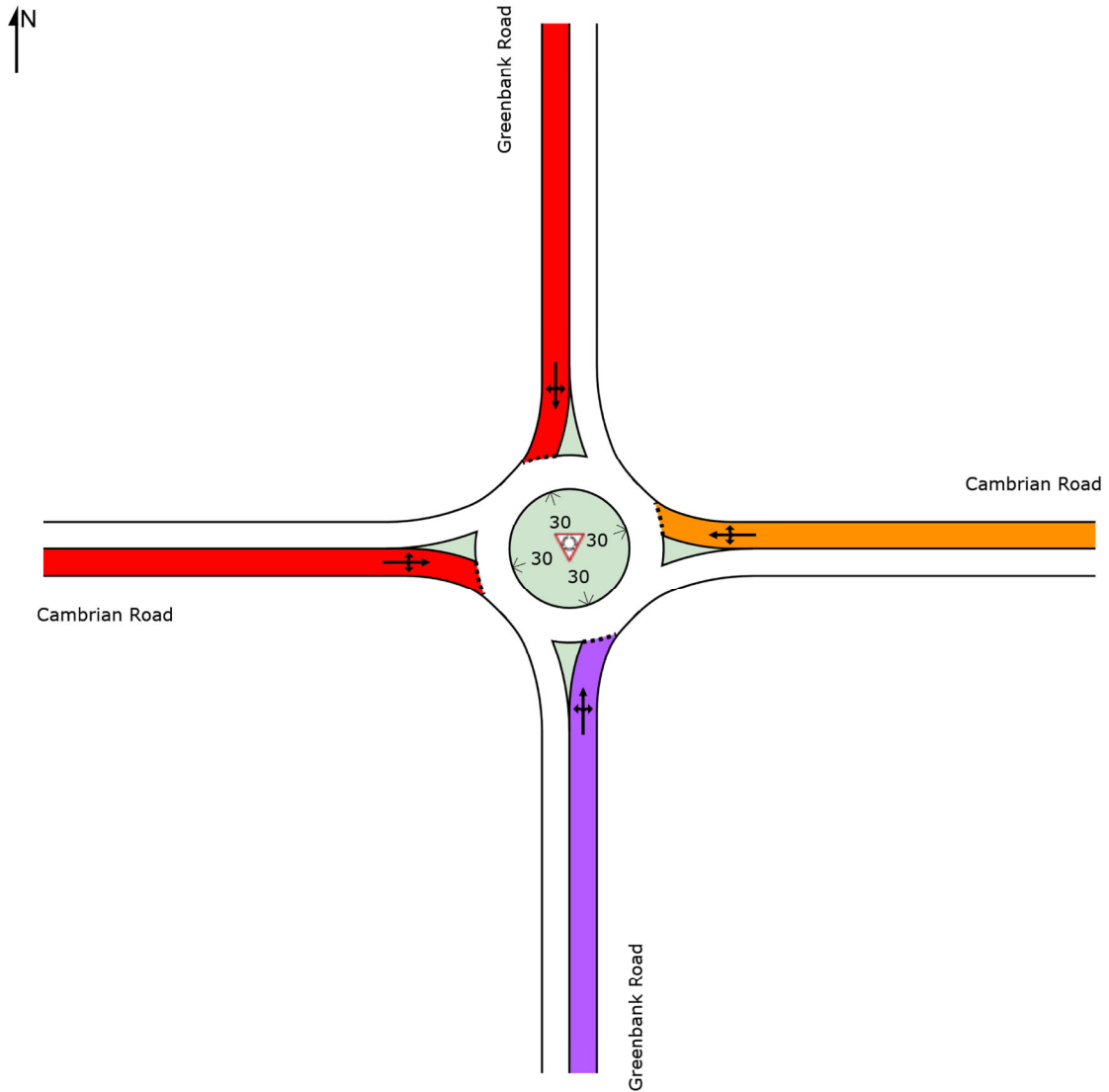
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

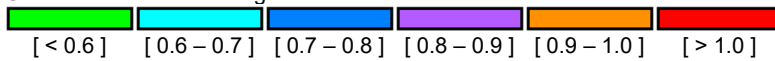
 Site: 101 [Cambrian and Greenbank 2023 FB PM]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.82	0.96	1.46	1.05	1.46



Colour code based on Degree of Saturation



DELAY (CONTROL)

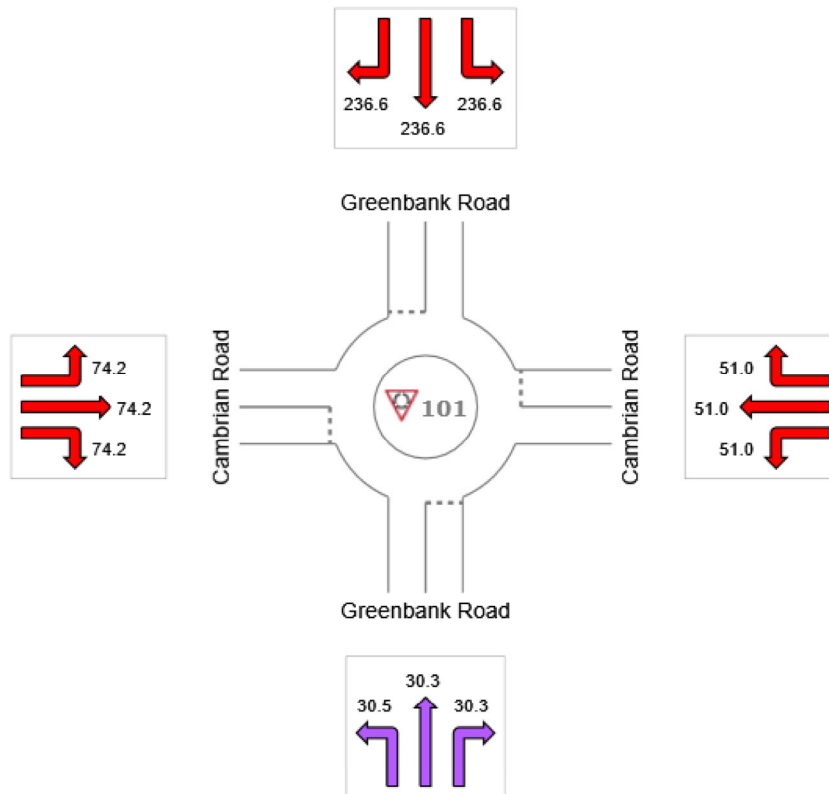
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FB PM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	30.3	51.0	236.6	74.2	114.4
LOS	D	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

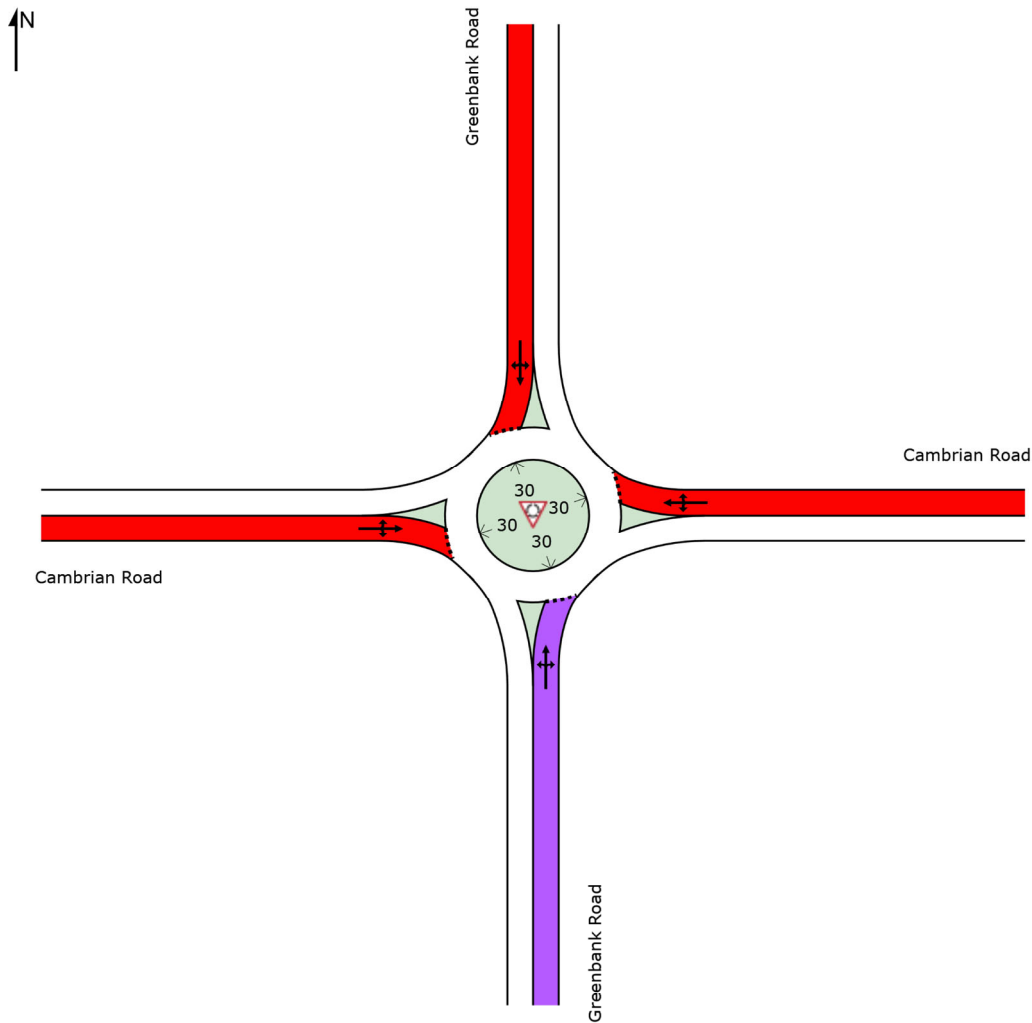
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2023 FB PM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FB PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	78	8.0	0.821	30.5	LOS D	11.3	81.2	0.90	1.37	2.25	26.0
2	T1	322	2.0	0.821	30.3	LOS D	11.3	81.2	0.90	1.37	2.25	27.0
3	R2	125	2.0	0.821	30.3	LOS D	11.3	81.2	0.90	1.37	2.25	22.1
Approach		525	2.9	0.821	30.3	LOS D	11.3	81.2	0.90	1.37	2.25	25.7
East: Cambrian Road												
4	L2	144	2.0	0.955	51.0	LOS F	21.2	151.3	1.00	2.01	3.58	16.7
5	T1	372	2.0	0.955	51.0	LOS F	21.2	151.3	1.00	2.01	3.58	18.9
6	R2	86	2.0	0.955	51.0	LOS F	21.2	151.3	1.00	2.01	3.58	19.4
Approach		602	2.0	0.955	51.0	LOS F	21.2	151.3	1.00	2.01	3.58	18.5
North: Greenbank Road												
7	L2	68	2.0	1.463	236.6	LOS F	105.2	749.2	1.00	4.68	12.04	6.1
8	T1	519	2.0	1.463	236.6	LOS F	105.2	749.2	1.00	4.68	12.04	6.1
9	R2	307	2.0	1.463	236.6	LOS F	105.2	749.2	1.00	4.68	12.04	7.0
Approach		894	2.0	1.463	236.6	LOS F	105.2	749.2	1.00	4.68	12.04	6.4
West: Cambrian Road												
10	L2	175	2.0	1.048	74.2	LOS F	34.0	242.8	1.00	2.58	4.97	17.4
11	T1	358	2.0	1.048	74.2	LOS F	34.0	242.8	1.00	2.58	4.97	14.8
12	R2	137	4.0	1.048	74.2	LOS F	34.0	242.8	1.00	2.58	4.97	14.6
Approach		670	2.4	1.048	74.2	LOS F	34.0	242.8	1.00	2.58	4.97	15.4
All Vehicles		2691	2.3	1.463	114.4	LOS F	105.2	749.2	0.98	2.92	6.48	11.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Organisation: CGH TRANSPORTATION | Processed: August 10, 2020 9:52:06 AM

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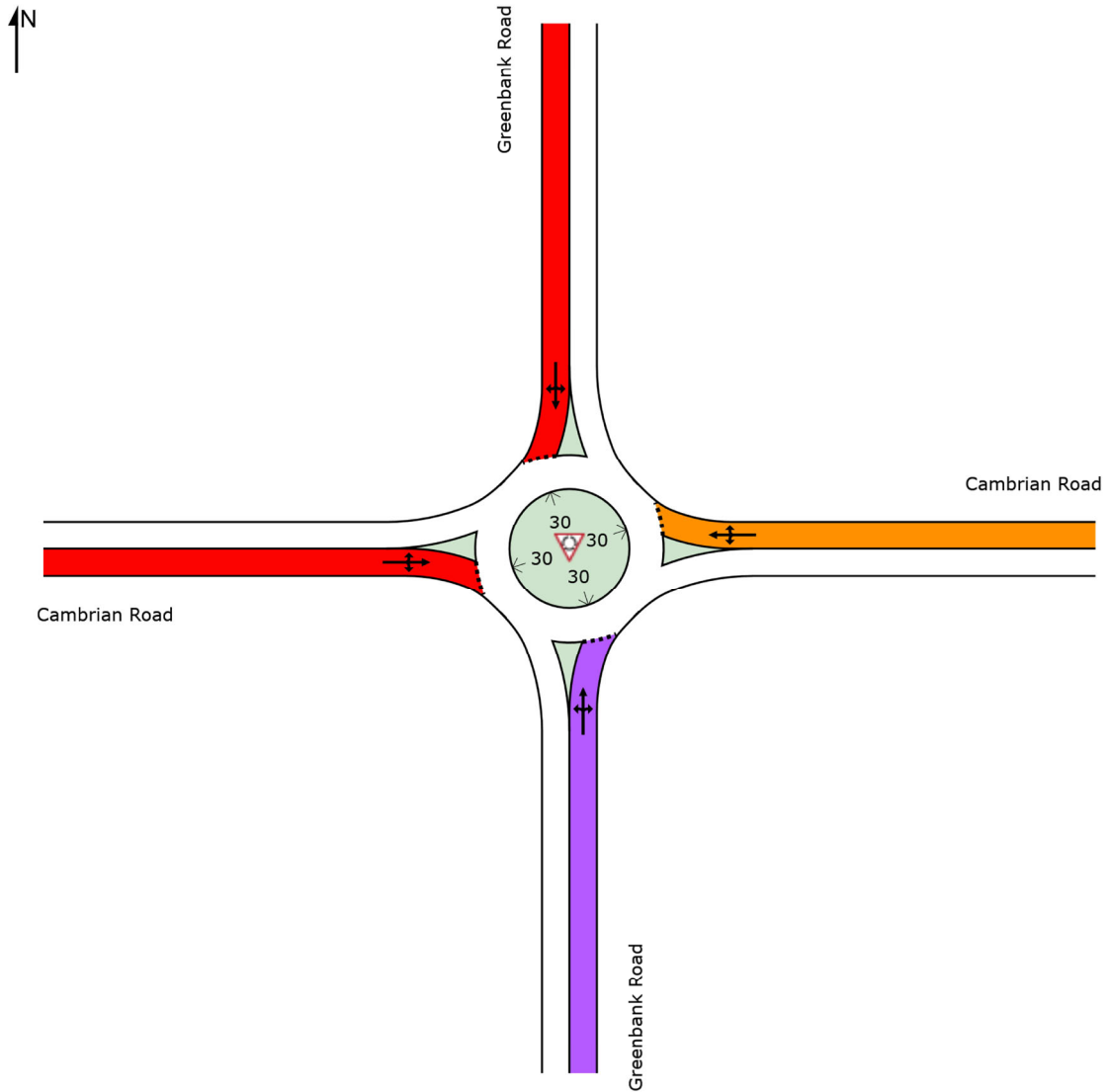
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

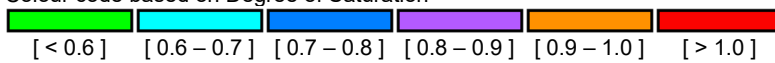
 Site: 101 [Cambrian and Greenbank 2023 FB Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.82	0.96	1.46	1.05	1.46



Colour code based on Degree of Saturation



DELAY (CONTROL)

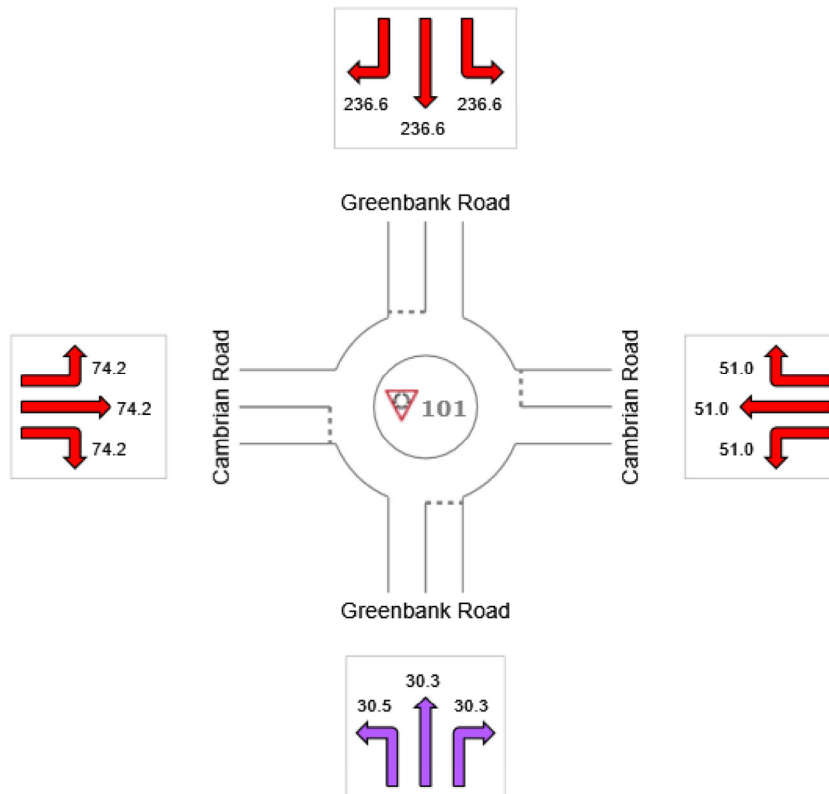
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FB Sat]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	30.3	51.0	236.6	74.2	114.4
LOS	D	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

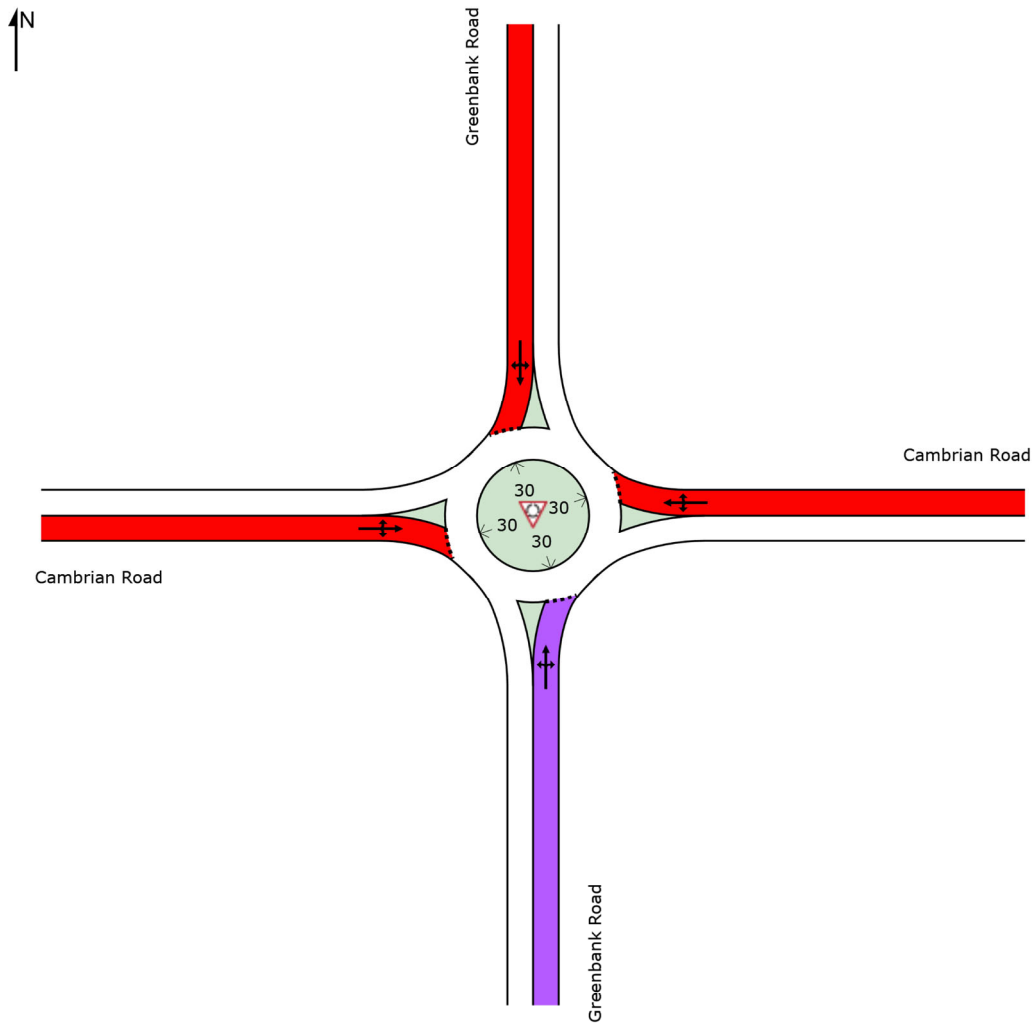
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2023 FB Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FB Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	78	8.0	0.821	30.5	LOS D	11.3	81.2	0.90	1.37	2.25	26.0
2	T1	322	2.0	0.821	30.3	LOS D	11.3	81.2	0.90	1.37	2.25	27.0
3	R2	125	2.0	0.821	30.3	LOS D	11.3	81.2	0.90	1.37	2.25	22.1
Approach		525	2.9	0.821	30.3	LOS D	11.3	81.2	0.90	1.37	2.25	25.7
East: Cambrian Road												
4	L2	144	2.0	0.955	51.0	LOS F	21.2	151.3	1.00	2.01	3.58	16.7
5	T1	372	2.0	0.955	51.0	LOS F	21.2	151.3	1.00	2.01	3.58	18.9
6	R2	86	2.0	0.955	51.0	LOS F	21.2	151.3	1.00	2.01	3.58	19.4
Approach		602	2.0	0.955	51.0	LOS F	21.2	151.3	1.00	2.01	3.58	18.5
North: Greenbank Road												
7	L2	68	2.0	1.463	236.6	LOS F	105.2	749.2	1.00	4.68	12.04	6.1
8	T1	519	2.0	1.463	236.6	LOS F	105.2	749.2	1.00	4.68	12.04	6.1
9	R2	307	2.0	1.463	236.6	LOS F	105.2	749.2	1.00	4.68	12.04	7.0
Approach		894	2.0	1.463	236.6	LOS F	105.2	749.2	1.00	4.68	12.04	6.4
West: Cambrian Road												
10	L2	175	2.0	1.048	74.2	LOS F	34.0	242.8	1.00	2.58	4.97	17.4
11	T1	358	2.0	1.048	74.2	LOS F	34.0	242.8	1.00	2.58	4.97	14.8
12	R2	137	4.0	1.048	74.2	LOS F	34.0	242.8	1.00	2.58	4.97	14.6
Approach		670	2.4	1.048	74.2	LOS F	34.0	242.8	1.00	2.58	4.97	15.4
All Vehicles		2691	2.3	1.463	114.4	LOS F	105.2	749.2	0.98	2.92	6.48	11.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Organisation: CGH TRANSPORTATION | Processed: August 10, 2020 9:56:57 AM













Project: C:\Users\RobinMarina\CGH TRANSPORTATION\CGH Working - Documents\Projects\2019-54 Metro Greenbank Road\DATA\Sidra\Cambrian Greenbank.sip8

Appendix Q

Synchro and Sidra Intersection Worksheets – 2028 Future Background Conditions

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FB - AM
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	93	1212	240	75	460	253
Future Volume (vph)	93	1212	240	75	460	253
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	300.0		135.0	300.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.554	
Satd. Flow (perm)	1433	1455	1496	1293	850	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		549		75		
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	93	1212	240	75	460	253
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	1212	240	75	460	253
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2028 FB - AM
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.7	29.7	25.7	25.7	25.7	25.7
Total Split (s)	66.0	66.0	64.0	64.0	64.0	64.0
Total Split (%)	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%
Maximum Green (s)	60.3	60.3	58.3	58.3	58.3	58.3
Yellow Time (s)	4.2	4.2	4.6	4.6	4.6	4.6
All-Red Time (s)	1.5	1.5	1.1	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	60.3	60.3	58.3	58.3	58.3	58.3
Actuated g/C Ratio	0.46	0.46	0.45	0.45	0.45	0.45
v/c Ratio	0.14	1.25	0.36	0.12	1.21	0.52
Control Delay	20.8	140.7	25.5	4.9	148.7	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	140.7	25.5	4.9	148.7	30.7
LOS	C	F	C	A	F	C
Approach Delay	132.2		20.6			106.8
Approach LOS	F		C			F
Queue Length 50th (m)	13.4	~308.4	39.7	0.0	~143.4	45.9
Queue Length 95th (m)	23.9	#389.5	60.4	8.7	#207.8	72.5
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		300.0		135.0	300.0	
Base Capacity (vph)	664	969	670	621	381	483
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	1.25	0.36	0.12	1.21	0.52

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Natural Cycle:	140
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.25
Intersection Signal Delay:	109.4
Intersection LOS:	F
Intersection Capacity Utilization:	102.0%
ICU Level of Service:	G
Analysis Period (min):	15

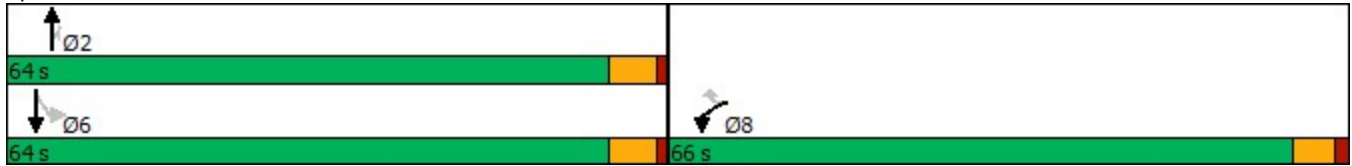
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2028 FB - AM
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↶	↑	↷	↶	↷
Traffic Volume (veh/h)	93	1212	240	75	460	253
Future Volume (veh/h)	93	1212	240	75	460	253
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1561	1575	887
Adj Flow Rate, veh/h	93	1212	240	75	460	253
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	17	16	65
Cap, veh/h	0	0	1397	1205	959	808
Arrive On Green	0.00	0.00	0.91	0.91	0.91	0.91
Sat Flow, veh/h	0		1533	1323	946	887
Grp Volume(v), veh/h	0.0		240	75	460	253
Grp Sat Flow(s),veh/h/ln			1533	1323	946	887
Q Serve(g_s), s			1.1	0.3	6.4	2.3
Cycle Q Clear(g_c), s			1.1	0.3	7.4	2.3
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			1397	1205	959	808
V/C Ratio(X)			0.17	0.06	0.48	0.31
Avail Cap(c_a), veh/h			1397	1205	959	808
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			0.3	0.3	0.7	0.4
Incr Delay (d2), s/veh			0.3	0.1	1.7	1.0
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			0.1	0.0	0.8	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			0.6	0.4	2.4	1.4
LnGrp LOS			A	A	A	A
Approach Vol, veh/h			315			713
Approach Delay, s/veh			0.5			2.0
Approach LOS			A			A
Timer - Assigned Phs		2				6
Phs Duration (G+Y+Rc), s		64.0				64.0
Change Period (Y+Rc), s		* 5.7				* 5.7
Max Green Setting (Gmax), s		* 58				* 58
Max Q Clear Time (g_c+I1), s		3.1				9.4
Green Ext Time (p_c), s		2.3				7.0
Intersection Summary						
HCM 6th Ctrl Delay			1.6			
HCM 6th LOS			A			

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2028 FB - AM
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	553	930	6	17	53
Future Volume (vph)	19	553	930	6	17	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.898	
Flt Protected	0.950				0.988	
Satd. Flow (prot)	1658	1679	1569	0	1393	0
Flt Permitted	0.950				0.988	
Satd. Flow (perm)	1658	1679	1569	0	1393	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	19	553	930	6	17	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	553	936	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	63.9%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	19	553	930	6	17	53
Future Vol, veh/h	19	553	930	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	19	553	930	6	17	53

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	941	0	-	0	1531 940
Stage 1	-	-	-	-	938 -
Stage 2	-	-	-	-	593 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	729	-	-	-	129 320
Stage 1	-	-	-	-	381 -
Stage 2	-	-	-	-	552 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	726	-	-	-	124 318
Mov Cap-2 Maneuver	-	-	-	-	124 -
Stage 1	-	-	-	-	369 -
Stage 2	-	-	-	-	549 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	27.4
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	726	-	-	-	230
HCM Lane V/C Ratio	0.026	-	-	-	0.304
HCM Control Delay (s)	10.1	-	-	-	27.4
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	565	153	57	425	45	384	60	135	58	19	26
Future Volume (vph)	14	565	153	57	425	45	384	60	135	58	19	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97		0.97	1.00		0.92	0.99		0.93	0.96	0.98	
Frt			0.850			0.850			0.850		0.913	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1366	0
Flt Permitted	0.400			0.264			0.728			0.718		
Satd. Flow (perm)	514	1456	1298	364	1470	1205	1127	1456	1220	1067	1366	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			153			45			135			26
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	14	565	153	57	425	45	384	60	135	58	19	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	565	153	57	425	45	384	60	135	58	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	41.0	41.0	41.0	41.0	41.0	41.0	34.0	34.0	34.0	34.0	34.0	34.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	54.7%	54.7%	45.3%	45.3%	45.3%	45.3%	45.3%	45.3%
Maximum Green (s)	35.5	35.5	35.5	35.5	35.5	35.5	28.5	28.5	28.5	28.5	28.5	28.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	30.5	30.5	30.5	30.5	30.5	30.5	28.7	28.7	28.7	28.7	28.7	28.7
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43	0.43	0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	0.06	0.90	0.24	0.36	0.67	0.08	0.83	0.10	0.23	0.13	0.08	
Control Delay	11.7	37.2	3.2	20.5	21.4	4.1	39.5	15.4	4.4	16.0	9.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	37.2	3.2	20.5	21.4	4.1	39.5	15.4	4.4	16.0	9.2	
LOS	B	D	A	C	C	A	D	B	A	B	A	
Approach Delay		29.6			19.9			28.8				13.0
Approach LOS		C			B			C				B
Queue Length 50th (m)	1.0	65.3	0.0	4.8	42.3	0.0	49.1	5.3	0.0	5.2	1.6	
Queue Length 95th (m)	4.0	#122.2	8.7	14.1	70.5	4.8	#99.6	12.5	9.8	12.8	7.6	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		
Base Capacity (vph)	261	741	735	185	748	635	460	594	578	435	573	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.76	0.21	0.31	0.57	0.07	0.83	0.10	0.23	0.13	0.08	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 70.3

Natural Cycle: 75

Control Type: Semi Act-Uncoord

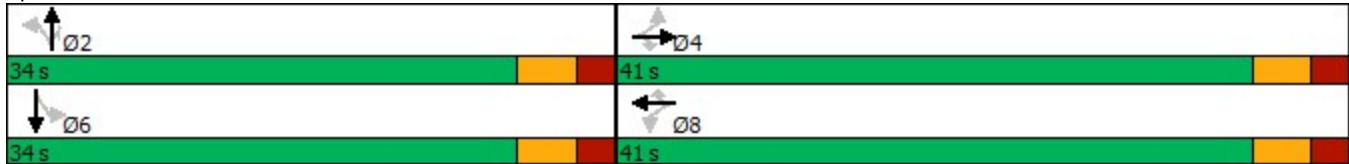
Maximum v/c Ratio: 0.90

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

2028 FB - AM
 3831 Cambrian Road

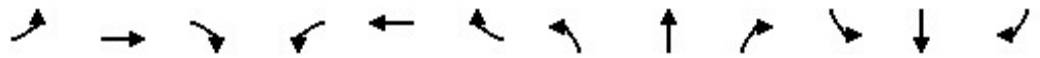
Intersection Signal Delay: 25.8	Intersection LOS: C
Intersection Capacity Utilization 82.6%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
3: River Mist Road & Cambrian Road

2028 FB - AM
3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	565	153	57	425	45	384	60	135	58	19	26
Future Volume (veh/h)	14	565	153	57	425	45	384	60	135	58	19	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	0.97		0.94	0.97		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	14	565	153	57	425	45	384	60	135	58	19	26
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	291	722	562	196	728	553	612	676	511	545	232	317
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	774	1660	1291	650	1674	1270	1314	1660	1253	1146	569	778
Grp Volume(v), veh/h	14	565	153	57	425	45	384	60	135	58	0	45
Grp Sat Flow(s),veh/h/ln	774	1660	1291	650	1674	1270	1314	1660	1253	1146	0	1347
Q Serve(g_s), s	1.0	20.4	5.3	5.8	13.4	1.5	17.7	1.6	5.0	2.3	0.0	1.4
Cycle Q Clear(g_c), s	14.4	20.4	5.3	26.2	13.4	1.5	19.1	1.6	5.0	3.8	0.0	1.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	291	722	562	196	728	553	612	676	511	545	0	549
V/C Ratio(X)	0.05	0.78	0.27	0.29	0.58	0.08	0.63	0.09	0.26	0.11	0.00	0.08
Avail Cap(c_a), veh/h	347	843	655	243	850	645	612	676	511	545	0	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.4	16.9	12.7	28.1	15.0	11.6	18.5	12.7	13.7	13.9	0.0	12.7
Incr Delay (d2), s/veh	0.1	4.2	0.3	0.8	0.7	0.1	4.8	0.3	1.3	0.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	9.2	1.7	1.0	5.7	0.5	6.6	0.7	1.7	0.7	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	21.1	12.9	28.9	15.7	11.6	23.4	13.0	15.0	14.3	0.0	13.0
LnGrp LOS	C	C	B	C	B	B	C	B	B	B	A	B
Approach Vol, veh/h		732			527			579				103
Approach Delay, s/veh		19.4			16.8			20.3				13.7
Approach LOS		B			B			C				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		34.0		35.9		34.0		35.9				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		28.5		35.5		28.5		35.5				
Max Q Clear Time (g_c+I1), s		21.1		22.4		5.8		28.2				
Green Ext Time (p_c), s		1.8		4.4		0.5		2.3				
Intersection Summary												
HCM 6th Ctrl Delay				18.7								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FB - AM
3831 Cambrian Road















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	266	524	61	120	287	81	146	429	241	95	159	137
Future Volume (vph)	266	524	61	120	287	81	146	429	241	95	159	137
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.978			0.960			0.953	
Flt Protected		0.985			0.988			0.991			0.988	
Satd. Flow (prot)	0	1502	0	0	1489	0	0	1657	0	0	1576	0
Flt Permitted		0.985			0.988			0.991			0.988	
Satd. Flow (perm)	0	1502	0	0	1489	0	0	1657	0	0	1576	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	266	524	61	120	287	81	146	429	241	95	159	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	851	0	0	488	0	0	816	0	0	391	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	136.6%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	78	720	350	83	1105	268
Future Volume (vph)	78	720	350	83	1105	268
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	300.0		135.0	300.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.207	
Satd. Flow (perm)	1433	1455	1496	1293	318	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		720		83		
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	78	720	350	83	1105	268
Shared Lane Traffic (%)						
Lane Group Flow (vph)	78	720	350	83	1105	268
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2028 FB - PM
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	29.7	29.7	25.7	25.7	10.7	25.7
Total Split (s)	29.7	29.7	35.3	35.3	65.0	100.3
Total Split (%)	22.8%	22.8%	27.2%	27.2%	50.0%	77.2%
Maximum Green (s)	24.0	24.0	29.6	29.6	59.3	94.6
Yellow Time (s)	4.2	4.2	4.6	4.6	4.6	4.6
All-Red Time (s)	1.5	1.5	1.1	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	17.0	17.0	13.0	13.0		13.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	15.1	15.1	29.7	29.7	94.8	94.8
Actuated g/C Ratio	0.12	0.12	0.24	0.24	0.78	0.78
v/c Ratio	0.44	0.89	0.96	0.22	1.37	0.32
Control Delay	56.4	17.6	83.9	9.7	198.0	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	17.6	83.9	9.7	198.0	5.7
LOS	E	B	F	A	F	A
Approach Delay	21.4		69.7			160.5
Approach LOS	C		E			F
Queue Length 50th (m)	17.4	0.0	79.3	0.0	~310.0	12.9
Queue Length 95th (m)	32.5	#49.4	#154.7	13.2	#447.9	34.8
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		300.0		135.0	300.0	
Base Capacity (vph)	284	865	365	378	807	843
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.83	0.96	0.22	1.37	0.32

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	121.3
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.37
Intersection Signal Delay:	102.8
Intersection LOS:	F
Intersection Capacity Utilization:	106.6%
ICU Level of Service:	G
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2028 FB - PM
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	78	720	350	83	1105	268
Future Volume (veh/h)	78	720	350	83	1105	268
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1561	1575	887
Adj Flow Rate, veh/h	78	720	350	83	1105	268
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	17	16	65
Cap, veh/h	0	0	452	390	1032	837
Arrive On Green	0.00	0.00	0.30	0.30	0.59	0.94
Sat Flow, veh/h	0		1533	1323	1500	887
Grp Volume(v), veh/h	0.0		350	83	1105	268
Grp Sat Flow(s),veh/h/ln			1533	1323	1500	887
Q Serve(g_s), s			20.9	4.7	59.3	2.5
Cycle Q Clear(g_c), s			20.9	4.7	59.3	2.5
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			452	390	1032	837
V/C Ratio(X)			0.77	0.21	1.07	0.32
Avail Cap(c_a), veh/h			452	390	1032	837
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			32.3	26.6	14.7	0.2
Incr Delay (d2), s/veh			12.1	1.2	48.8	1.0
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			9.7	1.7	37.6	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			44.4	27.8	63.5	1.2
LnGrp LOS			D	C	F	A
Approach Vol, veh/h			433			1373
Approach Delay, s/veh			41.2			51.4
Approach LOS			D			D
Timer - Assigned Phs	1	2				6
Phs Duration (G+Y+Rc), s	65.0	35.3				100.3
Change Period (Y+Rc), s	* 5.7	* 5.7				* 5.7
Max Green Setting (Gmax), s	* 59	* 30				* 95
Max Q Clear Time (g_c+I1), s	61.3	22.9				4.5
Green Ext Time (p_c), s	0.0	1.6				2.5

Intersection Summary

HCM 6th Ctrl Delay	48.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2028 FB - PM
3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	903	651	21	9	31
Future Volume (vph)	49	903	651	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.996		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1564	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1564	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	903	651	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	903	672	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	60.8%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	903	651	21	9	31
Future Vol, veh/h	49	903	651	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	903	651	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	677	0	-	0	1670 669
Stage 1	-	-	-	-	667 -
Stage 2	-	-	-	-	1003 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	915	-	-	-	106 458
Stage 1	-	-	-	-	510 -
Stage 2	-	-	-	-	355 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	911	-	-	-	99 455
Mov Cap-2 Maneuver	-	-	-	-	99 -
Stage 1	-	-	-	-	480 -
Stage 2	-	-	-	-	353 -

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	22
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	911	-	-	-	252
HCM Lane V/C Ratio	0.054	-	-	-	0.159
HCM Control Delay (s)	9.2	-	-	-	22
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.6

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	668	293	151	574	64	219	18	120	29	14	15
Future Volume (vph)	20	668	293	151	574	64	219	18	120	29	14	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.92	0.98		0.93	0.95	0.98	
Frt			0.850			0.850			0.850		0.922	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1381	0
Flt Permitted	0.306			0.230			0.738			0.746		
Satd. Flow (perm)	397	1456	1298	317	1470	1205	1142	1456	1220	1105	1381	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			293			64			120			15
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	668	293	151	574	64	219	18	120	29	14	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	668	293	151	574	64	219	18	120	29	29	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Maximum Green (s)	39.5	39.5	39.5	39.5	39.5	39.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	35.4	35.4	35.4	35.4	35.4	35.4	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50	0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.10	0.92	0.37	0.96	0.79	0.10	0.55	0.04	0.24	0.08	0.06	
Control Delay	10.5	37.2	2.8	86.2	23.6	3.0	26.8	17.6	5.4	18.2	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	10.5	37.2	2.8	86.2	23.6	3.0	26.8	17.6	5.4	18.2	12.0	
LOS	B	D	A	F	C	A	C	B	A	B	B	
Approach Delay		26.4			33.9			19.1				15.1
Approach LOS		C			C			B				B
Queue Length 50th (m)	1.3	76.9	0.0	18.0	58.7	0.0	25.5	1.7	0.0	2.8	1.3	
Queue Length 95th (m)	4.8	#145.1	10.3	#53.6	98.7	5.1	47.3	5.8	10.4	8.2	6.5	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		
Base Capacity (vph)	222	814	855	177	822	701	396	504	501	383	489	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.82	0.34	0.85	0.70	0.09	0.55	0.04	0.24	0.08	0.06	

Intersection Summary

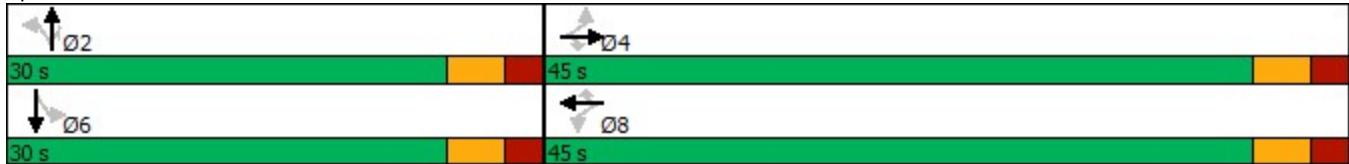
Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 71.1
 Natural Cycle: 75
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.96

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road

Intersection Signal Delay: 27.6	Intersection LOS: C
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
3: River Mist Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	668	293	151	574	64	219	18	120	29	14	15
Future Volume (veh/h)	20	668	293	151	574	64	219	18	120	29	14	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.96		0.93	0.96		0.93
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	20	668	293	151	574	64	219	18	120	29	14	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	283	874	685	204	881	675	508	542	405	477	214	229
Arrive On Green	0.53	0.53	0.53	0.53	0.53	0.53	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	669	1660	1301	520	1674	1281	1319	1660	1240	1193	655	702
Grp Volume(v), veh/h	20	668	293	151	574	64	219	18	120	29	0	29
Grp Sat Flow(s),veh/h/ln	669	1660	1301	520	1674	1281	1319	1660	1240	1193	0	1358
Q Serve(g_s), s	1.7	23.9	10.3	15.6	18.5	1.9	10.3	0.6	5.4	1.3	0.0	1.1
Cycle Q Clear(g_c), s	20.2	23.9	10.3	39.5	18.5	1.9	11.4	0.6	5.4	1.8	0.0	1.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.52
Lane Grp Cap(c), veh/h	283	874	685	204	881	675	508	542	405	477	0	444
V/C Ratio(X)	0.07	0.76	0.43	0.74	0.65	0.09	0.43	0.03	0.30	0.06	0.00	0.07
Avail Cap(c_a), veh/h	283	874	685	204	881	675	508	542	405	477	0	444
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.1	14.1	10.8	31.9	12.8	8.8	21.3	17.2	18.8	17.8	0.0	17.4
Incr Delay (d2), s/veh	0.1	4.1	0.4	13.4	1.7	0.1	2.7	0.1	1.9	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	10.7	3.4	3.7	8.0	0.6	3.8	0.3	1.9	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	18.1	11.3	45.3	14.5	8.9	23.9	17.3	20.7	18.1	0.0	17.7
LnGrp LOS	C	B	B	D	B	A	C	B	C	B	A	B
Approach Vol, veh/h		981			789			357				58
Approach Delay, s/veh		16.1			19.9			22.5				17.9
Approach LOS		B			B			C				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		45.0		30.0		45.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		39.5		24.5		39.5				
Max Q Clear Time (g_c+I1), s		13.4		25.9		3.8		41.5				
Green Ext Time (p_c), s		1.3		6.0		0.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				18.6								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	193	407	160	166	421	95	91	361	142	75	588	341
Future Volume (vph)	193	407	160	166	421	95	91	361	142	75	588	341
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.972			0.981			0.968			0.954	
Flt Protected		0.987			0.988			0.992			0.996	
Satd. Flow (prot)	0	1451	0	0	1496	0	0	1673	0	0	1594	0
Flt Permitted		0.987			0.988			0.992			0.996	
Satd. Flow (perm)	0	1451	0	0	1496	0	0	1673	0	0	1594	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	193	407	160	166	421	95	91	361	142	75	588	341
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	760	0	0	682	0	0	594	0	0	1004	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	134.6%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	78	720	350	83	1105	268
Future Volume (vph)	78	720	350	83	1105	268
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	295.0		135.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.207	
Satd. Flow (perm)	1433	1455	1496	1293	318	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		720		83		
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	78	720	350	83	1105	268
Shared Lane Traffic (%)						
Lane Group Flow (vph)	78	720	350	83	1105	268
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	29.7	29.7	25.7	25.7	10.7	25.7
Total Split (s)	29.7	29.7	35.3	35.3	65.0	100.3
Total Split (%)	22.8%	22.8%	27.2%	27.2%	50.0%	77.2%
Maximum Green (s)	24.0	24.0	29.6	29.6	59.3	94.6
Yellow Time (s)	4.2	4.2	4.6	4.6	4.6	4.6
All-Red Time (s)	1.5	1.5	1.1	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	17.0	17.0	13.0	13.0		13.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	15.1	15.1	29.7	29.7	94.8	94.8
Actuated g/C Ratio	0.12	0.12	0.24	0.24	0.78	0.78
v/c Ratio	0.44	0.89	0.96	0.22	1.37	0.32
Control Delay	56.4	17.6	83.9	9.7	198.0	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	17.6	83.9	9.7	198.0	5.7
LOS	E	B	F	A	F	A
Approach Delay	21.4		69.7			160.5
Approach LOS	C		E			F
Queue Length 50th (m)	17.4	0.0	79.3	0.0	~310.0	12.9
Queue Length 95th (m)	32.5	#49.4	#154.7	13.2	#447.9	34.8
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		295.0		135.0	275.0	
Base Capacity (vph)	284	865	365	378	807	843
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.83	0.96	0.22	1.37	0.32

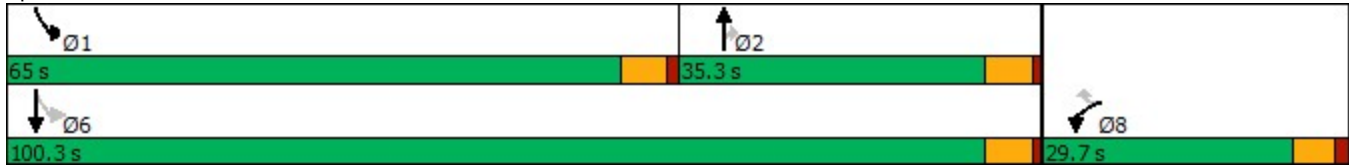
Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	121.3
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.37
Intersection Signal Delay:	102.8
Intersection LOS:	F
Intersection Capacity Utilization:	106.6%
ICU Level of Service:	G
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2028 FB - SAT
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↘	↙	↓
Traffic Volume (veh/h)	78	720	350	83	1105	268
Future Volume (veh/h)	78	720	350	83	1105	268
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1561	1575	887
Adj Flow Rate, veh/h	78	720	350	83	1105	268
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	17	16	65
Cap, veh/h	0	0	452	390	1032	837
Arrive On Green	0.00	0.00	0.30	0.30	0.59	0.94
Sat Flow, veh/h	0		1533	1323	1500	887
Grp Volume(v), veh/h	0.0		350	83	1105	268
Grp Sat Flow(s),veh/h/ln			1533	1323	1500	887
Q Serve(g_s), s			20.9	4.7	59.3	2.5
Cycle Q Clear(g_c), s			20.9	4.7	59.3	2.5
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			452	390	1032	837
V/C Ratio(X)			0.77	0.21	1.07	0.32
Avail Cap(c_a), veh/h			452	390	1032	837
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(l)			1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			32.3	26.6	14.7	0.2
Incr Delay (d2), s/veh			12.1	1.2	48.8	1.0
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			9.7	1.7	37.6	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			44.4	27.8	63.5	1.2
LnGrp LOS			D	C	F	A
Approach Vol, veh/h			433			1373
Approach Delay, s/veh			41.2			51.4
Approach LOS			D			D
Timer - Assigned Phs	1	2				6
Phs Duration (G+Y+Rc), s	65.0	35.3				100.3
Change Period (Y+Rc), s	* 5.7	* 5.7				* 5.7
Max Green Setting (Gmax), s	* 59	* 30				* 95
Max Q Clear Time (g_c+I1), s	61.3	22.9				4.5
Green Ext Time (p_c), s	0.0	1.6				2.5

Intersection Summary

HCM 6th Ctrl Delay	48.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2028 FB - SAT
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	903	651	21	9	31
Future Volume (vph)	49	903	651	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.996		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1564	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1564	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	903	651	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	903	672	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	60.8%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↘		↖	↗
Traffic Vol, veh/h	49	903	651	21	9	31
Future Vol, veh/h	49	903	651	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	903	651	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	677	0	-	0	1670 669
Stage 1	-	-	-	-	667 -
Stage 2	-	-	-	-	1003 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	915	-	-	-	106 458
Stage 1	-	-	-	-	510 -
Stage 2	-	-	-	-	355 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	911	-	-	-	99 455
Mov Cap-2 Maneuver	-	-	-	-	99 -
Stage 1	-	-	-	-	480 -
Stage 2	-	-	-	-	353 -

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	22
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	911	-	-	-	252
HCM Lane V/C Ratio	0.054	-	-	-	0.159
HCM Control Delay (s)	9.2	-	-	-	22
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.6

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	668	293	151	574	64	219	18	120	29	14	15
Future Volume (vph)	20	668	293	151	574	64	219	18	120	29	14	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.92	0.98		0.93	0.95	0.98	
Frt			0.850			0.850			0.850		0.922	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1381	0
Flt Permitted	0.306			0.230			0.738			0.746		
Satd. Flow (perm)	397	1456	1298	317	1470	1205	1142	1456	1220	1105	1381	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			293			64			120			15
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	668	293	151	574	64	219	18	120	29	14	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	668	293	151	574	64	219	18	120	29	29	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Maximum Green (s)	39.5	39.5	39.5	39.5	39.5	39.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	35.4	35.4	35.4	35.4	35.4	35.4	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50	0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.10	0.92	0.37	0.96	0.79	0.10	0.55	0.04	0.24	0.08	0.06	
Control Delay	10.5	37.2	2.8	86.2	23.6	3.0	26.8	17.6	5.4	18.2	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	37.2	2.8	86.2	23.6	3.0	26.8	17.6	5.4	18.2	12.0	
LOS	B	D	A	F	C	A	C	B	A	B	B	
Approach Delay		26.4			33.9			19.1				15.1
Approach LOS		C			C			B				B
Queue Length 50th (m)	1.3	76.9	0.0	18.0	58.7	0.0	25.5	1.7	0.0	2.8	1.3	
Queue Length 95th (m)	4.8	#145.1	10.3	#53.6	98.7	5.1	47.3	5.8	10.4	8.2	6.5	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		
Base Capacity (vph)	222	814	855	177	822	701	396	504	501	383	489	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.82	0.34	0.85	0.70	0.09	0.55	0.04	0.24	0.08	0.06	

Intersection Summary

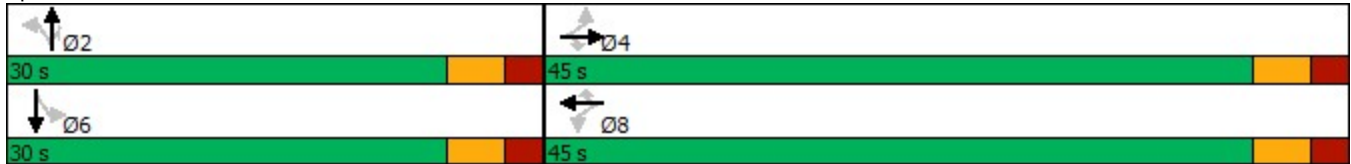
Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 71.1
 Natural Cycle: 75
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.96

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road

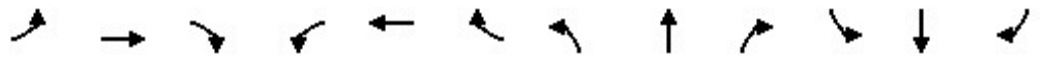
Intersection Signal Delay: 27.6	Intersection LOS: C
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 3: River Mist Road & Cambrian Road

2028 FB - SAT
 3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	668	293	151	574	64	219	18	120	29	14	15
Future Volume (veh/h)	20	668	293	151	574	64	219	18	120	29	14	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.96		0.93	0.96		0.93
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	20	668	293	151	574	64	219	18	120	29	14	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	283	874	685	204	881	675	508	542	405	477	214	229
Arrive On Green	0.53	0.53	0.53	0.53	0.53	0.53	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	669	1660	1301	520	1674	1281	1319	1660	1240	1193	655	702
Grp Volume(v), veh/h	20	668	293	151	574	64	219	18	120	29	0	29
Grp Sat Flow(s),veh/h/ln	669	1660	1301	520	1674	1281	1319	1660	1240	1193	0	1358
Q Serve(g_s), s	1.7	23.9	10.3	15.6	18.5	1.9	10.3	0.6	5.4	1.3	0.0	1.1
Cycle Q Clear(g_c), s	20.2	23.9	10.3	39.5	18.5	1.9	11.4	0.6	5.4	1.8	0.0	1.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.52
Lane Grp Cap(c), veh/h	283	874	685	204	881	675	508	542	405	477	0	444
V/C Ratio(X)	0.07	0.76	0.43	0.74	0.65	0.09	0.43	0.03	0.30	0.06	0.00	0.07
Avail Cap(c_a), veh/h	283	874	685	204	881	675	508	542	405	477	0	444
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.1	14.1	10.8	31.9	12.8	8.8	21.3	17.2	18.8	17.8	0.0	17.4
Incr Delay (d2), s/veh	0.1	4.1	0.4	13.4	1.7	0.1	2.7	0.1	1.9	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	10.7	3.4	3.7	8.0	0.6	3.8	0.3	1.9	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	18.1	11.3	45.3	14.5	8.9	23.9	17.3	20.7	18.1	0.0	17.7
LnGrp LOS	C	B	B	D	B	A	C	B	C	B	A	B
Approach Vol, veh/h		981			789			357			58	
Approach Delay, s/veh		16.1			19.9			22.5			17.9	
Approach LOS		B			B			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		45.0		30.0		45.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		39.5		24.5		39.5				
Max Q Clear Time (g_c+I1), s		13.4		25.9		3.8		41.5				
Green Ext Time (p_c), s		1.3		6.0		0.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				18.6								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	193	407	160	166	421	95	91	361	142	75	588	341
Future Volume (vph)	193	407	160	166	421	95	91	361	142	75	588	341
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.972			0.981			0.968			0.954	
Flt Protected		0.987			0.988			0.992			0.996	
Satd. Flow (prot)	0	1451	0	0	1496	0	0	1673	0	0	1594	0
Flt Permitted		0.987			0.988			0.992			0.996	
Satd. Flow (perm)	0	1451	0	0	1496	0	0	1673	0	0	1594	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	193	407	160	166	421	95	91	361	142	75	588	341
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	760	0	0	682	0	0	594	0	0	1004	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	134.6%
ICU Level of Service	H
Analysis Period (min)	15

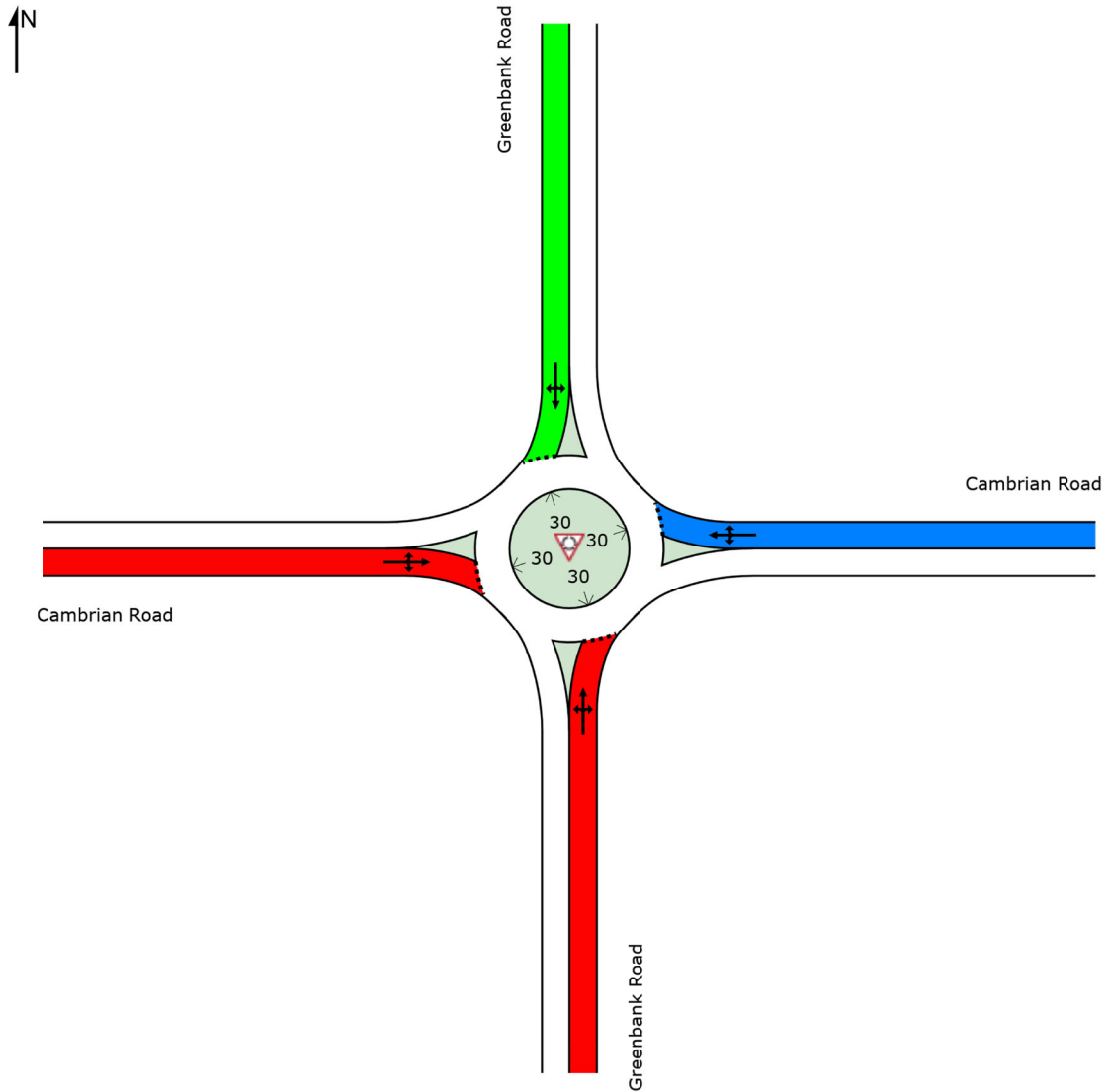
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

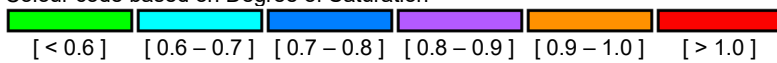
 Site: 101 [Cambrian and Greenbank 2028 FB AM]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	1.65	0.80	0.59	1.13	1.65



Colour code based on Degree of Saturation



DELAY (CONTROL)

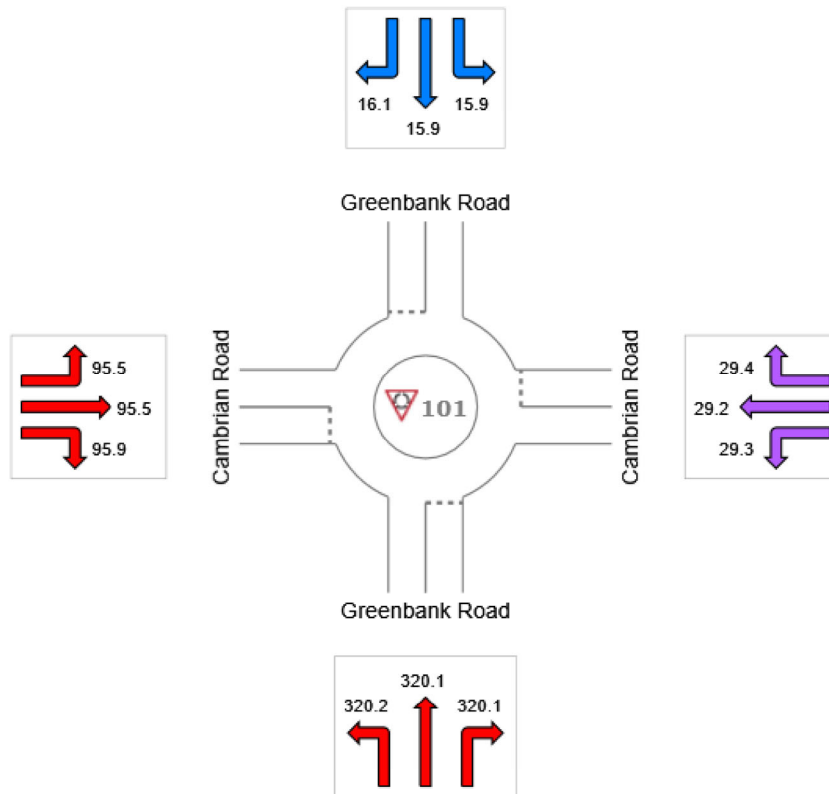
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Cambrian and Greenbank 2028 FB AM]**

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	320.1	29.3	16.0	95.6	142.6
LOS	F	D	C	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

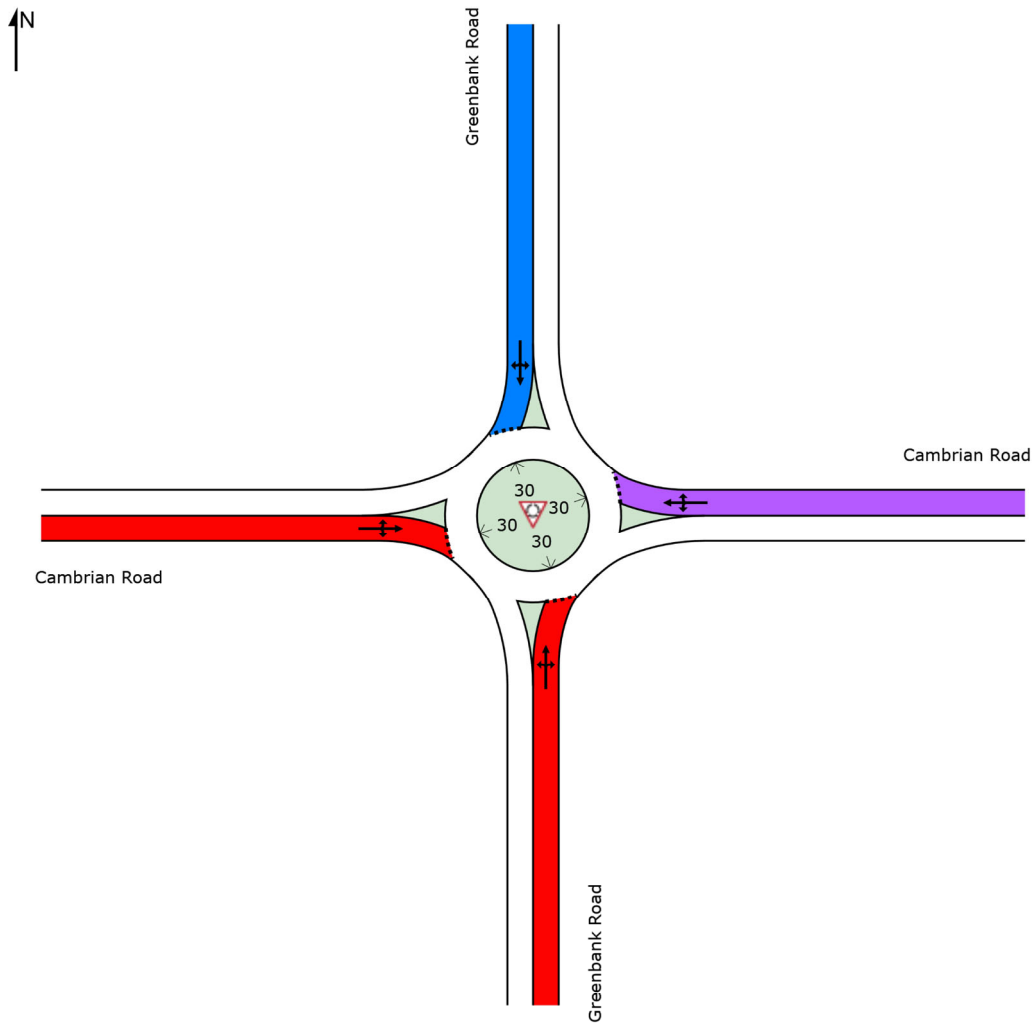
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2028 FB AM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	C	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FB AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	146	3.0	1.645	320.2	LOS F	113.0	805.7	1.00	5.11	14.56	4.4
2	T1	429	2.0	1.645	320.1	LOS F	113.0	805.7	1.00	5.11	14.56	4.6
3	R2	241	2.0	1.645	320.1	LOS F	113.0	805.7	1.00	5.11	14.56	3.6
Approach		816	2.2	1.645	320.1	LOS F	113.0	805.7	1.00	5.11	14.56	4.3
East: Cambrian Road												
4	L2	120	6.0	0.800	29.3	LOS D	9.7	70.0	0.87	1.36	2.12	23.2
5	T1	287	2.0	0.800	29.2	LOS D	9.7	70.0	0.87	1.36	2.12	25.6
6	R2	81	8.0	0.800	29.4	LOS D	9.7	70.0	0.87	1.36	2.12	25.8
Approach		488	4.0	0.800	29.3	LOS D	9.7	70.0	0.87	1.36	2.12	25.1
North: Greenbank Road												
7	L2	95	5.0	0.591	15.9	LOS C	4.5	33.3	0.71	0.89	1.21	34.9
8	T1	159	4.0	0.591	15.9	LOS C	4.5	33.3	0.71	0.89	1.21	35.0
9	R2	137	10.0	0.591	16.1	LOS C	4.5	33.3	0.71	0.89	1.21	34.9
Approach		391	6.3	0.591	16.0	LOS C	4.5	33.3	0.71	0.89	1.21	35.0
West: Cambrian Road												
10	L2	266	3.0	1.128	95.5	LOS F	59.6	431.8	1.00	3.21	5.84	14.7
11	T1	524	3.0	1.128	95.5	LOS F	59.6	431.8	1.00	3.21	5.84	12.4
12	R2	61	17.0	1.128	95.9	LOS F	59.6	431.8	1.00	3.21	5.84	12.1
Approach		851	4.0	1.128	95.6	LOS F	59.6	431.8	1.00	3.21	5.84	13.1
All Vehicles		2546	3.8	1.645	142.6	LOS F	113.0	805.7	0.93	3.11	7.21	9.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Organisation: CGH TRANSPORTATION | Processed: August 10, 2020 10:46:03 AM

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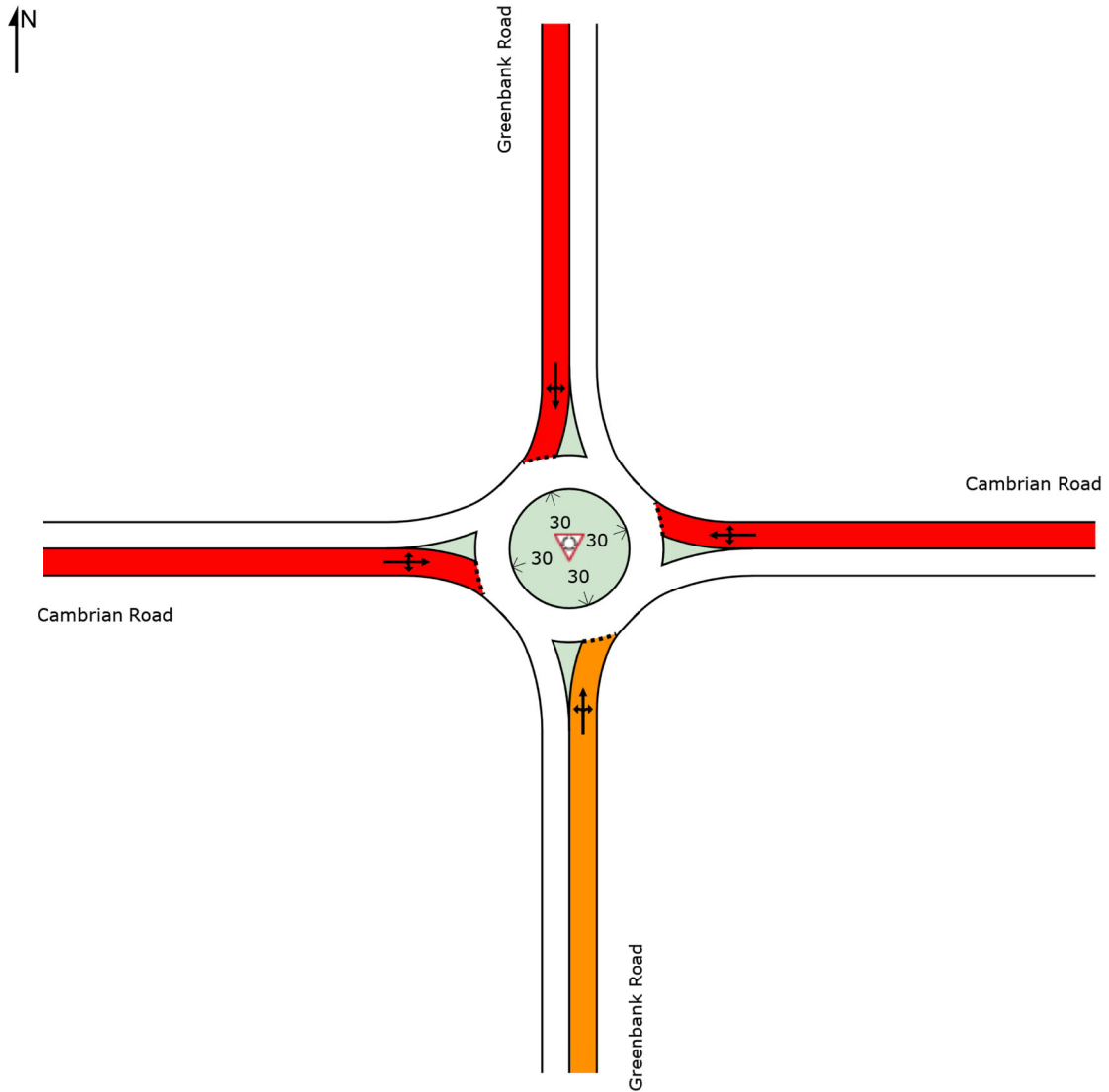
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

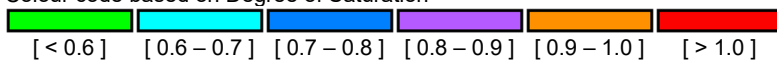
 Site: 101 [Cambrian and Greenbank 2028 FB PM]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.92	1.13	1.68	1.19	1.68



Colour code based on Degree of Saturation



DELAY (CONTROL)

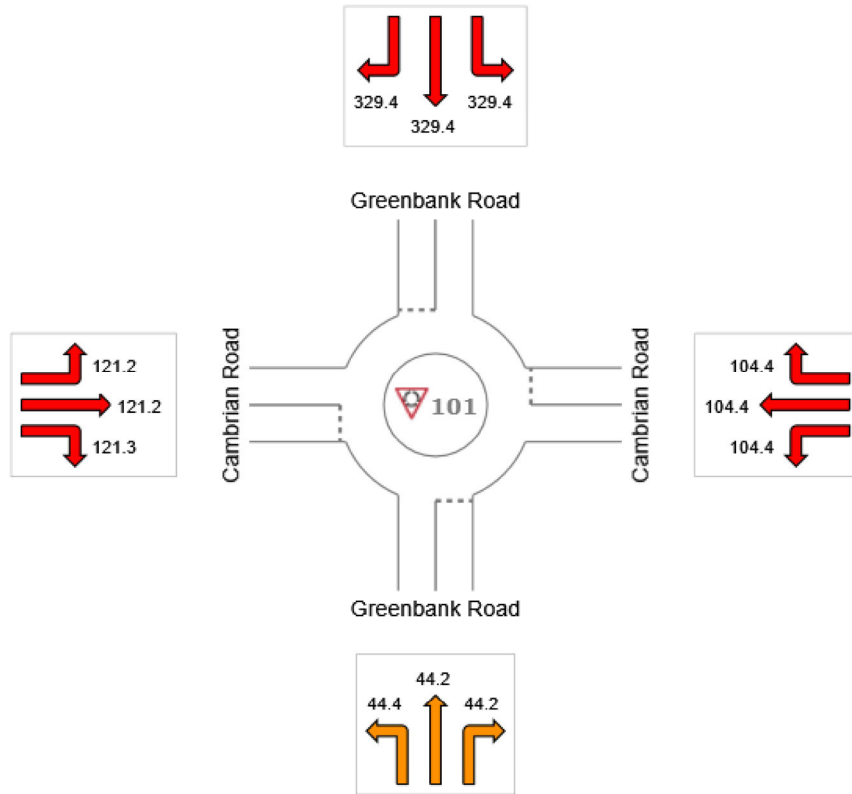
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2028 FB PM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	44.2	104.4	329.4	121.3	171.2
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

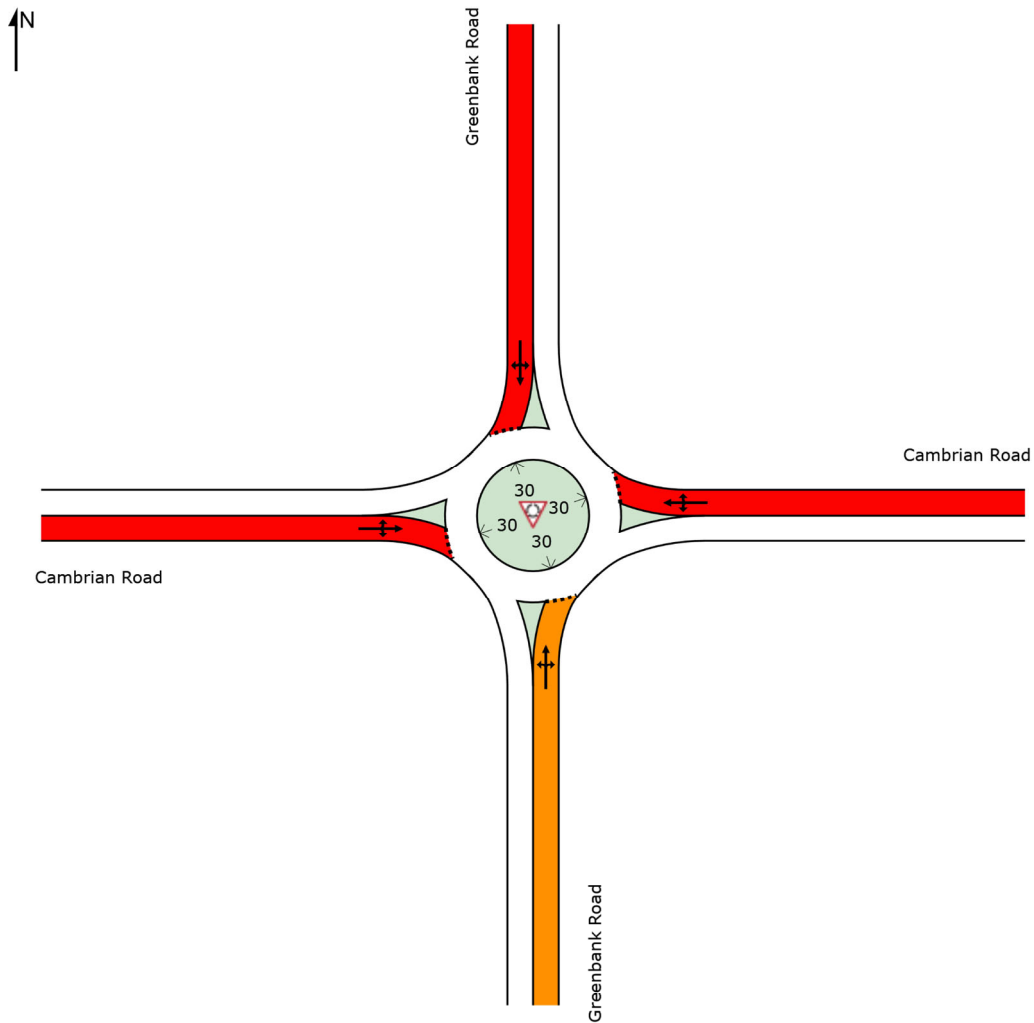
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2028 FB PM]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FB PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	91	8.0	0.924	44.4	LOS E	18.7	134.0	1.00	1.76	3.19	21.1
2	T1	361	2.0	0.924	44.2	LOS E	18.7	134.0	1.00	1.76	3.19	21.9
3	R2	142	2.0	0.924	44.2	LOS E	18.7	134.0	1.00	1.76	3.19	17.7
Approach		594	2.9	0.924	44.2	LOS E	18.7	134.0	1.00	1.76	3.19	20.8
East: Cambrian Road												
4	L2	166	2.0	1.135	104.4	LOS F	44.2	314.9	1.00	3.15	6.62	9.8
5	T1	421	2.0	1.135	104.4	LOS F	44.2	314.9	1.00	3.15	6.62	11.5
6	R2	95	2.0	1.135	104.4	LOS F	44.2	314.9	1.00	3.15	6.62	11.9
Approach		682	2.0	1.135	104.4	LOS F	44.2	314.9	1.00	3.15	6.62	11.2
North: Greenbank Road												
7	L2	75	2.0	1.676	329.4	LOS F	143.2	1019.9	1.00	5.54	14.73	4.5
8	T1	588	2.0	1.676	329.4	LOS F	143.2	1019.9	1.00	5.54	14.73	4.5
9	R2	341	2.0	1.676	329.4	LOS F	143.2	1019.9	1.00	5.54	14.73	5.2
Approach		1004	2.0	1.676	329.4	LOS F	143.2	1019.9	1.00	5.54	14.73	4.7
West: Cambrian Road												
10	L2	193	2.0	1.186	121.2	LOS F	57.2	408.6	1.00	3.57	7.42	12.3
11	T1	407	2.0	1.186	121.2	LOS F	57.2	408.6	1.00	3.57	7.42	10.2
12	R2	160	4.0	1.186	121.3	LOS F	57.2	408.6	1.00	3.57	7.42	10.1
Approach		760	2.4	1.186	121.3	LOS F	57.2	408.6	1.00	3.57	7.42	10.7
All Vehicles		3040	2.3	1.676	171.2	LOS F	143.2	1019.9	1.00	3.77	8.83	8.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Organisation: CGH TRANSPORTATION | Processed: August 10, 2020 11:12:03 AM

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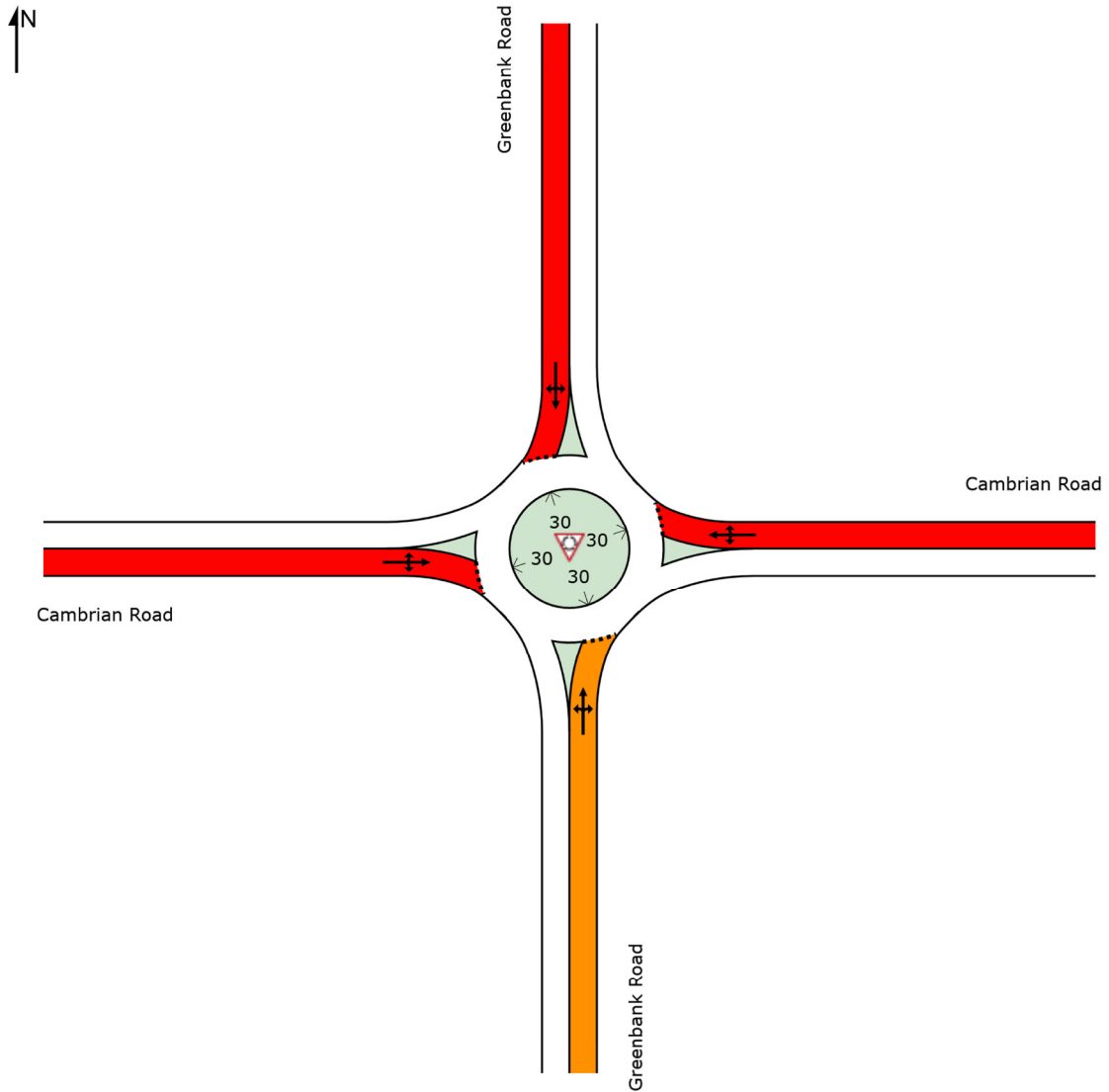
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

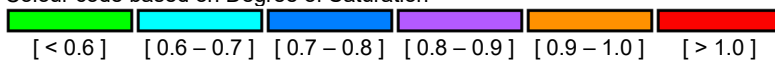
 Site: 101 [Cambrian and Greenbank 2028 FB Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.92	1.13	1.68	1.19	1.68



Colour code based on Degree of Saturation



DELAY (CONTROL)

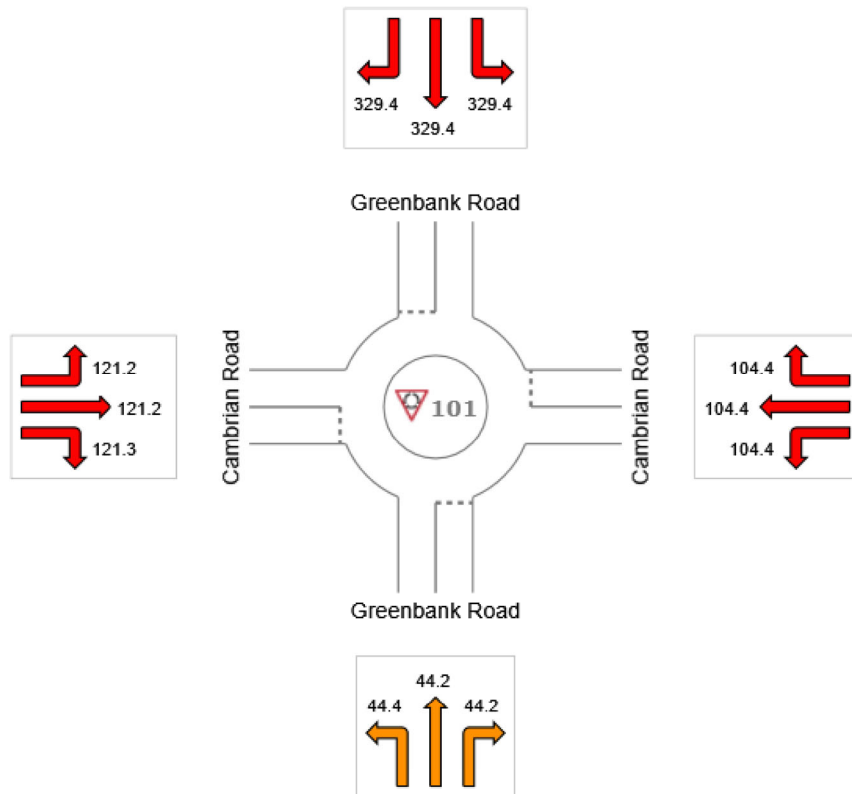
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2028 FB Sat]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	44.2	104.4	329.4	121.3	171.2
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

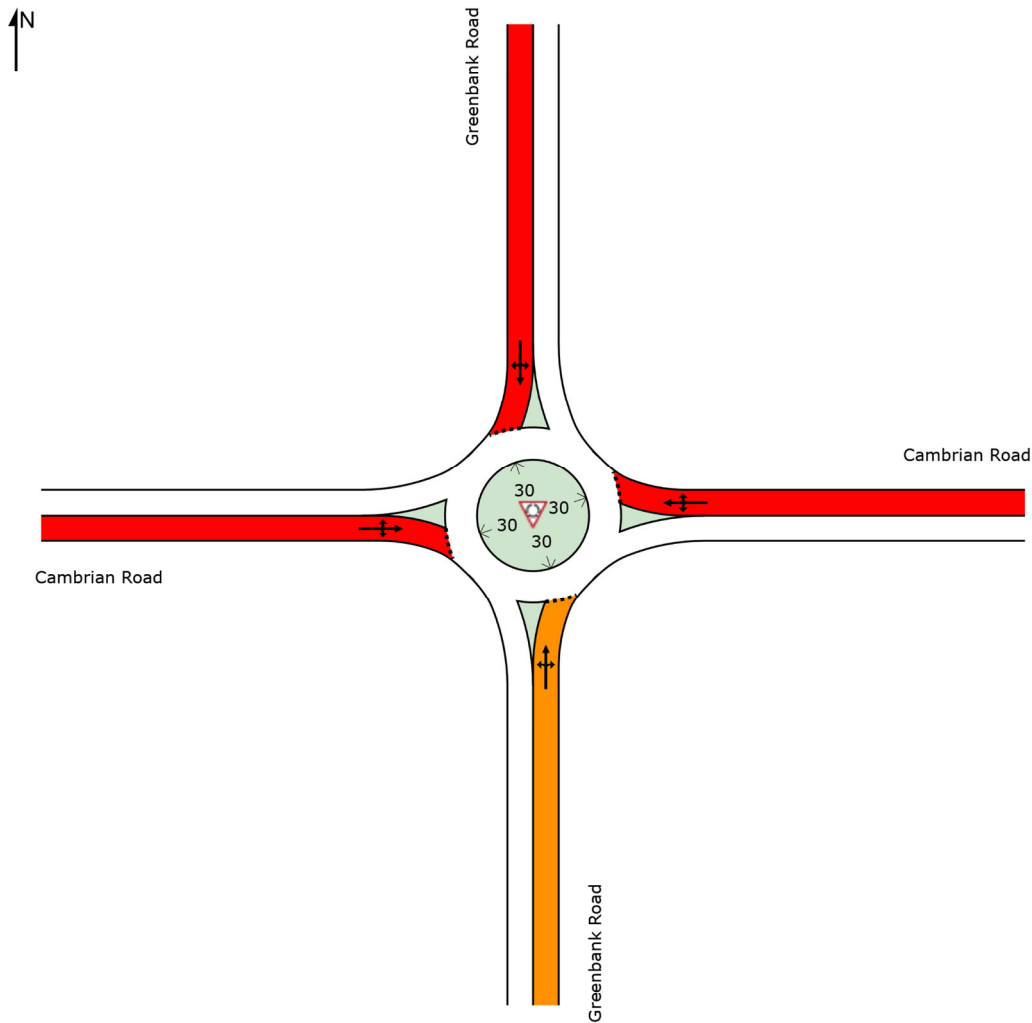
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2028 FB Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FB Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	91	8.0	0.924	44.4	LOS E	18.7	134.0	1.00	1.76	3.19	21.1
2	T1	361	2.0	0.924	44.2	LOS E	18.7	134.0	1.00	1.76	3.19	21.9
3	R2	142	2.0	0.924	44.2	LOS E	18.7	134.0	1.00	1.76	3.19	17.7
Approach		594	2.9	0.924	44.2	LOS E	18.7	134.0	1.00	1.76	3.19	20.8
East: Cambrian Road												
4	L2	166	2.0	1.135	104.4	LOS F	44.2	314.9	1.00	3.15	6.62	9.8
5	T1	421	2.0	1.135	104.4	LOS F	44.2	314.9	1.00	3.15	6.62	11.5
6	R2	95	2.0	1.135	104.4	LOS F	44.2	314.9	1.00	3.15	6.62	11.9
Approach		682	2.0	1.135	104.4	LOS F	44.2	314.9	1.00	3.15	6.62	11.2
North: Greenbank Road												
7	L2	75	2.0	1.676	329.4	LOS F	143.2	1019.9	1.00	5.54	14.73	4.5
8	T1	588	2.0	1.676	329.4	LOS F	143.2	1019.9	1.00	5.54	14.73	4.5
9	R2	341	2.0	1.676	329.4	LOS F	143.2	1019.9	1.00	5.54	14.73	5.2
Approach		1004	2.0	1.676	329.4	LOS F	143.2	1019.9	1.00	5.54	14.73	4.7
West: Cambrian Road												
10	L2	193	2.0	1.186	121.2	LOS F	57.2	408.6	1.00	3.57	7.42	12.3
11	T1	407	2.0	1.186	121.2	LOS F	57.2	408.6	1.00	3.57	7.42	10.2
12	R2	160	4.0	1.186	121.3	LOS F	57.2	408.6	1.00	3.57	7.42	10.1
Approach		760	2.4	1.186	121.3	LOS F	57.2	408.6	1.00	3.57	7.42	10.7
All Vehicles		3040	2.3	1.676	171.2	LOS F	143.2	1019.9	1.00	3.77	8.83	8.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Organisation: CGH TRANSPORTATION | Processed: August 10, 2020 10:50:27 AM

Project: C:\Users\RobinMarina\CGH TRANSPORTATION\CGH Working - Documents\Projects\2019-54 Metro Greenbank Road\DATA\Sidra
\Cambrian Greenbank.sip8

Appendix R

Synchro and Sidra Intersection Worksheets – 2023 Future Total Conditions

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	67	890	90	44	331	112
Future Volume (vph)	67	890	90	44	331	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	295.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.956			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1438	0	1458	1079
Flt Permitted	0.950				0.671	
Satd. Flow (perm)	1433	1455	1438	0	1030	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		830	44			
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	67	890	90	44	331	112
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	890	134	0	331	112
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.5	25.5	25.7		25.7	25.7
Total Split (s)	32.0	32.0	33.0		33.0	33.0
Total Split (%)	49.2%	49.2%	50.8%		50.8%	50.8%
Maximum Green (s)	26.5	26.5	27.3		27.3	27.3
Yellow Time (s)	4.2	4.2	4.6		4.6	4.6
All-Red Time (s)	1.3	1.3	1.1		1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.7		5.7	5.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		Max	Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	16.5	16.5	27.8		27.8	27.8
Actuated g/C Ratio	0.30	0.30	0.50		0.50	0.50
v/c Ratio	0.16	0.88	0.18		0.65	0.21
Control Delay	14.1	13.9	8.1		21.3	11.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	14.1	13.9	8.1		21.3	11.7
LOS	B	B	A		C	B
Approach Delay	13.9		8.1			18.9
Approach LOS	B		A			B
Queue Length 50th (m)	4.8	4.3	3.8		19.2	4.9
Queue Length 95th (m)	11.5	#84.4	15.9		#72.9	18.3
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		295.0			275.0	
Base Capacity (vph)	694	1132	739		513	538
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.10	0.79	0.18		0.65	0.21

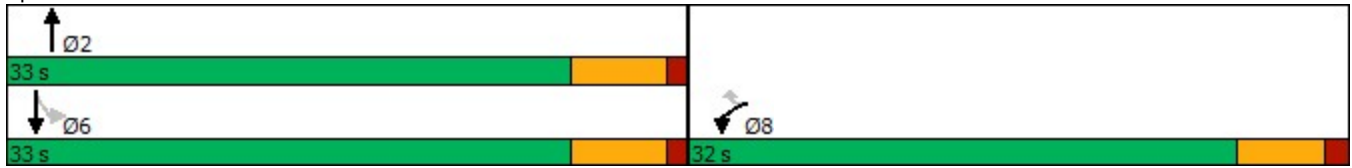
Intersection Summary

Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	55.7
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	14.8
Intersection LOS:	B
Intersection Capacity Utilization:	75.8%
ICU Level of Service:	D
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2023 FT - AM
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	67	890	90	44	331	112
Future Volume (veh/h)	67	890	90	44	331	112
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1533	1575	887
Adj Flow Rate, veh/h	67	890	90	44	331	112
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	19	16	65
Cap, veh/h	0	0	804	393	1122	734
Arrive On Green	0.00	0.00	0.83	0.83	0.83	0.83
Sat Flow, veh/h	0		972	475	1116	887
Grp Volume(v), veh/h	0.0		0	134	331	112
Grp Sat Flow(s),veh/h/ln			0	1448	1116	887
Q Serve(g_s), s			0.0	0.6	2.6	0.8
Cycle Q Clear(g_c), s			0.0	0.6	3.2	0.8
Prop In Lane				0.33	1.00	
Lane Grp Cap(c), veh/h			0	1198	1122	734
V/C Ratio(X)			0.00	0.11	0.30	0.15
Avail Cap(c_a), veh/h			0	1198	1122	734
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(l)			0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			0.0	0.5	0.8	0.6
Incr Delay (d2), s/veh			0.0	0.2	0.7	0.4
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			0.0	0.1	0.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			0.0	0.7	1.5	1.0
LnGrp LOS			A	A	A	A
Approach Vol, veh/h			134			443
Approach Delay, s/veh			0.7			1.4
Approach LOS			A			A
Timer - Assigned Phs		2				6
Phs Duration (G+Y+Rc), s		33.0				33.0
Change Period (Y+Rc), s		* 5.7				* 5.7
Max Green Setting (Gmax), s		* 27				* 27
Max Q Clear Time (g_c+I1), s		2.6				5.2
Green Ext Time (p_c), s		0.8				2.9
Intersection Summary						
HCM 6th Ctrl Delay			1.2			
HCM 6th LOS			A			

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2023 FT - AM
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	462	4	48	741	6	3	5	32	17	5	53
Future Volume (vph)	19	462	4	48	741	6	3	5	32	17	5	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.999			0.999			0.892			0.905	
Fl _t Protected	0.950			0.950				0.996			0.989	
Satd. Flow (prot)	1658	1678	0	1658	1569	0	0	1550	0	0	1562	0
Fl _t Permitted	0.950			0.950				0.996			0.989	
Satd. Flow (perm)	1658	1678	0	1658	1569	0	0	1550	0	0	1562	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	5						5			2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	19	462	4	48	741	6	3	5	32	17	5	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	466	0	48	747	0	0	40	0	0	75	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 58.9% ICU Level of Service B
 Analysis Period (min) 15

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	19	462	4	48	741	6	3	5	32	17	5	53
Future Vol, veh/h	19	462	4	48	741	6	3	5	32	17	5	53
Conflicting Peds, #/hr	5	0	0	0	0	5	0	0	0	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	462	4	48	741	6	3	5	32	17	5	53

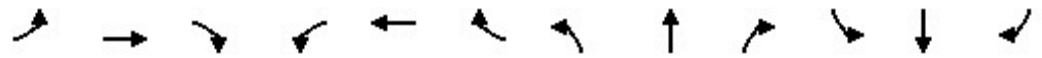
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	752	0	0	466	0	0	1373	1350	466	1368	1349	751
Stage 1	-	-	-	-	-	-	502	502	-	845	845	-
Stage 2	-	-	-	-	-	-	871	848	-	523	504	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	858	-	-	1095	-	-	123	150	597	124	151	411
Stage 1	-	-	-	-	-	-	552	542	-	357	379	-
Stage 2	-	-	-	-	-	-	346	378	-	537	541	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	854	-	-	1095	-	-	99	140	596	108	140	408
Mov Cap-2 Maneuver	-	-	-	-	-	-	99	140	-	108	140	-
Stage 1	-	-	-	-	-	-	540	530	-	347	360	-
Stage 2	-	-	-	-	-	-	283	359	-	491	529	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.5			17.2			27.8		
HCM LOS							C			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	334	854	-	-	1095	-	-	232
HCM Lane V/C Ratio	0.12	0.022	-	-	0.044	-	-	0.323
HCM Control Delay (s)	17.2	9.3	-	-	8.4	-	-	27.8
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	1.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	511	129	57	387	45	293	54	135	58	17	37
Future Volume (vph)	21	511	129	57	387	45	293	54	135	58	17	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97		0.97	1.00		0.93	0.99		0.94	0.96	0.98	
Frt			0.850			0.850			0.850		0.897	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1342	0
Flt Permitted	0.434			0.297			0.722			0.722		
Satd. Flow (perm)	560	1456	1300	409	1470	1221	1121	1456	1232	1083	1342	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			129			45			135			37
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	21	511	129	57	387	45	293	54	135	58	17	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	511	129	57	387	45	293	54	135	58	54	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.1	30.1	30.1	30.1	30.1	30.1	29.9	29.9	29.9	29.9	29.9	29.9
Total Split (s)	30.1	30.1	30.1	30.1	30.1	30.1	29.9	29.9	29.9	29.9	29.9	29.9
Total Split (%)	50.2%	50.2%	50.2%	50.2%	50.2%	50.2%	49.8%	49.8%	49.8%	49.8%	49.8%	49.8%
Maximum Green (s)	24.6	24.6	24.6	24.6	24.6	24.6	24.4	24.4	24.4	24.4	24.4	24.4
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	22.8	22.8	22.8	22.8	22.8	22.8	24.4	24.4	24.4	24.4	24.4	24.4
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.42	0.42	0.42	0.42	0.42	0.42
v/c Ratio	0.10	0.90	0.22	0.36	0.67	0.09	0.62	0.09	0.23	0.13	0.09	
Control Delay	12.3	38.5	3.7	20.0	21.4	4.5	21.4	11.5	3.7	12.2	6.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	38.5	3.7	20.0	21.4	4.5	21.4	11.5	3.7	12.2	6.3	
LOS	B	D	A	B	C	A	C	B	A	B	A	
Approach Delay		30.8			19.7			15.3				9.3
Approach LOS		C			B			B				A
Queue Length 50th (m)	1.4	48.9	0.0	4.1	32.6	0.0	24.8	3.5	0.0	3.8	1.1	
Queue Length 95th (m)	5.1	#99.5	8.1	13.0	58.5	4.8	#49.6	9.1	8.3	10.1	6.5	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		
Base Capacity (vph)	236	615	624	172	621	542	469	610	595	454	584	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.83	0.21	0.33	0.62	0.08	0.62	0.09	0.23	0.13	0.09	

Intersection Summary

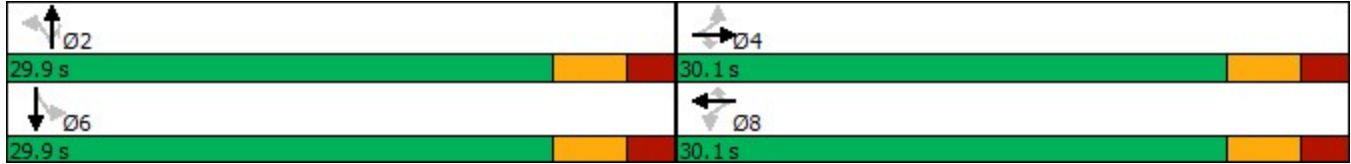
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 58.3
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.90

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road

Intersection Signal Delay: 22.0	Intersection LOS: C
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
3: River Mist Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	511	129	57	387	45	293	54	135	58	17	37
Future Volume (veh/h)	21	511	129	57	387	45	293	54	135	58	17	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.95	0.99		0.95	0.97		0.94	0.97		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	21	511	129	57	387	45	293	54	135	58	17	37
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	296	663	513	214	668	505	630	687	519	576	172	374
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	795	1660	1285	692	1674	1265	1305	1660	1253	1152	415	902
Grp Volume(v), veh/h	21	511	129	57	387	45	293	54	135	58	0	54
Grp Sat Flow(s),veh/h/ln	795	1660	1285	692	1674	1265	1305	1660	1253	1152	0	1317
Q Serve(g_s), s	1.2	15.7	3.9	4.6	10.6	1.3	10.4	1.2	4.2	1.9	0.0	1.5
Cycle Q Clear(g_c), s	11.9	15.7	3.9	20.3	10.6	1.3	11.9	1.2	4.2	3.1	0.0	1.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	296	663	513	214	668	505	630	687	519	576	0	545
V/C Ratio(X)	0.07	0.77	0.25	0.27	0.58	0.09	0.47	0.08	0.26	0.10	0.00	0.10
Avail Cap(c_a), veh/h	310	693	537	226	699	528	630	687	519	576	0	545
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.5	15.4	11.8	24.2	13.8	11.0	14.2	10.5	11.3	11.4	0.0	10.6
Incr Delay (d2), s/veh	0.1	5.1	0.3	0.7	1.1	0.1	2.5	0.2	1.2	0.3	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	7.3	1.3	0.8	4.6	0.4	3.8	0.5	1.5	0.6	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.6	20.5	12.1	24.8	14.9	11.1	16.7	10.7	12.6	11.7	0.0	10.9
LnGrp LOS	B	C	B	C	B	B	B	B	B	B	A	B
Approach Vol, veh/h		661			489			482				112
Approach Delay, s/veh		18.8			15.7			14.8				11.3
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		29.9		29.0		29.9		29.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.4		24.6		24.4		24.6				
Max Q Clear Time (g_c+l1), s		13.9		17.7		5.1		22.3				
Green Ext Time (p_c), s		1.8		2.6		0.5		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				16.4								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	242	471	61	103	259	73	136	379	208	86	142	125
Future Volume (vph)	242	471	61	103	259	73	136	379	208	86	142	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.977			0.961			0.952	
Flt Protected		0.985			0.988			0.991			0.988	
Satd. Flow (prot)	0	1499	0	0	1488	0	0	1659	0	0	1574	0
Flt Permitted		0.985			0.988			0.991			0.988	
Satd. Flow (perm)	0	1499	0	0	1488	0	0	1659	0	0	1574	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	242	471	61	103	259	73	136	379	208	86	142	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	774	0	0	435	0	0	723	0	0	353	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	125.2%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2023 FT - AM
3831 Cambrian Road

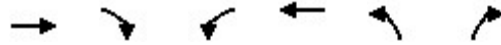


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↖
Traffic Volume (vph)	0	19	0	0	28	0
Future Volume (vph)	0	19	0	0	28	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	19	0	0	28	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	19	0	0	0	28
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 6.7%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	461	20	8	736	13	5
Future Volume (vph)	461	20	8	736	13	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.994			0.962		
Fl _t Protected				0.999	0.965	
Satd. Flow (prot)	1735	0	0	1743	1620	0
Fl _t Permitted				0.999	0.965	
Satd. Flow (perm)	1735	0	0	1743	1620	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	461	20	8	736	13	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	481	0	0	744	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.6%
Analysis Period (min)	15
	ICU Level of Service B

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	461	20	8	736	13	5
Future Vol, veh/h	461	20	8	736	13	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	461	20	8	736	13	5

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	481	0	1223 471
Stage 1	-	-	-	-	471 -
Stage 2	-	-	-	-	752 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1082	-	198 593
Stage 1	-	-	-	-	628 -
Stage 2	-	-	-	-	466 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1082	-	195 593
Mov Cap-2 Maneuver	-	-	-	-	195 -
Stage 1	-	-	-	-	628 -
Stage 2	-	-	-	-	460 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	21.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	240	-	-	1082	-
HCM Lane V/C Ratio	0.075	-	-	0.007	-
HCM Control Delay (s)	21.2	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	513	160	56	791	102
Future Volume (vph)	48	513	160	56	791	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	295.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.965			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1450	0	1458	1079
Flt Permitted	0.950				0.391	
Satd. Flow (perm)	1433	1455	1450	0	600	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		513	16			
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	48	513	160	56	791	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	513	216	0	791	102
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	25.5	25.5	25.7		10.7	25.7
Total Split (s)	25.8	25.8	26.2		48.0	74.2
Total Split (%)	25.8%	25.8%	26.2%		48.0%	74.2%
Maximum Green (s)	20.3	20.3	20.5		42.3	68.5
Yellow Time (s)	4.2	4.2	4.6		4.6	4.6
All-Red Time (s)	1.3	1.3	1.1		1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.0	13.0	13.0			13.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	12.4	12.4	20.5		68.6	68.6
Actuated g/C Ratio	0.13	0.13	0.22		0.74	0.74
v/c Ratio	0.25	0.80	0.64		0.94	0.13
Control Delay	38.6	14.0	41.1		33.5	4.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	38.6	14.0	41.1		33.5	4.4
LOS	D	B	D		C	A
Approach Delay	16.1		41.1			30.2
Approach LOS	B		D			C
Queue Length 50th (m)	7.7	0.0	31.2		78.8	3.6
Queue Length 95th (m)	17.4	31.1	#66.4		#201.6	11.8
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		295.0			275.0	
Base Capacity (vph)	316	721	335		840	802
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.15	0.71	0.64		0.94	0.13

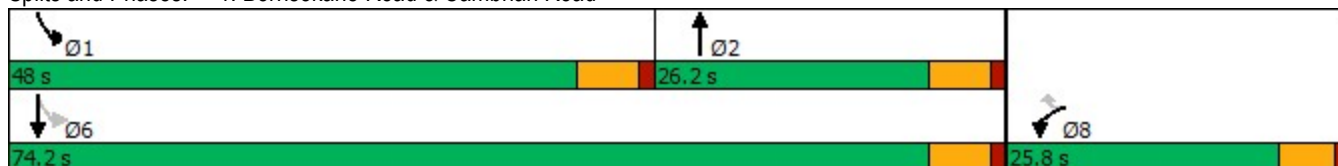
Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	92.2
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	26.9
Intersection LOS:	C
Intersection Capacity Utilization:	81.2%
ICU Level of Service:	D
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2023 FT - PM
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↑	↷	↶	↓
Traffic Volume (veh/h)	48	513	160	56	791	102
Future Volume (veh/h)	48	513	160	56	791	102
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1533	1575	887
Adj Flow Rate, veh/h	48	513	160	56	791	102
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	19	16	65
Cap, veh/h	0	0	662	232	1014	819
Arrive On Green	0.00	0.00	0.61	0.61	0.24	0.92
Sat Flow, veh/h	0		1085	380	1500	887
Grp Volume(v), veh/h	0.0		0	216	791	102
Grp Sat Flow(s),veh/h/ln			0	1465	1500	887
Q Serve(g_s), s			0.0	5.0	10.5	0.7
Cycle Q Clear(g_c), s			0.0	5.0	10.5	0.7
Prop In Lane				0.26	1.00	
Lane Grp Cap(c), veh/h			0	894	1014	819
V/C Ratio(X)			0.00	0.24	0.78	0.12
Avail Cap(c_a), veh/h			0	894	1515	819
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			0.0	6.6	2.7	0.2
Incr Delay (d2), s/veh			0.0	0.6	1.6	0.3
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			0.0	1.8	2.2	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			0.0	7.3	4.2	0.6
LnGrp LOS			A	A	A	A
Approach Vol, veh/h			216			893
Approach Delay, s/veh			7.3			3.8
Approach LOS			A			A
Timer - Assigned Phs	1	2				6
Phs Duration (G+Y+Rc), s	23.2	51.0				74.2
Change Period (Y+Rc), s	* 5.7	* 5.7				* 5.7
Max Green Setting (Gmax), s	* 42	* 21				* 69
Max Q Clear Time (g_c+I1), s	12.5	7.0				2.7
Green Ext Time (p_c), s	5.0	1.1				0.9

Intersection Summary

HCM 6th Ctrl Delay			4.5			
HCM 6th LOS			A			

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2023 FT - PM
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	675	2	115	504	21	5	5	120	9	5	31
Future Volume (vph)	49	675	2	115	504	21	5	5	120	9	5	31
Ideal Flow (vphp)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t					0.994			0.875				0.907
Fl _t Protected	0.950			0.950				0.998				0.990
Satd. Flow (prot)	1658	1679	0	1658	1561	0	0	1524	0	0	1567	0
Fl _t Permitted	0.950			0.950				0.998				0.990
Satd. Flow (perm)	1658	1679	0	1658	1561	0	0	1524	0	0	1567	0
Link Speed (k/h)		50			50			30				50
Link Distance (m)		141.7			449.3			169.6				208.1
Travel Time (s)		10.2			32.3			20.4				15.0
Confl. Peds. (#/hr)	5						5			2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	49	675	2	115	504	21	5	5	120	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	677	0	115	525	0	0	130	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0				0.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	63.2%
ICU Level of Service	B
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	49	675	2	115	504	21	5	5	120	9	5	31
Future Vol, veh/h	49	675	2	115	504	21	5	5	120	9	5	31
Conflicting Peds, #/hr	5	0	0	0	0	5	0	0	0	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	675	2	115	504	21	5	5	120	9	5	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	530	0	0	677	0	0	1539	1534	678	1589	1525	522
Stage 1	-	-	-	-	-	-	774	774	-	750	750	-
Stage 2	-	-	-	-	-	-	765	760	-	839	775	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1037	-	-	915	-	-	94	116	452	87	118	555
Stage 1	-	-	-	-	-	-	391	408	-	403	419	-
Stage 2	-	-	-	-	-	-	396	414	-	360	408	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1032	-	-	915	-	-	74	96	451	53	98	551
Mov Cap-2 Maneuver	-	-	-	-	-	-	74	96	-	53	98	-
Stage 1	-	-	-	-	-	-	373	389	-	382	365	-
Stage 2	-	-	-	-	-	-	322	360	-	248	389	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			1.7			22.2			35.6		
HCM LOS							C			E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	337	1032	-	-	915	-	-	162
HCM Lane V/C Ratio	0.386	0.047	-	-	0.126	-	-	0.278
HCM Control Delay (s)	22.2	8.7	-	-	9.5	-	-	35.6
HCM Lane LOS	C	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	1.8	0.1	-	-	0.4	-	-	1.1

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	657	194	151	576	64	172	16	120	29	13	22
Future Volume (vph)	26	657	194	151	576	64	172	16	120	29	13	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99		0.93	0.95	0.98	
Frt			0.850			0.850			0.850		0.906	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1354	0
Flt Permitted	0.302			0.236			0.734			0.747		
Satd. Flow (perm)	391	1456	1298	325	1470	1205	1136	1456	1220	1107	1354	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			194			64			120			22
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	26	657	194	151	576	64	172	16	120	29	13	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	657	194	151	576	64	172	16	120	29	35	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Maximum Green (s)	39.5	39.5	39.5	39.5	39.5	39.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	34.8	34.8	34.8	34.8	34.8	34.8	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.14	0.92	0.26	0.94	0.79	0.10	0.43	0.03	0.24	0.07	0.07	0.07
Control Delay	11.2	36.2	2.6	80.6	24.2	3.0	23.6	17.6	5.4	18.1	10.7	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	36.2	2.6	80.6	24.2	3.0	23.6	17.6	5.4	18.1	10.7	10.7
LOS	B	D	A	F	C	A	C	B	A	B	B	B
Approach Delay		28.0			33.3			16.2				14.1
Approach LOS		C			C			B				B
Queue Length 50th (m)	1.7	74.6	0.0	17.6	59.0	0.0	19.1	1.5	0.0	2.8	1.2	1.2
Queue Length 95th (m)	5.9	#141.2	8.6	#52.9	99.6	5.1	36.5	5.5	10.4	8.2	6.9	6.9
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		
Base Capacity (vph)	220	820	816	183	829	707	397	509	504	387	488	488
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.80	0.24	0.83	0.69	0.09	0.43	0.03	0.24	0.07	0.07	0.07

Intersection Summary

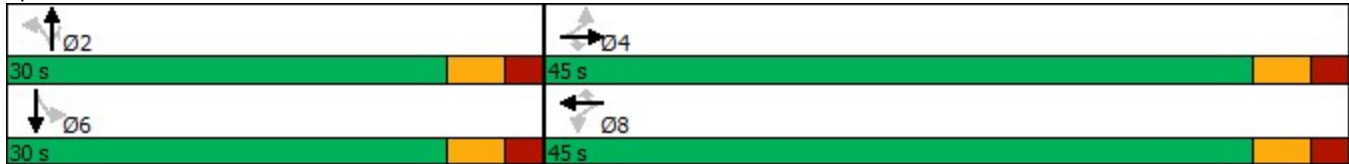
Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 70.6
 Natural Cycle: 75
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.94

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road

Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 79.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 3: River Mist Road & Cambrian Road

2023 FT - PM
 3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	657	194	151	576	64	172	16	120	29	13	22
Future Volume (veh/h)	26	657	194	151	576	64	172	16	120	29	13	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.96		0.93	0.96		0.93
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	26	657	194	151	576	64	172	16	120	29	13	22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	282	874	685	221	881	675	501	542	405	479	161	272
Arrive On Green	0.53	0.53	0.53	0.53	0.53	0.53	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	668	1660	1301	576	1674	1281	1313	1660	1240	1195	492	832
Grp Volume(v), veh/h	26	657	194	151	576	64	172	16	120	29	0	35
Grp Sat Flow(s),veh/h/ln	668	1660	1301	576	1674	1281	1313	1660	1240	1195	0	1323
Q Serve(g_s), s	2.2	23.3	6.2	16.2	18.6	1.9	7.8	0.5	5.4	1.3	0.0	1.4
Cycle Q Clear(g_c), s	20.8	23.3	6.2	39.5	18.6	1.9	9.2	0.5	5.4	1.8	0.0	1.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.63
Lane Grp Cap(c), veh/h	282	874	685	221	881	675	501	542	405	479	0	432
V/C Ratio(X)	0.09	0.75	0.28	0.68	0.65	0.09	0.34	0.03	0.30	0.06	0.00	0.08
Avail Cap(c_a), veh/h	282	874	685	221	881	675	501	542	405	479	0	432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	13.9	9.9	30.8	12.8	8.8	20.6	17.2	18.8	17.8	0.0	17.5
Incr Delay (d2), s/veh	0.1	3.7	0.2	8.4	1.7	0.1	1.9	0.1	1.9	0.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	10.3	2.0	3.5	8.1	0.6	2.9	0.2	1.9	0.4	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	17.6	10.1	39.2	14.5	8.9	22.5	17.3	20.7	18.0	0.0	17.8
LnGrp LOS	C	B	B	D	B	A	C	B	C	B	A	B
Approach Vol, veh/h		877			791			308				64
Approach Delay, s/veh		16.0			18.8			21.5				17.9
Approach LOS		B			B			C				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		45.0		30.0		45.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		39.5		24.5		39.5				
Max Q Clear Time (g_c+I1), s		11.2		25.3		3.8		41.5				
Green Ext Time (p_c), s		1.2		5.7		0.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				18.0								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	200	362	179	144	377	86	109	297	125	68	482	344
Future Volume (vph)	200	362	179	144	377	86	109	297	125	68	482	344
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.967			0.981			0.968			0.948	
Flt Protected		0.987			0.988			0.990			0.996	
Satd. Flow (prot)	0	1437	0	0	1496	0	0	1669	0	0	1580	0
Flt Permitted		0.987			0.988			0.990			0.996	
Satd. Flow (perm)	0	1437	0	0	1496	0	0	1669	0	0	1580	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	200	362	179	144	377	86	109	297	125	68	482	344
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	741	0	0	607	0	0	531	0	0	894	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	127.8%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2023 FT - PM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	38	0	0	52	0
Future Volume (vph)	0	38	0	0	52	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected	0.950					
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted	0.950					
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	38	0	0	52	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	0	0	0	52
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 6.7%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	672	47	5	504	31	7
Future Volume (vph)	672	47	5	504	31	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.991			0.975		
Fl _t Protected				0.961		
Satd. Flow (prot)	1729	0	0	1745	1635	0
Fl _t Permitted				0.961		
Satd. Flow (perm)	1729	0	0	1745	1635	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	672	47	5	504	31	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	719	0	0	509	38	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	672	47	5	504	31	7
Future Vol, veh/h	672	47	5	504	31	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	672	47	5	504	31	7

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	719	0	1210 696
Stage 1	-	-	-	-	696 -
Stage 2	-	-	-	-	514 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	882	-	202 442
Stage 1	-	-	-	-	495 -
Stage 2	-	-	-	-	600 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	882	-	200 442
Mov Cap-2 Maneuver	-	-	-	-	200 -
Stage 1	-	-	-	-	495 -
Stage 2	-	-	-	-	595 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	24.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	222	-	-	882	-
HCM Lane V/C Ratio	0.171	-	-	0.006	-
HCM Control Delay (s)	24.5	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	513	160	56	791	102
Future Volume (vph)	48	513	160	56	791	102
Ideal Flow (vphp)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	295.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.965			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1450	0	1458	1079
Flt Permitted	0.950				0.391	
Satd. Flow (perm)	1433	1455	1450	0	600	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		513	16			
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	48	513	160	56	791	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	513	216	0	791	102
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	25.5	25.5	25.7		10.7	25.7
Total Split (s)	25.8	25.8	26.2		48.0	74.2
Total Split (%)	25.8%	25.8%	26.2%		48.0%	74.2%
Maximum Green (s)	20.3	20.3	20.5		42.3	68.5
Yellow Time (s)	4.2	4.2	4.6		4.6	4.6
All-Red Time (s)	1.3	1.3	1.1		1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.0	13.0	13.0			13.0
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	12.4	12.4	20.5		68.6	68.6
Actuated g/C Ratio	0.13	0.13	0.22		0.74	0.74
v/c Ratio	0.25	0.80	0.64		0.94	0.13
Control Delay	38.6	14.0	41.1		33.5	4.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	38.6	14.0	41.1		33.5	4.4
LOS	D	B	D		C	A
Approach Delay	16.1		41.1			30.2
Approach LOS	B		D			C
Queue Length 50th (m)	7.7	0.0	31.2		78.8	3.6
Queue Length 95th (m)	17.4	31.1	#66.4		#201.6	11.8
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		295.0			275.0	
Base Capacity (vph)	316	721	335		840	802
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.15	0.71	0.64		0.94	0.13

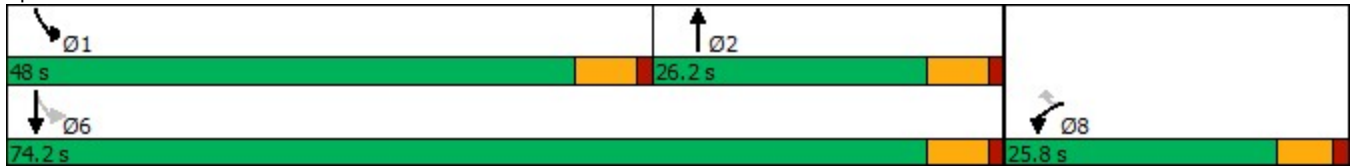
Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	92.2
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	26.9
Intersection LOS:	C
Intersection Capacity Utilization:	81.2%
ICU Level of Service:	D
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2023 FT - SAT
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↶		↷	↶
Traffic Volume (veh/h)	48	513	160	56	791	102
Future Volume (veh/h)	48	513	160	56	791	102
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1533	1575	887
Adj Flow Rate, veh/h	48	513	160	56	791	102
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	19	16	65
Cap, veh/h	0	0	662	232	1014	819
Arrive On Green	0.00	0.00	0.61	0.61	0.24	0.92
Sat Flow, veh/h	0		1085	380	1500	887
Grp Volume(v), veh/h	0.0		0	216	791	102
Grp Sat Flow(s),veh/h/ln			0	1465	1500	887
Q Serve(g_s), s			0.0	5.0	10.5	0.7
Cycle Q Clear(g_c), s			0.0	5.0	10.5	0.7
Prop In Lane				0.26	1.00	
Lane Grp Cap(c), veh/h			0	894	1014	819
V/C Ratio(X)			0.00	0.24	0.78	0.12
Avail Cap(c_a), veh/h			0	894	1515	819
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			0.0	6.6	2.7	0.2
Incr Delay (d2), s/veh			0.0	0.6	1.6	0.3
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			0.0	1.8	2.2	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			0.0	7.3	4.2	0.6
LnGrp LOS			A	A	A	A
Approach Vol, veh/h			216			893
Approach Delay, s/veh			7.3			3.8
Approach LOS			A			A
Timer - Assigned Phs	1	2				6
Phs Duration (G+Y+Rc), s	23.2	51.0				74.2
Change Period (Y+Rc), s	* 5.7	* 5.7				* 5.7
Max Green Setting (Gmax), s	* 42	* 21				* 69
Max Q Clear Time (g_c+I1), s	12.5	7.0				2.7
Green Ext Time (p_c), s	5.0	1.1				0.9

Intersection Summary

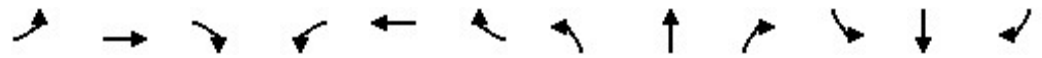
HCM 6th Ctrl Delay			4.5			
HCM 6th LOS			A			

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2023 FT - SAT
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	682	3	134	508	21	6	5	137	9	5	31
Future Volume (vph)	49	682	3	134	508	21	6	5	137	9	5	31
Ideal Flow (vphp)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.999			0.994			0.875			0.907	
Fl _t Protected	0.950			0.950				0.998			0.990	
Satd. Flow (prot)	1658	1678	0	1658	1561	0	0	1524	0	0	1567	0
Fl _t Permitted	0.950			0.950				0.998			0.990	
Satd. Flow (perm)	1658	1678	0	1658	1561	0	0	1524	0	0	1567	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	5						5			2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	49	682	3	134	508	21	6	5	137	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	685	0	134	529	0	0	148	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	66.0%
ICU Level of Service	C
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	49	682	3	134	508	21	6	5	137	9	5	31
Future Vol, veh/h	49	682	3	134	508	21	6	5	137	9	5	31
Conflicting Peds, #/hr	5	0	0	0	0	5	0	0	0	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	682	3	134	508	21	6	5	137	9	5	31

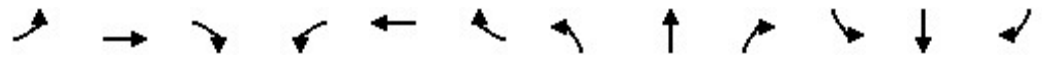
Major/Minor	Major1		Major2		Minor1			Minor2				
Conflicting Flow All	534	0	0	685	0	0	1589	1584	686	1647	1575	526
Stage 1	-	-	-	-	-	-	782	782	-	792	792	-
Stage 2	-	-	-	-	-	-	807	802	-	855	783	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1034	-	-	908	-	-	87	108	447	79	110	552
Stage 1	-	-	-	-	-	-	387	405	-	382	401	-
Stage 2	-	-	-	-	-	-	375	396	-	353	404	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1029	-	-	908	-	-	67	87	446	45	89	548
Mov Cap-2 Maneuver	-	-	-	-	-	-	67	87	-	45	89	-
Stage 1	-	-	-	-	-	-	368	386	-	362	340	-
Stage 2	-	-	-	-	-	-	297	336	-	229	385	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	2	24.9	41
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	326	1029	-	-	908	-	-	144
HCM Lane V/C Ratio	0.454	0.048	-	-	0.148	-	-	0.313
HCM Control Delay (s)	24.9	8.7	-	-	9.7	-	-	41
HCM Lane LOS	C	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	2.3	0.1	-	-	0.5	-	-	1.2

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	674	199	151	593	64	177	16	120	29	13	24
Future Volume (vph)	28	674	199	151	593	64	177	16	120	29	13	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99		0.93	0.95	0.98	
Frt			0.850			0.850			0.850		0.903	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1349	0
Flt Permitted	0.292			0.227			0.733			0.747		
Satd. Flow (perm)	379	1456	1298	313	1470	1205	1134	1456	1220	1107	1349	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			199			64			120			24
Link Speed (k/h)		50			50			50				50
Link Distance (m)		449.3			477.1			575.8				329.8
Travel Time (s)		32.3			34.4			41.5				23.7
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	28	674	199	151	593	64	177	16	120	29	13	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	674	199	151	593	64	177	16	120	29	37	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	1	2
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Maximum Green (s)	39.5	39.5	39.5	39.5	39.5	39.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	35.7	35.7	35.7	35.7	35.7	35.7	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50	0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.15	0.93	0.27	0.97	0.81	0.10	0.45	0.03	0.24	0.08	0.08	
Control Delay	11.5	37.8	2.5	88.5	25.1	3.0	24.2	17.6	5.4	18.2	10.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	37.8	2.5	88.5	25.1	3.0	24.2	17.6	5.4	18.2	10.4	
LOS	B	D	A	F	C	A	C	B	A	B	B	
Approach Delay		29.2			35.2			16.7				13.8
Approach LOS		C			D			B				B
Queue Length 50th (m)	1.9	78.2	0.0	18.2	62.0	0.0	19.7	1.5	0.0	2.8	1.2	
Queue Length 95th (m)	6.2	#146.9	8.6	#53.9	#107.5	5.1	37.7	5.5	10.4	8.2	7.1	
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		
Base Capacity (vph)	210	810	810	173	818	698	391	502	499	382	481	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.83	0.25	0.87	0.72	0.09	0.45	0.03	0.24	0.08	0.08	

Intersection Summary

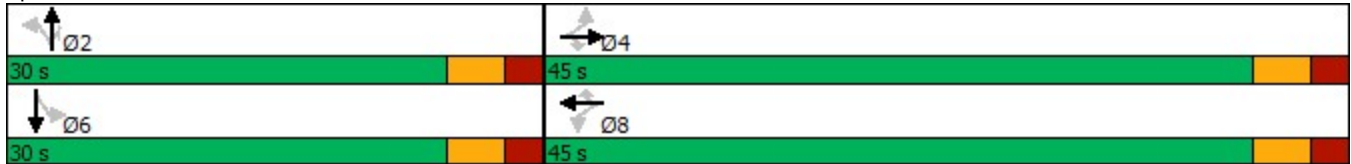
Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 71.4
 Natural Cycle: 75
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.97

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road

Intersection Signal Delay: 29.2	Intersection LOS: C
Intersection Capacity Utilization 80.0%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 3: River Mist Road & Cambrian Road

2023 FT - SAT
 3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	674	199	151	593	64	177	16	120	29	13	24
Future Volume (veh/h)	28	674	199	151	593	64	177	16	120	29	13	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.96		0.93	0.96		0.93
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	28	674	199	151	593	64	177	16	120	29	13	24
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	272	874	685	211	881	675	499	542	405	479	151	279
Arrive On Green	0.53	0.53	0.53	0.53	0.53	0.53	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	657	1660	1301	564	1674	1281	1311	1660	1240	1195	463	854
Grp Volume(v), veh/h	28	674	199	151	593	64	177	16	120	29	0	37
Grp Sat Flow(s),veh/h/ln	657	1660	1301	564	1674	1281	1311	1660	1240	1195	0	1317
Q Serve(g_s), s	2.4	24.3	6.4	15.2	19.5	1.9	8.1	0.5	5.4	1.3	0.0	1.5
Cycle Q Clear(g_c), s	21.9	24.3	6.4	39.5	19.5	1.9	9.6	0.5	5.4	1.8	0.0	1.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.65
Lane Grp Cap(c), veh/h	272	874	685	211	881	675	499	542	405	479	0	430
V/C Ratio(X)	0.10	0.77	0.29	0.72	0.67	0.09	0.35	0.03	0.30	0.06	0.00	0.09
Avail Cap(c_a), veh/h	272	874	685	211	881	675	499	542	405	479	0	430
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.0	14.1	9.9	31.7	13.0	8.8	20.8	17.2	18.8	17.8	0.0	17.5
Incr Delay (d2), s/veh	0.2	4.3	0.2	11.1	2.0	0.1	2.0	0.1	1.9	0.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	10.9	2.1	3.6	8.5	0.6	3.0	0.2	1.9	0.4	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.2	18.4	10.2	42.8	15.0	8.9	22.8	17.3	20.7	18.0	0.0	17.9
LnGrp LOS	C	B	B	D	B	A	C	B	C	B	A	B
Approach Vol, veh/h		901			808			313				66
Approach Delay, s/veh		16.7			19.7			21.7				17.9
Approach LOS		B			B			C				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		45.0		30.0		45.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		39.5		24.5		39.5				
Max Q Clear Time (g_c+I1), s		11.6		26.3		3.8		41.5				
Green Ext Time (p_c), s		1.2		5.6		0.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				18.7								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	206	364	189	144	379	86	116	292	125	68	474	353
Future Volume (vph)	206	364	189	144	379	86	116	292	125	68	474	353
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.966			0.981			0.968			0.947	
Flt Protected		0.987			0.988			0.989			0.996	
Satd. Flow (prot)	0	1434	0	0	1496	0	0	1667	0	0	1577	0
Flt Permitted		0.987			0.988			0.989			0.996	
Satd. Flow (perm)	0	1434	0	0	1496	0	0	1667	0	0	1577	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	206	364	189	144	379	86	116	292	125	68	474	353
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	759	0	0	609	0	0	533	0	0	895	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	132.0%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2023 FT - SAT
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↘
Traffic Volume (vph)	0	40	0	0	48	0
Future Volume (vph)	0	40	0	0	48	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	40	0	0	48	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	40	0	0	0	48
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 6.7%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	677	47	6	508	32	9
Future Volume (vph)	677	47	6	508	32	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991			0.970		
Flt Protected				0.999	0.962	
Satd. Flow (prot)	1729	0	0	1743	1628	0
Flt Permitted				0.999	0.962	
Satd. Flow (perm)	1729	0	0	1743	1628	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	677	47	6	508	32	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	724	0	0	514	41	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.6%
Analysis Period (min)	15
	ICU Level of Service A

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	677	47	6	508	32	9
Future Vol, veh/h	677	47	6	508	32	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	677	47	6	508	32	9

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	724	0	1221 701
Stage 1	-	-	-	-	701 -
Stage 2	-	-	-	-	520 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	879	-	199 439
Stage 1	-	-	-	-	492 -
Stage 2	-	-	-	-	597 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	879	-	197 439
Mov Cap-2 Maneuver	-	-	-	-	197 -
Stage 1	-	-	-	-	492 -
Stage 2	-	-	-	-	591 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	24.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	224	-	-	879	-
HCM Lane V/C Ratio	0.183	-	-	0.007	-
HCM Control Delay (s)	24.6	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

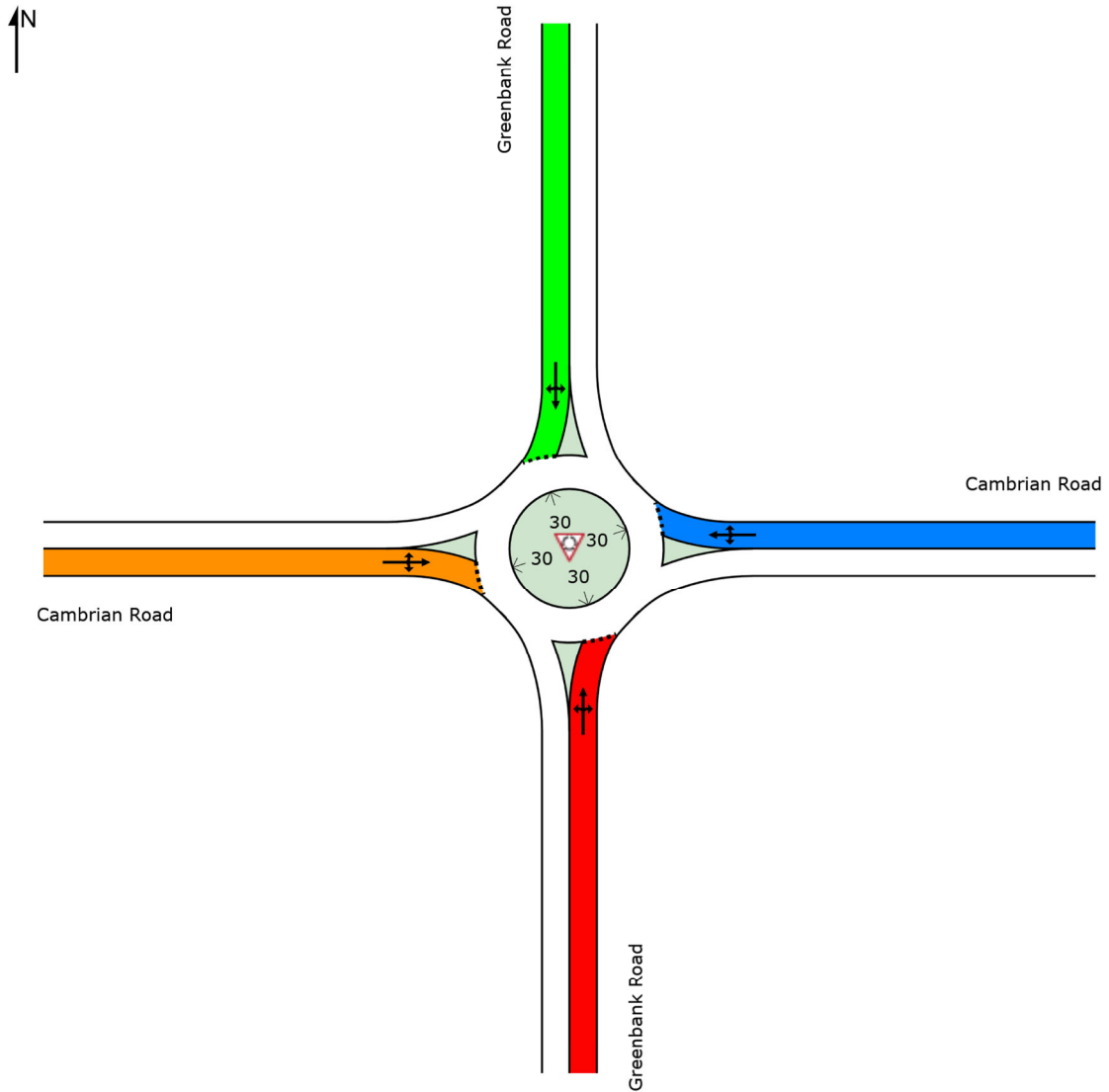
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

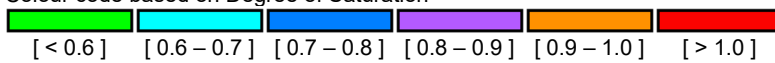
 Site: 101 [Cambrian and Greenbank 2023 FT AM]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	1.46	0.72	0.51	0.98	1.46



Colour code based on Degree of Saturation



DELAY (CONTROL)

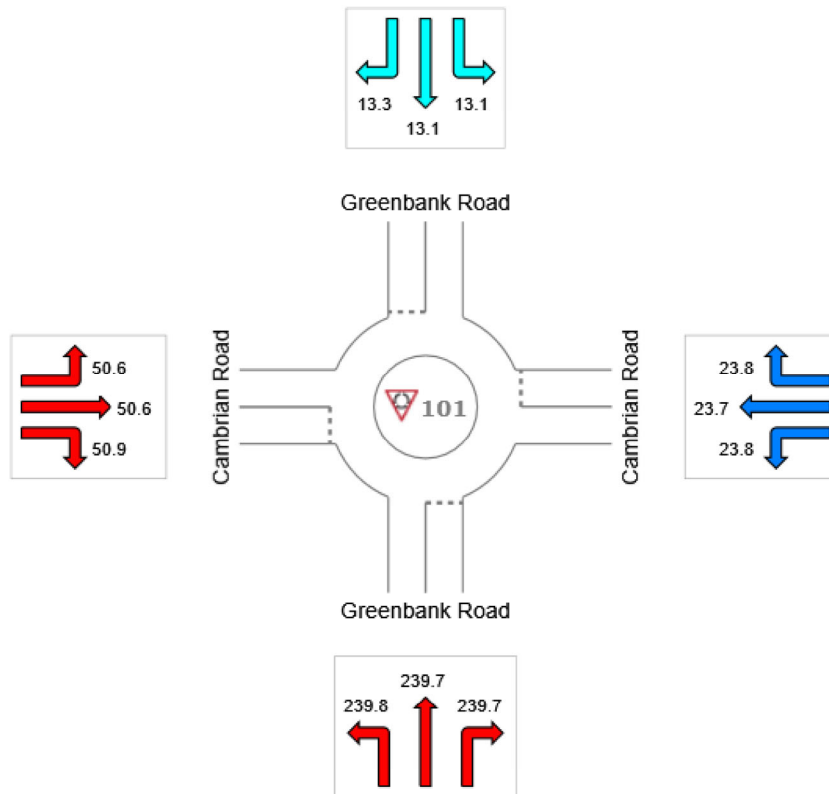
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FT AM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	239.7	23.7	13.2	50.6	99.5
LOS	F	C	B	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

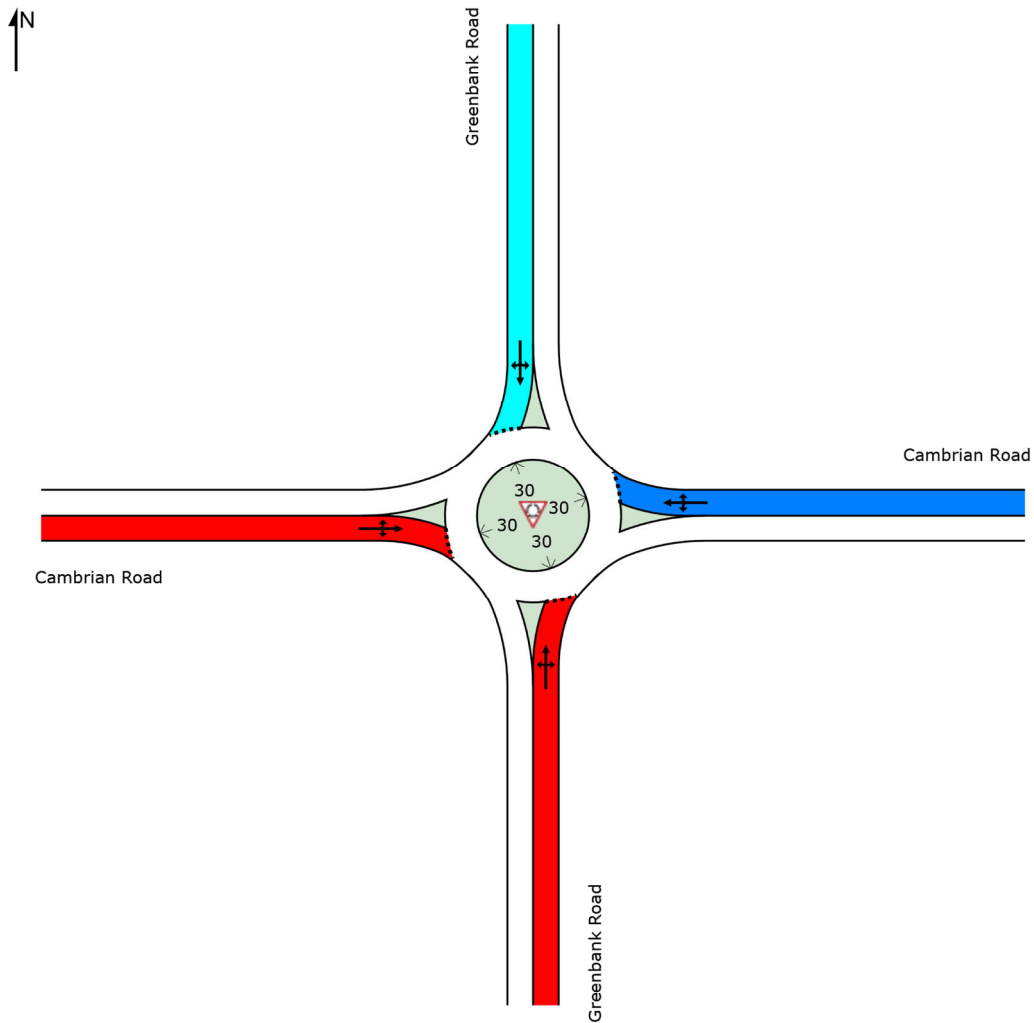
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2023 FT AM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	C	B	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FT AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	136	3.0	1.459	239.8	LOS F	83.7	597.0	1.00	4.38	12.17	5.8
2	T1	379	2.0	1.459	239.7	LOS F	83.7	597.0	1.00	4.38	12.17	6.0
3	R2	208	2.0	1.459	239.7	LOS F	83.7	597.0	1.00	4.38	12.17	4.7
Approach		723	2.2	1.459	239.7	LOS F	83.7	597.0	1.00	4.38	12.17	5.6
East: Cambrian Road												
4	L2	103	6.0	0.725	23.8	LOS C	6.9	50.1	0.81	1.17	1.73	25.9
5	T1	259	2.0	0.725	23.7	LOS C	6.9	50.1	0.81	1.17	1.73	28.2
6	R2	73	8.0	0.725	23.8	LOS C	6.9	50.1	0.81	1.17	1.73	28.3
Approach		435	4.0	0.725	23.7	LOS C	6.9	50.1	0.81	1.17	1.73	27.7
North: Greenbank Road												
7	L2	86	5.0	0.513	13.1	LOS B	3.3	24.5	0.65	0.77	0.97	37.1
8	T1	142	4.0	0.513	13.1	LOS B	3.3	24.5	0.65	0.77	0.97	37.2
9	R2	125	10.0	0.513	13.3	LOS B	3.3	24.5	0.65	0.77	0.97	36.7
Approach		353	6.4	0.513	13.2	LOS B	3.3	24.5	0.65	0.77	0.97	37.0
West: Cambrian Road												
10	L2	242	3.0	0.982	50.6	LOS F	36.1	261.8	1.00	2.23	3.58	22.1
11	T1	471	3.0	0.982	50.6	LOS F	36.1	261.8	1.00	2.23	3.58	19.0
12	R2	61	17.0	0.982	50.9	LOS F	36.1	261.8	1.00	2.23	3.58	18.5
Approach		774	4.1	0.982	50.6	LOS F	36.1	261.8	1.00	2.23	3.58	20.0
All Vehicles		2285	3.8	1.459	99.5	LOS F	83.7	597.0	0.91	2.48	5.54	12.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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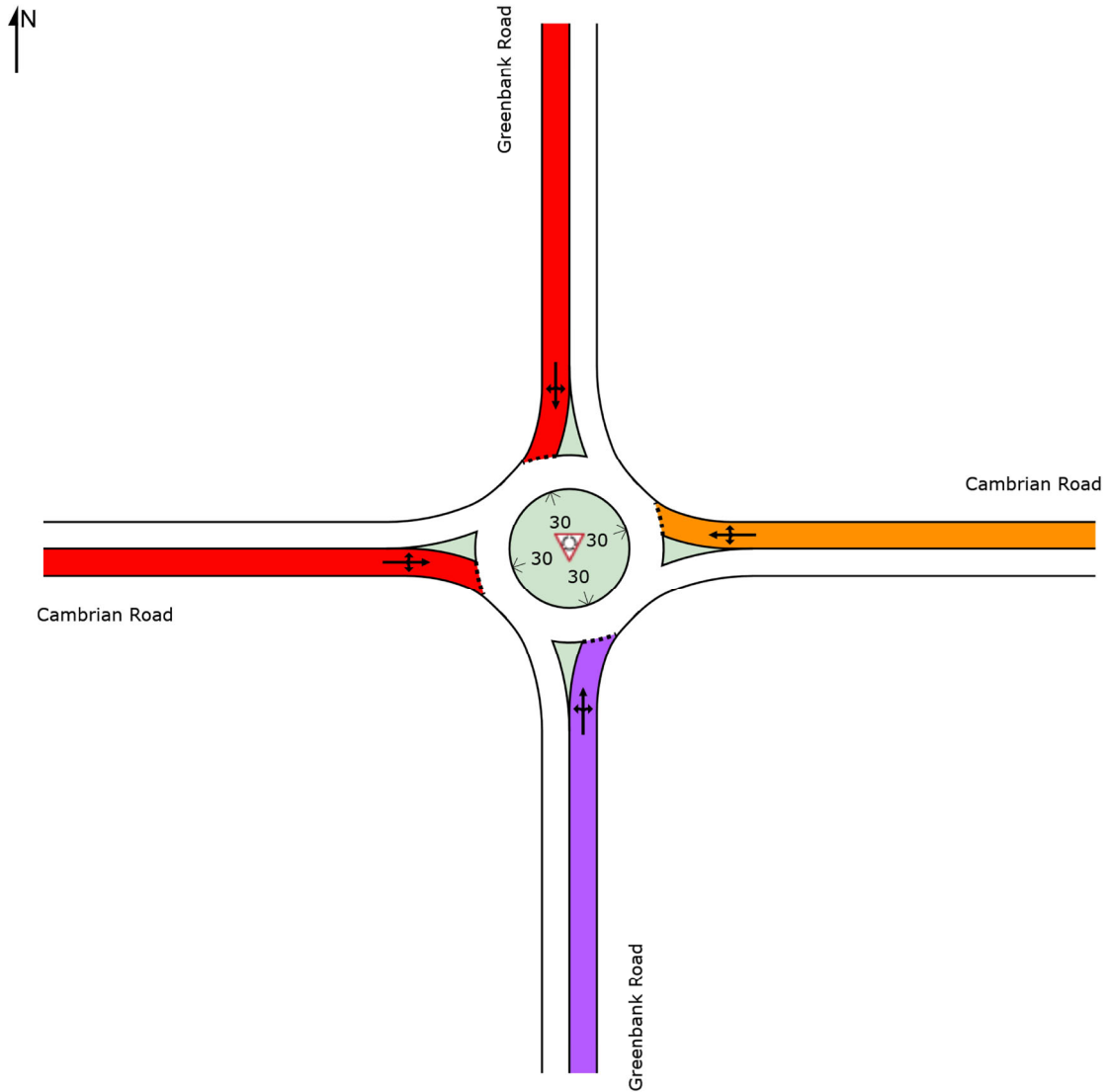
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

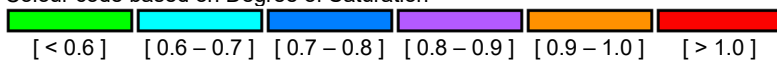
 Site: 101 [Cambrian and Greenbank 2023 FT PM]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.83	0.98	1.52	1.12	1.52



Colour code based on Degree of Saturation



DELAY (CONTROL)

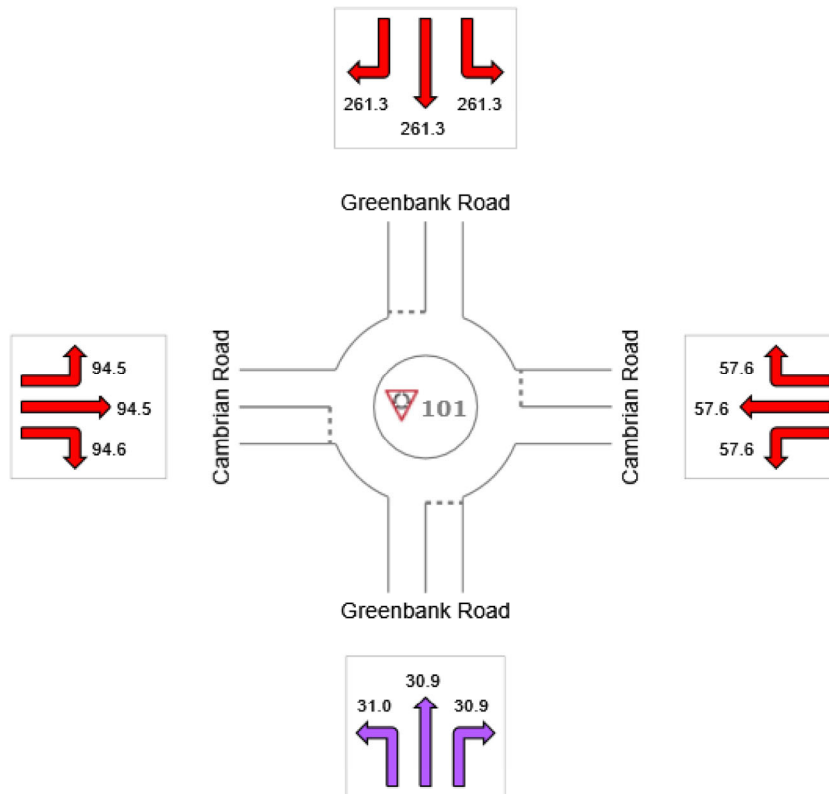
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FT PM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	30.9	57.6	261.3	94.5	128.0
LOS	D	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

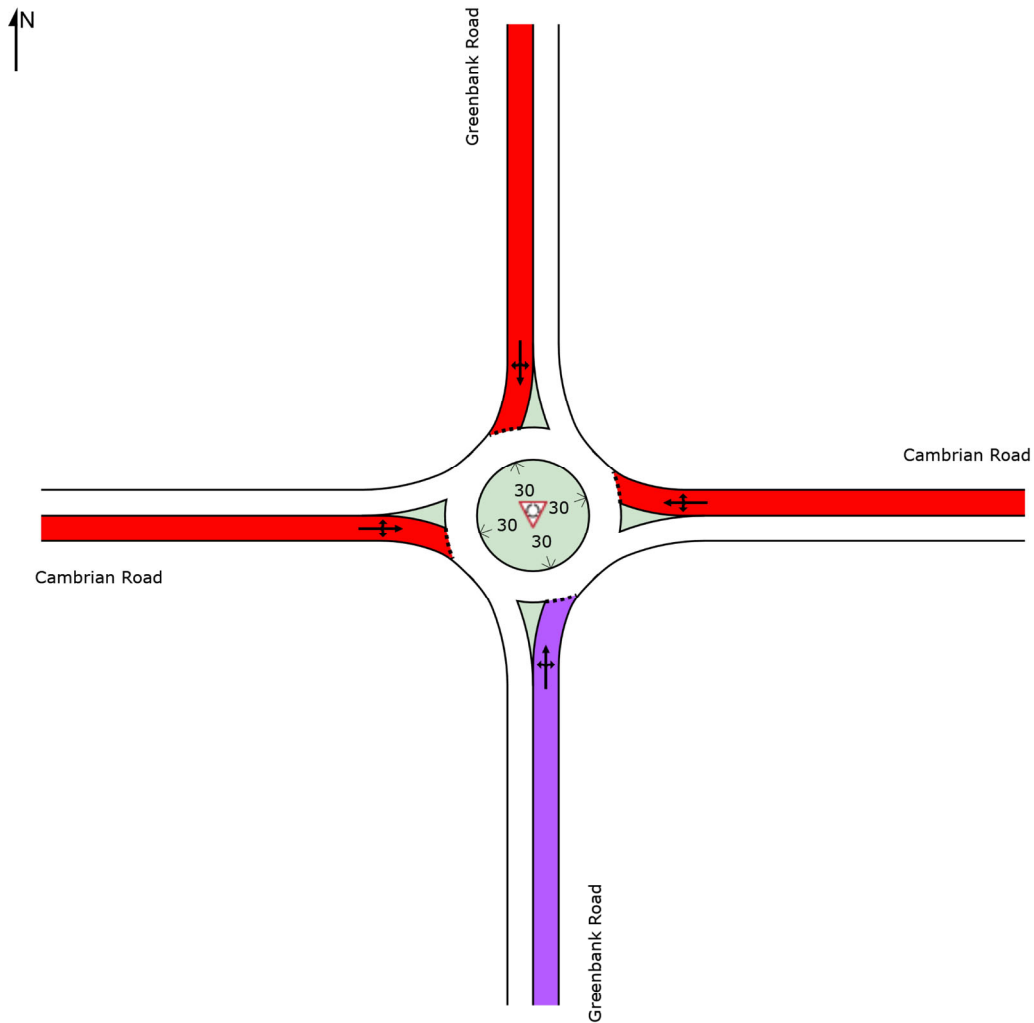
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2023 FT PM]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FT PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	109	8.0	0.827	31.0	LOS D	11.7	84.3	0.91	1.39	2.29	25.6
2	T1	297	2.0	0.827	30.9	LOS D	11.7	84.3	0.91	1.39	2.29	26.7
3	R2	125	2.0	0.827	30.9	LOS D	11.7	84.3	0.91	1.39	2.29	21.8
Approach		531	3.2	0.827	30.9	LOS D	11.7	84.3	0.91	1.39	2.29	25.4
East: Cambrian Road												
4	L2	144	2.0	0.982	57.6	LOS F	23.7	168.6	1.00	2.15	3.96	15.3
5	T1	377	2.0	0.982	57.6	LOS F	23.7	168.6	1.00	2.15	3.96	17.5
6	R2	86	2.0	0.982	57.6	LOS F	23.7	168.6	1.00	2.15	3.96	18.0
Approach		607	2.0	0.982	57.6	LOS F	23.7	168.6	1.00	2.15	3.96	17.1
North: Greenbank Road												
7	L2	68	2.0	1.519	261.3	LOS F	111.3	792.5	1.00	4.89	12.90	5.5
8	T1	482	2.0	1.519	261.3	LOS F	111.3	792.5	1.00	4.89	12.90	5.5
9	R2	344	2.0	1.519	261.3	LOS F	111.3	792.5	1.00	4.89	12.90	6.4
Approach		894	2.0	1.519	261.3	LOS F	111.3	792.5	1.00	4.89	12.90	5.9
West: Cambrian Road												
10	L2	200	2.0	1.115	94.5	LOS F	47.0	336.0	1.00	3.07	6.07	14.7
11	T1	362	2.0	1.115	94.5	LOS F	47.0	336.0	1.00	3.07	6.07	12.4
12	R2	179	4.0	1.115	94.6	LOS F	47.0	336.0	1.00	3.07	6.07	12.2
Approach		741	2.5	1.115	94.5	LOS F	47.0	336.0	1.00	3.07	6.07	13.0
All Vehicles		2773	2.4	1.519	128.0	LOS F	111.3	792.5	0.98	3.13	7.09	10.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Organisation: CGH TRANSPORTATION | Processed: August 11, 2020 9:26:31 AM

Project: C:\Users\RobinMarina\CGH TRANSPORTATION\CGH Working - Documents\Projects\2019-54 Metro Greenbank Road\DATA\Sidra\Cambrian Greenbank.sip8

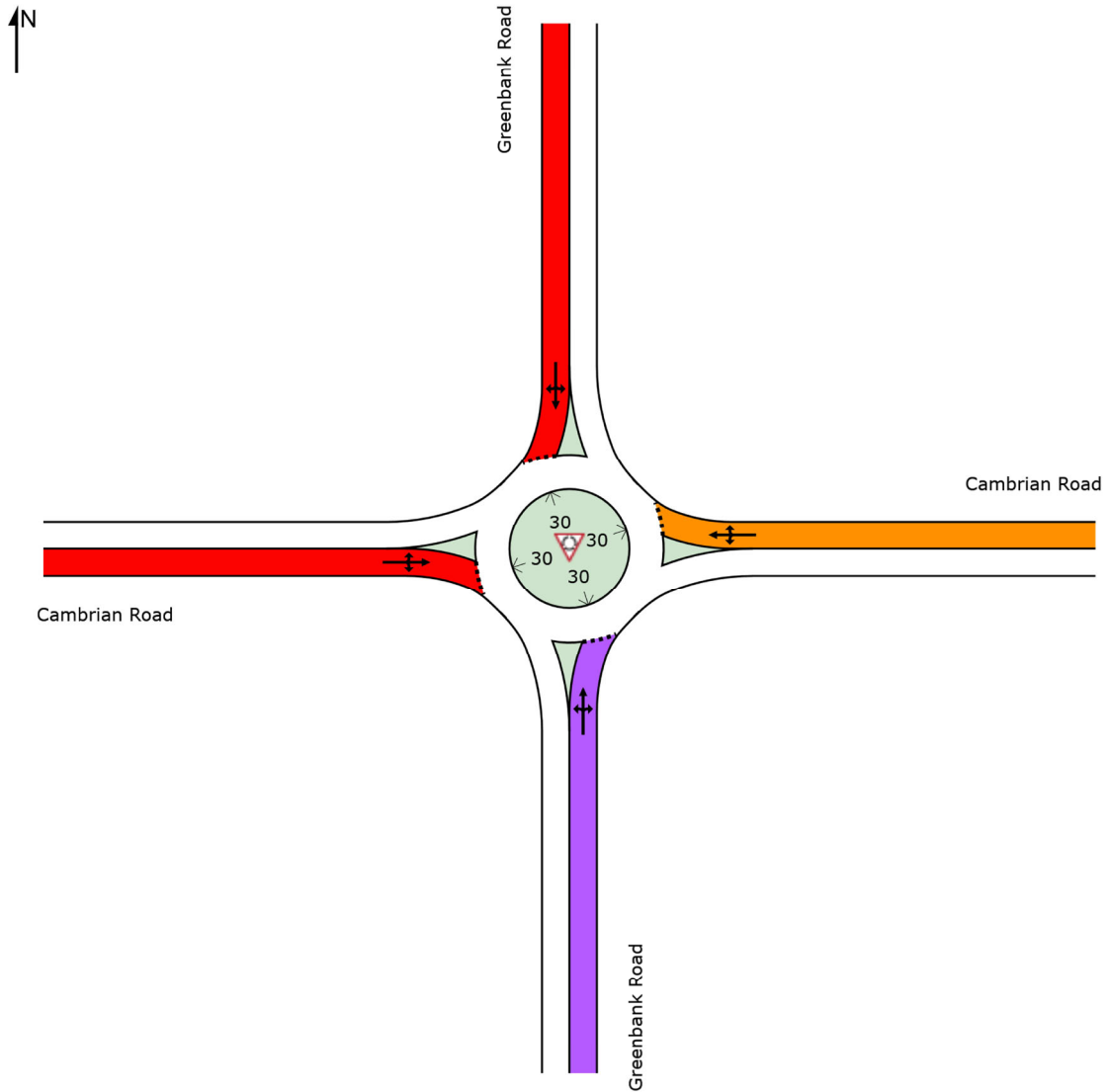
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

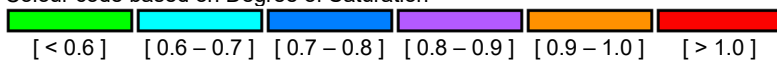
 Site: 101 [Cambrian and Greenbank 2023 FT Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.83	0.99	1.53	1.13	1.53



Colour code based on Degree of Saturation



DELAY (CONTROL)

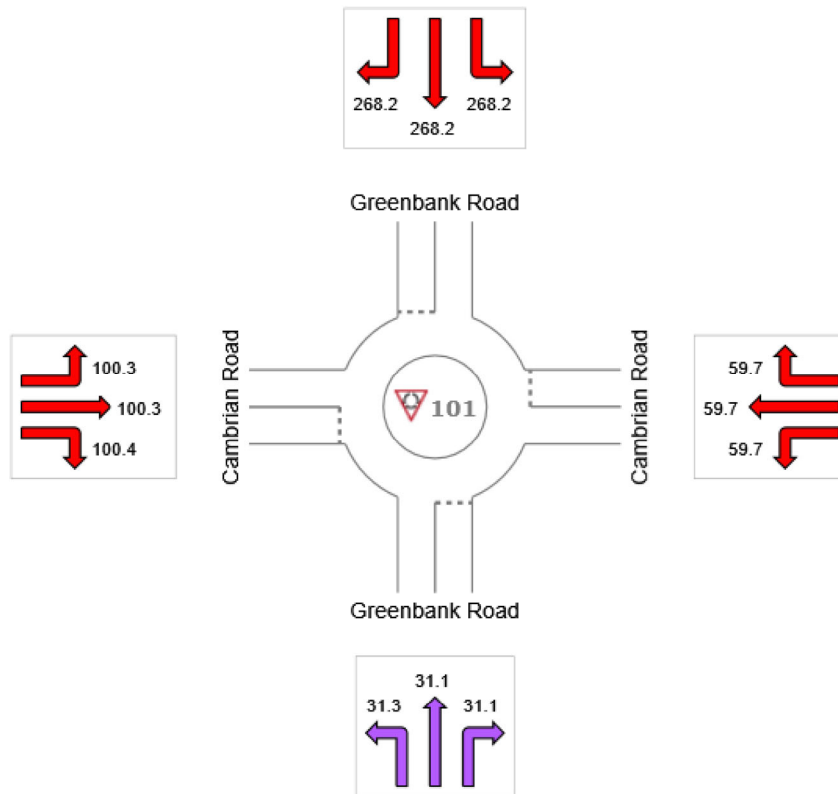
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FT Sat]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	31.2	59.7	268.2	100.3	132.0
LOS	D	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

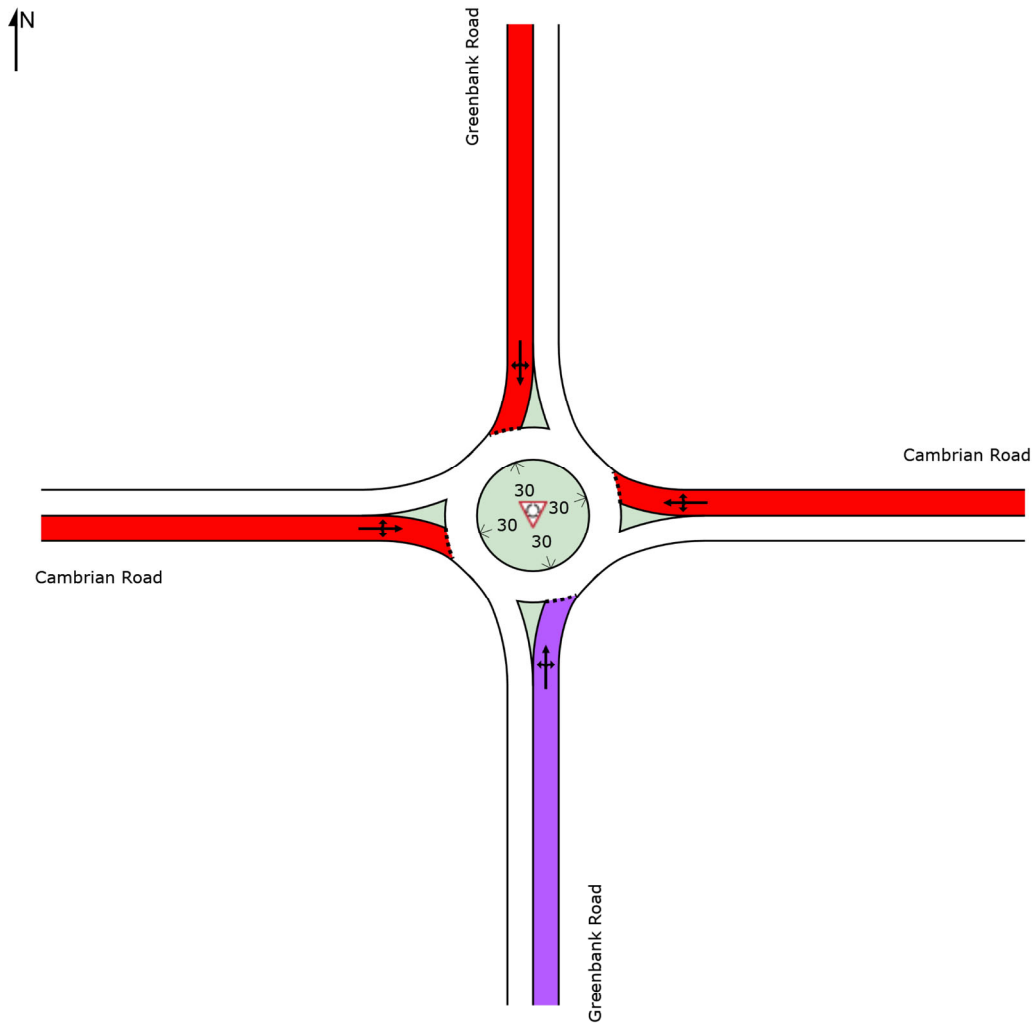
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2023 FT Sat]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FT Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	116	8.0	0.830	31.3	LOS D	11.9	85.5	0.91	1.39	2.31	25.5
2	T1	292	2.0	0.830	31.1	LOS D	11.9	85.5	0.91	1.39	2.31	26.5
3	R2	125	2.0	0.830	31.1	LOS D	11.9	85.5	0.91	1.39	2.31	21.7
Approach		533	3.3	0.830	31.2	LOS D	11.9	85.5	0.91	1.39	2.31	25.2
East: Cambrian Road												
4	L2	144	2.0	0.990	59.7	LOS F	24.5	174.3	1.00	2.19	4.08	15.0
5	T1	379	2.0	0.990	59.7	LOS F	24.5	174.3	1.00	2.19	4.08	17.1
6	R2	86	2.0	0.990	59.7	LOS F	24.5	174.3	1.00	2.19	4.08	17.6
Approach		609	2.0	0.990	59.7	LOS F	24.5	174.3	1.00	2.19	4.08	16.7
North: Greenbank Road												
7	L2	68	2.0	1.534	268.2	LOS F	113.1	805.2	1.00	4.94	13.13	5.4
8	T1	474	2.0	1.534	268.2	LOS F	113.1	805.2	1.00	4.94	13.13	5.4
9	R2	353	2.0	1.534	268.2	LOS F	113.1	805.2	1.00	4.94	13.13	6.2
Approach		895	2.0	1.534	268.2	LOS F	113.1	805.2	1.00	4.94	13.13	5.7
West: Cambrian Road												
10	L2	206	2.0	1.132	100.3	LOS F	50.6	362.1	1.00	3.20	6.35	14.1
11	T1	364	2.0	1.132	100.3	LOS F	50.6	362.1	1.00	3.20	6.35	11.8
12	R2	189	4.0	1.132	100.4	LOS F	50.6	362.1	1.00	3.20	6.35	11.7
Approach		759	2.5	1.132	100.3	LOS F	50.6	362.1	1.00	3.20	6.35	12.4
All Vehicles		2796	2.4	1.534	132.0	LOS F	113.1	805.2	0.98	3.20	7.26	9.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Appendix S

Synchro and Sidra Intersection Worksheets – 2028 Future Total Conditions

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	93	1212	240	75	460	253
Future Volume (vph)	93	1212	240	75	460	253
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	300.0		135.0	300.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.554	
Satd. Flow (perm)	1433	1455	1496	1293	850	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		549		75		
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	93	1212	240	75	460	253
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	1212	240	75	460	253
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.7	29.7	26.1	26.1	26.1	26.1
Total Split (s)	66.0	66.0	64.0	64.0	64.0	64.0
Total Split (%)	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%
Maximum Green (s)	60.3	60.3	58.3	58.3	58.3	58.3
Yellow Time (s)	4.2	4.2	4.6	4.6	4.6	4.6
All-Red Time (s)	1.5	1.5	1.1	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	60.3	60.3	58.3	58.3	58.3	58.3
Actuated g/C Ratio	0.46	0.46	0.45	0.45	0.45	0.45
v/c Ratio	0.14	1.25	0.36	0.12	1.21	0.52
Control Delay	20.8	140.7	25.5	4.9	148.7	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	140.7	25.5	4.9	148.7	30.7
LOS	C	F	C	A	F	C
Approach Delay	132.2		20.6			106.8
Approach LOS	F		C			F
Queue Length 50th (m)	13.4	~308.4	39.7	0.0	~143.4	45.9
Queue Length 95th (m)	23.9	#389.5	60.4	8.7	#207.8	72.5
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		300.0		135.0	300.0	
Base Capacity (vph)	664	969	670	621	381	483
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	1.25	0.36	0.12	1.21	0.52

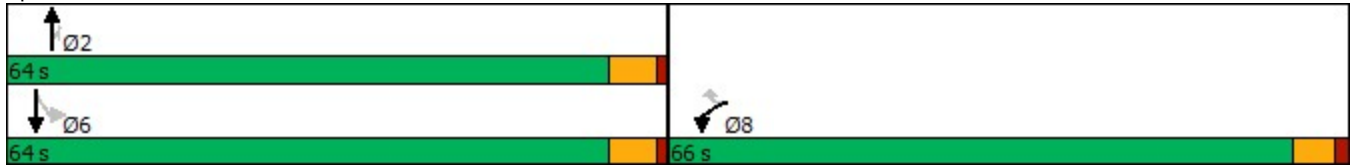
Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Natural Cycle:	140
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.25
Intersection Signal Delay:	109.4
Intersection LOS:	F
Intersection Capacity Utilization:	102.0%
ICU Level of Service:	G
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2028 FT - AM
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↶	↑	↷	↶	↷
Traffic Volume (veh/h)	93	1212	240	75	460	253
Future Volume (veh/h)	93	1212	240	75	460	253
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1561	1575	887
Adj Flow Rate, veh/h	93	1212	240	75	460	253
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	17	16	65
Cap, veh/h	0	0	1397	1205	959	808
Arrive On Green	0.00	0.00	0.91	0.91	0.91	0.91
Sat Flow, veh/h	0		1533	1323	946	887
Grp Volume(v), veh/h	0.0		240	75	460	253
Grp Sat Flow(s),veh/h/ln			1533	1323	946	887
Q Serve(g_s), s			1.1	0.3	6.4	2.3
Cycle Q Clear(g_c), s			1.1	0.3	7.4	2.3
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			1397	1205	959	808
V/C Ratio(X)			0.17	0.06	0.48	0.31
Avail Cap(c_a), veh/h			1397	1205	959	808
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(l)			1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			0.3	0.3	0.7	0.4
Incr Delay (d2), s/veh			0.3	0.1	1.7	1.0
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			0.1	0.0	0.8	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			0.6	0.4	2.4	1.4
LnGrp LOS			A	A	A	A
Approach Vol, veh/h			315			713
Approach Delay, s/veh			0.5			2.0
Approach LOS			A			A
Timer - Assigned Phs		2				6
Phs Duration (G+Y+Rc), s		64.0				64.0
Change Period (Y+Rc), s		* 5.7				* 5.7
Max Green Setting (Gmax), s		* 58				* 58
Max Q Clear Time (g_c+I1), s		3.1				9.4
Green Ext Time (p_c), s		2.3				7.0
Intersection Summary						
HCM 6th Ctrl Delay			1.6			
HCM 6th LOS			A			

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2028 FT - AM
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	558	4	48	938	6	3	5	32	17	5	53
Future Volume (vph)	19	558	4	48	938	6	3	5	32	17	5	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.999			0.999			0.892			0.905	
Fl _t Protected	0.950			0.950				0.996			0.989	
Satd. Flow (prot)	1658	1678	0	1658	1569	0	0	1550	0	0	1562	0
Fl _t Permitted	0.950			0.950				0.996			0.989	
Satd. Flow (perm)	1658	1678	0	1658	1569	0	0	1550	0	0	1562	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	5						5			2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	19	558	4	48	938	6	3	5	32	17	5	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	562	0	48	944	0	0	40	0	0	75	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 69.3% ICU Level of Service C
 Analysis Period (min) 15

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	19	558	4	48	938	6	3	5	32	17	5	53
Future Vol, veh/h	19	558	4	48	938	6	3	5	32	17	5	53
Conflicting Peds, #/hr	5	0	0	0	0	5	0	0	0	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	558	4	48	938	6	3	5	32	17	5	53

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	949	0	0	562	0	0	1666	1643	562	1661	1642	948
Stage 1	-	-	-	-	-	-	598	598	-	1042	1042	-
Stage 2	-	-	-	-	-	-	1068	1045	-	619	600	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	724	-	-	1009	-	-	77	100	526	77	100	316
Stage 1	-	-	-	-	-	-	489	491	-	277	307	-
Stage 2	-	-	-	-	-	-	268	306	-	476	490	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	721	-	-	1009	-	-	58	92	525	65	92	314
Mov Cap-2 Maneuver	-	-	-	-	-	-	58	92	-	65	92	-
Stage 1	-	-	-	-	-	-	476	478	-	268	291	-
Stage 2	-	-	-	-	-	-	208	290	-	430	477	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.4			23.1			48.3		
HCM LOS							C			E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	239	721	-	-	1009	-	-	155
HCM Lane V/C Ratio	0.167	0.026	-	-	0.048	-	-	0.484
HCM Control Delay (s)	23.1	10.1	-	-	8.7	-	-	48.3
HCM Lane LOS	C	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.1	-	-	2.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	578	169	57	445	45	409	60	135	58	19	37
Future Volume (vph)	21	578	169	57	445	45	409	60	135	58	19	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		110.0	80.0		60.0	130.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97		0.97	1.00		0.92	0.98		0.93	0.95	0.98	
Frt			0.850			0.850			0.850		0.901	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1345	0
Flt Permitted	0.379			0.254			0.720			0.718		
Satd. Flow (perm)	487	1456	1297	350	1470	1200	1113	1456	1216	1064	1345	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			169			45			135			37
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	21	578	169	57	445	45	409	60	135	58	19	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	578	169	57	445	45	409	60	135	58	56	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	44.0	44.0	44.0	44.0	44.0	44.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Maximum Green (s)	38.5	38.5	38.5	38.5	38.5	38.5	30.5	30.5	30.5	30.5	30.5	30.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	32.9	32.9	32.9	32.9	32.9	32.9	30.7	30.7	30.7	30.7	30.7	30.7
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	0.10	0.90	0.25	0.37	0.69	0.08	0.89	0.10	0.23	0.13	0.10	0.10
Control Delay	12.9	38.7	3.2	21.6	22.8	4.2	48.0	16.2	4.5	16.9	8.6	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	38.7	3.2	21.6	22.8	4.2	48.0	16.2	4.5	16.9	8.6	8.6
LOS	B	D	A	C	C	A	D	B	A	B	A	A
Approach Delay		30.2			21.1			35.1				12.8
Approach LOS		C			C			D				B
Queue Length 50th (m)	1.6	71.9	0.0	5.1	47.9	0.0	57.9	5.6	0.0	5.5	1.7	1.7
Queue Length 95th (m)	5.6	#131.2	9.2	14.8	78.2	4.9	#114.6	13.2	10.3	13.4	8.7	8.7
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		110.0	80.0		60.0	130.0		75.0	60.0		
Base Capacity (vph)	252	756	754	181	763	644	457	599	579	437	575	575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.76	0.22	0.31	0.58	0.07	0.89	0.10	0.23	0.13	0.10	0.10

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 74.7

Natural Cycle: 80

Control Type: Semi Act-Uncoord

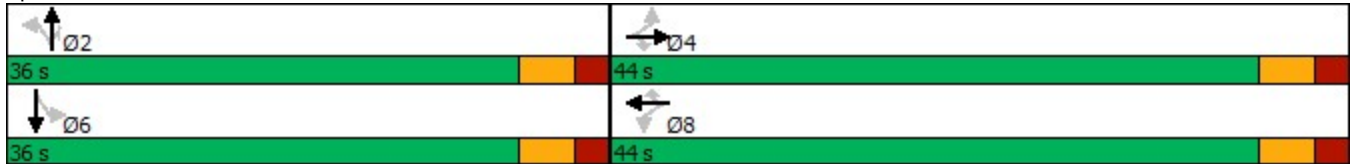
Maximum v/c Ratio: 0.90

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road

Intersection Signal Delay: 28.2	Intersection LOS: C
Intersection Capacity Utilization 84.8%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
3: River Mist Road & Cambrian Road

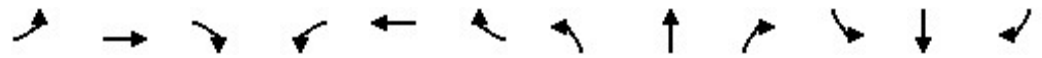
2028 FT - AM
3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	578	169	57	445	45	409	60	135	58	19	37
Future Volume (veh/h)	21	578	169	57	445	45	409	60	135	58	19	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	0.97		0.94	0.97		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	21	578	169	57	445	45	409	60	135	58	19	37
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	280	735	572	189	741	563	596	679	513	540	184	358
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	762	1660	1292	634	1674	1271	1303	1660	1253	1146	449	874
Grp Volume(v), veh/h	21	578	169	57	445	45	409	60	135	58	0	56
Grp Sat Flow(s),veh/h/ln	762	1660	1292	634	1674	1271	1303	1660	1253	1146	0	1323
Q Serve(g_s), s	1.6	22.2	6.2	6.3	15.0	1.5	21.0	1.7	5.3	2.4	0.0	1.9
Cycle Q Clear(g_c), s	16.6	22.2	6.2	28.5	15.0	1.5	23.0	1.7	5.3	4.1	0.0	1.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.66
Lane Grp Cap(c), veh/h	280	735	572	189	741	563	596	679	513	540	0	542
V/C Ratio(X)	0.07	0.79	0.30	0.30	0.60	0.08	0.69	0.09	0.26	0.11	0.00	0.10
Avail Cap(c_a), veh/h	337	858	668	235	865	657	596	679	513	540	0	542
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.1	17.7	13.3	29.9	15.7	12.0	20.6	13.5	14.6	14.7	0.0	13.6
Incr Delay (d2), s/veh	0.1	4.2	0.3	0.9	0.9	0.1	6.3	0.3	1.2	0.4	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	10.0	2.1	1.1	6.5	0.5	8.0	0.7	1.9	0.8	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	22.0	13.6	30.8	16.6	12.0	27.0	13.7	15.8	15.1	0.0	13.9
LnGrp LOS	C	C	B	C	B	B	C	B	B	B	A	B
Approach Vol, veh/h		768			547			604				114
Approach Delay, s/veh		20.1			17.7			23.2				14.6
Approach LOS		C			B			C				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		36.0		38.5		36.0		38.5				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		30.5		38.5		30.5		38.5				
Max Q Clear Time (g_c+I1), s		25.0		24.2		6.1		30.5				
Green Ext Time (p_c), s		1.6		4.9		0.6		2.5				
Intersection Summary												
HCM 6th Ctrl Delay				20.1								
HCM 6th LOS				C								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	267	530	68	120	296	81	156	429	241	95	159	138
Future Volume (vph)	267	530	68	120	296	81	156	429	241	95	159	138
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.978			0.961			0.952	
Flt Protected		0.985			0.988			0.991			0.988	
Satd. Flow (prot)	0	1499	0	0	1489	0	0	1659	0	0	1574	0
Flt Permitted		0.985			0.988			0.991			0.988	
Satd. Flow (perm)	0	1499	0	0	1489	0	0	1659	0	0	1574	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	267	530	68	120	296	81	156	429	241	95	159	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	865	0	0	497	0	0	826	0	0	392	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	139.6%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2028 FT - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↖
Traffic Volume (vph)	0	19	0	0	28	0
Future Volume (vph)	0	19	0	0	28	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.865				
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30			30
Link Distance (m)	77.1		61.5			112.7
Travel Time (s)	9.3		7.4			13.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	19	0	0	28	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	19	0	0	0	28
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	557	20	8	933	13	5
Future Volume (vph)	557	20	8	933	13	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995			0.962		
Flt Protected				0.965		
Satd. Flow (prot)	1736	0	0	1745	1620	0
Flt Permitted				0.965		
Satd. Flow (perm)	1736	0	0	1745	1620	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	557	20	8	933	13	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	577	0	0	941	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

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

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	557	20	8	933	13	5
Future Vol, veh/h	557	20	8	933	13	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	557	20	8	933	13	5













Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	577	0	1516
Stage 1	-	-	-	-	567
Stage 2	-	-	-	-	949
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	996	-	131
Stage 1	-	-	-	-	568
Stage 2	-	-	-	-	376
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	996	-	129
Mov Cap-2 Maneuver	-	-	-	-	129
Stage 1	-	-	-	-	568
Stage 2	-	-	-	-	370

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	29.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	163	-	-	996	-
HCM Lane V/C Ratio	0.11	-	-	0.008	-
HCM Control Delay (s)	29.8	-	-	8.6	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	78	720	350	83	1105	268
Future Volume (vph)	78	720	350	83	1105	268
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	300.0		135.0	300.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.207	
Satd. Flow (perm)	1433	1455	1496	1293	318	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		720		83		
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	78	720	350	83	1105	268
Shared Lane Traffic (%)						
Lane Group Flow (vph)	78	720	350	83	1105	268
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	29.7	29.7	26.0	26.0	10.7	26.0
Total Split (s)	29.7	29.7	35.3	35.3	65.0	100.3
Total Split (%)	22.8%	22.8%	27.2%	27.2%	50.0%	77.2%
Maximum Green (s)	24.0	24.0	29.6	29.6	59.3	94.6
Yellow Time (s)	4.2	4.2	4.6	4.6	4.6	4.6
All-Red Time (s)	1.5	1.5	1.1	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	17.0	17.0	13.0	13.0		13.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	15.1	15.1	29.7	29.7	94.8	94.8
Actuated g/C Ratio	0.12	0.12	0.24	0.24	0.78	0.78
v/c Ratio	0.44	0.89	0.96	0.22	1.37	0.32
Control Delay	56.4	17.6	83.9	9.7	198.0	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	17.6	83.9	9.7	198.0	5.7
LOS	E	B	F	A	F	A
Approach Delay	21.4		69.7			160.5
Approach LOS	C		E			F
Queue Length 50th (m)	17.4	0.0	79.3	0.0	~310.0	12.9
Queue Length 95th (m)	32.5	#49.4	#154.7	13.2	#447.9	34.8
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		300.0		135.0	300.0	
Base Capacity (vph)	284	865	365	378	807	843
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.83	0.96	0.22	1.37	0.32

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	121.3
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.37
Intersection Signal Delay:	102.8
Intersection LOS:	F
Intersection Capacity Utilization:	106.6%
ICU Level of Service:	G
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2028 FT - PM
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↶	↑	↷	↶	↷
Traffic Volume (veh/h)	78	720	350	83	1105	268
Future Volume (veh/h)	78	720	350	83	1105	268
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1561	1575	887
Adj Flow Rate, veh/h	78	720	350	83	1105	268
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	17	16	65
Cap, veh/h	0	0	452	390	1032	837
Arrive On Green	0.00	0.00	0.30	0.30	0.59	0.94
Sat Flow, veh/h	0		1533	1323	1500	887
Grp Volume(v), veh/h	0.0		350	83	1105	268
Grp Sat Flow(s),veh/h/ln			1533	1323	1500	887
Q Serve(g_s), s			20.9	4.7	59.3	2.5
Cycle Q Clear(g_c), s			20.9	4.7	59.3	2.5
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			452	390	1032	837
V/C Ratio(X)			0.77	0.21	1.07	0.32
Avail Cap(c_a), veh/h			452	390	1032	837
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(l)			1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			32.3	26.6	14.7	0.2
Incr Delay (d2), s/veh			12.1	1.2	48.8	1.0
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			9.7	1.7	37.6	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			44.4	27.8	63.5	1.2
LnGrp LOS			D	C	F	A
Approach Vol, veh/h			433			1373
Approach Delay, s/veh			41.2			51.4
Approach LOS			D			D
Timer - Assigned Phs	1	2				6
Phs Duration (G+Y+Rc), s	65.0	35.3				100.3
Change Period (Y+Rc), s	* 5.7	* 5.7				* 5.7
Max Green Setting (Gmax), s	* 59	* 30				* 95
Max Q Clear Time (g_c+I1), s	61.3	22.9				4.5
Green Ext Time (p_c), s	0.0	1.6				2.5

Intersection Summary

HCM 6th Ctrl Delay	48.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
2: Site Access #1/Seeley's Bay Street & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	873	2	115	632	21	5	5	120	9	5	31
Future Volume (vph)	49	873	2	115	632	21	5	5	120	9	5	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t					0.995			0.875				0.907
Fl _t Protected	0.950			0.950				0.998				0.990
Satd. Flow (prot)	1658	1679	0	1658	1563	0	0	1524	0	0	1567	0
Fl _t Permitted	0.950			0.950				0.998				0.990
Satd. Flow (perm)	1658	1679	0	1658	1563	0	0	1524	0	0	1567	0
Link Speed (k/h)		50			50			30				50
Link Distance (m)		141.7			449.3			169.6				208.1
Travel Time (s)		10.2			32.3			20.4				15.0
Confl. Peds. (#/hr)	5						5			2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	49	873	2	115	632	21	5	5	120	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	875	0	115	653	0	0	130	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0				0.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop				Stop

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	74.2%
ICU Level of Service	D
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	5.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	49	873	2	115	632	21	5	5	120	9	5	31
Future Vol, veh/h	49	873	2	115	632	21	5	5	120	9	5	31
Conflicting Peds, #/hr	5	0	0	0	0	5	0	0	0	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	873	2	115	632	21	5	5	120	9	5	31

Major/Minor	Major1		Major2		Minor1			Minor2				
Conflicting Flow All	658	0	0	875	0	0	1865	1860	876	1915	1851	650
Stage 1	-	-	-	-	-	-	972	972	-	878	878	-
Stage 2	-	-	-	-	-	-	893	888	-	1037	973	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	930	-	-	771	-	-	56	73	348	51	74	469
Stage 1	-	-	-	-	-	-	304	331	-	343	366	-
Stage 2	-	-	-	-	-	-	336	362	-	279	330	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	926	-	-	771	-	-	42	59	347	26	59	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	42	59	-	26	59	-
Stage 1	-	-	-	-	-	-	288	313	-	323	310	-
Stage 2	-	-	-	-	-	-	262	307	-	170	313	-

Approach	EB		WB		NB			SB		
HCM Control Delay, s	0.5		1.6		37.2			79.7		
HCM LOS					E			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	237	926	-	-	771	-	-	90
HCM Lane V/C Ratio	0.549	0.053	-	-	0.149	-	-	0.5
HCM Control Delay (s)	37.2	9.1	-	-	10.5	-	-	79.7
HCM Lane LOS		E	A	-	-	B	-	F
HCM 95th %tile Q(veh)	3	0.2	-	-	0.5	-	-	2.2

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	740	305	151	648	64	234	18	120	29	14	22
Future Volume (vph)	26	740	305	151	648	64	234	18	120	29	14	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		110.0	80.0		60.0	130.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.92	0.98		0.93	0.95	0.98	
Frt			0.850			0.850			0.850		0.908	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1356	0
Flt Permitted	0.272			0.206			0.734			0.746		
Satd. Flow (perm)	354	1456	1297	284	1470	1200	1135	1456	1215	1102	1356	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			305			64			120			22
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	26	740	305	151	648	64	234	18	120	29	14	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	740	305	151	648	64	234	18	120	29	36	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	49.0	49.0	49.0	49.0	49.0	49.0	31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	61.3%	61.3%	61.3%	61.3%	61.3%	61.3%	38.8%	38.8%	38.8%	38.8%	38.8%	38.8%
Maximum Green (s)	43.5	43.5	43.5	43.5	43.5	43.5	25.5	25.5	25.5	25.5	25.5	25.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	43.0	43.0	43.0	43.0	43.0	43.0	25.5	25.5	25.5	25.5	25.5	25.5
Actuated g/C Ratio	0.54	0.54	0.54	0.54	0.54	0.54	0.32	0.32	0.32	0.32	0.32	0.32
v/c Ratio	0.14	0.94	0.36	0.99	0.82	0.09	0.64	0.04	0.25	0.08	0.08	0.08
Control Delay	11.2	39.7	2.5	93.9	25.5	2.9	33.0	19.2	5.8	20.0	11.7	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	39.7	2.5	93.9	25.5	2.9	33.0	19.2	5.8	20.0	11.7	11.7
LOS	B	D	A	F	C	A	C	B	A	B	B	B
Approach Delay		28.4			35.8			23.6				15.4
Approach LOS		C			D			C				B
Queue Length 50th (m)	1.8	97.1	0.0	20.8	74.6	0.0	30.2	1.9	0.0	3.1	1.5	1.5
Queue Length 95th (m)	6.0	#173.5	10.4	#58.1	#140.1	5.0	#54.9	6.3	10.8	8.7	7.6	7.6
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		110.0	80.0		60.0	130.0		75.0	60.0		
Base Capacity (vph)	193	796	847	155	804	685	363	467	471	353	450	450
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.93	0.36	0.97	0.81	0.09	0.64	0.04	0.25	0.08	0.08	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 79.5
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.99

HCM 6th Signalized Intersection Summary
3: River Mist Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	740	305	151	648	64	234	18	120	29	14	22
Future Volume (veh/h)	26	740	305	151	648	64	234	18	120	29	14	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.96		0.93	0.96		0.93
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	26	740	305	151	648	64	234	18	120	29	14	22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	250	902	709	175	910	697	483	529	395	461	165	259
Arrive On Green	0.54	0.54	0.54	0.54	0.54	0.54	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	626	1660	1303	480	1674	1282	1311	1660	1239	1192	516	811
Grp Volume(v), veh/h	26	740	305	151	648	64	234	18	120	29	0	36
Grp Sat Flow(s),veh/h/ln	626	1660	1303	480	1674	1282	1311	1660	1239	1192	0	1327
Q Serve(g_s), s	2.6	29.4	11.2	14.1	23.1	1.9	12.2	0.6	5.8	1.4	0.0	1.5
Cycle Q Clear(g_c), s	25.6	29.4	11.2	43.5	23.1	1.9	13.7	0.6	5.8	2.0	0.0	1.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	250	902	709	175	910	697	483	529	395	461	0	423
V/C Ratio(X)	0.10	0.82	0.43	0.86	0.71	0.09	0.48	0.03	0.30	0.06	0.00	0.09
Avail Cap(c_a), veh/h	250	902	709	175	910	697	483	529	395	461	0	423
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.1	15.0	10.9	36.0	13.6	8.8	23.9	18.8	20.6	19.4	0.0	19.1
Incr Delay (d2), s/veh	0.2	6.1	0.4	33.3	2.6	0.1	3.5	0.1	2.0	0.3	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	13.5	3.6	4.8	10.2	0.6	4.6	0.3	2.1	0.5	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.3	21.1	11.3	69.4	16.2	8.8	27.3	18.9	22.5	19.7	0.0	19.5
LnGrp LOS	C	C	B	E	B	A	C	B	C	B	A	B
Approach Vol, veh/h		1071			863			372				65
Approach Delay, s/veh		18.4			25.0			25.4				19.6
Approach LOS		B			C			C				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		31.0		49.0		31.0		49.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		25.5		43.5		25.5		43.5				
Max Q Clear Time (g_c+I1), s		15.7		31.4		4.0		45.5				
Green Ext Time (p_c), s		1.3		6.2		0.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				21.9								
HCM 6th LOS				C								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	218	411	202	166	426	95	122	336	142	75	551	378
Future Volume (vph)	218	411	202	166	426	95	122	336	142	75	551	378
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.967			0.981			0.968			0.949	
Flt Protected		0.987			0.988			0.990			0.996	
Satd. Flow (prot)	0	1437	0	0	1496	0	0	1669	0	0	1582	0
Flt Permitted		0.987			0.988			0.990			0.996	
Satd. Flow (perm)	0	1437	0	0	1496	0	0	1669	0	0	1582	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	218	411	202	166	426	95	122	336	142	75	551	378
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	831	0	0	687	0	0	600	0	0	1004	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	141.8%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2028 FT - PM
3831 Cambrian Road



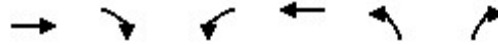
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↘
Traffic Volume (vph)	0	38	0	0	52	0
Future Volume (vph)	0	38	0	0	52	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.865				
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30			30
Link Distance (m)	77.1		61.5			112.7
Travel Time (s)	9.3		7.4			13.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	38	0	0	52	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	0	0	0	52
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 6.7%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	870	47	5	632	31	7
Future Volume (vph)	870	47	5	632	31	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993			0.975		
Flt Protected				0.961		
Satd. Flow (prot)	1733	0	0	1745	1635	0
Flt Permitted				0.961		
Satd. Flow (perm)	1733	0	0	1745	1635	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	870	47	5	632	31	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	917	0	0	637	38	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.3%
Analysis Period (min)	15
	ICU Level of Service B

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	870	47	5	632	31	7
Future Vol, veh/h	870	47	5	632	31	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	870	47	5	632	31	7













Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	917	0	1536
Stage 1	-	-	-	-	894
Stage 2	-	-	-	-	642
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	744	-	128
Stage 1	-	-	-	-	399
Stage 2	-	-	-	-	524
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	744	-	127
Mov Cap-2 Maneuver	-	-	-	-	127
Stage 1	-	-	-	-	399
Stage 2	-	-	-	-	519

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	38.7
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	144	-	-	744	-
HCM Lane V/C Ratio	0.264	-	-	0.007	-
HCM Control Delay (s)	38.7	-	-	9.9	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	78	720	350	83	1105	268
Future Volume (vph)	78	720	350	83	1105	268
Ideal Flow (vphp)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	295.0		135.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.193	
Satd. Flow (perm)	1433	1455	1496	1293	296	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		720		83		
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	78	720	350	83	1105	268
Shared Lane Traffic (%)						
Lane Group Flow (vph)	78	720	350	83	1105	268
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	29.7	29.7	26.0	26.0	11.0	26.0
Total Split (s)	29.7	29.7	34.3	34.3	66.0	100.3
Total Split (%)	22.8%	22.8%	26.4%	26.4%	50.8%	77.2%
Maximum Green (s)	24.0	24.0	28.6	28.6	60.3	94.6
Yellow Time (s)	4.2	4.2	4.6	4.6	4.6	4.6
All-Red Time (s)	1.5	1.5	1.1	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	17.0	17.0	13.0	13.0		13.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	15.1	15.1	28.7	28.7	94.8	94.8
Actuated g/C Ratio	0.12	0.12	0.24	0.24	0.78	0.78
v/c Ratio	0.44	0.89	0.99	0.22	1.36	0.32
Control Delay	56.4	17.6	92.8	10.0	195.9	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	17.6	92.8	10.0	195.9	5.7
LOS	E	B	F	A	F	A
Approach Delay	21.4		77.0			158.7
Approach LOS	C		E			F
Queue Length 50th (m)	17.4	0.0	80.2	0.0	~311.5	12.9
Queue Length 95th (m)	32.5	#49.4	#157.8	13.3	#449.4	34.8
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		295.0		135.0	275.0	
Base Capacity (vph)	284	865	353	369	810	843
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.83	0.99	0.22	1.36	0.32

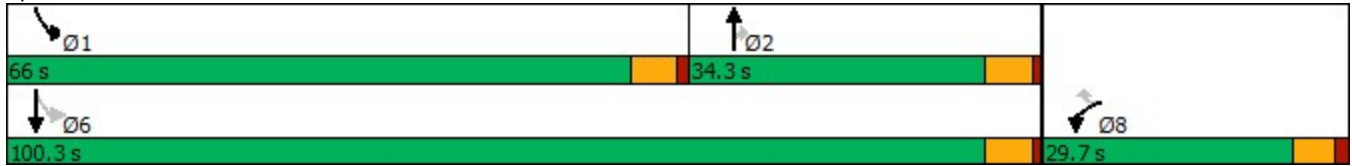
Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	121.3
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.36
Intersection Signal Delay:	103.0
Intersection LOS:	F
Intersection Capacity Utilization:	106.6%
ICU Level of Service:	G
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 1: Borrisokane Road & Cambrian Road

2028 FT - SAT
 3831 Cambrian Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↶	↕	↷	↶	↷
Traffic Volume (veh/h)	78	720	350	83	1105	268
Future Volume (veh/h)	78	720	350	83	1105	268
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1547	1744	1533	1561	1575	887
Adj Flow Rate, veh/h	78	720	350	83	1105	268
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	18	4	19	17	16	65
Cap, veh/h	0	0	437	377	1036	837
Arrive On Green	0.00	0.00	0.29	0.29	0.60	0.94
Sat Flow, veh/h	0		1533	1323	1500	887
Grp Volume(v), veh/h	0.0		350	83	1105	268
Grp Sat Flow(s),veh/h/ln			1533	1323	1500	887
Q Serve(g_s), s			21.2	4.8	60.3	2.5
Cycle Q Clear(g_c), s			21.2	4.8	60.3	2.5
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			437	377	1036	837
V/C Ratio(X)			0.80	0.22	1.07	0.32
Avail Cap(c_a), veh/h			437	377	1036	837
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(l)			1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh			33.2	27.3	14.6	0.2
Incr Delay (d2), s/veh			14.3	1.3	47.4	1.0
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			10.1	1.8	37.3	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			47.5	28.7	62.0	1.2
LnGrp LOS			D	C	F	A
Approach Vol, veh/h			433			1373
Approach Delay, s/veh			43.9			50.2
Approach LOS			D			D
Timer - Assigned Phs	1	2				6
Phs Duration (G+Y+Rc), s	66.0	34.3				100.3
Change Period (Y+Rc), s	* 5.7	* 5.7				* 5.7
Max Green Setting (Gmax), s	* 60	* 29				* 95
Max Q Clear Time (g_c+I1), s	62.3	23.2				4.5
Green Ext Time (p_c), s	0.0	1.3				2.5

Intersection Summary

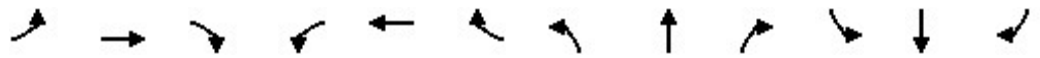
HCM 6th Ctrl Delay	48.7
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2028 FT - SAT
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	880	3	134	636	21	6	5	137	9	5	31
Future Volume (vph)	49	880	3	134	636	21	6	5	137	9	5	31
Ideal Flow (vphp)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.999			0.995			0.875			0.907	
Fl _t Protected	0.950			0.950				0.998			0.990	
Satd. Flow (prot)	1658	1678	0	1658	1563	0	0	1524	0	0	1567	0
Fl _t Permitted	0.950			0.950				0.998			0.990	
Satd. Flow (perm)	1658	1678	0	1658	1563	0	0	1524	0	0	1567	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	5						5			2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	49	880	3	134	636	21	6	5	137	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	883	0	134	657	0	0	148	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 77.0% ICU Level of Service D
 Analysis Period (min) 15

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	49	880	3	134	636	21	6	5	137	9	5	31
Future Vol, veh/h	49	880	3	134	636	21	6	5	137	9	5	31
Conflicting Peds, #/hr	5	0	0	0	0	5	0	0	0	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	880	3	134	636	21	6	5	137	9	5	31

Major/Minor	Major1		Major2		Minor1			Minor2				
Conflicting Flow All	662	0	0	883	0	0	1915	1910	884	1973	1901	654
Stage 1	-	-	-	-	-	-	980	980	-	920	920	-
Stage 2	-	-	-	-	-	-	935	930	-	1053	981	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	927	-	-	766	-	-	51	68	344	47	69	467
Stage 1	-	-	-	-	-	-	301	328	-	325	350	-
Stage 2	-	-	-	-	-	-	318	346	-	274	328	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	923	-	-	766	-	-	37	53	343	22	54	464
Mov Cap-2 Maneuver	-	-	-	-	-	-	37	53	-	22	54	-
Stage 1	-	-	-	-	-	-	285	311	-	306	287	-
Stage 2	-	-	-	-	-	-	240	284	-	153	311	-

Approach	EB		WB		NB			SB		
HCM Control Delay, s	0.5		1.8		46.8			98.8		
HCM LOS					E			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	226	923	-	-	766	-	-	79
HCM Lane V/C Ratio	0.655	0.053	-	-	0.175	-	-	0.57
HCM Control Delay (s)	46.8	9.1	-	-	10.7	-	-	98.8
HCM Lane LOS	E	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	4	0.2	-	-	0.6	-	-	2.5

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	757	310	151	665	64	239	18	120	29	14	24
Future Volume (vph)	28	757	310	151	665	64	239	18	120	29	14	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		110.0	80.0		60.0	130.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.97	1.00		0.91	0.98		0.92	0.94	0.97	
Frt			0.850			0.850			0.850		0.905	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1456	1309	1478	1350	0
Flt Permitted	0.274			0.211			0.732			0.746		
Satd. Flow (perm)	356	1456	1296	291	1470	1189	1129	1456	1207	1095	1350	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			310			64			120			24
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	28	757	310	151	665	64	239	18	120	29	14	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	757	310	151	665	64	239	18	120	29	38	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	60.0	60.0	60.0	60.0	60.0	60.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	66.7%	66.7%	66.7%	66.7%	66.7%	66.7%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	54.5	54.5	54.5	54.5	54.5	54.5	24.5	24.5	24.5	24.5	24.5	24.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	46.3	46.3	46.3	46.3	46.3	46.3	24.8	24.8	24.8	24.8	24.8	24.8
Actuated g/C Ratio	0.56	0.56	0.56	0.56	0.56	0.56	0.30	0.30	0.30	0.30	0.30	0.30
v/c Ratio	0.14	0.92	0.36	0.93	0.80	0.09	0.70	0.04	0.27	0.09	0.09	0.09
Control Delay	9.8	34.8	2.2	74.1	22.7	2.4	41.4	24.3	7.0	25.0	14.2	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	34.8	2.2	74.1	22.7	2.4	41.4	24.3	7.0	25.0	14.2	14.2
LOS	A	C	A	E	C	A	D	C	A	C	B	B
Approach Delay		25.0			30.1			29.6				18.9
Approach LOS		C			C			C				B
Queue Length 50th (m)	1.9	98.2	0.0	19.6	75.7	0.0	36.4	2.2	0.0	3.6	1.7	1.7
Queue Length 95th (m)	5.9	#181.0	9.3	#59.2	122.3	4.5	#75.0	7.3	12.4	10.4	9.0	9.0
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		110.0	80.0		60.0	130.0		75.0	60.0		
Base Capacity (vph)	239	977	972	195	986	819	340	439	448	330	424	424
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.77	0.32	0.77	0.67	0.08	0.70	0.04	0.27	0.09	0.09	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 82.3
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.93

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road

Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 85.3%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



HCM 6th Signalized Intersection Summary
 3: River Mist Road & Cambrian Road

2028 FT - SAT
 3831 Cambrian Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	757	310	151	665	64	239	18	120	29	14	24
Future Volume (veh/h)	28	757	310	151	665	64	239	18	120	29	14	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.95		0.92	0.95		0.92
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1505	1660	1772	1575	1674	1744	1772	1660	1744	1758	1716	1716
Adj Flow Rate, veh/h	28	757	310	151	665	64	239	18	120	29	14	24
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	10	2	16	9	4	2	10	4	3	6	6
Cap, veh/h	293	1005	792	209	1013	779	405	452	334	393	132	226
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	617	1660	1308	470	1674	1287	1299	1660	1228	1184	484	829
Grp Volume(v), veh/h	28	757	310	151	665	64	239	18	120	29	0	38
Grp Sat Flow(s),veh/h/ln	617	1660	1308	470	1674	1287	1299	1660	1228	1184	0	1313
Q Serve(g_s), s	2.8	29.8	11.0	24.7	23.4	1.9	15.2	0.7	7.1	1.7	0.0	2.0
Cycle Q Clear(g_c), s	26.2	29.8	11.0	54.5	23.4	1.9	17.2	0.7	7.1	2.4	0.0	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.63
Lane Grp Cap(c), veh/h	293	1005	792	209	1013	779	405	452	334	393	0	357
V/C Ratio(X)	0.10	0.75	0.39	0.72	0.66	0.08	0.59	0.04	0.36	0.07	0.00	0.11
Avail Cap(c_a), veh/h	293	1005	792	209	1013	779	405	452	334	393	0	357
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.2	12.9	9.2	34.4	11.6	7.4	31.0	24.1	26.4	25.0	0.0	24.5
Incr Delay (d2), s/veh	0.1	3.3	0.3	11.5	1.5	0.0	6.2	0.2	3.0	0.4	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	13.0	3.6	4.3	10.0	0.6	5.8	0.3	2.5	0.6	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	16.1	9.5	46.0	13.2	7.4	37.1	24.3	29.4	25.3	0.0	25.1
LnGrp LOS	C	B	A	D	B	A	D	C	C	C	A	C
Approach Vol, veh/h		1095			880			377				67
Approach Delay, s/veh		14.4			18.4			34.1				25.2
Approach LOS		B			B			C				C
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		60.0		30.0		60.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		24.5		54.5		24.5		54.5				
Max Q Clear Time (g_c+I1), s		19.2		31.8		4.4		56.5				
Green Ext Time (p_c), s		0.9		9.2		0.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				19.2								
HCM 6th LOS				B								

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	224	413	212	166	428	95	129	331	142	75	543	387
Future Volume (vph)	224	413	212	166	428	95	129	331	142	75	543	387
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.966			0.981			0.968			0.948	
Flt Protected		0.987			0.988			0.989			0.996	
Satd. Flow (prot)	0	1434	0	0	1496	0	0	1667	0	0	1580	0
Flt Permitted		0.987			0.988			0.989			0.996	
Satd. Flow (perm)	0	1434	0	0	1496	0	0	1667	0	0	1580	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	224	413	212	166	428	95	129	331	142	75	543	387
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	849	0	0	689	0	0	602	0	0	1005	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	146.0%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2028 FT - SAT
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↘
Traffic Volume (vph)	0	40	0	0	48	0
Future Volume (vph)	0	40	0	0	48	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	40	0	0	48	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	40	0	0	0	48
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2028 FT - SAT
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	875	47	6	636	32	9
Future Volume (vph)	875	47	6	636	32	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993			0.970		
Flt Protected				0.962		
Satd. Flow (prot)	1733	0	0	1745	1628	0
Flt Permitted				0.962		
Satd. Flow (perm)	1733	0	0	1745	1628	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	875	47	6	636	32	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	922	0	0	642	41	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.6%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	875	47	6	636	32	9
Future Vol, veh/h	875	47	6	636	32	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	875	47	6	636	32	9

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	922	0	1547
Stage 1	-	-	-	-	899
Stage 2	-	-	-	-	648
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	741	-	126
Stage 1	-	-	-	-	397
Stage 2	-	-	-	-	521
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	741	-	124
Mov Cap-2 Maneuver	-	-	-	-	124
Stage 1	-	-	-	-	397
Stage 2	-	-	-	-	514

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	39.7
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	144	-	-	741	-
HCM Lane V/C Ratio	0.285	-	-	0.008	-
HCM Control Delay (s)	39.7	-	-	9.9	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0	-

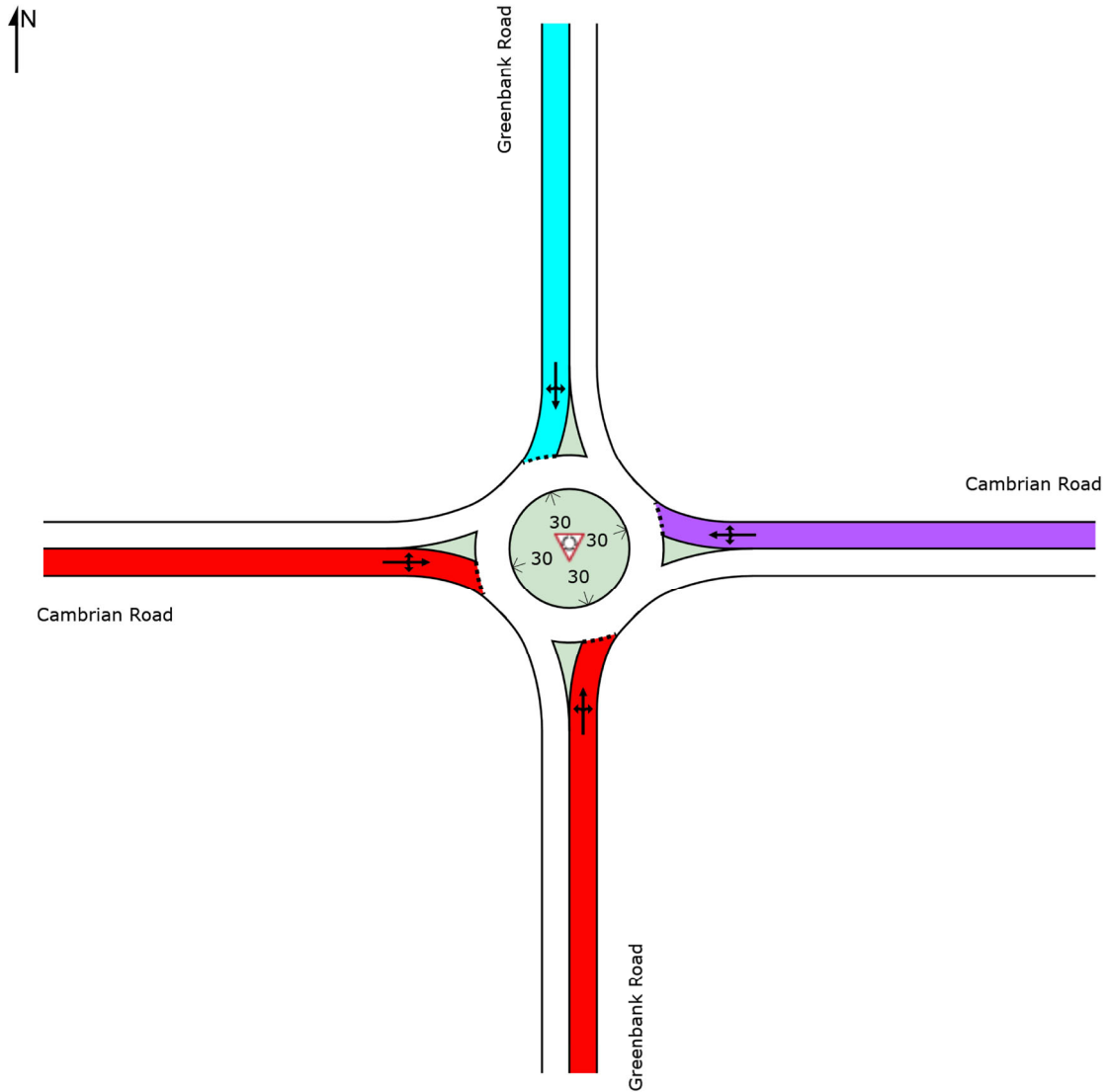
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

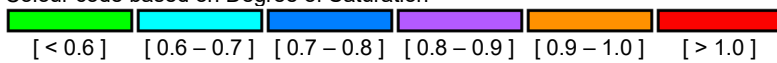
 Site: 101 [Cambrian and Greenbank 2028 FT AM]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	1.66	0.81	0.60	1.15	1.66



Colour code based on Degree of Saturation



DELAY (CONTROL)

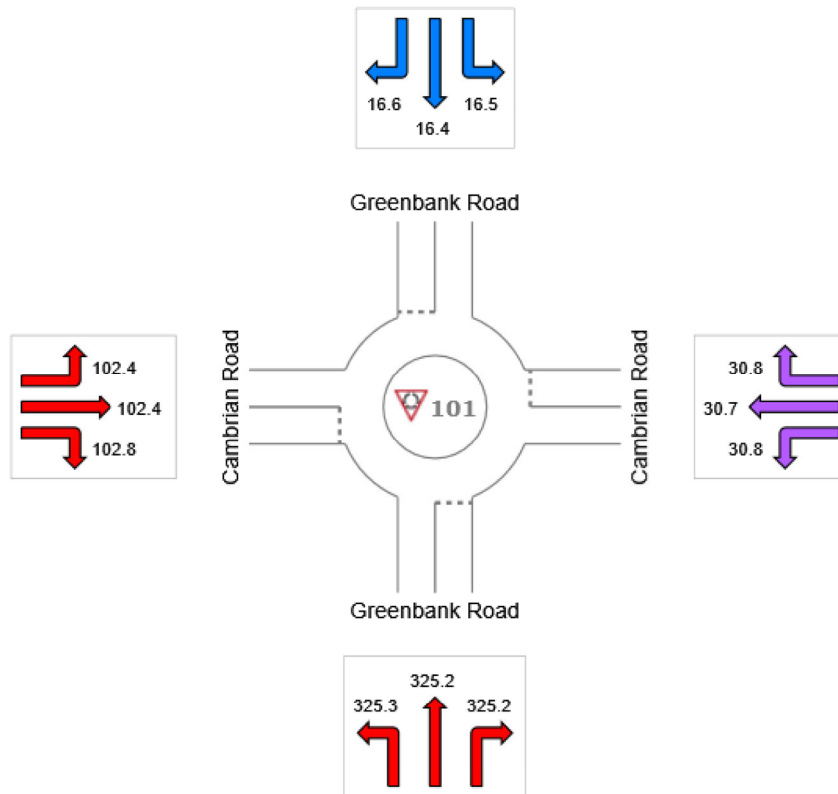
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Cambrian and Greenbank 2028 FT AM]**

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	325.2	30.7	16.5	102.5	146.9
LOS	F	D	C	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

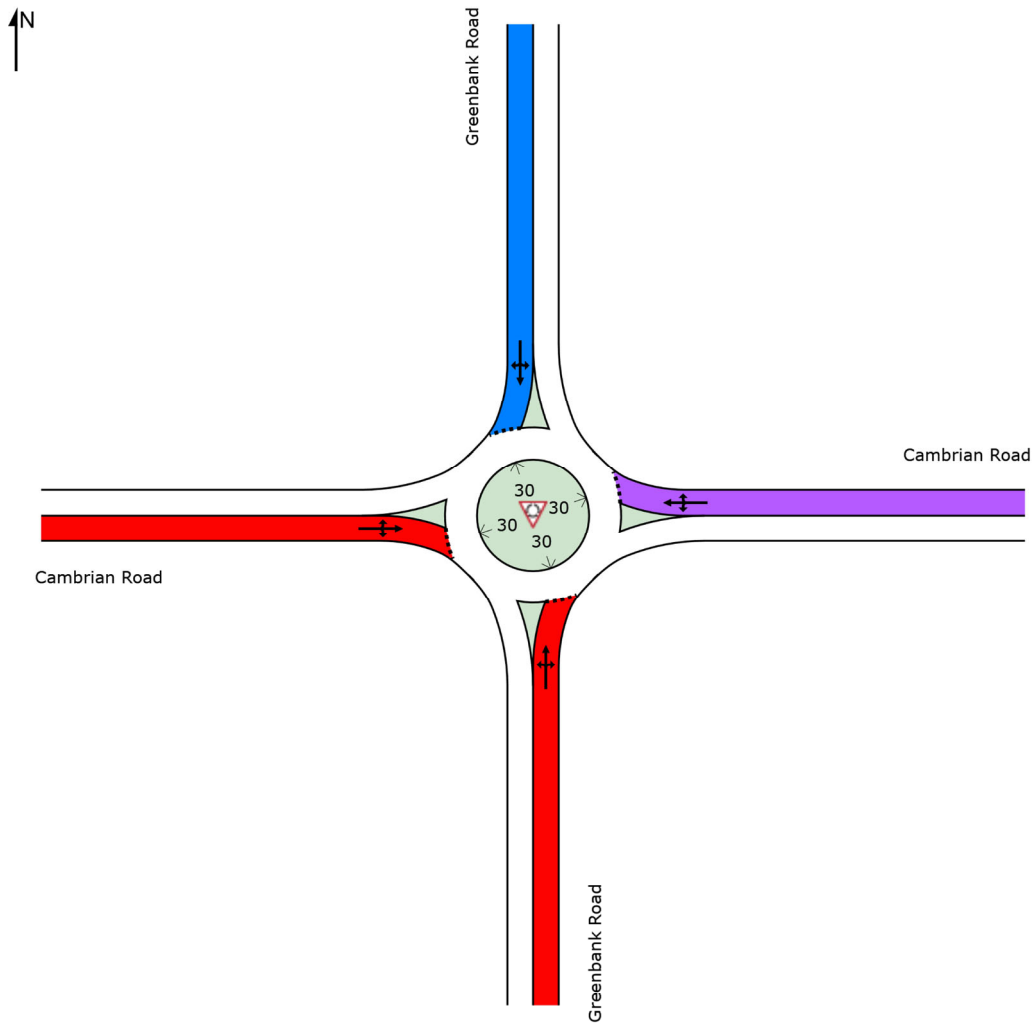
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2028 FT AM]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	C	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FT AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	156	3.0	1.657	325.3	LOS F	115.5	823.3	1.00	5.16	14.71	4.4
2	T1	429	2.0	1.657	325.2	LOS F	115.5	823.3	1.00	5.16	14.71	4.6
3	R2	241	2.0	1.657	325.2	LOS F	115.5	823.3	1.00	5.16	14.71	3.6
Approach		826	2.2	1.657	325.2	LOS F	115.5	823.3	1.00	5.16	14.71	4.2
East: Cambrian Road												
4	L2	120	6.0	0.815	30.8	LOS D	10.3	74.6	0.88	1.40	2.21	22.6
5	T1	296	2.0	0.815	30.7	LOS D	10.3	74.6	0.88	1.40	2.21	25.0
6	R2	81	8.0	0.815	30.8	LOS D	10.3	74.6	0.88	1.40	2.21	25.2
Approach		497	3.9	0.815	30.7	LOS D	10.3	74.6	0.88	1.40	2.21	24.5
North: Greenbank Road												
7	L2	95	5.0	0.601	16.5	LOS C	4.6	34.2	0.72	0.91	1.25	34.5
8	T1	159	4.0	0.601	16.4	LOS C	4.6	34.2	0.72	0.91	1.25	34.6
9	R2	138	10.0	0.601	16.6	LOS C	4.6	34.2	0.72	0.91	1.25	34.6
Approach		392	6.4	0.601	16.5	LOS C	4.6	34.2	0.72	0.91	1.25	34.6
West: Cambrian Road												
10	L2	267	3.0	1.147	102.4	LOS F	63.5	460.1	1.00	3.34	6.14	14.0
11	T1	530	3.0	1.147	102.4	LOS F	63.5	460.1	1.00	3.34	6.14	11.7
12	R2	68	17.0	1.147	102.8	LOS F	63.5	460.1	1.00	3.34	6.14	11.5
Approach		865	4.1	1.147	102.5	LOS F	63.5	460.1	1.00	3.34	6.14	12.4
All Vehicles		2580	3.8	1.657	146.9	LOS F	115.5	823.3	0.93	3.18	7.38	9.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Organisation: CGH TRANSPORTATION | Processed: August 11, 2020 9:46:46 AM

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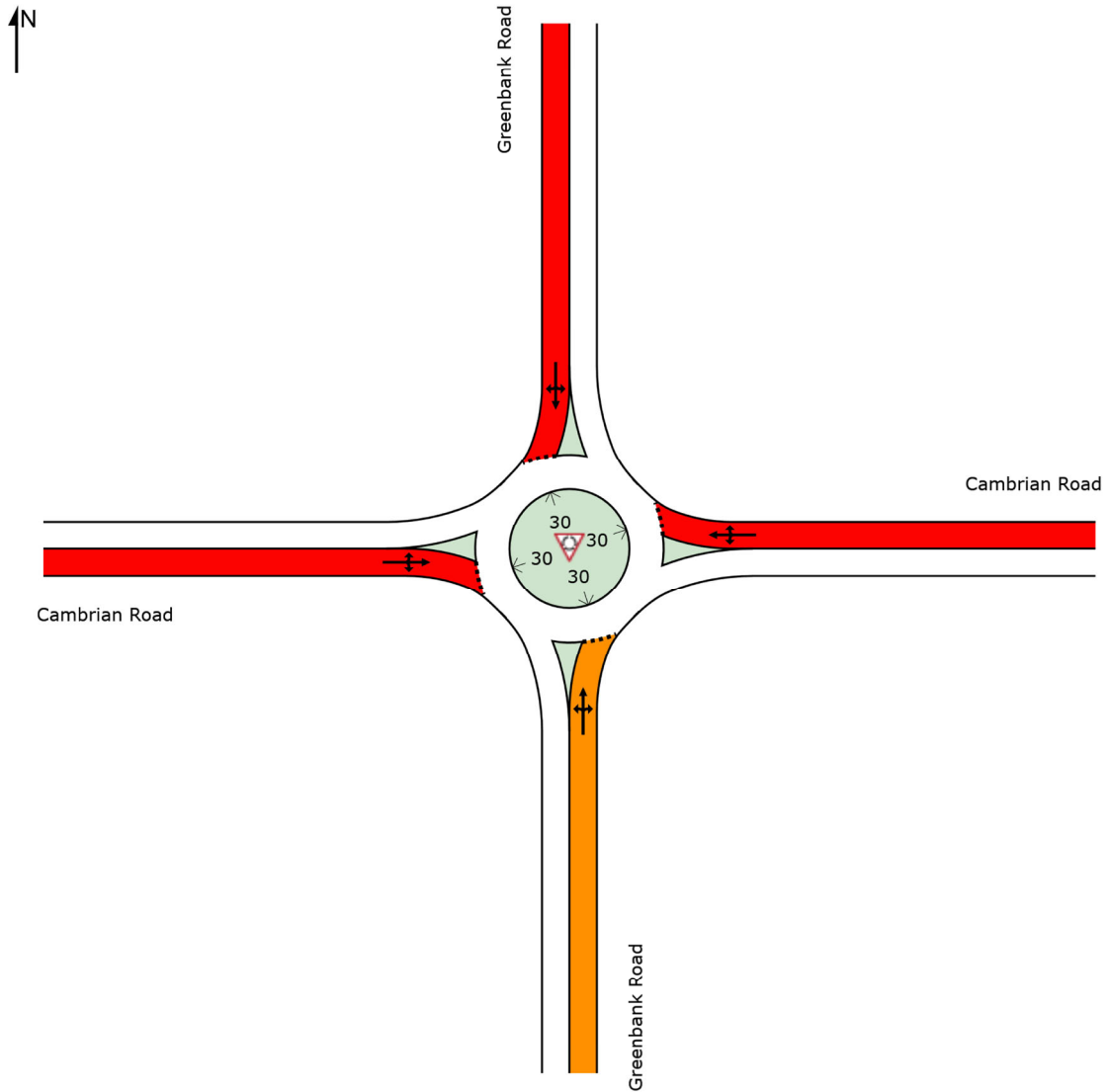
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

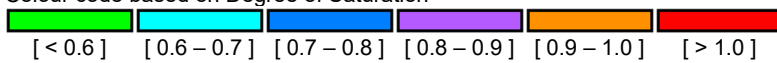
 Site: 101 [Cambrian and Greenbank 2028 FT PM]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.93	1.16	1.72	1.25	1.72



Colour code based on Degree of Saturation



DELAY (CONTROL)

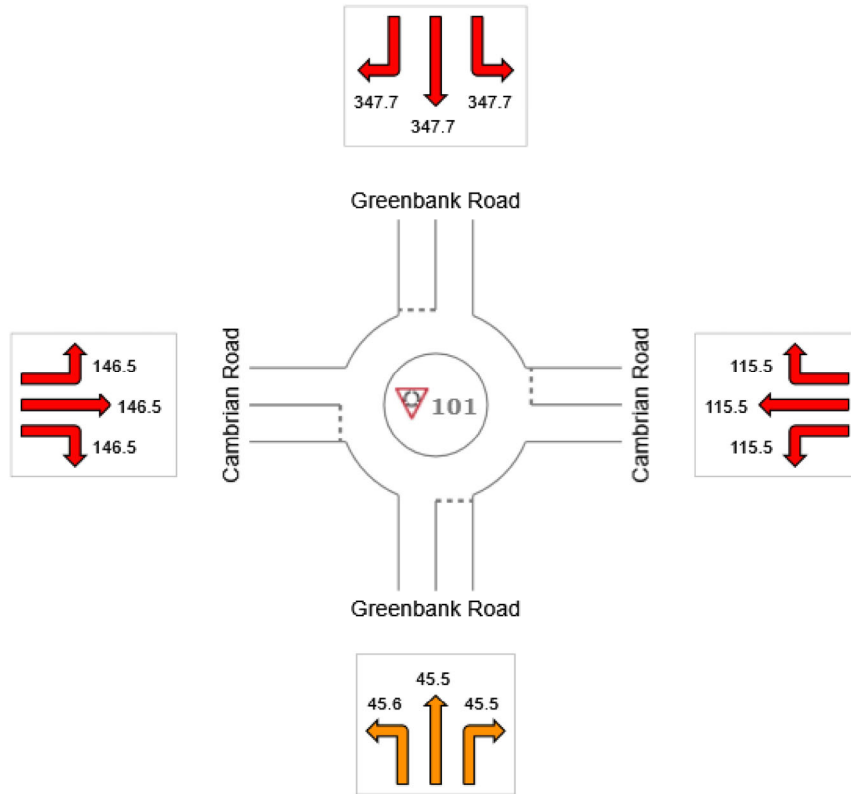
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2028 FT PM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	45.5	115.5	347.7	146.5	185.0
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

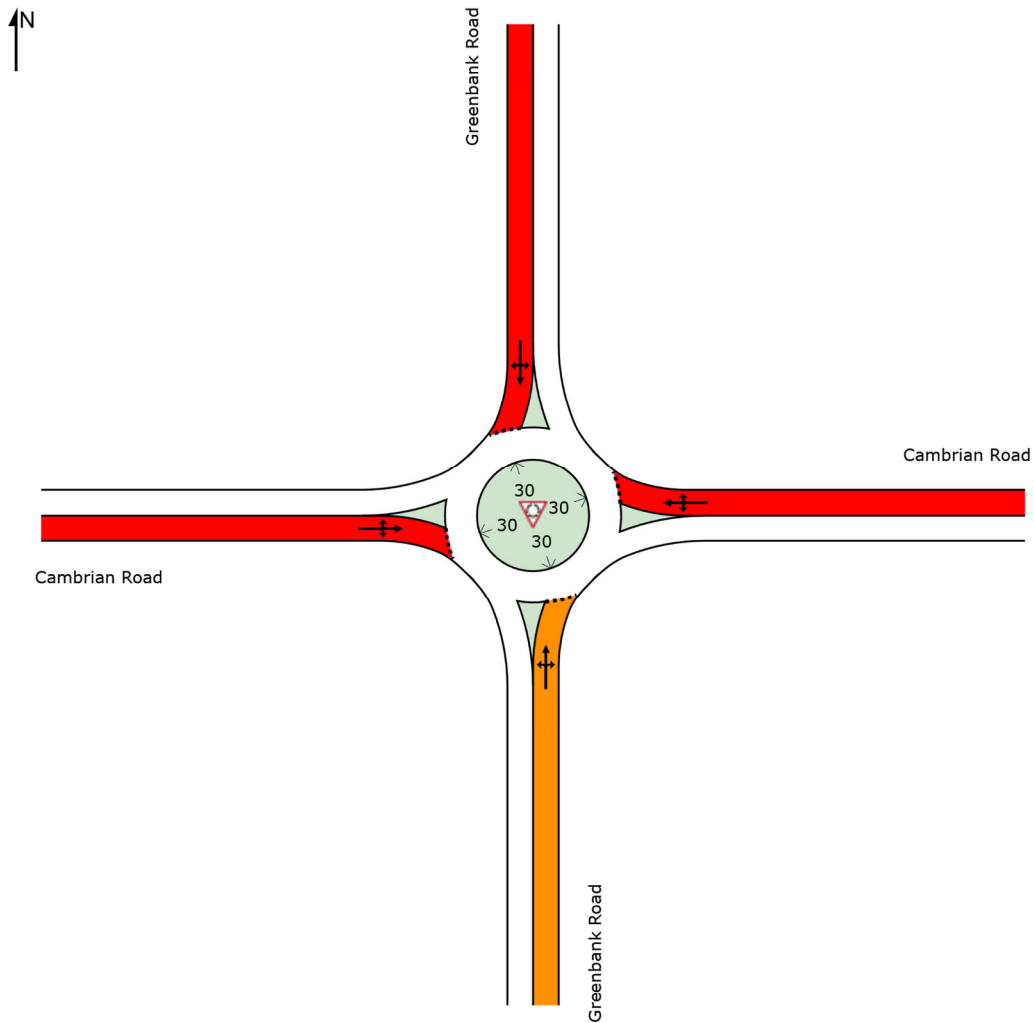
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2028 FT PM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FT PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	122	8.0	0.931	45.6	LOS E	19.5	139.9	1.00	1.79	3.27	20.7
2	T1	336	2.0	0.931	45.5	LOS E	19.5	139.9	1.00	1.79	3.27	21.5
3	R2	142	2.0	0.931	45.5	LOS E	19.5	139.9	1.00	1.79	3.27	17.4
Approach		600	3.2	0.931	45.5	LOS E	19.5	139.9	1.00	1.79	3.27	20.4
East: Cambrian Road												
4	L2	166	2.0	1.164	115.5	LOS F	48.0	341.7	1.00	3.34	7.19	9.0
5	T1	426	2.0	1.164	115.5	LOS F	48.0	341.7	1.00	3.34	7.19	10.7
6	R2	95	2.0	1.164	115.5	LOS F	48.0	341.7	1.00	3.34	7.19	11.0
Approach		687	2.0	1.164	115.5	LOS F	48.0	341.7	1.00	3.34	7.19	10.3
North: Greenbank Road												
7	L2	75	2.0	1.716	347.7	LOS F	147.2	1048.2	1.00	5.65	15.24	4.3
8	T1	551	2.0	1.716	347.7	LOS F	147.2	1048.2	1.00	5.65	15.24	4.3
9	R2	378	2.0	1.716	347.7	LOS F	147.2	1048.2	1.00	5.65	15.24	5.0
Approach		1004	2.0	1.716	347.7	LOS F	147.2	1048.2	1.00	5.65	15.24	4.5
West: Cambrian Road												
10	L2	218	2.0	1.252	146.5	LOS F	72.7	519.4	1.00	4.05	8.47	10.6
11	T1	411	2.0	1.252	146.5	LOS F	72.7	519.4	1.00	4.05	8.47	8.8
12	R2	202	4.0	1.252	146.5	LOS F	72.7	519.4	1.00	4.05	8.47	8.7
Approach		831	2.5	1.252	146.5	LOS F	72.7	519.4	1.00	4.05	8.47	9.2
All Vehicles		3122	2.4	1.716	185.0	LOS F	147.2	1048.2	1.00	3.97	9.37	7.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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Project: C:\Users\RobinMarina\CGH TRANSPORTATION\CGH Working - Documents\Projects\2019-54 Metro Greenbank Road\DATA\Sidra\Cambrian Greenbank.sip8

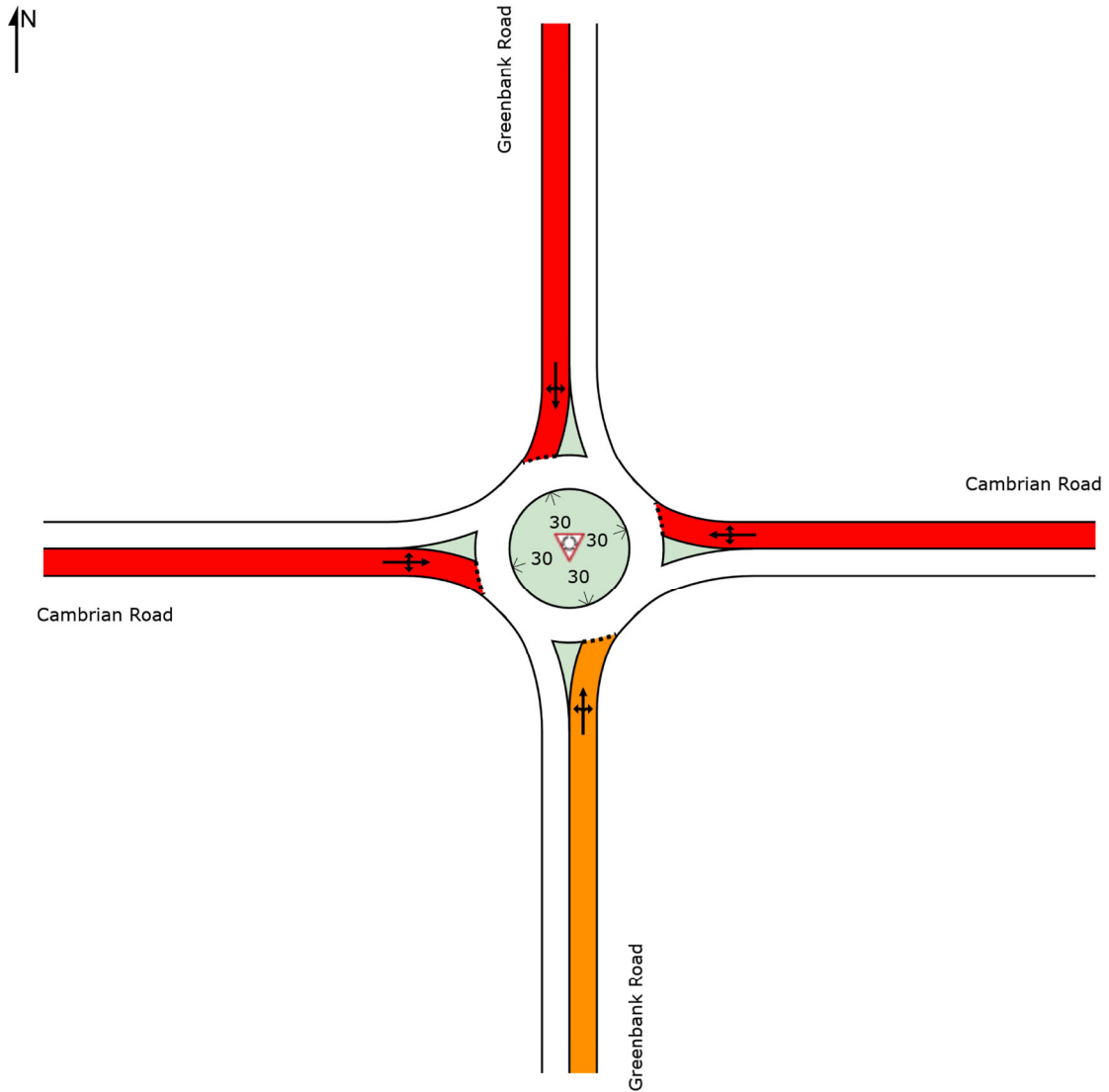
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

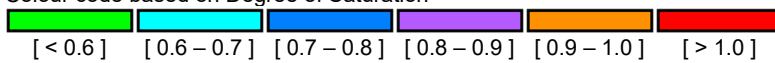
 Site: 101 [Cambrian and Greenbank 2028 FT Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.93	1.17	1.73	1.27	1.73



Colour code based on Degree of Saturation



DELAY (CONTROL)

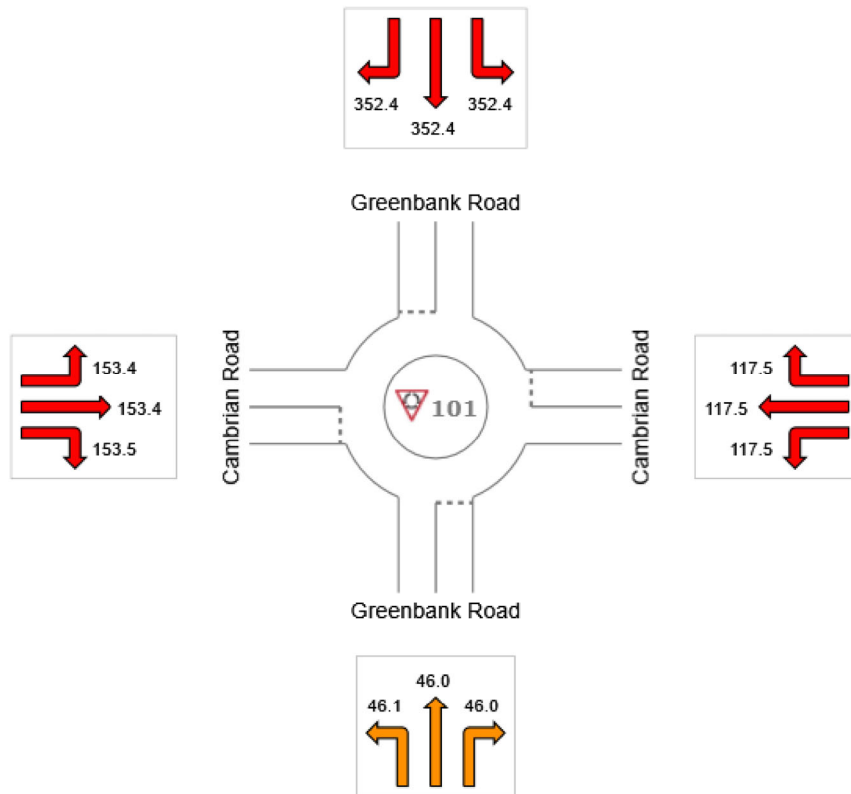
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2028 FT Sat]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	46.0	117.5	352.4	153.4	188.6
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

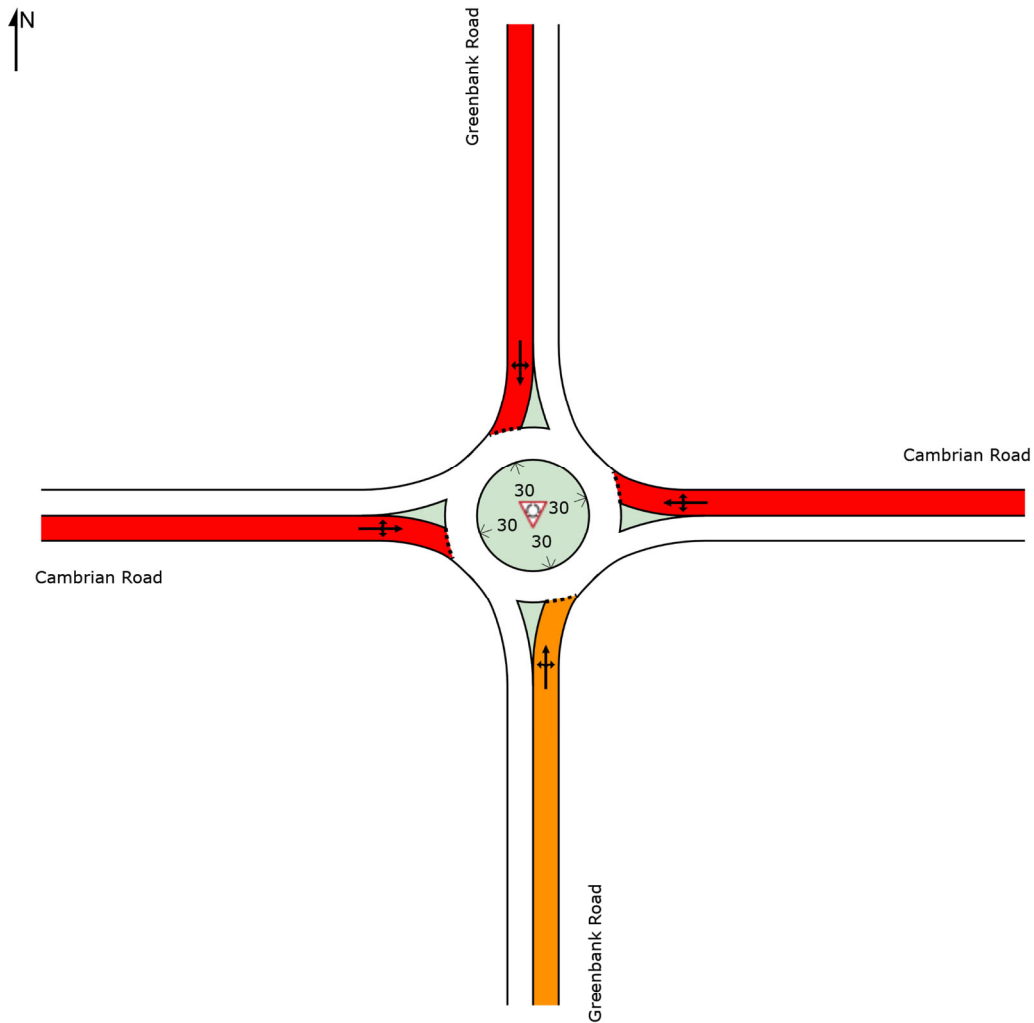
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2028 FT Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FT Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	129	8.0	0.934	46.1	LOS E	19.7	142.1	1.00	1.80	3.31	20.5
2	T1	331	2.0	0.934	46.0	LOS E	19.7	142.1	1.00	1.80	3.31	21.4
3	R2	142	2.0	0.934	46.0	LOS E	19.7	142.1	1.00	1.80	3.31	17.2
Approach		602	3.3	0.934	46.0	LOS E	19.7	142.1	1.00	1.80	3.31	20.3
East: Cambrian Road												
4	L2	166	2.0	1.169	117.5	LOS F	48.6	346.0	1.00	3.37	7.29	8.9
5	T1	426	2.0	1.169	117.5	LOS F	48.6	346.0	1.00	3.37	7.29	10.5
6	R2	95	2.0	1.169	117.5	LOS F	48.6	346.0	1.00	3.37	7.29	10.9
Approach		687	2.0	1.169	117.5	LOS F	48.6	346.0	1.00	3.37	7.29	10.2
North: Greenbank Road												
7	L2	75	2.0	1.727	352.4	LOS F	148.4	1056.4	1.00	5.68	15.37	4.2
8	T1	543	2.0	1.727	352.4	LOS F	148.4	1056.4	1.00	5.68	15.37	4.2
9	R2	387	2.0	1.727	352.4	LOS F	148.4	1056.4	1.00	5.68	15.37	4.9
Approach		1005	2.0	1.727	352.4	LOS F	148.4	1056.4	1.00	5.68	15.37	4.5
West: Cambrian Road												
10	L2	224	2.0	1.270	153.4	LOS F	76.9	549.5	1.00	4.18	8.73	10.2
11	T1	413	2.0	1.270	153.4	LOS F	76.9	549.5	1.00	4.18	8.73	8.4
12	R2	212	4.0	1.270	153.5	LOS F	76.9	549.5	1.00	4.18	8.73	8.4
Approach		849	2.5	1.270	153.4	LOS F	76.9	549.5	1.00	4.18	8.73	8.9
All Vehicles		3143	2.4	1.727	188.6	LOS F	148.4	1056.4	1.00	4.02	9.50	7.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

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.

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\Cambrian Greenbank.sip8

Appendix T

Painted Left-Turn Lanes Conceptual Drawing



Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS: Draft			

CGH Transportation
 13 Markham Ave
 Ottawa, ON
 K2G 3Z1
 (343) 999-9117

CLIENT: Metro Ontario Inc.
 25 Vickers Road Building A, 2nd Floor
 Etobicoke, ON
 M9B 1C1

ARCHITECT: RLA Architecture
 56 Beech Street
 Ottawa, ON
 K1S3J6

SITE: Cambrian Road at
 Seeley's Bay Road

TITLE: Left-Turn Lanes

SCALE AT A3: scale	DATE: 2020-08-19	DRAWN: JK	CHECKED: MC
PROJECT NO: 2019-54	DRAWING NO: 001	REVISION: -	