

# **Appendix B**

**Transportation Problem and Opportunity** 

• B.1 Traffic Impact Study

# A=COM

**B.1 Traffic Impact Study** 





Region of Peel

# Mississauga Road Class EA Study (North of Bovaird Drive West to Mayfield Road) Needs Assessment and Traffic Performance

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#### **Project Number:**

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#### Date:

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Revision #	Revised By	Date	Issue / Revision Description
1	Winnie Lai	September 1, 2009	Integrating Roundabout Analysis Results into Report
2	Winnie Lai	October 8, 2009	Addressing comments from Region of Peel
3	Francis Li	December 24, 2009	Integrating updated Roundabout Analysis Results into Report
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7	Khalid Khan	December 19, 2012	Addressing comments received from Region of Peel
8	Jessica Mollo	April 4, 2013	Addressing comments from Region of Peel

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### 1. Introduction

The Region of Peel has retained AECOM Canada Ltd. to undertake a Municipal Class Environmental Assessment (EA), Schedule "C" for Mississauga Road between Mayfield Road and Bovaird Drive West, in the City of Brampton. Figure 1.1 shows the study area along the Mississauga Road corridor from Mayfield Road to Bovaird Drive West.

The Long Range Transportation Plan (Final Report) prepared by the Region of Peel in September 2005 identified road improvements in the Region of Peel which are required to address transportation challenges over the next 10, 15 and 25 years. These road improvements were based on projections for future population growth between the years 2001 to 2031 and development within the existing urban boundary. For the section of Mississauga Road studied in the EA, the Long Range Transportation Plan identified the need to widen Mississauga Road from its current two lane section to a four lane section by the year 2021.

In addition to the Region of Peel Long Range Transportation Plan report, there have been a number of other studies undertaken by the City of Brampton which also indicates the need to provide additional road capacity in the north/south direction in order to accommodate future growth in this area. The expansion of the City of Brampton's urban boundary to include the development area referred to as the Northwest Brampton Area, will potentially reach a population of approximately 76,000 people and approximately 19,300 employment<sup>1</sup>, and there will be further need for additional transportation capacity in this corridor to accommodate the future growth.

In 2004, the City of Brampton undertook a Transportation and Transit Master Plan (TTMP) which identified the need to widen the section of Mississauga Road within the study area to 6 lanes by 2031. The City of Brampton, in July 2009, approved and adopted an update to the TTMP. The updated City of Brampton TTMP followed the Municipal Class EA process for Phase 1 and Phase 2, establishing the need and justification for the projects proposed in its study. The City's updated TTMP had taken into consideration a number of changes to the road network and has resulted in changes to the recommended implementation plan. Changes pertaining to our study area are: widening of Mississauga Road to 4 lanes from Bovaird Drive West to Mayfield Road by 2016, 6 lanes from Bovaird Drive West to Sandalwood Parkway by 2021 and 6 lanes from Sandalwood Parkway to Mayfield Road beyond 2031.

A Development Charges study undertaken by the Region of Peel in 2007, reviewed road improvements required to support growth in the area. This study indicated that the section of Mississauga Road between Mayfield Drive and Bovaird Drive West will require widening to 6 lanes by 2023.

This report documents the traffic volumes in the study area under existing (2008) and future conditions, to the horizon years 2018 and 2031. It identifies any need for additional road improvements required along Mississauga Road, between Bovaird Drive West and Mayfield Road to accommodate anticipated future traffic volumes associated with growth in the area.

The City of Brampton undertook a Transportation Master Plan (TMP) for the Mount Pleasant Secondary Plan Area in July 2009. The Mount Pleasant Secondary Plan Area TMP Study addressed the transportation requirements for the Mount Pleasant Secondary Plan area by ensuring that both the road network and the community-friendly transit service are planned and implemented in conjunction with one another. The City of Brampton has identified the need for growth in Northwest Brampton in a phased manner. The first phase of future urban expansion will be in the Mount Pleasant Community, it is forecasted that this community will reach a population of more than 40,000 people and employment of over 3,000 employees, prior to year 2021.

<sup>1.</sup> Northwest Brampton Transportation Infrastructure Review Updated Report, iTrans Consulting Inc., April 2005, Pg 24.

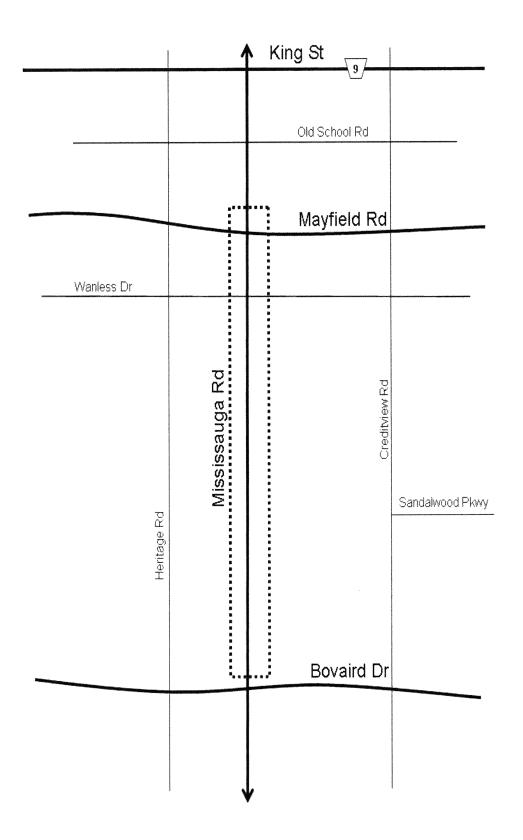


Figure 1.1 Study Area

The existing transportation system of roads, transit and associated pedestrian linkages and pathways are insufficient to meet the demands of this expanding community.<sup>2</sup> The TMP, under Alternative 2, identified a preliminary planning transportation network for the Mount Pleasant Secondary Plan Area to address the deficiency within the current network. Improvements, under Alternative 2 comprise of:<sup>3</sup>

- Creditview Road as a Minor Arterial Road (36.0 m ROW) with a south re-alignment (Bovaird Drive West-Mayfield Road) and widened to four lanes.
- Four-lane extension of Sandalwood Parkway as a Minor Arterial Road (36.0 m ROW) from Creditview Road to Mississauga Road.
- Required additional (beyond programmed improvements) arterial road improvements in the Study Area, including:
  - Bovaird Drive West widened to six lanes (east of Mississauga Road)
  - Wanless Drive widened to four lanes (Chinguacousy Road Mississauga Road)
  - Mayfield Road widened to six lanes (McLaughlin Road Chinguacousy Road)
  - Mayfield Road widened to four lanes (Chinguacousy Road Creditview Road)
  - Mississauga Road widened to six lanes (Bovaird Drive West Sandalwood Parkway)
  - a north-south collector road (i.e., the TOD corridor), comprising four lanes (26.0 m ROW)
     (Creditview Road Mayfield Road)
  - a grid network of collector roads in the Mount Pleasant Secondary Plan area

Similarly, as recommended in the Halton-Peel Region Boundary Area Transportation Study (HPBATS) Amended Final Report, Mississauga Road should be widened from two to six lanes from 407 ETR to Sandalwood Parkway and from two to four lanes up to Mayfield Road. It is also recognized that the development of the HPBATS network and the Halton-Peel Freeway will have opportunities to connect with the proposed GTA West Corridor. Schedules regarding GTA West Corridor are being planned by the Ontario Ministry of Transportation.

<sup>2.</sup> Mount Pleasant Secondary Plan Area Transportation Master Plan, City of Brampton, July 2009, Pg. ii

<sup>3.</sup> Mount Pleasant Secondary Plan Area Transportation Master Plan, City of Brampton, July 2009, Pg. 155

# 2. Study Area Context

#### 2.1 Study Area

The section of Mississauga Road in the study area is located in the northwest quadrant of the City of Brampton and is bounded by Mayfield Road to the north and Bovaird Drive West to the south. The lands immediately surrounding the study area are rural in nature and are currently used for agricultural purposes. Further to the east are new urban subdivisions, with Brampton Bricks on Wanless Drive, east of Mississauga Road. Future land uses in the area has been identified as the Northwest Brampton Area to be comprised of medium and low density residential developments and employment.

Needs Assessment and Traffic Performance

North of Bovaird Drive West, bisecting Mississauga Road is the Canadian National (CNR) Halton subdivision. GO Transit operates its Georgetown service on this line with a GO station located on the north side of Bovaird Drive West, east of Mississauga Road.

#### 2.2 Population and Employment Growth

The Province of Ontario's Growth Plan for the Greater Golden Horseshoe (2006) identifies a significant amount of growth in population and employment in the Region of Peel between the years 2001 and 2031. **Table 2.1** summarizes the amount of growth expected in the Region, as identified in Places to Grow (2006).

Table 2.1 Future Growth in Region of Peel

	Region of Peel							
Year	Pop	ulation	Employment					
	Amount	Annual Growth Rate (%)	Amount	Annual Growth Rate (%)				
2001-2011	1,030,000-1,320,000 2.5		530,000-730,000	3.3				
2011-2021	1,320,000-1,490,000	1.2	730,000-820,000	1.2				
2021-2031	1,490,000-1,640,000	1.0	820,000-870,000	0.6				

Source: Provincial Places to Grow (2006) Schedule 3

Within the Region of Peel, the City of Brampton has established future population and employment projections for its local municipality for time periods between 2001 and 2031. **Table 2.2** summarizes the anticipated future growth in the City, as established by the City of Brampton in its Growth Management Program (2009).

Table 2.2 Future Growth in the City of Brampton

V	City of B	Brampton
Year	Population	Employment
1996	274,000	104,000
2001	325,000	134,000
2011	510,000	182,000
2021	646,000	274,000
2031	738.000 (758.310)*	319,000 (320,000)*

Source: Brampton Growth Management Program, Development Outlook Report Part

1: Report 2009, Table 1

\* Source: City of Brampton Transportation and Transit Master Plan Sustainable Update

- Final Draft Report, July 2009

In the immediate area surrounding the study area is the Northwest Brampton Study Area with projected population and employment forecasts as outlined in **Table 2.3**. The boundary of the Northwest Brampton area is bounded by Mayfield Road to the north, Winston Churchill Road to the west, the Credit River to the south and Mississauga Road, Creditview Road and McLaughlin Road to the east. The Northwest Brampton study area is to be comprised of the Mount Pleasant Community (SP 51) located on the east side of Mississauga Road, north of Bovaird Drive West (approximately 51% of potential development) and the remainder of the Northwest Brampton (SP 52 and SP 53) is located on the west side of Mississauga Road with a majority of the area north of Bovaird Drive. A small area of the Northwest Brampton area is located on the west side of Mississauga Road, south of Bovaird Drive.

Figure 2.1 illustrates the northwest Brampton area and limits of the secondary plan.



Figure 2.1 Northwest Brampton Area

As shown in **Table 2.3** there is a significant amount of population and employment planned for the immediate area, with approximately 41% of the expected population and employment occurring by 2021 and 100% by the year 2031. Within the 2021 time horizon, approximately 66% of the Mount Pleasant community is anticipated to be built out. The City of Brampton anticipated that 50% of the Mount Pleasant population and employment will be built-out by 2018. For the balance of the Northwest Brampton area, 1% and 6% of population and employment are expected to be built-out by 2018 respectively.

Table 2.3 Population and Employment in Northwest Brampton

	Mount Pleasant		Remainder of No	rthwest Brampton	Total Northwest Brampton		
Year	Population	Employment	oloyment Population En		Population	Employment	
2006	230	10	240	80	470	90	
2011	1,390	30	250	80	1,640	110	
2021	33,960	2,090	4,250	4,250 3,390		5,480	
2031	51,740	2,740	38,250	17,650	85,990	20,390	

Sources: City of Brampton – Preliminary Population and Employment Forecast. Appendix III, June 2008, approved by Council to use in respond to the Provincial Growth Plan.

#### 2.3 Background Studies

Past studies referenced for background information include the following reports:

- City of Brampton Transportation and Transit Master Plan, June 2004
- Region of Peel, Long Range Transportation Plan Final Report, September 2005
- Mississauga Road Class EA Study Needs Assessment and Safety Performance Final Report, iTrans, August 2005
- City of Brampton Northwest Brampton Transportation Infrastructure Review, Updated Report, iTrans Consulting, April 2005
- City of Brampton Growth Management Program, Development Outlook Report 2006
- City of Brampton, Mount Pleasant Community Transportation Strategy and Creditview Road and Sandalwood Parkway Transportation Corridors Class Environmental Assessment Study, Phase 2 Final Report, Entra Consultants, September 2007
- Region of Peel Development Charges Study, 2007
- City of Brampton Transportation and Transit Master Plan (TTMP) Draft Final Report, July 2009
- City of Brampton, Mount Pleasant Secondary Plan Area Transportation Master Plan, July 2009
- "Traffic Impact Study Osmington Regional Centre Mississauga Road and Bovaird Drive West Brampton", by Read, Voorhees & Associates Ltd., February 2010
- Halton-Peel Boundary Area Transportation Study (HPBATS), Amended Final Report, May 2010
- "Mount Pleasant Block 51-1 Transportation Study and Collector Road Environmental Assessment Study" by BA Group Transportation Consultants, August 2011

## 3. Transportation Analysis

#### 3.1 Road Network

**Mississauga Road** is a major north-south arterial road under the jurisdiction of the Region of Peel. It is currently a two lane road with a rural cross-section and has a posted speed limit of 80km/hour.

**Bovaird Drive West** intersects Mississauga Road at the south end of the EA study limit. Bovaird Drive West is under the jurisdiction of the Region of Peel and is currently a two lane arterial road and is signal controlled. Existing EA study for the Bovaird Drive West (Lake Louise/Worthington Avenue to 1.45 km west of Heritage Road) is anticipated to be completed by the end of 2012.

**Wanless Drive** is a two lane rural road that runs east-west intersecting Mississauga Road. The intersection of Mississauga Road and Wanless Drive is unsignalized. The City of Brampton has jurisdiction over Wanless Drive. EA study for the Wanless Drive has been completed by the City of Brampton.

**Mayfield Road** is located at the north end of the EA study limit and is a two lane rural arterial road which runs east-west. Mayfield Road is under the jurisdiction of the Region of Peel and intersects Mississauga Road at a signalized intersection. EA study for Mayfield Road is upcoming in 2013. The existing lane configuration along Mississauga Road is illustrated in **Figure 3.1.** 

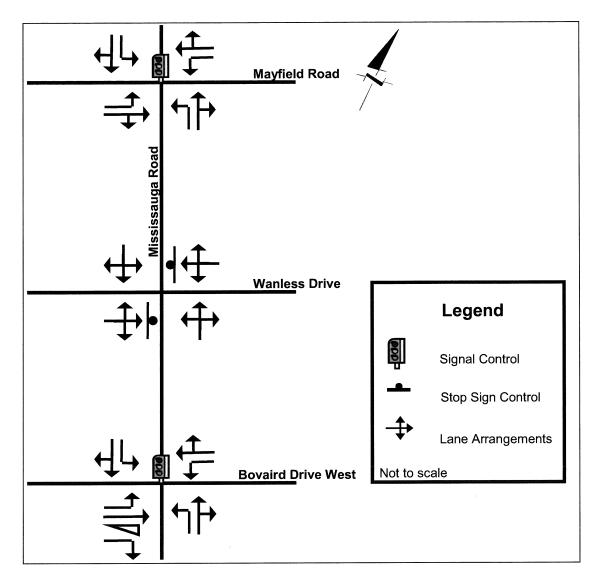


Figure 3.1 Existing Lane Configuration

#### 3.2 Non-Auto Network

At the present time, local transit does not service the study area. The closest transit stop is the GO Transit on-street bus stop located on Bovaird Drive West immediately west of the intersection with Mississauga Road. The current infrastructure along Mississauga Road, within the study area, does not provide for any pedestrian or cycling facilities.

Under the City of Brampton's Revised Pathways Routing Plan (2006), Class I Pathway will be located along Mississauga Road within the City's boundary as 3.0 m wide multi-use trail.

#### 3.3 Existing 2008 Traffic Conditions

The Region of Peel provided AECOM with historical and available existing traffic data for the study area. The Region of Peel provided updated turning movement counts reflecting September 2008 conditions for the intersection of Mississauga Road at Bovaird Drive West, Mississauga Road at Mayfield Road, and Mississauga Road at Wanless Drive.

While it is recognized that the intersection of Mississauga Road and Bovaird Drive West is not within the Study area, it has been included in the analysis as the operations of the north leg of the intersection could influence the lane recommendations on Mississauga Road.

**Figure 3.2** illustrates the intersection turning movement volumes for the existing conditions (2008), while the existing turning movement volumes and signal timing plans are attached in **Appendix A**.

Along Mississauga Road, there is a significant peak directional flow with the dominant movement in the southbound direction during the AM Peak hour and in the reverse, northbound direction, in the PM peak hour. At the point just north of Bovaird Drive West, the peak directional traffic flow is in the southbound direction during the AM Peak carrying in the order of 540 vehicle trips. During the PM peak hour, the peak traffic flow is in the northbound direction and carries approximately 490 vehicle trips during the PM peak hour. In the north-bound direction, the AM volume is approximately 150 vehicle trips, while during the PM, the south-bound direction is approximately 220 vehicle trips.

#### 3.3.1 Truck Traffic

The 24 hour classification counts for the study area (2.1 km north of Bovaird Drive West) were done on September 18, 2008. **Table 3.1** provides a summary of the truck traffic on Mississauga Road for both the northbound and southbound directions.

**Figure 3.3** illustrates that the percentage of medium and heavy truck traffic along this section of Mississauga Road peaks near 3 AM, gradually tapering off until 7 AM and starts to increase and peaks again at mid-day, but at a lower value than the 3 AM percentage. After mid-day, medium and heavy truck traffic taper off again to a low of 1% at 8 PM. The average of medium and heavy truck percentage throughout the day along Mississauga Road is approximately 10%.

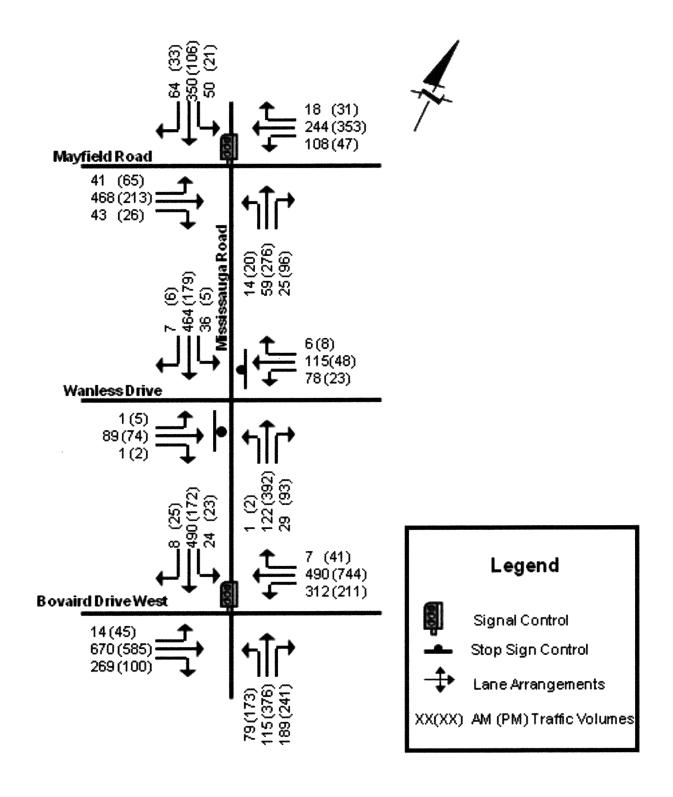


Figure 3.2 Existing 2008 Turning Movement Volumes

Table 3.1 Medium and Heavy Truck Percentages

Time	Medium and Heavy Vehicles	Medium and Heavy Vehicles Percentage
12:00 AM	0	0%
01:00 AM	1	6%
02:00 AM	1	8%
03:00 AM	4	27%
04:00 AM	6	18%
05:00 AM	21	14%
06:00 AM	55	13%
07:00 AM	62	9%
08:00 AM	67	11%
09:00 AM	44	11%
10:00 AM	47	15%
11:00 AM	37	14%
12:00 PM	47	16%
01:00 PM	37	12%
02:00 PM	37	11%
03:00 PM	52	11%
04:00 PM	46	8%
05:00 PM	41	6%
06:00 PM	30	6%
07:00 PM	16	5%
08:00 PM	3	1%
09:00 PM	8	4%
10:00 PM	4	4%
11:00 PM	4	6%
Total	670	10%

Source: Region of Peel -24 Hour Classification Counts 2.1 km north of Bovaird Drive West (September 18, 2008)

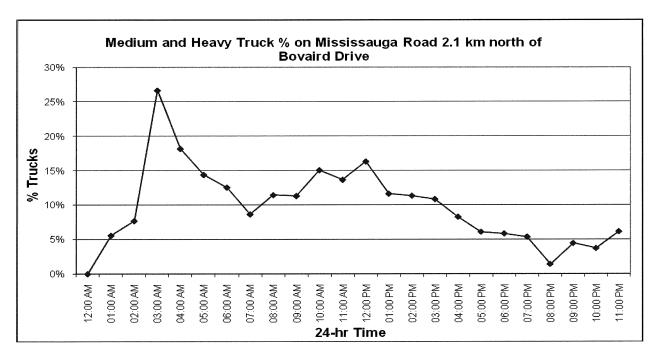


Figure 3.3 Existing 2008 Medium and Heavy Truck % on Mississauga Road 2.1 km north of Boyaird Drive West

#### 3.3.2 Level of Service Definition

Key indicators are used to identify the operating conditions of a corridor. The capacity of a road facility reflects its ability to accommodate a moving stream of vehicles and represents the maximum number of vehicles that can reasonably be expected to pass a given point during a specified period.

Level of service (LOS) describes the range of operating conditions of a roadway through intersections including:

- · Speed and travel time;
- Freedom to manoeuvre (density);
- Traffic interruptions;
- · Comfort;
- · Convenience; and
- Safety.

Six levels of LOS are defined using the letters "A" to "F". **Table 3.2** describes the LOS for signalized and unsignalized intersections considering the average delay in seconds per vehicle.

Table 3.2 Level of Service Description

		Signalized Intersection	Unsignalized Intersection
	LOS Description	Average Delay per Vehicle (s/veh)	Average Delay per Vehicle (s/veh)
Α	Vehicles rarely need to stop. Excellent conditions.	≤ 10	≤ 10
В	Some traffic stopped. Very good conditions.	> 10 – 20	> 10 – 15
С	Greater percentage of traffic is stopped. An occasional signal cycle "fails". Good conditions.	> 20 – 35	> 15 – 25
D	Most vehicles breakdown in operation. Long vehicular queues. Greater number of signal cycle "failures". Fair conditions.	> 35 – 55	> 25 – 35
E	Noticeable breakdown in operation. Long vehicular queues. Poor conditions.	> 55 – 80	> 35 – 50
F	Traffic arrivals exceed capacity. Severe congestion. Extremely poor conditions.	> 80	> 50

#### 3.3.3 Link/Midblock Analysis

Key indicators are used to identify the operating conditions of a corridor. The capacity of a facility reflects its ability to accommodate a moving stream of vehicles and represents the maximum number of vehicles that can reasonably be expected to pass a given point during a specified period.

The Region of Peel identifies that the Level of Service for corridor operation should be based on a desired service volume of 900 vehicles per lane for a major arterial road. For a two lane road, the desired capacity is 1800 and 2700 for a three lane road. **Table 3.3** outlines the current operating condition of the corridor.

		Desired Capacity	AM Peak Hour				PM Peak Hour			
Road Section	No. of Lanes per Direction		NB		SB		NB		SB	
			Vol	v/c	Vol	v/c	Vol	v/c	Vol	v/c
Bovaird Drive West to Wanless Drive	1	900	150	0.17	540	0.60	490	0.54	220	0.24
Wanless Drive to Mayfield Road	1	900	130	0.14	500	0.56	405	0.45	190	0.21

Table 3.3 Existing 2008 -Corridor Volumes and Levels of Service

Results from the assessment indicate that the current two lane section of Mississauga Road can accommodate existing traffic volumes.

#### 3.3.4 Intersection Analysis

Based on the 2008 intersection traffic volumes, operations of the key intersections within the study area were investigated using Synchro 7.0 (Build 739) software, in accordance with the methodology outlined in the Transportation Research Board's "Highway Capacity Manual, HCM 2000". The capacity analysis results, including the existing v/c ratios, level of service (LOS) and delays for the signalized and unsignalized intersections are summarized in **Table 3.4** and **Table 3.5**, respectively. The level of service definitions are provided in **Appendix B**. Detailed capacity analysis worksheets for the existing conditions are attached in **Appendix C**. The intersection calculations undertaken for this assignment were undertaken in accordance with the most up to date Region of Peel's Guidelines for using Synchro, (Version 5.0) Revision 1.2 dated March 2003. The parameters for the analysis were based on requirements set out in the guidelines and as requested by the Region (e.g., lost time adjustment parameter).

Weekday Intersection Approach/Movement AM PM LOS v/c Delay LOS V/C Delay Left 21.3 С 0.04 31.9 С 0.40 42.9 0.83 D 0.89 D EΒ Thru 46.9 С 0.23 0.1 0.07 Right 25.0 Α 84.4 F 0.98 46.3 D 0.81 Left WB С 0.82 Thru/Right 14.8 В 0.47 30.6 Mississauga Road/Bovaird Drive West С Left 46.1 D 0.55 25.2 0.42 NΒ 0.81 30.8 С 0.42 39.3 D Thru/Right С Left 23.3 С 0.09 26.4 0.18 SB Ε 26.7 С 0.35 Thru/Right 60.2 0.94 **Overall Intersection** 43.4 0.91 34.6 0.82

Table 3.4 Existing (2008) Traffic Capacity Analysis-Signalized Intersections

		Left	21.3	С	0.11	35.9	D	0.42
	EB	Thru/Right	32.2	С	0.70	33.0	С	0.40
	WB	Left	35.7	D	0.61	30.7	С	0.20
		Thru/Right	24.6	С	0.38	39.1	D	0.66
Mississauga Road/Mayfield Road		Left	8.6	Α	0.04	4.5	Α	0.03
Road/Mayrield Road	NB	Thru/Right	7.9	Α	0.09	5.7	Α	0.34
	0.5	Left	14.2	В	0.08	8.5	Α	0.04
	SB	Thru/Right	18.9	В	0.44	9.1	Α	0.13
	Overa	II Intersection	24.9	C	0.55	23.5	C	0.45

Table 3.5 Existing (2008) Traffic Capacity Analysis-Unsignalized Intersections

		and the second s	Weekday						
Intersection	Approach/Movement		<b>李金多</b> 泰	AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c	
	EB	Left/Thru/Right	18.5	С	0.25	17.3	С	0.22	
	WB	Left/Thru/Right	31.8	D	0.61	17.0	С	0.21	
Mississauga Road/Wanless Drive	NB	Left/Thru/Right	0.1	Α	0.00	0.0	Α	0.00	
Road/Waniess Drive	SB	Left/Thru/Right	0.8	Α	0.03	0.3	Α	0.00	
	Overall Intersection		8.9	A	0.61	3.4	A	0.22	

Under the existing traffic conditions, the signalized intersection of Mississauga Road/ Mayfield Road operates at good level of service during both weekday AM and PM peak hours. However, the intersection of Mississauga Road/Bovaird Drive West, experiences some delays and poor levels of services due to the heavy westbound/eastbound traffic along Bovaird Drive West. In particular, the eastbound through and westbound left-turn movements operate at capacity during the AM peak hour, while all movements are operating below capacity during the PM peak hour.

The unsignalized intersection of Mississauga Road/ Wanless Drive currently operates well as indicated by the average delay, with residual capacity for each movement during both weekdays AM and PM peak hours.

#### 3.4 Collision Data Review

Reported collision data from years 2002 to 2009 was obtained from the Region of Peel and was summarized in the **Table 3.6** below. Detailed summary of the collision records are attached in **Appendix D**. A total of 149 reported collisions occurred within the study limit during 2002 to 2009. The majority of collisions (approximately 62%) occurred at / near Mississauga Road/ Bovaird Drive West intersection. Over 80% of the collisions involved only property damage. None of the collisions reported resulted in fatal injuries. Rear end collisions and angle (T-bone) collisions at the intersections were most prevalent.

The majority of the collisions (approximately 65%) occurred after year 2007, among which, over 50% of the collisions occurred between May to October. The majority of the collisions occurred during the daylight under clear environmental conditions. Furthermore, approximately 50% of the collisions occurred during either the AM (6:00 a.m. to 9:00 a.m.) or

PM (3:00 p.m. to 6:00 p.m.) peak periods, when the heaviest traffic volumes happen along the road (more than 1,000 two-way vehicles per hour during the PM peak hour).

Table 3.6 Collision Summary along Mississauga Road (2002-2009)

Location	Fatal	Injury	PDO	Other	Total	Collision Types
Mississauga Rd./ Bovaird Drive West	0	14	77	2	93	Approaching (2) Sideswipe (7) Turning Movement (15) Rear End (38) Angle (19) Other (12)
Mississauga Rd. Between Bovaird Drive West & Wanless Dr.	0	7	24	0	31	Approaching (1) Turning Movement (2) Rear End (17) Angle (1) Sideswipe (1) Other (9)
Mississauga Rd./ Wanless Dr. Intersection	0	2	9	0	11	Approaching (1) Turning Movement (2) Rear End (2) Angle (2) Other (4)
Mississauga Rd. between Wanless Dr. & Mayfield Rd.	0	0	4	0	4	Sideswipe (1) Rear End (1) Other (2)
Mississauga Rd./ Mayfield Rd. Intersection	0	2	7	1	10	Approaching (1) Rear End (5) Angle (2) Other (2)
Total	0	25	121	3	149	

#### 3.4.1 Mississauga Road / Mayfield Road Intersection

Ten collisions occurred at the Mississauga Road/ Mayfield Road intersection, resulting in seven property damages. Five reported collisions were rear end collisions happened in poor weather and road conditions. Two reported collisions occurred as an angle (T-bone) collision under good weather and road conditions. One reported collision occurred when approaching vehicles had a head-on collision during wet surface and poor weather condition.

#### 3.4.2 Mississauga Road / Wanless Drive Intersection

Eleven collisions were reported between year 2004 and 2008. Four collisions involved single vehicle with improper driver action, causing minor property damage. The majority of the collisions occurred during the day in good weather and road conditions.

#### 3.4.3 Mississauga Road / Bovaird Drive West Intersection

Ninty-three out of the 149 collisions in a 8-year period (2002-2009) occurred at the intersection of Mississauga Road/ Bovaird Drive West. Some of the road conditions were reported to be poor with wet road surface conditions at the collision sites.

The review of the collision data shows that majority of the collisions (approximately 63%) occurred at the intersection of Mississauga Road /Bovaird Drive West and in the mid-block (approximately 21%) along Mississauga Road between Bovaird Drive West and Wanless Drive. About 24% of the collisions occurred on wet or icy road surface

conditions, while 32% collisions occurred during the winter season from November to February. Loose snow and ice on the road and wet road surface condition would unquestionably be one of the attributes to the cause of the collisions.

Furthermore, approximately 48% of the collisions occurred during either the AM (6:00 a.m.-9:00a.m.) or PM (3:00 p.m. – 6:00 p.m.) peak periods, when the heaviest traffic volumes happen along Mississauga Road and Bovaird Drive West. Amending the traffic signal timings and designated left-turn signals with either protected phase or protected permissive phase would be some recommendations to reduce collisions at these intersections along Mississauga Road. Also, 58% of the total reported collisions were either rear end or turning movement type. The high percentage of rear end and turning movement type collisions appear to be associated with the poor traffic capacity and insufficient exclusive lanes for the turning vehicles along Mississauga Road and Bovaird Drive West in the study area. Longer delays and poor LOS at the intersection and in the mid-block between Bovaird Drive West and Wanless Drive attribute to rear end collisions.

Increase in the capacity along Mississauga Road and the intersecting roads in the study area and improvement in corridor traffic flow along Mississauga Road using signal co-ordination will potentially enhance the safety of the road users in the study area. It is further recommended that the Region of Peel should monitor the safety conditions in the area closely after the implementation of the proposed improvements to determine any unsafe zones for which the detailed safety analysis would be conducted.

#### 3.5 Future Traffic Conditions

#### 3.5.1 Background Traffic Growth

Based on analysis from the Halton-Peel Boundary Study (HPBATS), the Region of Peel, given historic traffic and land use forecasts, provided a growth rate of 4% to estimate the future traffic demand in the horizon years 2018 and 2031.

#### 3.5.2 Development Traffic

In addition to the growth in background traffic, there will be traffic associated with the development of the Northwest Brampton Development Area which immediately surrounds the study area. According to the land use forecast published in June 2008 by the City of Brampton, 41% of the expected population and employment in Northwest Brampton will occur by 2021 and 100% by the year 2031.

As the time horizons examined in this study are 10 and 25 years, the traffic volumes were projected to reflect anticipated development in 2018 and 2031.

As per Region of Peel's request, AECOM reviewed the anticipated future background developments on the east and west side of Mississauga road in order to assess the future transportation needs. The "Mount Pleasant Block 51-1 Transportation Study and Collector Road Environmental Assessment Study", report<sup>4</sup> was reviewed and their findings were included for the traffic analysis:

This study investigated and recommended the collector road network as well as associated transportation infrastructure to support the development of Block 51-1 Mount Pleasant Secondary Master Plan Area on the east side of Mississauga Road. It also formed part of the phases 3 & 4 of the EA process for the collector road network contained within the block.

<sup>&</sup>lt;sup>4</sup> Mount Pleasant Block 51-1 Transportation Study and Collector Road Environmental Assessment Study, BA Group Transportation Consultants, August 2011

The preferred road network and the transportation solutions for the Mount Pleasant Secondary Plan Area are focused on developing an innovative, pedestrian-friendly and transit-oriented community. The transit spine (shown as North-south Spine Road and East-west Spine Road in **Figure 3.4**) represents one of the major elements of the Mount Pleasant transit-oriented development. It extends from the Village Core at the southern end to the northeast limits of the community. The function of the transit spine is to provide convenient access to public transit and reduce the number of automobiles and increase the frequency of transit usage in Mount Pleasant area and adjacent communities. The transit spine is expected to offer a high level of transit service (i.e. less than 10 minutes) that connects from north to south to the Mount Pleasant GO station.

The study assumed that the Block 51-1 will be fully built out by 2016, which will connect all planned collector roads with Regional Road 1 (Mississauga Road) except Road D and F. Collector Road D and F will be built out after 2018 horizon year.

The study assessed the 2031 traffic forecasts and examined the operations of the collector road network. The study also included the interim 2016 road network assessment.

Based on the study the following four collector roads were assumed to be built-out by the two horizon years considered:

By 2018	By 2031
Collector Road C	Collector Road D
Extension of Buick Boulevard up to Mississauga	<ul> <li>Collector Road F</li> </ul>
Road	

Location of these collector roads are shown in Figure 3.4.

The site traffic volumes resulting from the development of the block 51-1, as reflected in the Mount Pleasant Report, were utilized to estimate future traffic demand for the two horizon years 2018 and 2031.

**Figure 3.5 and 3.6** provides the future 2018 and 2031 turning movement volumes during the AM and PM peak hours along Mississauga Road between Bovaird Drive West and Mayfield Road.

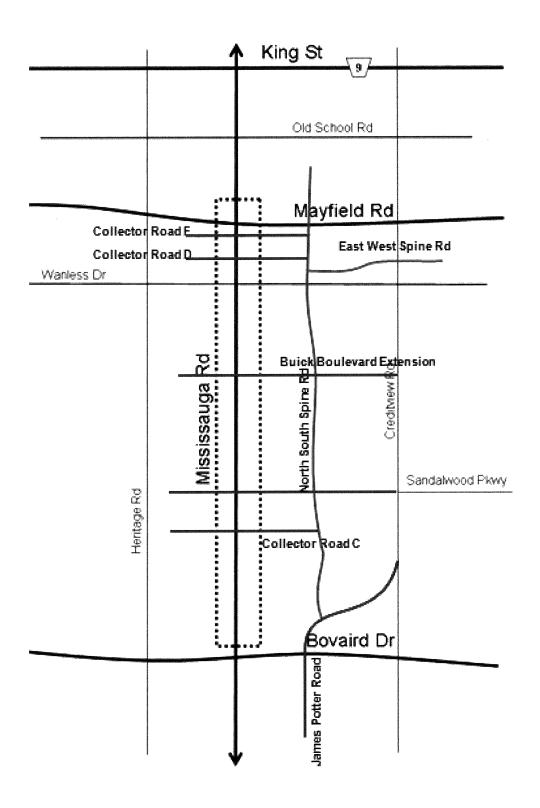


Figure 3.4 Location of the Collector Roads (Not to Scale)

			Peak H	our				Peak Ho	ur
		Mississauga Rd					Mississauga Rd	l	
Mayfield Road	95 54 3	6 86	43	37 <b>7</b>	Mayfield Road	¥ ↓ 49 193 <b>7</b>	47 96 315	66 K 532 <del>C</del> 70 <del>L</del> 35 462	142
Wanless Drive	₩ N 38 95	68 5 58 9	13 K 223 ← 231 Ł 10 243	81	Wanless Drive	₩ ¥ 37 358	38	19 K 136 ← 101 ½ 13 774	
Buick Bouleva	) ird 11	K A	17 K 203 L 318	70 <b>7</b>	Buick Bouleva	<b>¥</b> nrd 455	12 <b>31</b> 16	23 <b>K</b> 81 <b>L</b> 108:	3 256 <b>7</b>
Sandalwood Park	way 11	<b>3</b> 10 258	123 <b>K</b> 529 <b>£</b> 250	125	Sandalwood Parki	<b>↓</b> kway 333	<b>1</b> 29	260 K 416 &	567
Collector Ro	N ad C 15		10 K 105 &	24	Collector Road	<b>↓</b> C 586	<b>y</b> ; 9	12 K 40 L 142:	8 98 <b>7</b>
Bovaird Drive	15 16	59 55 7 24 • 1095	40 K 853 ← 587 Ł 117 405	314	Bovaird Drive	₩ ₩ 42 759 77	3 127 70 1297 148	147 R 1500 <del>C</del> 385 <del>L</del> 256 157	2 494 <b>7</b> 1

Figure 3.5 Future 2018 Turning Movement Volumes

			AM	Pea	k H	our				PM	Pea	k H	our
			Mississauga Rd							Mississauga Rd			
Mayfield Road	<b>1</b> € 158	₩ 891 7 ₩	135 101 1158 110	60 607 266 35	180	62 7	Mayfield Road	81	↓ 297	68 160 525 64	96 879 116 54	<b>₹ ¥</b> 733	237
Collector Road F	***************************************	<b>↓</b> 1264	3	4 127 2	<b>₹</b> 349	23	Collector Road	F	<b>↓</b> 473	4 2	6 1 47 1	1050	88
Collector Road D		¥ 1404	1 3	4 147	<b>€</b> 368	24	Collector Road D		\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	2 3 4	5 48		89 7
Wanless Drive	<b>¥</b> 45	1412 73 ->	94 10 265 8	19 336 308 11	<b>K</b> ← <b>Y</b>	109	Wanless Drive	<b>€</b> 43	\$\sqrt{534}\$ \$\pi\$\$ \$\pi\$\$ \$\pi\$\$ \$\pi\$\$ \$\pi\$\$ \$\pi\$\$ \$\pi\$\$ \$\pi\$\$	16 36 226 14	27 183 124 15	1160 1	
Buick Boulevard		<b>↓</b> 1714	34 14	17 0 203	₹ 468	70 <b>21</b>	Buick Boulevard		<b>\$</b> 656	<b>3</b> 16	23 81	1562	256 <b>7</b>
Sandalwood Parkway	<b>€</b> 99	1350 7 3	473 21 155 184	253 136 434 49	₹ ₩ 273	280	Sandalwood Parkway	68	↓ 433 <b>7</b> •	234 24 182 131	435 187 291 115	1153	817
Collector Road C		2086	<b>34</b> 7	10 105	<b>₹</b> 483	24	Collector Road C		<b>↓</b> 802	<b>3</b> 4 9	12 40	1883	98 71
Bovaird Drive	23	↓ 2292	92 38 1992 663	48 1538 894 195	641 1	500 <b>7</b>	Bovaird Driv	<b>€</b> 67	1065 7	118 114 2127 246	164 2502 593 426	2092	731 71

Figure 3.6 Future 2031 Turning Movement Volumes (Assuming Without North South Transportation Corridor)

#### 3.5.3 Other Planned Road Improvements

In 2004, the City of Brampton undertook a Transportation and Transit Master Plan (TTMP). In July 2009, the City approved and adopted an update to the TTMP. The updated City of Brampton TTMP followed the Municipal Class EA process for Phase 1 and Phase 2, establishing the need and justification for the projects proposed in its study. TTMP recommended that Mississauga Road to be widened to:

- 4 lanes from Bovaird Drive West to Mayfield Road by 2016;
- 6 lanes from Bovaird Drive West to Sandalwood Parkway by 2021; and
- 6 lanes from Sandalwood Parkway to Mayfield Road beyond 2031.

The City of Brampton undertook a Transportation Master Plan (TMP) for the Mount Pleasant Secondary Plan Area in July 2009, which addressed the transportation requirements for the area by ensuring that both the road network and the community-friendly transit service are planned and implemented in conjunction with one another. The existing transportation system of roads, transit and associated pedestrian linkages and pathways are insufficient to meet the demands of this expanding community. The TMP identified a preliminary planning transportation network for the Mount Pleasant Secondary Plan Area to address the deficiency within the current network. Improvements comprise of:

- Creditview Road as a Minor Arterial Road with a south re-alignment and widened to four lanes.
- Four-lane extension of Sandalwood Parkway as a Minor Arterial Road from Creditview Road to Mississauga Road.
- Required additional (beyond programmed improvements) arterial road improvements in the Study Area, including:
  - Bovaird Drive West widened to six lanes (east of Mississauga Road);
  - Wanless Drive widened to four lanes (Chinguacousy Road Mississauga Road);
  - Mayfield Road widened to six lanes (McLaughlin Road Chinguacousy Road);
  - Mayfield Road widened to four lanes (Chinquacousy Road Creditview Road);
  - Mississauga Road widened to six lanes (Bovaird Drive West– Sandalwood Parkway);
  - a north-south collector road (i.e., the TOD corridor), comprising four lanes (Creditview Road Mayfield Road); and
  - a grid network of collector roads in the Mount Pleasant Secondary Plan area.

The Halton-Peel Boundary Area Transportation Study (HPBATS) as summarized in Section 3 is a joint study between the Region of Peel, Halton Region, City of Brampton, Town of Caledon, and the Town of Halton Hills. The study had been initiated to identify the long-term (2021 – 2031) transportation infrastructure needed to support provincial and inter-municipal planning goals, and to serve future transportation demands.<sup>5</sup> One of the specific goals and objectives of the HPBATS is to examine the requirement for a new north/south high speed arterial to the west of Mississauga Road (North South Transportation Corridor, (NSTC)). Since the HPBATS study has not arrived at its recommendations yet, the updated Brampton TTMP performed a number of study specific analyses to conceptualize the role, function, geographic limits, costs and connectivity of NSTC if located only within the limits of the City of Brampton and Peel Region.<sup>6</sup>

<sup>5.</sup> West Brampton Development Analyses - Appendix H, City of Brampton, May 2009

Ibid.

It is within the HPBATS scope and mandate to make further recommendations on the NSTC. As a result, this traffic assessment examined two case scenarios:

Scenario #1: NSTC not be in place by 2031

**Scenario #1:** NSTC in place by 2031, as recommended in the updated TTMP.

The Region of Peel Long Range Transportation Plan (LRTP), Mayfield Road was identified (part of Appendix D, Table 3) to be widened to 4-lanes between Hurontario Street and Winston-Churchill Blvd in the short and medium term and to 6-lanes in the long term. The recent update to the LRTP, has identified the need for a six lane cross-section along Mayfield Road (up to 1.5 km west of Mississauga Road) by 2031. For our planning purposes, Mayfield Road is assumed to be widened to 4-lanes through the intersection by 2018 and to 6-lanes by 2031.

#### 3.5.4 Future Link/Midblock Analysis

AECOM analyzed two different time horizons, a medium term time horizon of 2018 and a long term horizon of 2031. The traffic assessment first determines the operating conditions and levels of service of the adjacent intersections and road segment corridors under the do-nothing scenario. The do-nothing scenario includes the existing lane configuration of Mississauga Road through the study area and planned road improvements for roads adjacent to the study corridor. In 2018, the section of Mississauga Road between Bovaird Drive West and Mayfield Road will experience capacity problems in the peak direction (i.e. southbound during the AM peak and northbound during PM peak); therefore, one lane per direction is not sufficient for the 2018 traffic demand along Mississauga Road between Bovaird Drive West and Mayfield Road.

**Table 3.7** and **Table 3.8** summarize mid-block volumes with the existing configuration of one lane along Mississauga Road for the years 2018 and 2031.

In 2018, the section of Mississauga Road between Bovaird Drive West and Mayfield Road Drive will experience capacity problems in the peak direction (i.e., southbound during the AM Peak and northbound during the PM peak); therefore, one lane per direction is not sufficient for the 2018 traffic demand along Mississauga Road between Bovaird Drive West and Mayfield Road.

Table 3.7 2018 Mid-Block Volumes – Do-Nothing Configuration

	No. of			AM Pea	k Hour		PM Peak Hour				
Road Section	Lanes per	Desired	NB		A A & SB		The NB		SI	3	
	direction	Capacity	Volume	v/c	Volume	v/c	Volume	v/c	Volume	v/c	
<b>Bovaird Drive West</b>	1	900	469	0.52	1729	1.92	1789	1.99	928	1.03	
to Collector Road C	<b>'</b>	900	409	0.52	1729	1.92	1709	1.55	920	1.03	
Collector Road C to											
Sandalwood	1	900	379	0.42	1643	1.83	1571	1.75	755	0.84	
Parkway											
Sandalwood											
Parkway to Buick	1	900	389	0.43	1392	1.55	1339	1.49	536	0.60	
Boulevard											
Buick Boulevard to	1	900	335	0.37	1194	1.33	1106	1.23	471	0.52	
Wanless Drive	1	900	333	0.37	1194	1.33	1100	1.23	₩/ I	0.52	
Wanless Drive to	4	000	200	0.29	1051	1.17	824	0.92	406	0.45	
Mavfield Road	1	900	265	0.29	1051	1.17	024	0.92	406	0.45	

	No. of			AM Pe	ak Hour			PM Pe	ak Hour	
Road Section	Lanes per	Desired	NB		SB		NB		SB	
	direction	Capacity	Volume	v/c	Volume	v/c	Volume	v/c	Volume	v/c
Bovaird Drive West to Collector Road C	1	900	727	0.81	2407	2.67	2370	2.63	1250	1.39
Collector Road C to Sandalwood Parkway	1	900	602	0.67	2093	2.33	2085	2.32	855	0.95
Sandalwood Parkway to Buick Boulevard	1	900	547	0.61	1922	2.14	1818	2.02	737	0.82
Buick Boulevard to Wanless Drive	1	900	485	0.54	1728	1.92	1585	1.76	672	0.75
Wanless Drive to Collector Road D	1	900	392	0.44	1551	1.72	1223	1.36	593	0.66
Collector Road D to Collector Road F	1	900	374	0.42	1407	1.56	1139	1.27	549	0.61
Collector Road F to Mayfield Road	1	900	353	0.39	1267	1.41	1056	1.17	477	0.53

Table 3.8 2031 Mid-Block Volumes – Do-Nothing Configuration

By 2031, the existing lane configuration of one lane in each direction on Mississauga Road between Bovaird Drive West and Mayfield Road will not be sufficient to accommodate the anticipated traffic volumes. The anticipated peak directional traffic demand in 2031 is higher than the capacity of the one lane.

#### 3.5.5 Future Intersection Operations

In addition to the corridor levels of service, the operating conditions at the intersections within the study area were also examined under 2018 and 2031 time horizons under the do-nothing condition.

Before proceeding with the operational analysis for the study area intersections, traffic signal warrant analysis was also completed for the following intersections for the horizon year 2018 and 2031 based on **MTO Book-12** methodologies.

- Mississauga Road and Sandalwood Parkway Extension
- Mississauga Road and Buick Boulevard Extension
- Mississauga Road and Wanless Drive
- Mississauga Road and Collector Road C
- Mississauga Road and Collector Road D
- Mississauga Road and Collector Road F

The results of signal warrant analysis indicated that traffic signals are warranted by 2018 at the following intersections. **Appendix E** includes detailed signal warrant calculation sheets.

- Mississauga Road and Sandalwood Parkway Extension
- Mississauga Road and Wanless Drive

**Table 3.9, Table 3.10, Table 3.11 and Table 3.12** show the traffic analysis results for signalized and unsignalized intersections for the future 2018 and 2031 time horizons with no roadway improvements along Mississauga Road,

while planned improvements for other intersecting roads were taken into consideration. These "Do-Nothing" scenarios assumed the following:

- Sandalwood Parkway would be extended to Mississauga Road by 2018;
- The intersections of Mississauga Road/ Sandalwood Parkway Extension and Mississauga Road/ Wanless Drive are assumed to be signalized by 2018;
- Buick Boulevard would be extended to Mississauga Road by 2018;
- Collector road D and Collector Road F would be built-out and extended further west of Mississauga Road by 2031 forming 4-legged intersection with Mississauga Road; and
- Collector Road C, Sandalwood Parkway, Buick Boulevard would be extended further west of Mississauga Road by 2031 forming 4-legged intersection with Mississauga Road.

**Appendix F** shows detailed intersection calculation sheets for 2018 and **Appendix G** includes calculation sheets for 2031 Do-Nothing scenario.

Table 3.9 Future 2018 Traffic Capacity Analysis-Signalized Intersections (Do-Nothing)

	:				Wee	kday		
Intersection	Appro	ach/Movement		AM			PM	
			Delay	LOS	v/c	Delay	LOS	v/c
		Left	24.1	С	0.18	>80	F	1.37
	EB	Thru	60.5	E	0.96	>80	F	2.10
		Right	0.1	Α	0.04	0.1	Α	0.09
	WD	Left	48.4	D	0.79	>80	F	1.60
Mississauga Road &	WB	Thru/Right	19.7	В	0.45	>80	F	1.94
<b>Bovaird Drive West</b>	ND	Left	29.7	С	0.21	>80	F	1.44
	NB	Thru/Right	20.7	С	0.19	>80	F	2.41
	0.0	Left	21.1	С	0.18	>80	F	2.27
	SB	Thru/Right	31.5	С	0.90	>80	F	1.12
	Overa	II Intersection	37.1	D	0.90	>80	F	2.25
		Left	>80	F	1.30	>80	F	2.85
	WB	Right	36.5	D	0.13	54.3	D	0.41
Mississauga Road/Sandalwood Pkwy	NB	Thru/Right	6.0	Α	0.29	35.5	D	1.02
Road/SalidalWood FRWy	SB	Left/Thru	>80	F	1.33	>80	F	3.14
	Overa	II Intersection	>80	F	1.32	>80	E	3.11
	EB	Left/Thru/Right	24.4	С	0.27	35.8	D	0.41
	WB	Left/Thru/Right	>80	F	1.08	50.5	D	0.77
Mississauga Road/Wanless Drive	NB	Left/Thru/Right	17.0	В	0.35	30.7	С	0.95
Noau/Wailless Dilve	SB	Left/Thru/Right	71.6	Е	1.10	13.0	В	0.35
	Overa	II Intersection	65.2	TE B	1.09	30.1	C	0.90
Mississauga		Left	18.7	В	0.14	42.2	D	0.67
Road/Mayfield Road	EB	Thru/Right	53.4	D	0.96	25.2	С	0.47

mental a company of the company of t	Overa	II Intersection	45.4	D	0.94	31.7	c	0.78
1 4 4 74 100	SD	Thru/Right	65.1	Е	0.97	16.9	В	0.26
	SB	Left	25.7	С	0.23	17.8	В	0.21
	IND	Thru/Right	24.2	С	0.33	33.9	С	0.73
100.00	NB	Left	37.6	D	0.34	22.2	С	0.07
	VVD	Thru/Right	14.8	В	0.43	40.3	D	0.84
	WB	Left	48.7	D	0.78	22.3	C	0.23

Table 3.10 Future 2018 Traffic Capacity Analysis-Unsignalized Intersections (Do-Nothing)

			Weekday							
Intersection	Approach/Movement			AM		PM				
			Delay	LOS	v/c	Delay	LOS	v/c		
	WB	Left/Right	>50	F	>1.0	>50	F	0.78		
Mississauga Road/Collector Road C	NB	Thru/Right	0.0	Α	0.22	0.0	Α	0.90		
	SB	Left/Thru	0.7	Α	0.01	0.6	Α	0.02		
	Overall Intersection		>50	F	19.72	3.9	A	0.90		
American Control of Co	WB	Left/Right	>50	F	1.69	>50	F	0.93		
Mississauga Road/Buick	NB	Thru/Right	0.0	Α	0.23	0.0	Α	0.79		
Boulevard	SB	Left/Thru	0.4	Α	0.01	0.9	Α	0.03		
	Overa	II Intersection	49.2	E	1.69	7.7	A	0.93		

**Table 3.9** illustrates that, many of the individual turning movements will operate at a level of service F, resulting in an overall level of service F at the intersections of Mississauga Road/Bovaird Drive West and Mississauga Road/Sandalwood Parkway during PM peak hour. The peak directional through traffic flow at Mississauga Road/Sandalwood Parkway will operate at level of service F with the intersection signalized. At Mississauga Road/Bovaird Drive West, a number of turning movements will experience long delays or the traffic demand will exceed the traffic capacity of the intersection. Although some of the movements at the other two signalized intersections are either over capacity or experience long delays but overall, both the intersections are expected to operate at an overall level of service E or better during the AM and PM peak hours of operations.

**Table 3.10** illustrates the results of operational analysis of the unsignalized intersections. Some of the individual cross traffic movements at these intersections will experience long delays resulting in level of service F. Overall, when factoring in the north and south-bound traffic; delay at the intersections will be within the acceptable operating conditions. The westbound movement at the intersections of Mississauga Road/Collector Road C and Mississauga Road/Buick Boulevard will experience long delays during both the AM and PM peak hours of operation.

Table 3.11 Future 2031 Traffic Capacity Analysis-Signalized Intersections (Do-Nothing)

					Wee	kday	-	
Intersection	Appro	ach/Movement	Delay	LOS	v/c	Delay	LOS	v/c
THE REPORT OF THE PARTY OF THE		Left	>80	F	0.81	>80	F	2.43
	EB	Thru	>80	F	3.06	>80	F	2.97
	Control of the Contro	Right	0.8	Α	0.42	0.2	Α	0.16
		Left	>80	F	3.15	>80	F	2.08
Mississauga Road &	WB	Thru/Right	>80	F	1.70	>80	F	2.68
Bovaird Drive West		Left	>80	F	1.39	>80	F	1.98
	NB	Thru/Right	>80	F	1.48	>80	F	3.93
	A MINISTER COLUMN TO AMERICAN AND ASSESSMENT	Left	>80	F	1.77	>80	F	2.27
	SB	Thru/Right	>80	F	3.42	>80	F	2.13
	Overa	III Intersection	>80	F	3.07	>80	F	3.36
Excellent Control of the Control of		Left	20.6	С	0.07	25.8	С	0.27
	EB	Thru/Right	24.9	С	0.44	26.2	С	0.42
	WB	Left	>80	F	1.34	65.0	Е	0.92
Mississauga		Thru/Right	25.3	С	0.47	46.7	D	0.88
Road/Sandalwood Pkwy	NB	Left/Thru/Right	31.2	С	0.78	>80	F	2.37
	SB	Left/Thru/Right	>80	F	3.17	>80	F	3.52
	Overa	III Intersection	>80	F	2.35	>80	F	2.42
	EB	Left/Thru/Right	27.5	С	0.41	36.1	D	0.54
	WB	Left/Thru/Right	>80	F	1.55	71.6	E	0.93
Mississauga Road/Wanless Drive	NB	Left/Thru/Right	19.3	В	0.50	>80	F	1.41
Road/warness Drive	SB	Left/Thru/Right	>80	F	1.62	13.5	В	0.54
	Overa	III Intersection	>80	F	1.60	>80	F	1.26
The second secon	pm pm,	Left	28.2	С	0.41	36.6	D	0.68
	EB	Thru/Right	>80	F	1.64	59.8	Е	0.93
		Left	>80	F	1.36	32.5	С	0.59
	WB	Thru/Right	25.9	С	0.72	>80	F	1.72
Mississauga Road/Mayfield Road	ND	Left	>80	F	0.66	25.9	С	0.15
Noau/Mayrielu Noau	NB	Thru/Right	43.9	D	0.49	>80	F	1.53
	00	Left	29.9	С	0.40	31.7	С	0.49
	SB	Thru/Right	>80	F	1.50	24.2	С	0.44
	Overa	all Intersection	>80	F	1.55	>80	F	1.48

Table 3.12 Future 2031 Traffic Capacity Analysis-Unsignalized Intersections (Do-Nothing)

			Weekday							
Intersection	Approach/Movement			AM		PM				
			Delay	LOS	v/c	Delay	LOS	v/c		
Mississauga Road/Collector Road C	EB	Left/Thru/Right	-		-	-		-		
	WB	Left/Thru/Right	>50	F	>1.0	>50	F	4.71		
	NB	Left/Thru/Right	-	-	-	0.0	Α	0.03		
	SB	Left/Thru/Right	0.0	Α	0.01	1.2	Α	0.03		
	Overa	all Intersection	>50	F	>1.0	>50		4.71		
Mississauga Road/Buick Boulevard	EB	Left/Thru/Right	-	-	_	-	-	-		
	WB	Left/Thru/Right	>50	F	6.91	>50	F	3.72		
	NB	Left/Thru/Right	-	-	-	0.0	Α	0.01		
	SB	Left/Thru/Right	0.1	Α	0.01	1.6	Α	0.05		
	Overall Intersection		>50	E F	6.91	>50	F	3.72		
Mississauga Road/Collector Road D	EB	Left/Thru/Right	-	-	-	-	-	-		
	WB	Left/Thru/Right	>50	F	2.80	>50	F	3.66		
	NB	Left/Thru/Right	0.0	Α	0.01	0.0	Α	0.01		
	SB	Left/Thru/Right	0.1	Α	0.01	0.4	Α	0.01		
	Overa	all Intersection	>50	₽.	2.80	>50	il F	3.66		
Mississauga Road/Collector Road F	EB	Left/Thru/Right	>50	F	0.03	28.8	D	0.03		
	WB	Left/Thru/Right	>50	F	3.48	>50	F	0.66		
	NB	Left/Thru/Right	0.2	Α	0.01	0.0	Α	0.01		
	SB	Left/Thru/Right	0.1	Α	0.01	0.2	Α	0.01		
	Overa	all Intersection	>50	F	3.48	3.7	A	0.66		

**Table 3.11** and **3.12** illustrate that under the 2031 future traffic and without improvements to Mississauga Road, the signalized intersections within the study area are expected to operate at an unsatisfactory level of service and operating conditions will include significant delays during the peak hours.

Due to high traffic volumes along Mississauga Road, the movements at the intersecting roadways will experience long delays resulting in an unsatisfactory operating condition at the unsignalized intersections.

**Figure 3.7** illustrates the midblock and intersection operations under the future 2018 and 2031 traffic condition without any improvement along Mississauga Road.

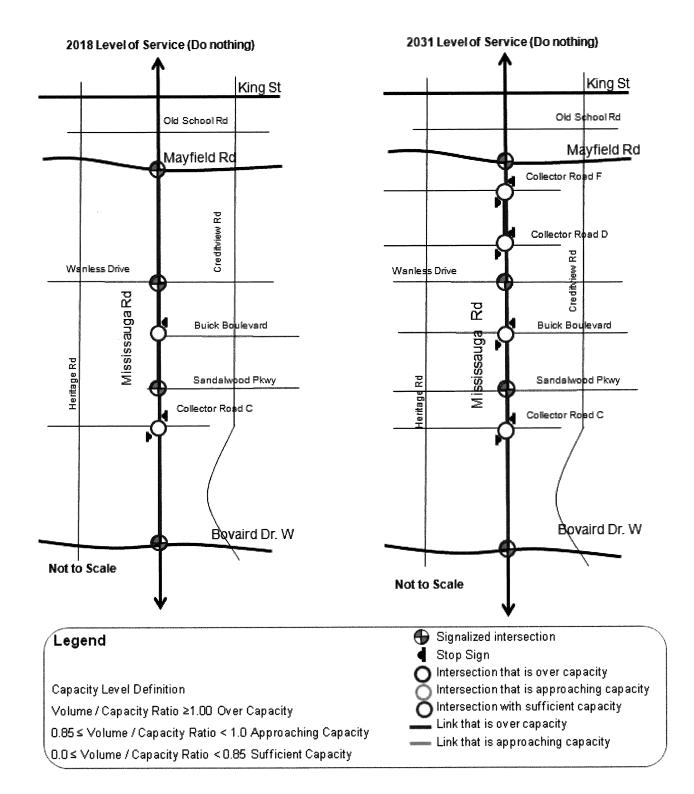


Figure 3.7 Midblock and Intersection Operations Under 2018 and 2031 Traffic Condition Without Improvements to Mississauga Road

#### 4. Road Network Needs

The planned land developments adjacent to Mississauga Road will generate a significant amount of traffic and as shown in the preceding tables the traffic demand cannot be properly accommodated by the existing road network and lane configurations for the future horizon years 2018 and 2031.

For the future horizon 2018, the study area intersections and roadway links will be either over capacity or approaching capacity. However, for the future horizon year 2031, with the existing road network and lane configurations, all the intersections and roadway links within the study area will experience LOS F.

Some traffic relief would be provided by the planned widening of Creditview Road and the extension of Sandalwood Parkway to the west of Creditview Road as shown in the Mount Pleasant Community Transportation Strategy study and the updated TTMP, however, the analysis indicates that improvements will still be required on Mississauga Road in order to accommodate the anticipated future traffic volumes.

#### 4.1 Road Improvements by 2018

Based on the future 2018 traffic analysis and also the road network suggested in the updated TTMP for 2016, a 4-lane section would be needed for Mississauga Road between Bovaird Drive West and Mayfield Road. **Figure 4.1** shows the proposed lane configuration for the 2018 time horizon.

**Table 4.1** shows the corridor level of service with road improvement. With four lanes on Mississauga Road between Bovaird Drive West and Mayfield Road, the corridor is expected to operate with residual capacity during both the AM and PM peak period.

Road Section	No. of Lanes per Direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB 2 ALK		SB	
			Volume	v/c	Volume	v/c	Volume	v/c	Volume	v/c
Bovaird Drive West to Collector Road C	2	1800	469	0.26	1729	0.96	1789	0.99	928	0.52
Collector Road C to Sandalwood Parkway	2	1800	379	0.21	1643	0.91	1571	0.87	755	0.42
Sandalwood Parkway to Buick Boulevard	2	1800	389	0.22	1392	0.77	1339	0.74	536	0.30
Buick Boulevard to Wanless Drive	2	1800	335	0.19	1194	0.66	1106	0.61	471	0.26
Wanless Drive to Mayfield Road	2	1800	265	0.15	1051	0.58	824	0.46	406	0.23

Table 4.1 2018 Mid-Block Volumes – Proposed Road Improvements

The results from the corridor analysis, presented in **Table 4.1** are further supported by the capacity calculations undertaken for the intersections within the study corridor. **Table 4.2** and **4.3** show the results of the analysis.

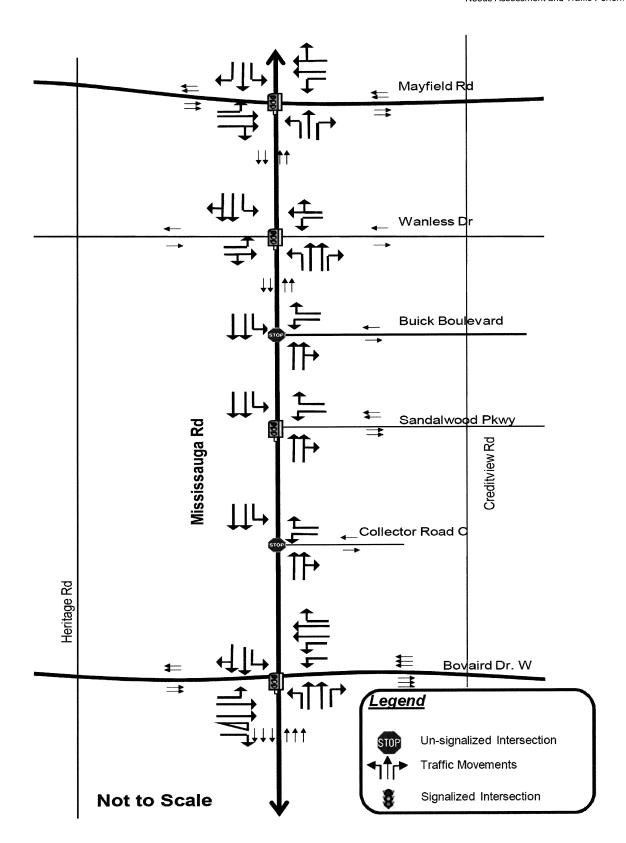


Figure 4.1 Future 2018 Improved Lane Configuration

Table 4.2 Future 2018 Traffic Capacity Analysis-Signalized Intersections (Improved)

			Weekday							
Intersection	Appro	each/Movement	Delay	AM LOS	v/c	Delay	PM LOS	v/c		
		Left	39.1	D	0.16	39.6	D	0.57		
	EB	Dual Thru	>80	F	1.13	>80	F	1.04		
	11 PERSONAL PROPERTY OF THE PERSON OF THE PE	Right	0.4	Α	0.25	0.1	Α	0.09		
		Dual Left	>80	F	1.17	>80	F	1.25		
	WB	Dual Thru	28.8	С	0.55	>80	F	1.08		
Mississauga Road &	· ·	Right	21.4	С	0.03	27.2	С	0.15		
Bovaird Drive West	To an other control of the second	Left	74.1	E	0.84	53.7	D	0.84		
	NB	Dual Thru	19.6	В	0.23	>80	F	1.12		
		Right	19.5	В	0.20	38.9	D	0.65		
		Left	24.4	С	0.14	82.8	F	0.88		
	SB	Dual Thru/Right	>80	F	1.1	44.1	D	0.70		
	Overa	all Intersection	79.8	E	1.11	>80	F	1.10		
	WD	Left	31.9	С	0.71	39.1	D	0.71		
	WB	Right	20.7	С	0.08	28.4	С	0.17		
Mississauga	NB	Dual Thru/Right	15.2	В	0.19	27.8	С	0.89		
Road/Sandalwood Pkwy	CD.	Left	24.1	С	0.54	36.7	D	0.64		
	SB	Dual Thru	21.7	С	0.60	13.8	В	0.15		
AND THE PROPERTY OF THE PROPER	Overa	all Intersection	23.1	C	0.65	28.3	C	0.81		
	EB	Left	45.9	D	0.06	30.3	С	0.08		
	ED	Thru/Right	48.5	D	0.40	30.9	С	0.15		
	WB	Left	32.3	С	0.53	20.1	C	0.18		
	VVD	Thru/Right	28.8	С	0.20	19.5	В	0.09		
Mississauga		Left	14.1	В	0.04	21.0	С	0.03		
Road/Wanless Drive	NB	Dual Thru	13.4	В	0.12	21.7	С	0.45		
		Right	25.8	С	0.05	32.5	С	0.25		
	SB	Left	10.3	В	0.09	15.9	В	0.04		
	ЗВ	Dual Thru/Right	15.4	В	0.47	15.5	В	0.23		
	Overa	all Intersection	22.0	C	0.49	22.8	C	0.33		
	EB	Left	31.3	С	0.21	22.1	С	0.28		
<b>14</b> 11-	LD	Dual Thru/Right	41.0	D	0.75	21.4	С	0.24		
Mississauga Road/Mayfield Road	WB	Left	25.2	С	0.56	34.2	С	0.27		
	VVD	Dual Thru/Right	20.2	С	0.28	40.3	D	0.67		
	NB	Left	11.5	В	0.09	24.5	С	0.06		

AND AND AND AND THE PARTY OF TH	Thru	12.4	В	0.15	33.3	С	0.55
		7.7	Α	0.03	78.2	Ε	0.10
Acceptable to the second of th	Left	17.6		0.15	16.5	В	0.15
SB	Right	25.8	С	0.62	16.5	В	0.21
	Right	16.3	В	0.06	14.6		0.03
Overall Intersection		28.1	Ċ	0.66	33.4	C	0.55

Table 4.3 Future 2018 Traffic Capacity Analysis-Unsignalized Intersections (Improved)

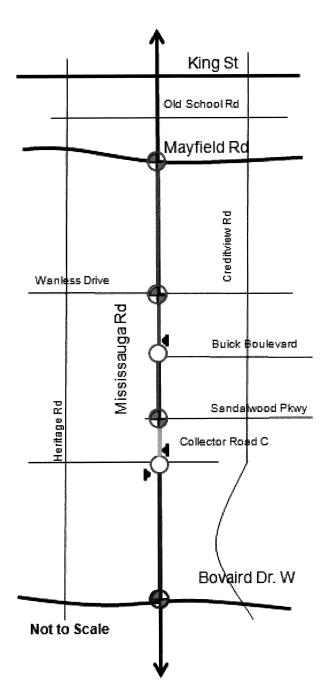
A STATE OF THE PROPERTY OF THE			THE CONTRACTOR OF THE CONTRACT		Wee	kday		
Intersection	Appro	ach/Movement		AM			PM LOS F C A A B A A F B A A A A A A A A A A A A A	
	au Thabaile In Thu current Phonography (1970) (1970)		Delay	LOS	v/c	Delay	LOS	v/c
	MD	Left	22.1	С	0.33	>80	F	0.56
	WB	Right	9.4	Α	.01	15.7	С	0.03
		Thru	0.0	Α	.014	0.0	Α	0.56
Mississauga	NB	Thru/Right	0.0	Α	0.08	0.0	Α	0.34
Road/Collector Road C		Left	8.1	Α	0.01	13.5	В	0.02
	SB	Thru	0.0	Α	0.46	0.0	Α	0.17
		Thru	0.0	Α	0.46	0.0	A A	0.17
	Overa	III Intersection	1.2	A	0.46	2.1		0.56
		Left	62.9	F	0.82	>80	F	0.71
	WB	Right	9.5	Α	0.02	14.6	В	0.06
:		Thru	0.0	Α	0.12	0.0	Α	0.42
Mississauga Road/Buick	NB	Thru/Right	0.0	Α	0.10	0.0	Α	0.36
Boulevard	THE RESIDENCE OF STREET	Left	0.0	Α	0.01	12.3	В	0.03
	SB	Thru	0.0	Α	0.35	0.0	Α	0.13
		Thru	0.0	Α	0.35	0.0	Α	0.13
Professional	Overa	II Intersection	7.2	A	0.82	4.1	A	0.71

As illustrated in **Table 4.2**, all signalized intersections will operate at an overall Level of Service C or better except Mississauga Road intersection at Bovaird Drive West. The Mississauga Road/Bovaird Drive West intersection will operate at poor level of service for the AM and PM peak hours because some movements at this intersection will operate over or near capacity and will experience long delays. Summaries of the 2018 intersection capacity calculations for these intersections operating with proposed improvements are provided in **Appendix H.** 

As illustrated in **Table 4.3**, all unsignalized intersections will experience minimal overall delay with westbound shared left/ right operating at unsatisfactory level of service due to heavy northbound and southbound traffic.

**Figure 4.2** illustrates the midblock and intersection operations under the future 2018 traffic condition with road widening along Mississauga Road.

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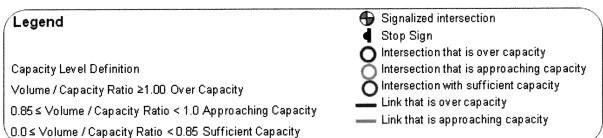


Figure 4.2 Midblock and Intersection Operations Under 2018 Traffic Condition With Road Improvements

The results summarized in **Table 4.2** and **Table 4.3** illustrate the need for 4 lanes along Mississauga Road between Bovaird Drive West and Mayfield Road. The intersection at Sandalwood Parkway will require exclusive southbound left lane. At Wanless Drive, exclusive left turn lanes should be provided in the northbound and southbound directions.

#### 4.2 Need and Justification for a Grade Separation at Rail Crossing

An Exposure Index (EI) calculation, which was traditionally adopted by Ontario Ministry of Transportation (MTO), Transport Canada, municipalities and railway companies, provides a warrant to eliminate an existing railway level crossing through the construction of a grade separation.

EI = Annual Daily Traffic x Daily Number of Trains

By 2018 daily travel demand on Mississauga Road is expected to be greater than 14,000 vehicles at the rail crossing and it is also expected that at least 40 trains per day will be moved through the crossing by GO Transit alone.

An EI threshold of 200,000 is the criterion used for determining whether a grade separation is warranted. The EI value by 2018 is anticipated to exceed 560,000, and hence, a grade separation is supported from a transportation safety perspective.

## 4.3 Road Improvements by 2031 – Without North South Transportation Corridor (NSTC) in Place

Based on the future 2031 traffic analysis, without the proposed North South Arterial Road in place, six traffic lanes will be needed for Mississauga Road between Bovaird Drive West and Sandalwood Parkway Extension. Based on the material provided and the assumptions made in this report it is anticipated that the 4-lane section on Mississauga Road between Sandalwood Parkway Extension and Mayfield Road will be sufficient to accommodate the expected traffic volumes. **Table 4.4** summarizes the future 2031 corridor levels of service with proposed road improvements, while **Table 4.5** and **4.6** summarizes the intersection levels of services and operating conditions with proposed road improvements. Summaries of the 2031 intersection capacity calculations for these intersections with proposed improvements are provided in **Appendix I**.

Table 4.4 2031 Mid-Block Volumes – Proposed Lane Configuration without North South Transportation Corridor

	NI	Desired		AM Pea	k Hour		PM Peak Hour				
Road Section	No. of Lanes	Desired	N	В	S	В	N	В	S	В	
	per Direction	Capacity	Volume	v/c	Volume	v/c	Volume	v/c	Volume	v/c	
Bovaird Drive West to Collector Road C	3	2700	727	0.27	2407	0.89	2370	0.88	1250	0.46	
Collector Road C to Sandalwood Parkway	3	2700	602	0.22	2093	0.78	2085	0.77	855	0.32	
Sandalwood Parkway to Buick Boulevard	2	1800	547	0.30	1922	1.07	1818	1.01	737	0.41	
Buick Boulevard to Wanless Drive	2	1800	485	0.27	1728	0.96	1585	0.88	672	0.37	
Wanless Drive to Collector Road D	2	1800	392	0.22	1551	0.86	1223	0.68	593	0.33	
Collector Road D to Collector Road F	2	1800	374	0.21	1407	0.78	1139	0.63	549	0.31	
Collector Road F to Mayfield Road	2	1800	353	0.20	1267	0.70	1056	0.59	477	0.27	

Table 4.5 Future 2031 Traffic Capacity Analysis-Signalized Intersections – Improved (without North South Transportation Corridor)

Intersection	Appro	ach/Movement								
			Delay	LOS	v/c	Delay	LOS	v/c		
		Left	31.1	С	0.30	75.0	E	0.86		
	EB	Triple Thru	>80	F	1.26	>80	F	1.22		
		Right	0.8	Α	0.42	0.2	Α	0.16		
		Dual Left	>80	F	1.45	>80	F	1.25		
	WB	Triple Thru/Right	32.9	С	0.71	>80	F	1.24		
Mississauga Road &		Dual Left	>80	F	1.15	72.0	Е	0.85		
Bovaird Drive West	NB	Triple Thru	34.1	С	0.36	>80	F	1.15		
		Right	39.2	D	0.52	>80	F	1.07		
		Dual Left	74.2	Е	0.51	73.0	Е	0.65		
	SB	Triple Thru	>80	F	1.27	51.5	D	0.78		
		Right	29.0	С	0.03	38.5	D	0.10		
	Overa	all Intersection	>80	F	1.27	>80	F	1.18		
		Left	44.7	D	0.12	45.3	D	0.15		
	EB	Dual Thru/Right	47.9	D	0.50	48.1	D	0.44		
	Instrumentation of the end of the control of the co	Left	50.4	D	0.91	52.6	D	0.85		
	WB	Dual Thru	22.5	С	0.10	30.0	С	0.17		
		Right	23.2	С	0.16	34.3	С	0.50		
Mississauga		Left	25.2	С	0.28	24.9	С	0.27		
Road/Sandalwood Pkwy	NB	Dual Thru	31.3	С	0.26	35.3	D	0.72		
		Right	49.5	D	0.18	54.8	D	0.76		
		Left	25.1	С	0.70	35.7	D	0.67		
	SB	Dual Thru	40.8	D	0.84	12.1	В	0.19		
		Right	23.2	C	0.12	16.8	В	0.04		
	Overa	all Intersection	38.0	D	0.86	38.1	D	0.78		
		Left	24.4	С	0.03	40.7	D	0.15		
	EB	Dual Thru	26.1	С	0.21	42.0	D	0.32		
		Right	24.1	C	0.01	38.3	D	0.01		
Mississauga		Left	49.4	D	0.83	29.4	С	0.33		
Road/Wanless Drive	WB	Dual Thru/Right	26.8	С	0.27	28.4	С	0.17		
	   	Left	11.1	В	0.11	13.6	В	0.03		
	NB	Dual Thru	11.4	В	0.18	18.3	В	0.56		
		Right	9.1	Α	0.07	52.3	D	0.26		

	0.0	Left	21.4	С	0.17	8.6	Α	0.08
	SB	Dual Thru/Right	33.7	С	0.73	9.5	Α	0.27
	Over	all Intersection	29.7	C	0.77	24.9	C	0.48
		Left	25.3	С	0.33	70.4	Е	0.90
	ЕВ	Dual Thru	36.8	D	0.84	18.0	В	0.31
		Right	22.4	С	0.16	15.4	В	0.05
	LA A PO	Left	53.2	D	0.85	19.3	В	0.34
	WB	Dual Thru/Right	12.7	В	0.36	22.9	С	0.62
Mississauga Road/Mayfield Road	***************************************	Left	72.0	E	0.57	24.6	С	0.14
Roau/Mayneiu Roau	NB	Dual Thru	30.5	С	0.16	31.1	С	0.52
	SB	Right	60.4	E	0.04	34.2	С	0.29
		Left	31.3	С	0.36	25.4	С	0.32
		Dual Thru/Right	45.2	D	0.87	20.8	С	0.24
	Over	all Intersection	35.5	D	0.85	26.6	C	0.72

Table 4.6 Future 2031 Traffic Capacity Analysis-Unsignalized Intersections – Improved (without North South Transportation Corridor)

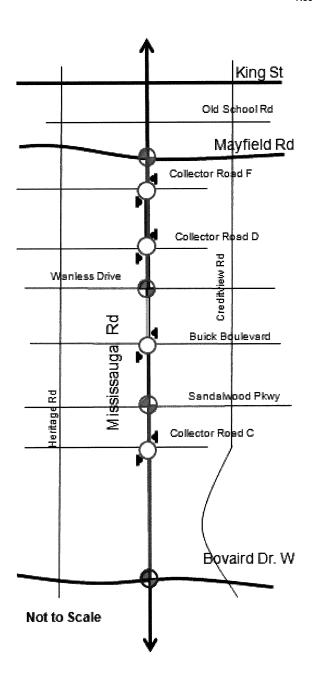
		Mentalendari (1001 - annaha arramani arramani arramani (1001 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 -		energy ( the control of the second of the control o	Wee	kday		
Intersection	Appro	ach/Movement		AM			PM	
		VALUE - 11111111111111111111111111111111111	Delay	LOS	v/c	Delay	LOS	v/c
	<b>ED</b>	Left	_	-	-	-		-
	EB	Thru/Right	<u>-</u>	-	_		-	-
	WD	Left	10.6	В	0.14	>50	F	1.7
	WB	Thru/Right	9.3	Α	0.01	14.4	В	0.03
		Left	_	-	_		-	- -
	ND	Thru	0.0	Α	0.11	0.0	Α	0.44
lississauga Road/Collector Road C	NB	Thru	0.0	Α	0.11	0.0	Α	0.44
Road C	· 1000 (10 Ma. · 100 · 100 May	Thru/Right	0.0	Α	0.07	0.0	Α	0.28
		Left	8.4	Α	0.01	17.9	С	0.03
	-	Thru	0.0	Α	0.49	0.0	Α	0.19
	SB	Thru	0.0	A	0.49	0.0	Α	0.19
		Thru/Right	0.0	Α	0.25	0.0	Α	0.09
	Overa	III Intersection	0.5	A	0.49	9.9	A	1.70
AND THE PROPERTY OF THE PROPER		Left	-	-	-	_	-	-
	EB	Thru/Right	-	-	-	_	-	-
Mississauga Road/Buick Boulevard		Left	>50	F	1.89	>50	F	2.08
Doulevalu	WB	Thru/Right	9.8	Α	0.02	16.4	С	0.07
<u>-</u>	NB	Left	-	_		-	C A A A F	

					Wee	kday		, page
Intersection	Appro	ach/Movement		AM			PM	
	d and		Delay	LOS	v/c	Delay	LOS	v/c
	a constant of the constant of	Thru	0.0	Α	0.14	0.0	Α	0.46
	1	Thru	0.0	Α	0.14	0.0	Α	0.46
1		Right	0.0	Α	0.04	0.0	Α	0.15
	1	Left	0.0	Α	0.01	16.3	С	0.05
	SB	Thru	0.0	Α	0.67	0.0	Α	0.26
	-	Thru/Right	0.0	Α	0.34	0.0	Α	0.13
	Overa	Il Intersection	41.1	E	1.89	22.7	C	2.08
	ED	Left	-	-	_	-	-	-
<u> </u>	EB	Thru/Right	-	-	_	-	-	-
		Left	47.6	E	0.66	43.5	Ε	0.34
ississauga Road/Collector	WB	Thru/Right	9.3	Α	0.1	9.2	Α	0.01
	NB	Left/Thru	_	_		0.0	Α	0.39
Roau D		Thru/Right	0.0	Α	0.12	0.0	Α	0.39
		Left/Thru	0.0	Α	0.41	0.2	Α	0.01
	SB	Thru/Right	0.0	Α	0.41	0.0	Α	0.16
For The Control of th	Overa	II Intersection	3.6	A	0.66	1.2	A	0.34
The second secon	1	Left	-	-		_		-
	EB	Thru/Right	20.1	С	0.01	The second control of the second control of	AND THE PROPERTY OF THE PROPERTY OF	
+- - - -		Left	15.6	С	0.27	>80	F	0.53
	WB	Thru/Right	9.4	Α	0.01	13.3	В	0.01
Mississauga Road/Collector Road F		Left/Thru	0.1	Α	0.12	0.0	Α	0.39
	NB	Thru/Right	0.1	Α	0.12	0.0	Α	0.39
		Left/Thru	0.1	. <b>A</b>	0.01	0.3	Α	0.01
	SB	Thru/Right	0.0	Α	0.37	0.0	Α	0.16
 	Overa	III Intersection	1.2	A	0.37	2.3	A	0.53

Under the future 2031 traffic condition all the signalized intersections (except the intersection of Mississauga Road/Bovaird Drive West) are expected to operate at overall level of service C or better.

Individual cross traffic movement, westbound left movement at the unsignalized intersection of Mississauga Road/Collector Road C and Mississauga Road/Buick Boulevard will experience significant delays and will operate at unsatisfactory levels of services. The intersections of Mississauga Road/Collector Road D and Mississauga Road/Collector Road F will experience long delays for the individual cross traffic movement (westbound shared left-through/right) during AM and PM peak hour, respectively. As indicated in **Section 3.5.5**, signals are not warranted at these four intersections based on the available future forecast for the horizon year 2031. It is suggested that close monitoring of future traffic volumes be continued at these four intersections and traffic warrant analysis should be revised to reflect the change in future traffic volumes (if any); where signalization would improve the operation of these intersections.

At the present time, based on the land use, trip generation and road networks assumptions used in this assessment, four lanes on Mississauga Road north of Sandalwood Parkway to Mayfield Road with associated auxiliary turn lanes will be capable of accommodating expected traffic volumes projected for the year 2031. **Figure 4.3** illustrates the midblock and intersection operations under the future 2031 traffic condition with recommended widening along Mississauga Road, and **Figure 4.4** shows the lane configurations in 2031 without NSTC in place.



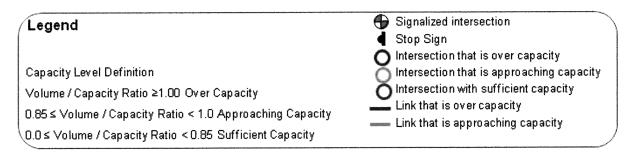


Figure 4.3 2031 Lane Configurations Without NSTC in Place

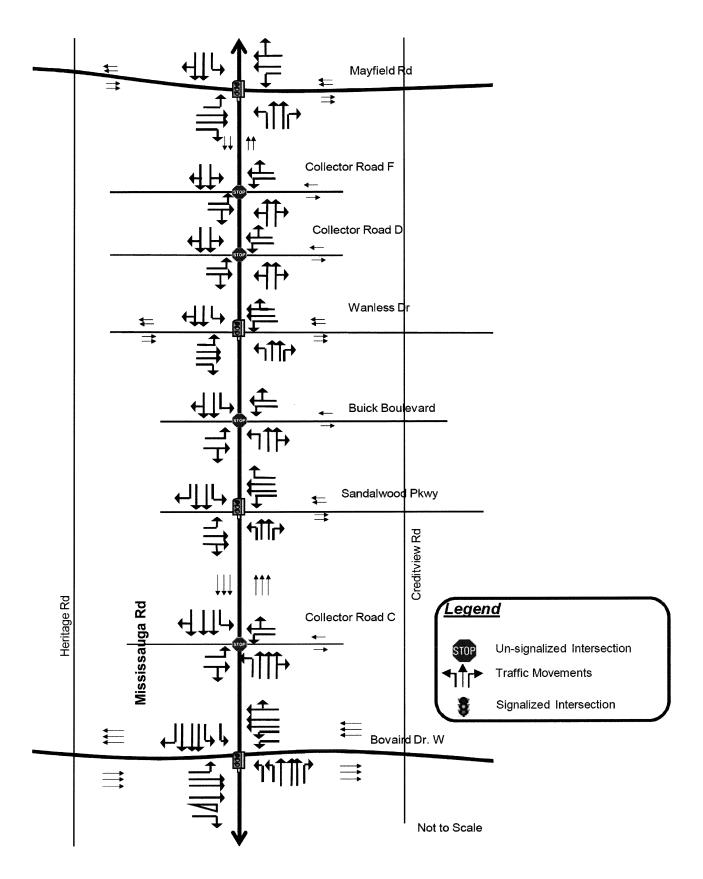


Figure 4.4 2031 Lane Configurations Without NSTC in Place

#### 4.4 2031 Road Improvements with North South Transportation Corridor (NSTC) in Place

Under the updated City of Brampton's Transportation and Transit Master Plan (TTMP), the recommended road network for 2031 includes a new north/south high speed arterial road to the west of Mississauga Road (NSTC). Based on the City's transportation model output, some of the forecasted north-south traffic along Mississauga Road would be diverted to use the NSTC should it be in place by 2031 (See Appendix for model output); thereby improve traffic operations at the study area intersections. **Figure 4.5** shows the proposed lane configuration in 2031 should NSTC be in place. Based on the City's transportation model forecast for 2031, with NSTC in place north-south traffic volumes on Mississauga Road are reduced significantly as well as the east-west traffic on the intersection roads within the study area east of Mississauga Road. West of Mississauga Road, the east-west traffic is projected to increase when NSTC is in place, suggesting that the reduced traffic along Mississauga Road are the existing longer distance through traffic. Shorter distance trips, local and/ or development traffic in the immediate areas will travel Mississauga Road and using the intersecting east-west collector roads to access the NSTC or the new development areas. **Figure 4.6** shows the resulting traffic demand within the study area with NSTC in place. **Table 4.7** summarizes the future 2031 corridor levels of service, while **Table 4.8 and 4.9** summarize the intersection levels of service and operating conditions with future traffic demand within the study area with NSTC in place. Summaries of the 2031 intersection capacity calculations for these intersections are provided in **Appendix J**.

Table 4.7 2031 Mid-Block Volumes – 2031 Road Network with North South Transportation Corridor

	No. of			AM Pe	ak Hour			PM Pea	k Hour	
Road Section	Lanes per	Desired	- NR I S		SI	3	NE		SE	3
	Direction	Capacity	Volume	v/c	Volume	v/c	Volume	v/c	Volume	v/c
<b>Bovaird Drive West to</b>	3	2700	468	0.17	1541	0.57	1615	0.60	750	0.28
Collector Road C	3	2700	700	0.17	1041	0.07	1010	0.00	700	0.20
Collector Road C to	3	2700	355	0.13	1609	0.60	1376	0.51	730	0.27
Sandalwood Parkway	3	2700	000	0.10	1000	0.00	10.0	0.01	.00	- · · · ·
Sandalwood Parkway to	2	1800	455	0.25	1269	0.71	1245	0.69	434	0.24
Buick Boulevard	2	1000	400	0.20	1200	0.71	1240	0.00	101	0.2 .
Buick Boulevard to	2	1800	319	0.18	1108	0.62	964	0.54	448	0.25
Wanless Drive		1000	010	0.10	1100	0.02	001	0.01	110	0
Wanless Drive to	2	1800	242	0.13	946	0.53	748	0.42	362	0.20
Collector Road D	2	1000	242	0.13	340	0.00	740	0.72	002	0.20
Collector Road D to	2	1800	223	0.12	816	0.45	663	0.37	319	0.18
Collector Road F		1000	223	0.12	010	0.40	000	0.07	010	0.10
Collector Road F to	2	1800	211	0.12	867	0.48	599	0.33	388	0.22
Mavfield Road	4	1000	411	0.12	557	0.40	339	0.55	550	0.22

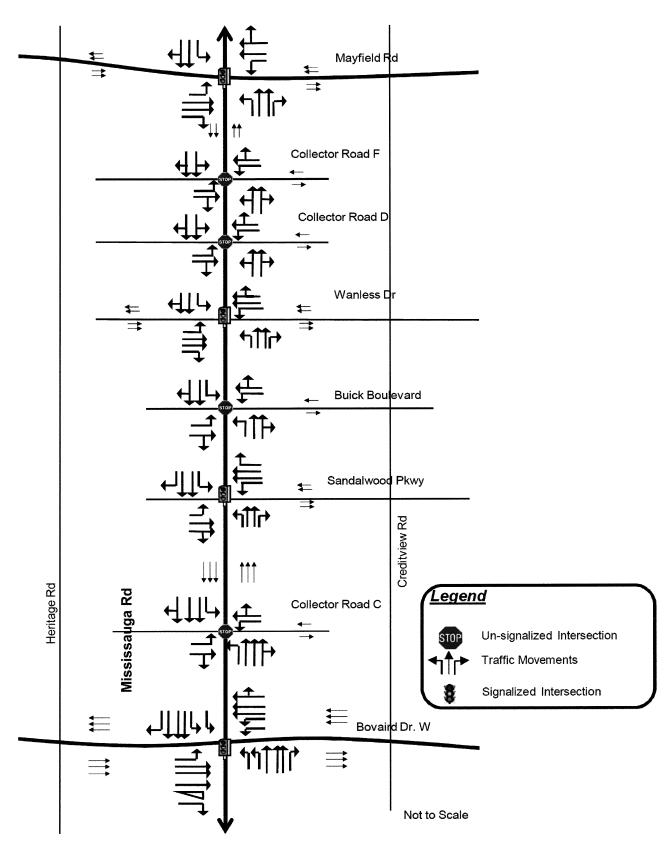


Figure 4.5 2031 Lane Configurations With NSTC in Place

			ΑM	Peal	k Ho	our					Pea	k Ho	ur
			Mississauga Rd							Mississauga Rd			
Mayfield Road	<b>L</b> e 90	<b>↓</b> 508	<b>SI</b> 77	53 528 232	K + N		Mayfield Road	<b>⊯</b> 59	<b>↓</b> 214	<b>)</b> 49	83 756 100	K + N	
mayneta noda .		71 → 31	117 1344 128	25	130 ↑ 0.7	44 <b>3</b>			78 → 13	186 609 74	31	418	135 <b>7</b>
Collector Road F	<b>12</b> 25	<b>↓</b> 696	<b>Sa</b> 29	9 9 51	<b>K</b> + <b>¥</b>		Collector Road F	<b>K</b> 6	¥ 232	<b>3</b> 4	5 5 24	K +	45
		K ÷ K	14 14 14	17	188	17 <b>7</b> 1			≯ >> 2i	14 14 14	32 K	580 <b>1</b>	45 <b>7</b> 1
Collector Road D		<b>↓</b> 814	<b>3</b> 1 2	4 132	K		Collector Road D		<b>↓</b> 316	<b>34</b> 2	5 0 46	K	
				0	213	14 <b>7</b>					0	658 <b>↑</b>	52 71
Wanless Drive	<b>1</b> 2 26	<b>↓</b> 819	<b>))</b> 54	17 303 277	K +		Wanless Drive	<b>⊌</b> 25	<b>↓</b> 310	9 <b>2</b> 4	26 176 119	<b>K</b>	
		₹ → ∠	14 364 12	7 <b>K</b>	210 <b>↑</b>	63 <b>7</b>			7 3	50 310 19	9	673 <b>↑</b>	237 <b>7</b> 1
Buick Boulevard	<b>₩</b> 12	<b>↓</b> 1012	<b>3</b> 2	15 16 99	<b>K</b> ←		Buick Boulevard	<b>⊭</b> 23	<b>↓</b> 357	<b>3</b> 1	22 15 62	K ← Ľ	
·		<i>y</i>	14 14 14	16 <b>K</b>	290 <b>↑</b>	47			71 -> 21	14 14 14	15 <b>K</b>	928 <b>↑</b>	148
andalwood Parkway	<b>⊯</b> 65	<b>↓</b> 891	<b>3</b> 312	263 141 451	K ← Ł		Sandalwood Parkway	<b>€</b> 40	<b>↓</b> 256	<b>3</b> 138	452 194 303	<b>K</b> → <b>Y</b>	
		7 > U	30 225 267	29 <b>K</b>	161 <b>↑</b>	165 7			7 -> 1	31 238 172	76 <b>K</b>	761 <b>^</b>	539 <b>2</b> 1
Collector Road C	<b>⊭</b> 18	<b>↓</b> 1160	<b>S</b>	9 7 81	K ← K		Collector Road C	<b>1</b>	<b>↓</b> 464	<b>3</b> J 5	12 10 29	K ← ¥	
		⊼ → ⊔	14 14 14	17 K	328 <b>1</b>	14			7 ->	14 14 14	12	1081	57 24
Bovaird Drive	<b>1</b> 2	<b>4</b> 1467	<b>34</b> 59	36 1138 662	K + 4		Bovaird Drive	<b>12</b> 40	<b>↓</b> 639	<b>34</b> 71	135 2051 486	K +	
		77 → 12	47 2471 822	117 <b>K</b>	385 <b>↑</b>	300			71 → 13	141 2637 306	273	1339 <b>↑</b>	468 <b>7</b> 1

Figure 4.6 2031 Traffic Demand along Mississauga Road with NSTC in Place

Table 4.8 Future 2031 Traffic Capacity Analysis-Signalized Intersections – Improved (with North South Transportation Corridor)

Intersection	Appro	ach/Movement		AM	Wee	kday	PM	
	. 4-1		Delay	LOS	v/c	Delay	LOS	v/c
		Left	29.8	С	0.29	60.7	E	0.75
	EB	Triple Thru	>80	F	1.14	>80	F	1.12
		Right	1.3	Α	0.52	0.3	Α	0.20
		Dual Left	>80	F	1.16	>80	F	1.20
	WB	Triple Thru/Right	13.8	В	0.38	36.3	D	0.88
Mississauga Road &		Left	>80	F	0.84	>80	F	1.04
Bovaird Drive West	NB	Dual Thru	41.0	D	0.29	74.5	Е	1.00
		Right	40.3	D	0.19	64.5	E	0.83
		Left	32.6	С	0.19	46.4	D	0.53
	SB	Dual Thru	>80	F	1.03	53.3	D	0.62
		Right	36.1	D	0.03	44.8	D	0.06
	Overa	all Intersection	72.4	E	1.06	73.6	E	1.09
		Left	40.5	D	0.13	38.1	D	0.12
	EB	Dual Thru/Right	46.8	D	0.63	41.7	D	0.42
	WB	Left	37.4	D	0.82	27.7	С	0.64
		Dual Thru	16.2	В	0.08	21.0	С	0.13
		Right	17.1	В	0.17	25.7	С	0.49
Mississauga		Left	19.7	В	0.17	15.4	В	0.13
Road/Sandalwood Pkwy	NB	Dual Thru	16.7	В	0.10	25.8	С	0.50
		Right	18.1	В	0.11	24.0	С	0.34
	A STATE OF THE PARTY OF THE PAR	Left	39.4	D	0.57	27.0	С	0.40
	SB	Dual Thru	36.2	D	0.55	33.0	С	0.16
		Right	33.6	С	0.07	50.8	D	0.03
	Overa	all Intersection	33.6	C	0.70	28.2	C	0.50
300. 10. 10. 10. 10. 10. 10. 10. 10. 10.		Left	37.8	D	0.06	31.0	С	0.14
	ЕВ	Dual Thru	43.3	D	0.48	32.4	С	0.29
		Right	36.9	D	0.01	29.1	С	0.01
Mississauga Road/Wanless Drive	WD	Left	19.7	В	0.47	20.0	С	0.25
	WB	Dual Thru/Right	17.1	В	0.18	19.2	В	0.12
		Left	18.9	В	0.04	23.3	С	0.02
	NB	Dual Thru	18.5	В	0.14	28.2	С	0.40
		Right	21.6	С	0.04	69.0	Е	0.15

IN THE PROPERTY OF THE PROPERT	0.5	Left	32.5	С	0.11	13.9	<b>B</b>	0.03
	SB	Dual Thru/Right	38.3	D	0.54	14.3	В	0.19
	Overa	all Intersection	31.0	C	0.50	30.0	C	0.34
		Left	18.5	В	0.29	16.5	В	0.46
	EB	Dual Thru	28.7	С	0.81	13.5	В	0.32
		Right	16.6	В	0.16	11.3	В	0.05
	\A/D	Left	52.7	D	0.83	27.6	С	0.36
	WB	Dual Thru/Right	8.7	Α	0.28	32.8	С	0.69
Mississauga Road/Mayfield Road	manus - miles make miles bettle demonst	Left	43.6	D	0.19	29.1	С	0.08
Road/Mayneld Road	NB	Dual Thru	40.3	D	0.14	31.3	С	0.36
		Right	74.4	Е	0.03	52.6	D	0.15
	O.D.	Left	34.0	С	0.23	26.4	С	0.18
	SB	Dual Thru/Right	39.4	D	0.60	25.7	С	0.20
	Over	all Intersection	29.3	C	0.73	26.5	C	0.51

Table 4.9 Future 2031 Traffic Capacity Analysis-Unsignalized Intersections – Improved (with North South Transportation Corridor)

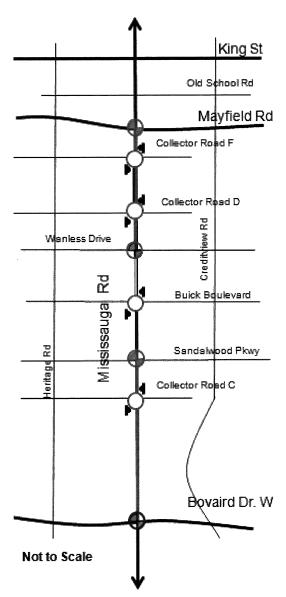
	Carried Control of the Control of th		Weekday								
Intersection	Appro	ach/Movement	量量量	AM		PM					
			Delay	LOS	v/c	Delay	LOS	v/c			
	EB	Left	45.3	E	0.14	22.7	С	0.06			
	ED	Thru/Right	28	D	0.15	29.3	<b>D</b>	0.16			
	WD	Left	27	D	0.33	50.0	E	0.27			
	WB	Thru/Right	23.1	С	0.07	26.9	D	0.12			
		Left	11.3	В	0.03	8.3	Α	0.01			
	NB	Thru	0.0	Α	0.08	0.0	Α	0.25			
Mississauga Road/Collector  Road C		Thru	0.0	Α	0.08	0.0	Α	0.25			
Noau C		Thru/Right	0.0	Α	0.05	0.0	Α	0.16			
		Left	8.0	Α	0.01	11.00	В	0.01			
		Thru	0.0	Α	0.27	0.0	Α	0.11			
	SB	Thru	0.0	Α	0.27	0.0	Α	0.11			
		Thru/Right	0.0	Α	0.15	0.0	Α	0.06			
, , , , , , , , , , , , , , , , , , ,	Overa	II Intersection	2.5	A	0.27	1.9	A	0.27			
		Left	40.0	С	1.12	24.5	С	0.07			
Mississauga Road/Buick	EB	Thru/Right	24.5	D	0.13	25.0	С	0.13			
Boulevard		Left	34.9	С	0.46	47.8	E	0.43			
	WB	Thru/Right	22.3	В	0.13	21.4	С	0.14			

AECOM

	CONTRACTOR OF THE CONTRACTOR TO		Weekday								
Intersection	Appro	ach/Movement		AM			PM				
			Delay	LOS	v/c	Delay	LOS	v/c			
		Left	10.5	Α	0.02	8.1	Α	0.01			
	NB	Thru	0.0	Α	0.09	0.0	Α	0.27			
	,,,,	Thru	0.0	Α	0.09	0.0	Α	0.27			
		Right	0.0	Α	0.03	0.0	Α	0.09			
		Left	8.0	Α	0.01	10.7	В	0.01			
	SB	Thru	0.0	Α	0.40	0.0	Α	0.14			
		Thru/Right	0.0	Α	0.21	0.0	Α	0.08			
	Overa	II Intersection	3.6	A	0.46	3.1	A	0.43			
	EB	Left	-	-		-					
		Thru/Right	_	-			- 14000 MAN WESTER	1 <b>M</b>			
	WB	Left	20.3	С	0.36	17.0	C	0.13			
		Thru/Right	8.9	Α	0.01	9.0	A	0.01			
Mississauga Road/Collector Road D	NB	Left/Thru	0.0	Α	0.01	0.0	Α	0.22			
1.000		Thru/Right	0.0	Α	0.07	0.0	Α	0.22			
!	CD	Left/Thru	0.1	Α	0.24	0.1	Α	0.09			
	SB	Thru/Right	0.0	. A	0.24	0.0	Α	0.09			
	Overa	III Intersection	2.3	A	0.36	0.8	A	0.22			
	EB	Left	18.9	С	0.05	15.5	С	0.09			
	ED	Thru/Right	14.4	В	0.07	14.8	В	0.07			
	W/D	Left	14.4	В	0.12	21.4	С	0.10			
	WB	Thru/Right	14.0	В	0.04	14.9	В	0.03			
Mississauga Road/Collector  Road F	ND	Left/Thru	1.5	Α	0.02	1.0	Α	0.02			
Noau I	NB	Thru/Right	0.0	Α	0.07	0.0	Α	0.20			
	00	Left/Thru	0.8	Α	0.02	0.8	Α	0.01			
	SB	Thru/Right	0.8	Α	0.22	0.0	Α	0.07			
**************************************	Overa	III Intersection	2.0	A	0.22	1.7	A	0.20			

With the North South Transportation Corridor in place, all the signalized and unsignalized intersections within the study limit are expected to operate at acceptable level of service with the exception at the intersection of Mississauga Road/Bovaird Drive West, which will remain with capacity deficiencies and long delays for some traffic movements.

Figure 4.7 illustrates the midblock and intersection operations under the future 2031 traffic condition with road widening along Mississauga Road (NSTC in place).



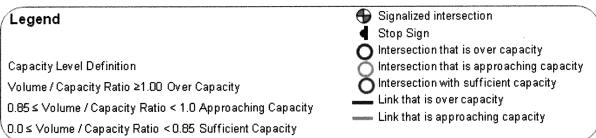


Figure 4.7 2031 Lane Configurations Without NSTC in Place

### 5. Roundabout Analysis

In order to cope better with the heavy travel demand in the future scenarios, AECOM has completed a separate roundabout analysis at the three key intersections within the study area in an attempt to further investigate at the needs of the 6-lane widening of the Mississauga Road. The analyses included the review of the intersections with two-lane roundabouts as the traffic control option. All analyses were conducted with Sidra Intersection 3.2 using the Highway Capacity Manual (Metric) settings.

The conceptual intersection configuration was used along with the same projected traffic volumes, truck percentages and peak hour factors described in earlier sections. Sidra Intersection includes multiple measures of effectiveness, including level of service (LOS) and volume to capacity ratio (v/c) for each approach and the overall intersection. The LOS criteria are summarized in **Table 5.1**.

	Average Control Delay (Seconds per Vehicle)									
Level of Service	Signals and Roundabouts	Stop Signs								
Α	≤ 10	≤ 10								
В	> 10 - 20	> 10 - 15								
С	> 20 - 35	> 15 - 25								
D	> 35 - 55	> 25 - 35								
Ε	> 55 - 80	> 35 - 50								
F	> 80	> 50								

Table 5.1 Intersection Level of Service Criteria

Sidra Intersection output tables are attached in **Appendix K**.

**Table 5.2** summarizes the analysis results in terms of a LOS and v/c for each of the intersections. The scenarios being assessed are as follow:

- 2018 forecasted 2018 traffic demand with 2-lane roundabouts
- 2031 without NSTC 2031 traffic demand as per landuse as shown in updated TTMP and as provided by the City of Brampton, 2 lanes roundabouts
- 2031 with NSTC 2031 traffic demand as per landuse as shown in updated TTMP with the North South Transportation Corridor in place, 2 lanes roundabouts

Table 5.2 Roundabout Analysis Results

Intersection			20	18		2031	TTMP v	vithout	NSTC	2031 TTMP with NSTC				
miersection	Approach	A	AM		PM		AM A		PM		AM		PM	
		LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	
	NB	В	0.45	В	0.19	В	0.53	В	0.25	В	0.35	В	0.13	
Mississauga	SB	В	0.14	В	0.44	В	0.28	С	0.86	В	0.16	С	0.66	
Road & Mayfield	EB	В	0.34	В	0.56	В	0.42	С	0.79	В	0.34	В	0.60	
Road	WB	В	0.61	В	0.24	D	0.99	В	0.55	С	0.84	В	0.56	
	All	В	0.61	A	0.56	С	0.99	В	0.86	В	0.84	В	0.66	
Mississauga	N	В	0.60	В	0.22	С	0.96	В	0.32	В	0.53	В	0.16	

Road & Wanless	S	В	0.15	В	0.44	В	0.32	С	0.70	В	0.18	С	0.52
Drive	Е	В	0.33	В	0.41	В	0.44	В	0.65	В	0.38	В	0.47
	W	В	0.15	В	0.08	F	1.21	В	0.63	С	0.68	В	0.64
	All	В	0.60	Α	0.44	D	1.21	В	0.70	В	0.68	C	0.64
	N	В	0.49	В	0.25	В	0.78	В	0.41	В	0.46	В	0.23
Mississauga	S	Α	0.22	Α	0.53	В	0.46	C	0.86	В	0.26	В	0.50
Road & Sandalwood	Е	В	0.28	В	0.47	В	0.28	O	0.78	В	0.25	В	0.54
Pkwy	W					С	0.47	В	0.19	В	0.40	В	0.20
. Kwy	All	Α	0.49	Α	0.53	В	0.78	В	0.86	Α	0.46	A	0.54

Notes: 1) LOS is for the worst movement for each approach.

- 2) v/c is for the worst movement for each approach.
- 3) "All" LOS includes all movements.
- 4) "All" v/c is for the worst movement in the entire intersection

#### 5.1 2018 Two-lane Roundabouts

As shown in **Table 5.2**, in year 2018 with two-lane roundabouts as the traffic control, there are no operational issues for any peak hour movements at any of the intersections. All movements operate at level of service B or better throughout the day.

#### 5.2 2031 TTMP Scenario with Two-lane roundabouts – Without NSTC

As shown in **Table 5.2**Table 5.2, under the 2031 TTMP scenario, with two-lane roundabouts as the traffic control in the corridor, most of the movements operate at an acceptable level of service throughout the day.

Sandalwood Parkway - all movements operate at level of service C or better throughout the day.

*Wanless Drive* – with the assumption that right turn bypass lanes are in place in northwest, southwest and southeast quadrants, the north and west approaches will experience long delays during the AM Peak hour. The west approach is expected to operate at a v/c ratio of 1.21 which is beyond the capacity and at level of service F. This intersection will experience delays during peak periods due to high directional flows. During the AM peak hour, the west approach is expected to experience 95<sup>th</sup> percentile queues of approximately 270 meters. Although the north approach is projected to operate with a high v/c ratio (0.96), the delays are manageable (LOS C) and the queues are reasonable (95<sup>th</sup> percentile queues will be approximately 140 m). During the PM peak hour, all movements operate at level of service C or better.

**Mayfield Road** - experiences delay during AM peak period due to high north-south directional flow. Assuming a right turn bypass lane is in place in northwest quadrant, the west approach is expected to experience 95<sup>th</sup> percentile queues of approximately 175 meters during the AM peak hour, with manageable delays at level of service D. The overall intersection will operate at level of service C in the AM peak hour and level of service B in the PM peak hour.

#### 5.3 2031 TTMP Scenario with Two-lane roundabouts – With NSTC

As shown in **Table 5.2**, with two-lane roundabouts as the traffic control in the corridor and with the same assumptions of the right turn bypass lanes in place as the previous section, all of the movements operate at an acceptable level of service throughout the day. All movements at all intersections operate well throughout the day at level of service C or better and v/c ratio at 0.84 or better.

#### 6. Conclusion

#### 6.1 Midblock Link Volume to Capacity Assessment

#### 6.1.1 Existing (2008) Condition

Both the sections along Mississauga Road from Bovaird Drive West to Mayfield Road are operating with residual capacity, indicating that the current two lane section of Mississauga Road is sufficient to accommodate existing traffic volumes.

#### 6.1.2 2018 Horizon Year

#### 6.1.2.1 Do Nothing

In 2018 and without improvement, the traffic demand in the peak direction (i.e., southbound during the AM Peak and northbound during the PM peak) along the section of Mississauga Road between Bovaird Drive West and Mayfield Road will significantly exceed the available capacity; therefore, one lane per direction is not sufficient for the 2018 traffic demand along Mississauga Road between Bovaird Drive West and Mayfield Road.

#### 6.1.2.2 With Improved Road Network

With Mississauga Road widened to 4-lane, all the sections along Mississauga Road within the study limit are expected to operate with residual capacity during both the AM and PM peak period except the sections between Bovaird Drive West and Sandalwood Pkwy Extension, where the 4-lane capacity will be insufficient to accommodate traffic demand for the horizon year 2018.

#### 6.1.3 2031 Horizon Year

#### 6.1.3.1 Do Nothing

In year 2031 and without road improvement, the traffic demand in the peak direction (i.e., southbound during the AM Peak and northbound during the PM peak) along the section of Mississauga Road between Bovaird Drive West and Mayfield Road will significantly exceed the available capacity; therefore, one lane in each direction will not be sufficient to accommodate the anticipated traffic demand in 2031.

#### 6.1.3.2 With Improved Road Network and without the North South Transportation Corridor (NSTC)

Based on the future 2031 traffic analysis, without the proposed North South Arterial Road in place, six traffic lanes will be required for Mississauga Road between Bovaird Drive West and Sandalwood Parkway Extension. Under this condition, 4 lanes on Mississauga Road between Sandalwood Parkway Extension and Mayfield Road will be able to accommodate the expected traffic volumes. The road section between Sandalwood Parkway and Wanless Drive will reach its capacity with 2031 traffic volume. As such, close monitoring will be required for this section beyond 2031.

#### 6.1.3.3 With Improved Road Network and with the North South Transportation Corridor (NSTC)

With the reduced traffic along Mississauga Road, it is anticipated that 6-lanes from Bovaird Drive West to Sandalwood Parkway Extension and 4-lanes from Sandalwood Parkway Extension and Mayfield Road will be able to accommodate the expected future traffic demand for the horizon year 2031.

#### 6.2 Intersection Operations

#### 6.2.1 Existing Condition

Under the existing traffic conditions, signalized intersection of Mississauga Road/ Mayfield Road operates at good levels of service during both weekday AM and PM peak hours. Although the overall delay and level of service at the intersection of Mississauga Road/ Bovaird Drive West is satisfactory (LOS D and LOS C) during both the AM and PM peak hours of operation, some delays and poor levels of services are experienced at some movements due to the heavy westbound/eastbound traffic along Bovaird Drive West.

The unsignalized intersection of Mississauga Road/ Wanless Drive operates well as indicated by the average delay, with residual capacity for each movement during both weekdays AM and PM peak hours.

#### 6.2.2 2018 Horizon Year

#### 6.2.2.1 Do Nothing

In 2018 and without improvement, many of the individual turning movements at the intersections of Mississauga Road/Bovaird Drive West for PM peak hour and Mississauga Road /Sandalwood Parkway for both the AM and PM peak hours are expected to exceed the desired level of service resulting in overall level of service F. Although some of the movements at the other two signalized intersections are expected to either operate at or over capacity or experience long delays, overall both intersections are expected to operate at a level of service E or better during the AM and PM peak hours of operations.

Although some of the individual movements at the unsignalized intersections are expected to experience long delays resulting in level of service F, the overall delay at these intersections will be within the acceptable operating conditions.

#### 6.2.2.2 With Improved Road Network

With the improved road network all the signalized intersections are expected to operate at an overall Level of Service C or better except Mississauga Road/Bovaird Drive West intersection, which some movements experience longer delays with poor LOS . All the unsignalized intersections are expected to experience acceptable delay and levels of services, resulting in good operating conditions.

The proposed lane configuration is shown in **Figure 4.1**.

In addition, based on the Exposure Index calculation, grade separating the existing level railway crossing is warranted from a transportation safety perspective.

#### 6.2.3 2031 Horizon Year

#### 6.2.3.1 Do Nothing

Under the 2031 future traffic and without improvements to Mississauga Road, the signalized intersections within the study area are expected to operate at an unsatisfactory level of service and operating conditions, and experience significant delays during the peak hours.

Due to high traffic volumes along Mississauga Road, the movements at the intersecting roadways will experience long delays resulting in an unsatisfactory operating condition at the unsignalized intersections.

#### 6.2.3.2 With Improved Road Network and without the North South Transportation Corridor (NSTC)

Under the future 2031 traffic condition with the improved road network all the signalized intersections (except the intersection of Mississauga Road/Bovaird Drive West) are expected to operate at level of service D or better.

Some of the individual movements at the unsignalized intersection of Mississauga Road at Collector Road C, Buick Boulevard and Collector Road F are expected to experience long delays during the AM and PM peak hours of operation.

It is suggested that close monitoring of future traffic volumes be continued at these three unsignalized intersections and traffic warrant analysis should be revised to reflect the change in future traffic volumes (if any); where signalization would improve the operation of these intersections.

The intersection of Mississauga Road and Bovaird Drive West is expected to continue to operate at a poor level of service during the AM and PM peak hours of operation. In order to accommodate the anticipated traffic volumes at this intersection, improvements assumed at this intersection includes three through lanes in both the northbound and southbound direction in addition to three through lanes in the eastbound and westbound directions, as per the TMP recommendations.

The proposed lane configurations in year 2031 assuming NSTC not in place is shown in Figure 4.4.

6.2.3.3 Roundabout Configuration without the North South Transportation Corridor (NSTC)

With two-lane roundabout option, the intersections will improve in the following level of service:

Mississauga Road & Mayfield Road - overall levels of service will not be improved.

Mississauga Road & Wanless Drive - overall levels of service will not be improved.

**Mississauga Road & Sandalwood Parkway** – improve from overall level of service C during both AM and PM peak hours to overall level of service B for both peak hours in the roundabout option.

#### 6.2.3.4 With Improved Road Network and with the North South Transportation Corridor (NSTC)

With North South Transportation Corridor in place and improved lane configurations as shown on **Figure 4.5**) all the signalized intersection within the study limit are expected to operate at good level of service C or better with the exception at the intersection of Mississauga Road/Bovaird Drive West, which will still have capacity deficiencies and will experience long delays.

All unsignalized intersections in the study area, with future traffic demand for the horizon year 2031 (NSTC in place) and improved lane configurations, are expected at excellent levels of services.

#### 6.2.3.5 Roundabout Configuration with the North South Transportation Corridor (NSTC)

An alternative to widening Mississauga Road from four to six lanes from Bovaird Drive West to Sandalwood Parkway Extension is to consider a two-lane roundabout option. With the roundabout option the intersections will improve in the following level of service:

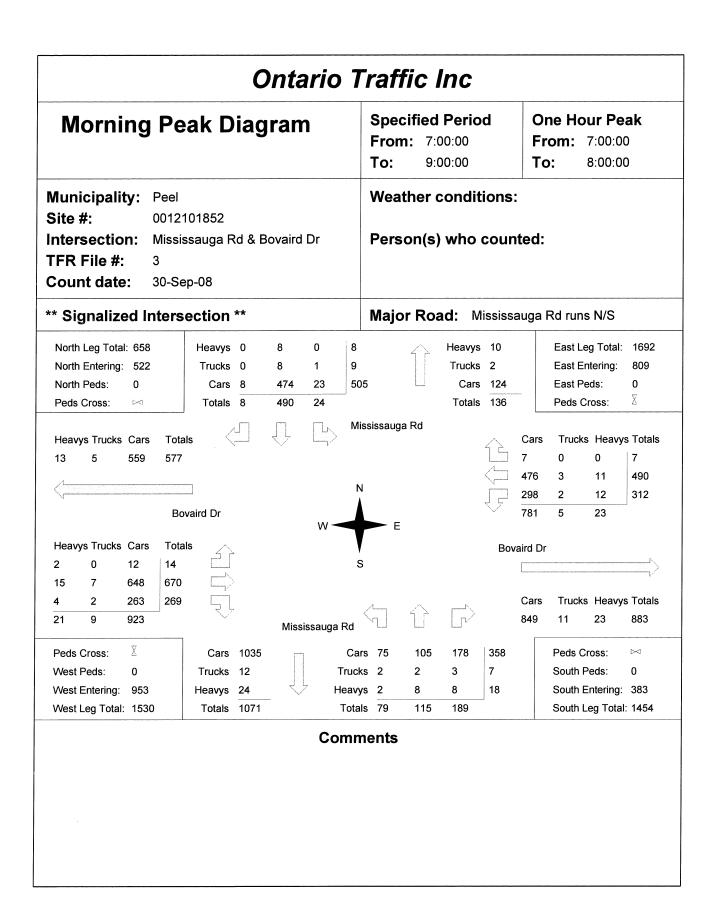
Mississauga Road & Mayfield Road – improve from overall level of service C in AM Peak hour to level of service B.

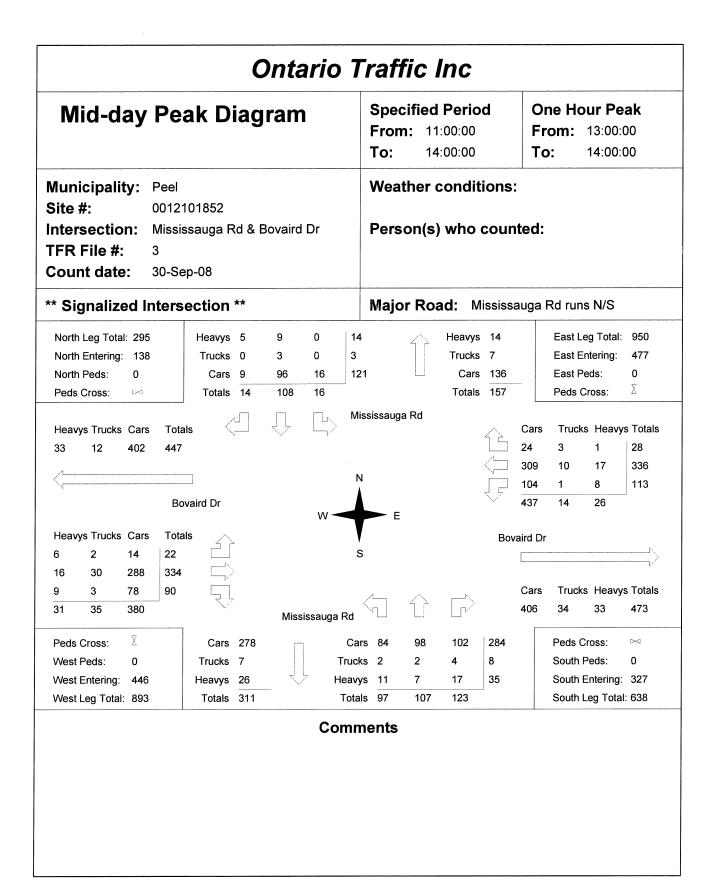
Mississauga Road & Wanless Drive – overall levels of service will not be improved.

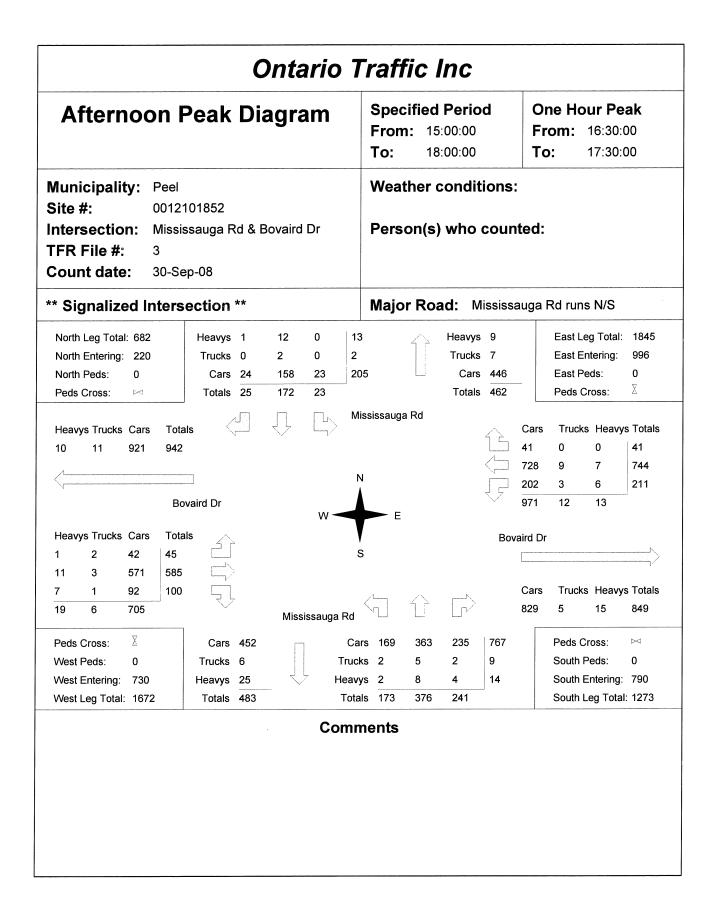
**Mississauga Road & Sandalwood Parkway** – improve from overall level of service C during the AM peak hour to level of service A and improve from overall level of service B during the PM peak hour to level of service A.

## Appendix A

2008 Traffic Data







## Ontario Traffic Inc

## **Total Count Diagram**

Municipality: Peel

Site #:

0012101852

Intersection:

Mississauga Rd & Bovaird Dr

TFR File #:

3

Count date:

North Leg Total: 3785

North Entering: 1968

North Peds:

Peds Cross:

30-Sep-08

### Weather conditions:

Person(s) who counted:

#### \*\* Signalized Intersection \*\*

0

 Heavys
 15
 70
 0
 85

 Trucks
 7
 30
 5
 42

 Cars
 106
 1603
 132
 1841

Totals 128 1703 137

Major Road: Mississauga Rd runs N/S

Heavys 92 Trucks 36 Cars 1689

Cars 1689
Totals 1817

East Leg Total: 10667
East Entering: 5493
East Peds: 1
Peds Cross:

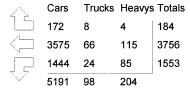
Heavys Trucks Cars Totals 173 97 4493 4763

Bovaird Dr

Heavys Trucks Cars Totals 21 5 176 202 3742 125 106 3511 59 28 969 1056 205 139 4656



Mississauga Rd



Bovaird Dr

Mississauga Rd

 Cars
 Trucks
 Heavys Totals

 4854
 127
 193
 5174

Peds Cross: ∑
West Peds: 1
West Entering: 5000
West Leg Total: 9763

 Cars
 4016

 Trucks
 82

 Heavys
 214

 Totals
 4312



L

 Cars
 812
 1341
 1211
 3364

 Trucks
 24
 23
 16
 63

 Heavys
 43
 67
 68
 178

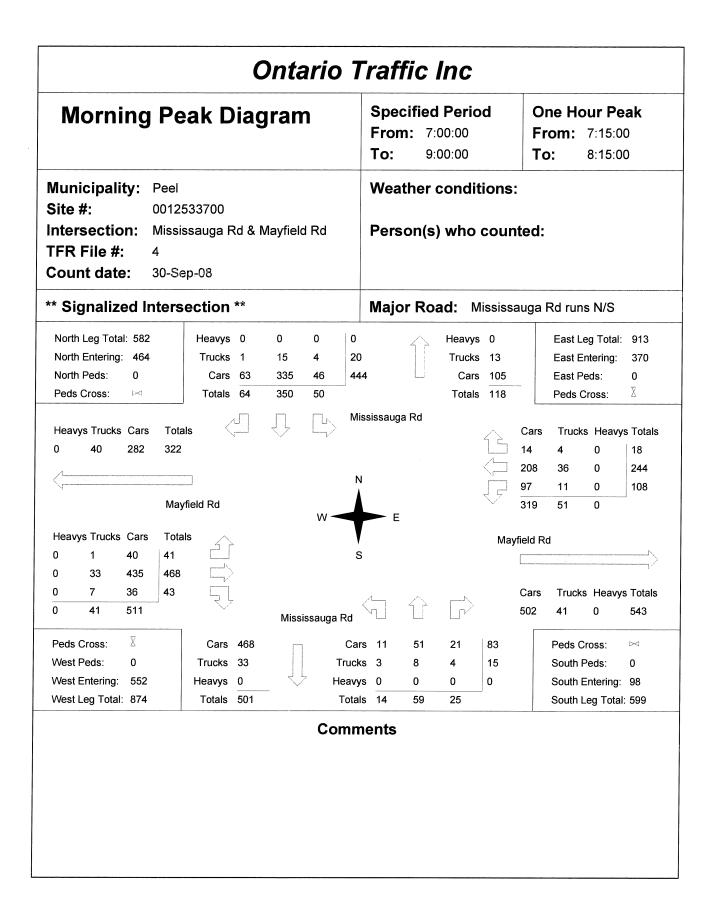
 Totals
 879
 1431
 1295

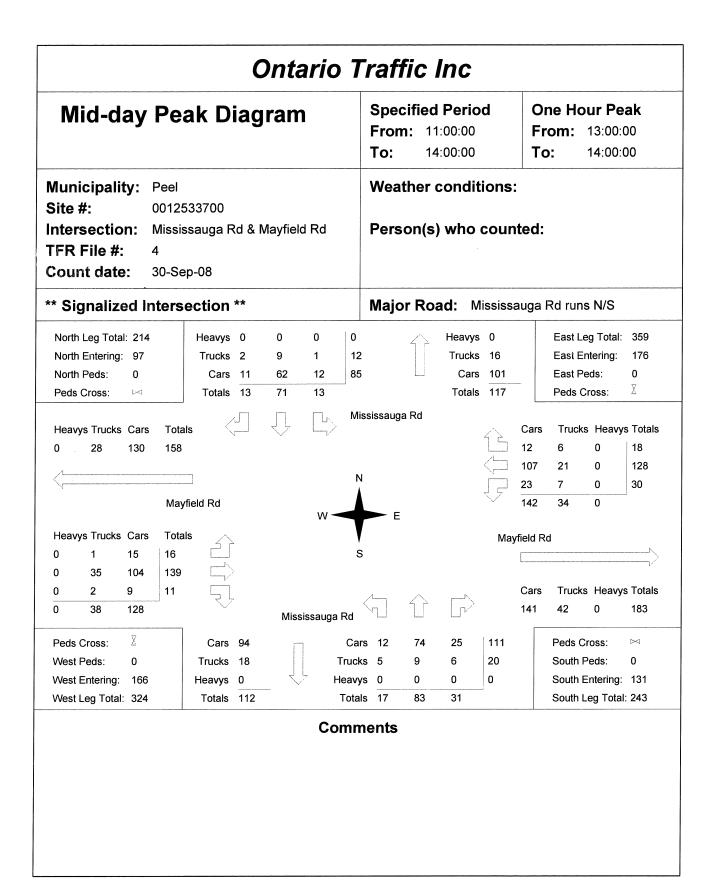
Peds Cross: 
South Peds: 0
South Entering: 3605
South Leg Total: 7917

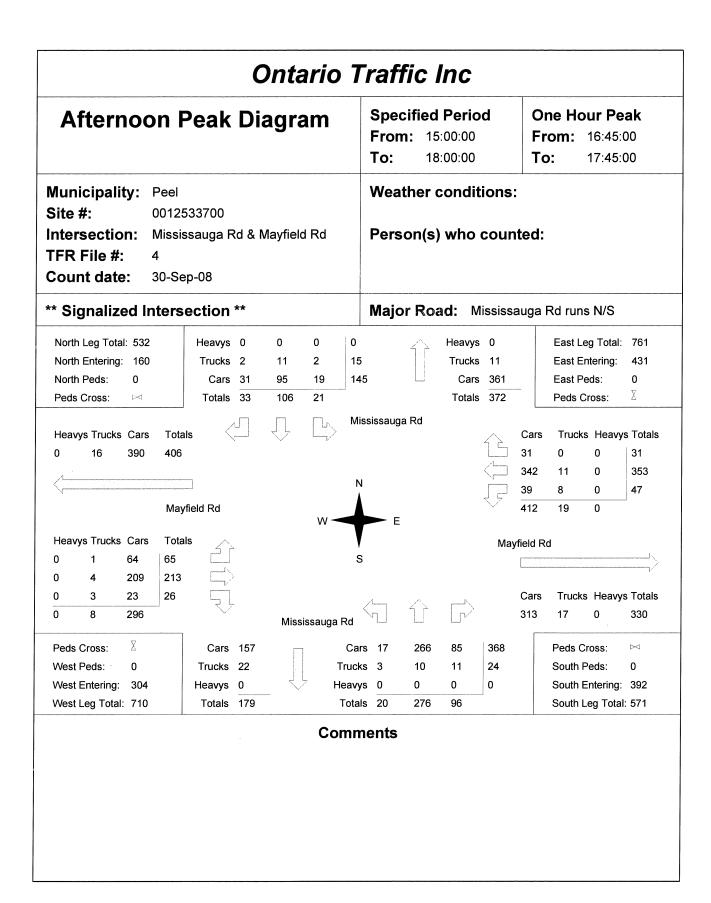
#### **Comments**

# Ontario Traffic Inc Traffic Count Summary

Intersection:	Mississa	uga Rd	& Boyai	rd Dr	Count E	Date: 30-Sep-0	8	Munic	cipality: Pe	el			
			ach Tot			30-0ep-0					oach Tot	als	
			rucks, & H			North/South					rucks, & H		
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hoi Endi		Left	Thru	Right	Grand Total	Total Peds
7:00:00 8:00:00 9:00:00 11:00:00 12:00:00 13:00:00 14:00:00 15:00:00 16:00:00 17:00:00 18:00:00	24 5 0 20 20 16	0 490 464 0 99 90 108 0 121 164 167	0 8 7 0 18 21 14 0 15 20	0 522 476 0 137 131 138 0 152 205 207	0 0 0 0 0 0 0	0 905 780 0 371 384	14:00 15:00 16:00 17:00	D:00 D:00 D:00 D:00 D:00 D:00 D:00 D:00	0 79 90 0 72 78 97 0 139 183 141	0 115 76 0 80 89 107 0 243 346 375	0 189 138 0 82 86 123 0 213 219 245	0 383 304 0 234 253 327 0 595 748 761	0 0 0 0 0 0 0
Totals:			128 ach Tota		0	5573					1295 ach Tota		0
11	Include	es Cars, Ti	rucks, & H		Tatal	East/West	Hai		Include	es Cars, T	rucks, & H		Total
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hou Endi	ng	Left	Thru	Right	Grand Total	Total Peds
7:00:00 8:00:00 9:00:00 11:00:00 12:00:00 13:00:00 14:00:00 15:00:00 16:00:00 17:00:00	0 312 310 2 128 111 113 0 169 191 217	0 490 450 0 287 294 336 0 607 677 615	0 7 10 0 18 21 28 0 27 27 46	0 809 770 2 433 426 477 0 803 895 878	0 0 0 0 0 0 0 1	0 1446 1527	7:00 8:00 9:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00	0:00 0:00 0:00 0:00 0:00 0:00 0:00	0 14 12 0 19 21 22 0 29 42 43	0 670 529 0 302 287 334 0 506 496 618	0 269 209 0 73 103 90 108 94 110	0 953 750 0 394 411 446 0 643 632 771	00100000000
Totals: Hours En		3756 8:00 996	184 <b>Calc</b> 9:00 851	5493 ulated V 12:00 449	1 alues fo 13:00 426	10493 or Traffic Cro	14	<b>g Ma</b> 1:00 471	202 ajor Stre 16:00 805	3742 eet 17:00 910	1056 18:00 878	5000	1







## Ontario Traffic Inc

## **Total Count Diagram**

Municipality: Peel

Site #:

0012533700

Intersection:

Mississauga Rd & Mayfield Rd

TFR File #:

Count date:

30-Sep-08

#### Weather conditions:

Person(s) who counted:

#### \*\* Signalized Intersection \*\*

Major Road: Mississauga Rd runs N/S

North Leg Total: 2945 North Entering: 1515

North Peds:

Peds Cross:

0 0 Heavys 0 0 Trucks 17 69 24 110 1405 Cars 236 1011 158

Totals 253 1080 182 Heavys 1 Trucks 136

Cars 1293 Totals 1430 East Leg Total: 4342 East Entering: 2172 East Peds: 0 X Peds Cross:

Heavys Trucks Cars Totals 264 1732 1997

Mayfield Rd

246

1452

142

1840

Totals

267

1635

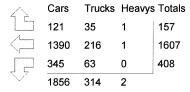
169





LJ-.

Mississauga Rd



Mayfield Rd

261

Cars

1909

X Peds Cross: West Peds: 0 West Entering: 2071

Heavys Trucks Cars

183

27

231

0

0

0

West Leg Total: 4068

Cars 1498 Trucks 159 Heavys 0 Totals 1657

Mississauga Rd

Cars 106 1331 926 299 Trucks 31 80 165 54 Heavys 0 0 0 0 Totals 137 1006

Peds Cross:  $\bowtie$ South Peds: 0 South Entering: 1496 South Leg Total: 3153

Trucks Heavys Totals

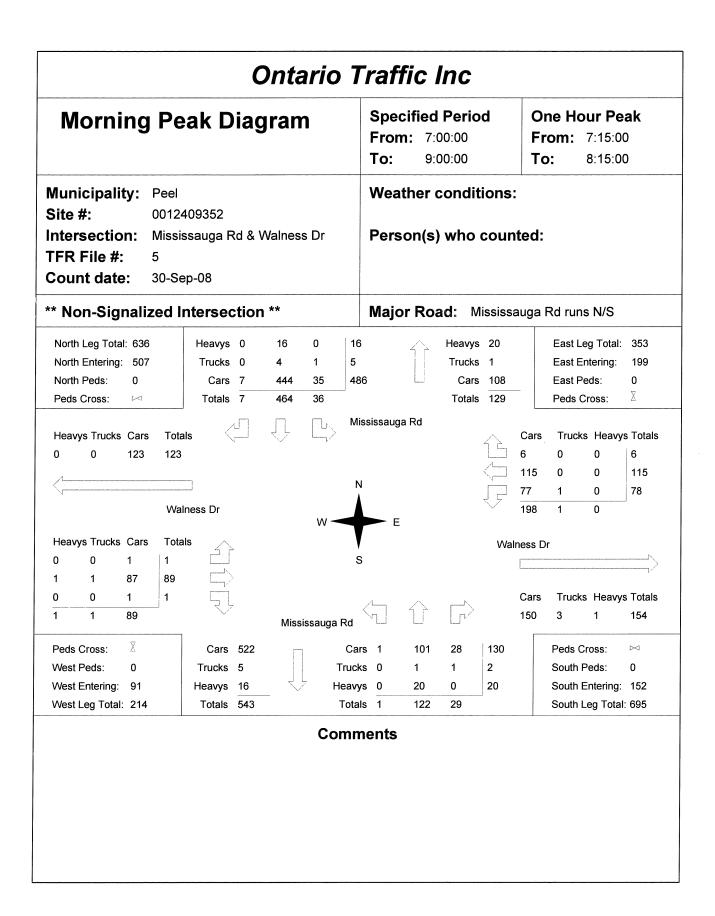
2170

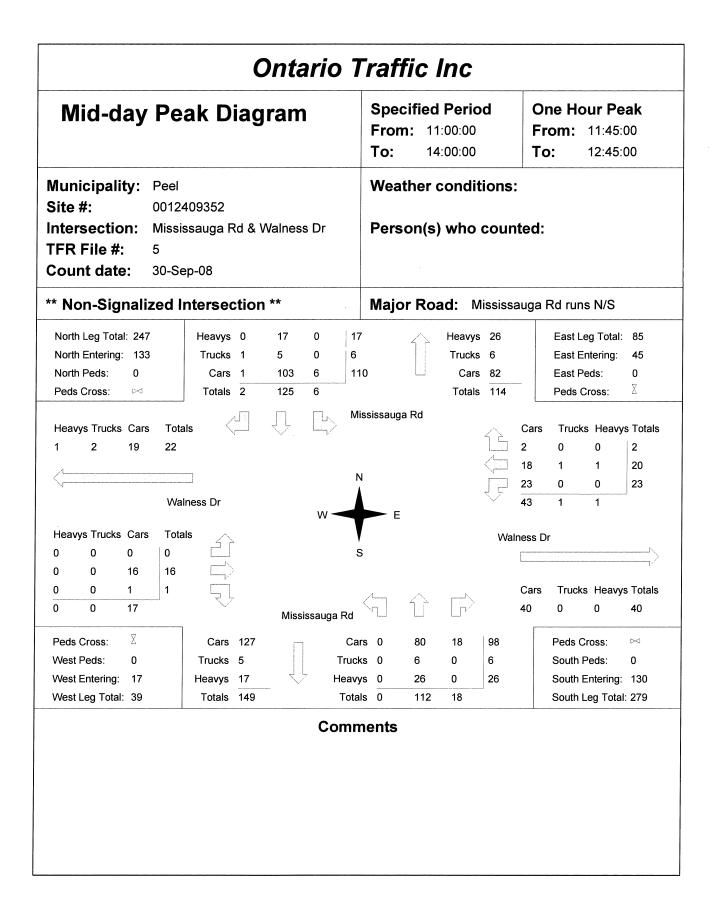
0

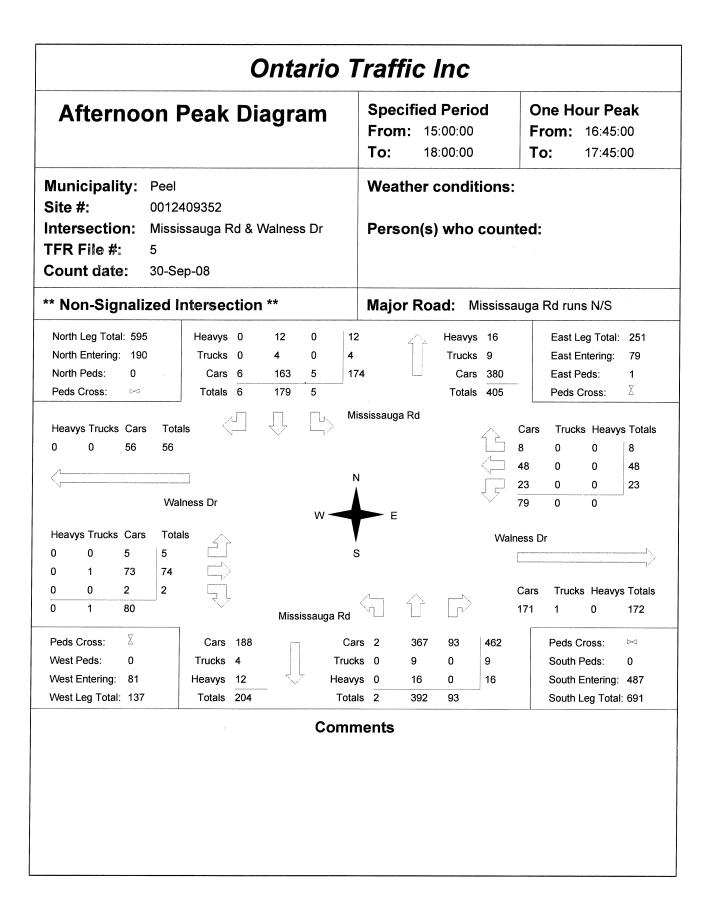
#### Comments

# Ontario Traffic Inc Traffic Count Summary

Intersection: Mississauga Rd & Mayfield Rd Count Date: 30-Sep-08 Municipality: Peel														
Intersection:					Count D	<sup>0ate:</sup> 30-Sep-0	8	Muni						
			ach Tot						Sout	h Appro	oach To	tals		
Hour	Include	es Cars, i	rucks, & H	eavys Grand	Total	North/South Total	Hou	ur	Includ	es Cars, I	rucks, & ⊢	Grand	Total	
Ending	Left	Thru	Right	Total	Peds	Approaches	Endi	ing	Left	Thru	Right	Total	Peds	
7:00:00	1	8	0 67	472	0	9			0	0		100	0	
8:00:00 9:00:00	42 32	364 261	49	473 342	0	576 427		0:00 0:00	13 13	61 45		103 85	0	
11:00:00	0	3	0	3	ŏ	3			0	0	0	0	0	
12:00:00	15	68	23	106	0		12:00		12	59		94	0	
13:00:00 14:00:00	26 13	60 71	14 13	100 97	0		13:00 14:00		17 17	50 83		92 131	0	
15:00:00	0	2	0	2	0	220 5			0	1	2	3	0	
16:00:00	12	67	21	100	ő		16:00		21	171	48	240	Ö	
17:00:00	19	95	30	144	0		17:00		27	269	72	368	0	
18:00:00	22	81	36	139	0	519	18:00	0:00	17	267	96	380	0	
					_									
Totals:	182 <b>East</b>	1080	253 ch Tota	1515	0	3011			137   1006   353   1496   (   West Approach Totals					
			ucks, & H			East/West	Includes Core Trustes 9 Heaving							
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hou Endi		Left	Thru	Right	Grand Total	Total Peds	
7:00:00	3 91	0 233	1 13	4 337	0	4	7:00		0	0	0	0	0	
8:00:00 9:00:00	93	188	13	294	0	859 662	8:00 9:00		39 33	443 307	40 28	522 368	0	
11:00:00	2	5	. 1	8	ő	8	11:00		0	0	0	0	Ö	
12:00:00	20	110	12	142	0	278	12:00		15	105	16	136	0	
13:00:00	29	87	17	133	0	260			14	96	17	127	0	
14:00:00 15:00:00	30	128	18 1	176 4	0	342 4	14:00 15:00		16 0	139 0	11 0	166 0	0	
16:00:00	39	204	23	266	ő		16:00		33	130	9	172	Ö	
17:00:00	42	309	21	372	0	646	17:00		55	193	26	274	0	
18:00:00	57	332	37	426	0	732	18:00	00:0	62	222	22	306	0	
Totals:	406	1599	157	2162	О	4233			267	1635	169	2071	o	
. c.a.c.	.00	. 555				or Traffic Cro	ossino	g Ma			100	2011	- 3	
Hours End		8:00	9:00	12:00	13:00		14	:00	16:00	17:00	18:00			
Crossing \	Values:	573	433	145	139		•	185	276	406	451			







### Ontario Traffic Inc

# **Total Count Diagram**

Municipality: Peel

Site #:

0012409352

Intersection:

Mississauga Rd & Walness Dr

TFR File #:

Count date:

North Leg Total: 3331

North Entering: 1740

North Peds:

Peds Cross:

30-Sep-08

### Weather conditions:

Person(s) who counted:

### \*\* Non-Signalized Intersection \*\*

119 Heavys 2 117 0 Trucks 3 43 1 47 1574 Cars 25 1480 69

Totals 30 1640 70 Major Road: Mississauga Rd runs N/S

Heavys 137 Trucks 45 Cars 1409

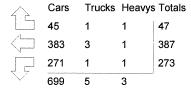
Totals 1591

East Leg Total: 1393 East Entering: 707 East Peds: 3 X Peds Cross:

Totals Heavys Trucks Cars 421 433

Walness Dr

Heavys Trucks Cars Totals 12 12 2 312 316 0 0 8 8 2 2 332



Walness Dr

Mississauga Rd

Mississauga Rd

Cars Trucks Heavys Totals 678 5 3 686

X Peds Cross: West Peds: 0 West Entering: 336 West Leg Total: 769

Cars 1759 Trucks 44 Heavys 118 Totals 1921

Cars 13 1662 1352 297 47 Trucks 1 44 2 Heavys 2 136 1 139 Totals 16 1532

Peds Cross: South Peds: 0 South Entering: 1848 South Leg Total: 3769

### Comments

# Ontario Traffic Inc Traffic Count Summary

Intersection:	Mississa	auga Rd	& Walne	ess Dr	Count [	Date: 30-Sep-0	8	Muni	cipality: Pe	el			
	Nort	h Appro	ach Tot	als							oach To		
	Includ	es Cars, T	rucks, & H		~	North/South			Includ	es Cars, T	rucks, & F		<b></b>
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hou Endi	ur ng	Left	Thru	Right	Grand Total	Total Peds
7:00:00 8:00:00 9:00:00 11:00:00 12:00:00 13:00:00 14:00:00 15:00:00 17:00:00 18:00:00	04906440067	0 471 358 0 118 127 110 0 148 143 165	07302310653	0 502 380 0 126 134 115 0 154 154	000001000	245 0 464 551	8:00 9:00 11:00 12:00 13:00	0:00 0:00 0:00 0:00 0:00 0:00 0:00	0 0 2 0 0 2 1 0 5 3 3	0 131 95 0 105 116 113 0 261 327 384	27 22 0	0 158 119 0 124 131 130 0 310 397 479	0 0 0 0 0 0 0
Totals:	70	1640	30 ach Tota	1740	1	3588	10.00		16 <b>Wes</b>	1532 t <b>Appro</b>	300 ach Tota	1848 a <b>ls</b>	0
			ucks, & H	eavys		East/West			Include	es Cars, T	rucks, & H	eavys	
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hou Endir	ır ng	Left	Thru	Right	Grand Total	Total Peds
7:00:00 8:00:00 9:00:00 11:00:00 12:00:00 13:00:00 14:00:00 15:00:00 16:00:00 17:00:00 18:00:00	0 86 62 0 12 24 18 0 25 26 20	0 115 64 0 17 15 22 0 54 50 50	0 7 3 0 3 0 10 11 10	0 208 129 0 32 39 43 0 89 87 80	0 0 1 0 0 0 0 0 1	56 60 0 124 134	7:00 8:00 9:00 11:00 12:00 13:00 15:00 16:00 17:00	0:00 0:00 0:00 0:00 0:00 0:00 0:00 0:0	0 0 4 0 1 0 0 1 4 2	0 65 46 0 16 17 0 34 42 80	0 2 1 0 1 1 0 0 0 1 2	0 67 51 0 18 17 17 0 35 47 84	000000000
Totals:	273	387	47	707	3	1043			12	316	8	336	0
Hours End Crossing \		8:00 201	9:00 130	12:00 30	13:00 40	or Traffic Cro		3 Ma :00 41	16:00 80	17:00 80	18:00 102		

# Ontario Traffic Inc

Count Date: 30-Sep-08

Intersection: Mississauga Rd & Walness Dr

Major Road: Mississauga Rd

Operating Speed of Major Road: km/hr

Municipality: Peel

Major Road Runs: N/S one lane each way

Operating under free flow conditions

Warrant #1: Minimum Vehicular Volumes.

### A. All Approaches.

**Not Satisfied** 

No. of	No. of Lanes and Lane Each Way 2 Lanes Each Way 3 Lanes														
Lanes	1 Lane E	ach Way	2 Lanes E	Each Way	3 Lanes				Hours	Ending					
Flow Condition	1 Lane F. Flow (Code 1)	1 Lane R. Flow (Code 2)	2 Lane F. Flow (Code 3)	2 Lane R. Flow (Code 4)	or More R. Flow (Code 5)	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00	Percentad Warrar	
100%	480	720	600	900	1125	935	679	300	321	305	588	685	818	100% Yes:	
80%	385	575	480	720	900	930	0/9	300	321	305	300	000	010	No: X	
		10	00% Fulfille	ed		100	100				100	100	100 100		
All Approa- ches		8	0% Fulfille	d										0	
		Actual	% if Belov	v 80%				63	67	64				193	

Total: 693
Actual Average (Total/8): 87%

### **B.** Minor Street Both Approaches.

T					т	r						r		
120	170	120	170	170	075	400	50	50		404	404	104	.,	100%
95	135	95	135	135	2/5	180	50	56	60	124	134	164	Yes: No:	х
	` 10	00% Fulfille	ed		100	100				100	100	100		500
	8	0% Fulfille	d											0
	Actual	% if Belov	v 80%				42	47	50					138
		95 135	95 135 95 100% Fulfille 80% Fulfille		95 135 95 135 135 100% Fulfilled 80% Fulfilled	95 135 95 135 135 275  100% Fulfilled 100  80% Fulfilled	95 135 95 135 135 275 180  100% Fulfilled 100 100  80% Fulfilled	95 135 95 135 135 275 180 50  100% Fulfilled 100 100  80% Fulfilled	95 135 95 135 135 275 180 50 56  100% Fulfilled 100 100  80% Fulfilled	95 135 95 135 135 275 180 50 56 60 100 100 100 80% Fulfilled	95 135 95 135 135 275 180 50 56 60 124  100% Fulfilled 100 100 100 100	95 135 95 135 135 135 275 180 50 56 60 124 134 134 100% Fulfilled 100 100 100 100 100	275 180 50 56 60 124 134 164  95 135 95 135 135  100% Fulfilled  100 100  80% Fulfilled  100 100	95   135   95   135   135   135   136   50   56   60   124   134   164   Yes: No: No: No: No: No: No: No: No: No: No

Total: 638
Actual Average (Total/8): 80%

# Ontario Traffic Inc

Count Date: 30-Sep-08

Intersection: Mississauga Rd & Walness Dr

Major Road: Mississauga Rd

Operating Speed of Major Road: km/hr

Municipality: Peel

Major Road Runs: N/S one lane each way

Operating under free flow conditions

Warrant #2: Delay to Cross Traffic.

### A. Major Street Both Approaches.

Not Satisfied

		Minim	um Require	ements											
No. of Lanes	1 Lane E	ach Way	2 Lanes E	Each Way	3 Lanes				Hours	Ending					
Flow Condition	1 Lane F. Flow (Code 1)	1 Lane R. Flow (Code 2)	2 Lane F. Flow (Code 3)	2 Lane R. Flow (Code 4)	or More R. Flow (Code 5)	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00		centage Warrant
100%	480	720	600	900	1125	660	499	250	265	245	464	EE1	GE A	Vasi	100%
80%	385	575	480	720	900	000	499	250	205	245	464	551	654	Yes: No:	х
		10	00% Fulfille	ed		100	100					100	100		400
All Approa- ches		8	0% Fulfille	d							80				80
		Actual	% if Belov	v 80%				52	55	51					158

Total: 638
Actual Average (Total/8): 80%

### **B.** Traffic Crossing Major Street.

100%	50	75	50	75	75	204	420	20	40	44	00	00	400	V	100%
80%	40	60	40	60	60	201	130	30	40	41	80	80	102	No:	x
AII		10	00% Fulfille	ed		100	100				100	100	100		500
All Approa- ches		8	0% Fulfille	d					80	80					160
		Actual	% if Belov	v 80%				60						Yes: No:	60

Total: 720
Actual Average (Total/8): 90%

# **Appendix B**

Capacity and Level of Service Definitions



# CAPACITY ANALYSIS AT UNSIGNALIZED INTERSECTIONS Highway Capacity Manual Methodology

The level of service at an unsignalized intersection is determined on the basis of control delay for each critical lane. This method of analysis is taken from the Highway Capacity Manual, Special Report 209, by the Transportation Research Board, 2000.

The average control delay for any particular critical movement (control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay) is a function of the service rate or capacity of the approach and degree of saturation. The level of service criteria for unsignalized intersections is outlined below and is related to ranges in vehicle delay.

Level of Service	Expected Delay to Minor Street Traffic	Average Control Delay 'd' (sec/veh)
Α	Little or no delays	0 < d ≤ 10
В	Short traffic delays	10 < d ≤ 15
С	Average traffic delays	15 < d ≤ 25
D	Long traffic delays	25 < d ≤ 35
E	Very long traffic delays	35 < d ≤ 50
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	d > 50



### CAPACITY ANALYSIS AT SIGNALIZED INTERSECTIONS Highway Capacity Manual Methodology

The capacity of signalized intersections has been determined in terms of delay taken from the Highway Capacity Manual, by the Transportation Research Board, 2000.

To assist in clarifying the arithmetic analysis associated with traffic engineering, it is often useful to refer to "Level of Service". Level of Service (LOS) for signalized intersections is defined in terms of delay, which is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Only the portion of total delay attributed to the control facility is quantified. This control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay. The following table describes in detail the characteristics of each level:

Level of Service	Features	Control Delay (sec/veh)
A	Describes operations with very low control delay, up to 10 seconds/ vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all at this LOS. Short cycle lengths may also contribute to low delay.	≤ 10
В	Describes operations with control delay greater than 10 seconds and up to 20 seconds/vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop at this level than at LOS A, causing longer average delays.	> 10 to 20
С	Describes operations with control delay greater than 20 seconds and up to 35 seconds/vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	> 20 to 35
D	Describes operations with control delay greater than 35 seconds and up to 55 seconds/vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures become noticeable.	> 35 to 55
E	Describes operations with control delay greater than 55 seconds and up to 80 seconds/vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	> 55 to 80
F	Describes operations with control delay in excess of 80 seconds/vehicle. This <i>oversaturation</i> , considered to be unacceptable to most drivers, occurs when arrival flow rates exceed the design capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such high delay levels.	> 80

# **Appendix C**

2008 Intersection Capacity
Calculations AM/ PM Peak Hour

	•	-	*	1	4	1	4	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	<b>†</b>	7	Ť	f)		) Y	1→		ħ	1>	
Volume (vph)	14	670	269	312	490	7	79	115	189	24	490	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	5.6	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Fr	1.00	1.00	0.85	1.00	1.00	AND COMPANY OF SAME SAME SAME SAME SAME SAME SAME SAME	1.00	0.91	er Adde og Addes og Adde og Addes og Addes	1.00	1.00	and enchelones independent in the second
FIt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	1824	1566	1716	1821	account of the state of the sta	1750	1664	eshikana hilic na hilicaca hilican	1716	1821	51:30368 II 31:34:30:303441
FIt Permitted	0.48	1.00	1.00	0.08	1.00		0.12	1.00		0.51	1.00	
Satd. Flow (perm)	794	1824	1566	148	1821	49 a. de 10 12 a. 1 a	214	1664	er verg ein zweit, im beken der Stille u. b.	926	1821	0.0000000000000000000000000000000000000
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00
Adj. Flow (vph)	14	670	269	312	490	7	79	115	189	24	490	8
RTOR Reduction (vph)	0	0	128	0	0	0	0	49	0	0	1	0
Lane Group Flow (vph)	14	670	141	312	497	0	79	255	0	24	497	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Perm	pm+pt			pm+pt			Perm		
Protected Phases		2		1	6		3	8		. •	4	
Permitted Phases	2		2	6	· ·		8	under state <del>T</del> errit		4		
Actuated Green, G (s)	45.7	45.7	45.7	66.7	66.7		40.1	40.1		31.4	31.4	
Effective Green, g (s)	49.3	49.3	46.7	66.7	70.3		40.1	43.7		35.0	35.0	
Actuated g/C Ratio	0.41	0.41	0.39	0.56	0.59		0.33	0.36		0.29	0.29	
Clearance Time (s)	6.6	6.6	6.6	3.0	6.6		3.0	6.6		6.6	6.6	#1457#3666#36545#6
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	326	749	609	317	1067		144	606		270	531	
v/s Ratio Prot	0_0	0.37	333	c0.15	0.27		c0.03	0.15		2.0	c0.27	
v/s Ratio Perm	0.02		0.09	c0.40			0.16			0.03		
v/c Ratio	0.04	0.89	0.23	0.98	0.47		0.55	0.42		0.09	0.94	
Uniform Delay, d1	21.2	32.9	24.6	38.2	14.2		31.9	28.6		30.9	41.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.73	0.85	
Incremental Delay, d2	0.1	14.0	0.4	46.2	0.7		14.2	2.1		0.6	25.1	
Delay (s)	21.3	46.9	25.0	84.4	14.8		46.1	30.8		23.3	60.2	
_evel of Service	С	D	C	F	В		D	C		C	E	
Approach Delay (s)		40.4			41.7		_	33.9		-	58.5	
Approach LOS		D			D			C			Ē	
ntersection Summary												
HCM Average Control Delay			43.4	H	CM Level	of Servic	е		D			
HCM Volume to Capacity ratio	)		0.91									
Actuated Cycle Length (s)			120.0	Sı	m of lost	time (s)		Carata Service and American Actual American Services	9.0			
ntersection Capacity Utilizatio	n		96.5%		U Level o				F			
Analysis Period (min)			15									

		-	*	<b></b>	-	1	1	1	<b>/</b>	<b>\</b>	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Volume (veh/h)	1	89	1	78	115	6	1	122	29	36	464	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	89	- 1	78	115	6	1	122	29	36	464	7
Pedestrians			Corest Scantilization (November							entiriane di America Conservi de		State of Automobilities (Cr.)
Lane Width (m)												
Walking Speed (m/s)		riska sitalaani baaritaan					Coesa de la Coesa de la composición de la coesa de					ob-900-agridació
Percent Blockage												
Right turn flare (veh)												onegrangsamma
Median type							10000000	None			None	
Median storage veh)				ancontrol and Gaggara						Therefore beautiful		
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	742	692	468	724	682	136	471			151		
vC1, stage 1 conf vol			and the second									
vC2, stage 2 conf vol	740	000	400	704	000	400	474			454		
vCu, unblocked vol	742	692	468	724	682	136	471			151		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
tF (s) p0 queue free %	ა.s 100	4.0 75	ა.ა 100	ა.ა 71	4.0 69	ა.ა 99	100			2.2 97		
cM capacity (veh/h)	246	357	600	271	365	99 917	1101			1424		
**************************************		VVIDTUS NUTRICIS (0012) 44/17/2014	12301-0-1270276-12301-0-127076-0-1	20-44-0-20-20-20-20-20-20-20-20-20-20-20-20-2	303	917	1101			1424		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	91	199	152	507								
Volume Left	1	78	1	36						caensides sees to		entrofekrefelmi
Volume Right	1	6	29	7								
cSH	357	327	1101	1424								
Volume to Capacity	0.25	0.61	0.00	0.03								
Queue Length 95th (m)	7.6	28.7	0.0	0.6								
Control Delay (s)	18.5	31.8	0.1	8.0	17.00							
Lane LOS	C 18.5	D 31.8	A 0.1	A 0.8								
Approach Delay (s) Approach LOS	18,5 C	31,6 D	U, I	U.8						Park ex		
Intersection Summary												
Average Delay	adati o suggio o suggio o o o o o o o o o o o o o o o o o o	antonia de la composición dela composición de la composición de la composición dela composición dela composición dela composición de la composición dela composición de la composición dela composición de	8.9	evitigi angani evitani an			us and a second	Soundiermenier	namina waning order	an decorphism and the	acolero gracia e rogge de la compansión de	0.00.00.00.00.00.00.00.00.00.00.00.00.0
Intersection Capacity Utiliza	ation		62.5%	IC	U Level o	of Service			В			
Analysis Period (min)			15									

	•	-	•	<b> </b>	-	1	4	1	1	-	<b> </b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Y	ĵ,		*	1		ሻ	1>		ሻ	ĵ»	
Volume (vph)	41	468	43	108	244	18	14	59	25	50	350	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	22/04/9023/54/9027/54/03
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99	EED 01-9000101-01000101-01000101	1.00	0.99	MERCHANIST AND PROPERTY OF PROPERTY OF THE PRO	1.00	0.96	CONTRACTOR STATEMENT OF THE PROPERTY OF THE PR	1.00	0.98	(0.000)46(0.000)46(0.000)46(0
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1722	Marin Addition Addition of the Collection of the	1623	1630	AND THE PROPERTY OF THE PROPERTY OF	1750	1566	3. Maria (12. page 12. page 12	1653	1770	0.000-0.000-0.000
FIt Permitted	0.49	1.00		0.25	1.00		0.41	1.00		0.70	1.00	
Satd. Flow (perm)	909	1722	Der Out Patrice May Patrice Carbonics - Pat Patrice	419	1630		747	1566	9575B1 (4.54B1 (4.54B1)941 G1.5	1222	1770	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	41	468	43	108	244	18	14	59	25	50	350	64
RTOR Reduction (vph)	0	4	0	0	3	0	0	9	0	0	4	0
Lane Group Flow (vph)	41	507	0	108	259	0	14	75	0	50	410	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4		, 0,,,,	8			2		. 0	6	
Permitted Phases	4			8			2	7		6		
Actuated Green, G (s)	47.0	47.0		47.0	47.0		59.8	59.8		59.8	59.8	
Effective Green, g (s)	50.6	50.6		50.6	50.6		63.4	63.4		63.4	63.4	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.53	0.53		0.53	0.53	
Clearance Time (s)	6.6	6.6		6.6	6.6		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	383	726		177	687		395	827		646	935	
v/s Ratio Prot	303	c0.29		111	0.16		333	0.05		040	c0.23	
v/s Ratio Perm	0.05	00.Z0		0.26	0.10		0.02	0.00		0.04	00.20	
v/c Ratio	0.11	0.70		0.61	0.38		0.02	0.09		0.04	0.44	
Uniform Delay, d1	21.0	28.4		27.0	23.9		13.6	14.0		13.9	17.4	
Progression Factor	1.00	1.00		1.00	1.00		0.62	0.55		1.00	1.00	
Incremental Delay, d2	0.3	3.7		8.7	0.7		0.02	0.33		0.2	1.50	
Delay (s)	21.3	32.2		35.7	24.6		8.6	7.9		14.2	18.9	
Level of Service	Z 1.3	32.2 C		55.7 D	24.0 C		0.0 A	7.3 A		14.2 B	10.9	
Approach Delay (s)	C	31.4		U	27.8			8.0		U	18.4	
Approach LOS		31. <del>4</del> C			27.0 C			0.0 A			10.4 B	
Intersection Summary												
HCM Average Control Delay			24.9	Н	CM Level	of Servic	е		С			POSTANISTI DE LA COMPANION DE
HCM Volume to Capacity ra	tio		0.55			Sec.						
Actuated Cycle Length (s)			120.0		ım of lost		et eggenerationer		6.0			
ntersection Capacity Utiliza	tion		67.0%	IC	U Level c	f Service			С			
Analysis Period (min)			15				ledazadakkazatalkak menikalan har		orthographic permitting of the control of the contr	- ESSAND DESANDER VALUE OF THE STATE OF THE		
Description: Mayfield Rd												
c Critical Lane Group												

	•	-	*		4-	1	4	†	-	-	↓	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	ሻ	<b>+</b>	7	T	1→		Y	4		M	1→	
Volume (vph)	45	582	100	211	744	41	173	376	241	23	172	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	ookamay kadaan kadaan ka saraan k	3.0	3.0	t vie mie Geen de Weene Warn	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99	rige to a grant page to the feet entre	1.00	0.94		1.00	0.98	380/3/23/02/3/04/5
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1668	1842	1479	1716	1829		1750	1724		1785	1701	
FIt Permitted	0.17	1.00	1.00	0.09	1,00		0.47	1.00		0.21	1.00	
Satd. Flow (perm)	298	1842	1479	169	1829		865	1724		390	1701	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	582	100	211	744	41	173	376	241	23	172	25
RTOR Reduction (vph)	0	0	0	- 0	2	0	0	18	0	0	4	
Lane Group Flow (vph)	45	582	100	211	783	0	173	599	0	23	193	(
Heavy Vehicles (%)	7%	2%	8%	4%	2%	0%	2%	3%	2%	0%	9%	4%
Turn Type	Perm	<i></i> 10	Free	pm+pt	<u>_</u> 70	070	pm+pt	070	270	Perm	J/0	7.4
Protected Phases	1 61111	4	1166	3	8		5 S	2		L CIIII	6	
Permitted Phases	4	7	Free	8	•		2			6	U	
Actuated Green, G (s)	42.0	42.0	120.0	58.9	58.9		47.9	47.9		35.4	35.4	
Effective Green, g (s)	45.6	45.6	120.0	58.9	62.5		47.9	51.5		39.0	39.0	
Actuated g/C Ratio	0.38	0.38	1.00	0.49	02.5		0.40	0.43		0.32	0.32	
Clearance Time (s)	6.6	6.6	1.00	3.0	6.6		3.0	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		3.0	5.0		3.0	5.0		5.0	5.0	
		ALD THE STREET STREET	4470							1222		
Lane Grp Cap (vph)	113	700	1479	262	953		415	740		127	553	
v/s Ratio Prot	0.45	0.32	0.07	0.09	c0.43		0.03	c0.35		0.00	0.11	
v/s Ratio Perm	0.15	0.00	0.07	0.30			0.13			0.06		
v/c Ratio	0.40	0.83	0.07	0.81	0.82		0.42	0.81		0.18	0.35	
Uniform Delay, d1	27.2	33.7	0.0	30.0	24.1		24.5	30.0		29.0	30.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.80	0.81	
Incremental Delay, d2	4.8	9.2	0.1	16.3	6.5		0.7	9.3		3.1	1.7	filozofia silikoza
Delay (s)	31.9	42.9	0.1	46.3	30.6		25.2	39.3		26.4	26.7	
Level of Service	С	D	Α	D	С		С	D		С	C	
Approach Delay (s)		36.4			33.9			36.2			26.7	
Approach LOS		D			С			D			C	
ntersection Summary												
HCM Average Control Delay			34.6	HO	CM Level	of Service	е		С			
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			120.0	Sı	ım of lost	time (s)			6.0			
ntersection Capacity Utilization	1		107.0%	IC	U Level o	f Service			G			
Analysis Period (min)			15	The second secon		The second secon						- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1-
Description: Bovaird Dr. W												

	•	-	•	<b>1</b>	-	1	•	1	1	<b>\</b>	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			44			4			44	
Volume (veh/h)	5	74	2	23	48	8	2	392	93	5	179	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	74	2	23	48	8	2	392	93	5	179	6
Pedestrians	winkowateh overhinover chowateh over		The hand the court of the country was property		SOLT Probable Through 1000 to the Sold Probable		MO SProject Title sky of the control of the control	The control is control to the control to constitution on which is				
Lane Width (m)												
Walking Speed (m/s)						O Amareti Reason Asarath Nais		Alexandr Nacional Area and the Control of Co	natriusas kusis kwatsiy		entah-o-estah-o-estah-o-estah-o-es	
Percent Blockage												
Right turn flare (veh)	ni shikisa edil saat danak sae	Principal dispensive analysis assessed		stantif sandahanat da satu sa		Constitution of the second				o do An enda Ar de do Andreio Chare		Scalab Howard Spines III
Median type								None			None	
Median storage veh)					ELONAL COMPANY COM	95 00 NNS 24 NNS 2 NNS 2 NNS				entriguent diaments are etricias e	sila da di da	Association (specific language to )
Upstream signal (m)												
pX, platoon unblocked			and the property of the second									
vC, conflicting volume	666	681	182	674	638	438	185			485		
vC1, stage 1 conf vol								A TRANSPORT AND				
vC2, stage 2 conf vol							·					
vCu, unblocked vol	666	681	182	674	638	438	185			485		
C, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
(F (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	80	100	93	88	99	100			100		
cM capacity (veh/h)	335	372	866	312	395	623	1402			1088		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	81	79	487	190								
/olume Left	5	23	2	5		onen seronen ser						Sinternation of the same
Volume Right	2	8	93	6								
:SH	374	380	1402	1088		n Makata Basin Ng Makata Nasa In				engliseraphism amenitation		niemsteinnationers
Volume to Capacity	0.22	0.21	0.00	0.00								
Queue Length 95th (m)	6.2	5.9	0.0	0.1	na ann an							Forest December Security
Control Delay (s)	17.3	17.0	0.0	0.3								
ane LOS	C	_ C	A	_ A			Version seed to the			raeron broken		instructions:
Approach Delay (s)	17.3	17.0	0.0	0.3						4		
Approach LOS	С	С										
ntersection Summary												
Average Delay			3.4									
ntersection Capacity Utiliza	tion		44.8%	ICI	J Level o	f Service			Α			
Analysis Period (min)		No consideration of the constraint of the constr	15									

l l		₩	₩		_	7			7	♦	4
EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
	13		'n	₽		ነና	1→		ሻ	\$	
65	213	26	47	353	31	20	276	96	21	106	3(
1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.0	3.0	V CAA-6400 800 HERBY NEW SERVICE (ABOVE	3.0	3.0	NAME OF STREET OF STREET STREET,	3.0	3.0	OF COSES AND SECURITY OF COSES OF	3.0	3.0	
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1.00	0.98	madelia a Maria Maria Ma	1.00	0.99	CONTRACTOR OF STREET	1.00	0.96	8. MERCEL PROPERTY OF MARKET	1.00	0.96	10/2006/00/2019/00/00/00
0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
1750	1814	randalari eri dela santata	1526	1806		1552	1707	s-bland-frame-shares-bland	1623	1662	292240000000000000000000000000000000000
0.27	1.00		0.46	1.00		0.66	1.00		0.48	1.00	
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	0.40		0.20	0.66		0.03	0.34			0.13	
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on		COMPANIES CONTRACTOR C									
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	65 1900 3.5 3.0 1.00 0.95 1750 0.27 490 1.00 65 0 65 2% Perm 4 34.6 38.2 0.32 6.6 5.0 156 0.13 0.42 32.1 1.00 3.7 35.9	65 213 1900 1900 3.5 3.5 3.0 3.0 1.00 1.00 1.00 0.98 0.95 1.00 1750 1814 0.27 1.00 490 1814 1.00 1.00 65 213 0 5 65 234 2% 2% Perm  4 34.6 34.6 38.2 38.2 0.32 0.32 6.6 6.6 5.0 5.0 156 577 0.13 0.13 0.42 0.40 32.1 32.0 1.00 1.00 3.7 1.0 35.9 33.0 D C 33.6 C	65 213 26 1900 1900 1900 3.5 3.5 3.5 3.0 3.0 1.00 1.00 1.00 0.98 0.95 1.00 1750 1814 0.27 1.00 490 1814 1.00 1.00 1.00 65 213 26 0 5 0 65 234 0 2% 2% 1%  Perm  4 34.6 34.6 38.2 38.2 0.32 0.32 6.6 6.6 5.0 5.0 156 577 0.13 0.13 0.42 0.40 32.1 32.0 1.00 1.00 3.7 1.0 35.9 33.0 D C 33.6 C	65 213 26 47 1900 1900 1900 1900 3.5 3.5 3.5 3.5 3.0 3.0 3.0 1.00 1.00 1.00 1.00 1.00 0.98 1.00 0.95 1.00 0.95 1750 1814 1526 0.27 1.00 0.46 490 1814 735 1.00 1.00 1.00 1.00 65 213 26 47 0 5 0 0 65 234 0 47 2% 2% 1% 17% Perm Perm 4 8 34.6 34.6 34.6 34.6 38.2 38.2 38.2 0.32 0.32 0.32 6.6 6.6 6.6 5.0 5.0 5.0 156 577 234 0.13 0.13 0.06 0.42 0.40 0.20 32.1 32.0 29.8 1.00 1.00 1.00 1.00 3.7 1.0 0.9 35.9 33.0 30.7 D C 33.6 C	1	The   The   The   State   St	T	T	T	T	T

# **Appendix D**

**Collision Report Summary** 

# (T) raffic

E ngineering

Software

# Region of Peel

# **ACCIDENT ANALYSIS BY LOCATION REPORT**

Consice Report

FROM: January 01, 2002 TO: December 31, 2009

MUNICIPALITY:BRAMPTON INTERSECTION ID: INT\_7352

DESCRIPTIONBOVAIRD DR W @ MISSISSAUGA RD

Classification of Accident	Non fortining	P D oply	\do \C \d	Non-fatal injury	Vino C A	P.D. only	P.D. only	Non-fatal injury	Non-fatal injury	P.D. only	P.D. only	P.D. only	P.D. only	P.D. only	Vino CI d	Non-fatal injury	P.D. only	P.D. only	P.D. only	P.D. only	P.D. only	P.D. only	P.D. only	P.D. only	P.D. only	P.D. only	Vano Cl d	Vino Ci d	Vino C. 9	ylao C d	yino :: • • • • • • • • • • • • • • • • • •	Non-fatal injury
Initial Imnact Type	Rear end	SMV - Other	Rear end	Turning movement	Rear end	Rear end	Rear end	Turning movement	Rear end	Turning movement	Sideswipe	Turning movement	Rear end	Angle (t-bone)	SMV - Other	Rear end	Rear end	Angle (t-bone)	SMV - Other	Rear end	Sideswipe	Rear end	Rear end	Angle (t-bone)	Angle (t-bone)	Angle (t-bone)	Turning movement	Angle (t-bone)	Rear end	Sideswine	Sideswine	Angle (t-bone)
Road 1 Surface Condition	20	ا کا	ριν	Dry	Wet	Dry	Dry	) Dry	Dry	Dry	) Au	Wet	Dry	Dry	, AD	, סיס	Dry	Wet	Wet	Dry	ΔI	. <b>∠</b> IQ	, <u>2</u> 0	Wet		Dry						
Light	Davlight	Daylight	Dark	Dark	Dark	Daylight	Daylight	Daylight	Dark	Daylight	Daylight	Dark	Daylight	Daylight	Dark	Daylight	Daylight	Daylight	Dawn	Daylight	Dusk	Daylight	Daylight	Daylight	Daylight	Daylight	Daylight	Daylight	Daylight	Daylight	Daylight	Daylight
<b>Environment Condition 1</b>	Clear	Clear	Clear	Clear	Rain	Clear	Clear	Clear	Clear	Clear	Clear	Rain	Clear	Clear	Clear	Clear	Clear	Clear	Rain	Clear	Clear	Clear	Clear	Clear	Clear							
Date & Time	12-Sep-02 8:55a	18-Sep-02 2:05a	31-Oct-03 7:39a	15-Nov-03 5:46p	13-Dec-03 7:00p	24-May-04 12:50p	02-Aug-04 6:30p	08-Aug-04 4:32p	22-Nov-04 7:29p	19-Apr-05 3:22p	05-May-05 8:20a	03-Aug-05 6:50a	03-Aug-05 11:30a	18-Aug-05 8:00p	09-Sep-05 2:12a	08-Nov-05 8:40a	13-Dec-05 11:30a	23-Dec-05 1:06p	25-Jan-06 6:01a	07-May-06 7:25p	29-May-06 9:30p	07-Jul-06 3:45p	10-Aug-06 9:40a	03-Oct-06 3:04a	08-Oct-06 3:20p	08-Oct-06 4:45p	06-Feb-07 12:43p	15-Feb-07 3:14p	19-Feb-07 7:30a	03-Mar-07 8:54a	08-Mar-07 11:50a	30-Mar-07 4:53p
Accident ID																																

INTERSEC	INTERSECTION ID: INT_7352	MUNICIPALITY:E	RAMPTON	DESCRIPTIONBOVAIRD DR W @ MISSISSAUGA RD	MISSISSAUGA RD	cont'd
Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
07068779	18-Apr-07 3:30p	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
07077982S	01-May-07 4:48a	Clear	Daylight	Dry	Sideswipe	P.D. only
07088537	16-May-07 3:34p	Rain	Daylight	Wet	Rear end	P.D. only
07088662	16-May-07 4:50p	Rain	Daylight	Wet	Rear end	P.D. only
07101696S	03-Jun-07 10:30a	Clear	Daylight	Dry	Rear end	P.D. only
07101724	03-Jun-07 12:18p	Clear	Daylight	Dry	Rear end	P.D. only
07102231	04-Jun-07 7:41a	Rain	Daylight	Wet	Rear end	P.D. only
07124808	03-Jul-07 11:04a	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
07133244	14-Jul-07 12:21p	Clear	Daylight	λūΩ	Angle (t-bone)	Non-fatal injury
07150054	05-Aug-07 6:30p	Clear	Daylight	. A	Rear end	P.D. only
07166679	27-Aug-07 11:26a	Clear	Dark	λίΩ	SMV - Other	P.D. only
07167818	29-Aug-07 2:56p	Clear	Daylight	. Y.O	Turning movement	P.D. only
07221517S	13-Nov-07 6:00p	Clear	Dark	ViQ	Rear end	P.D. only
07235569	06-Dec-07 10:20a	Clear	Daylight	λū	Angle (t-bone)	P.D. only
07244564	20-Dec-07 8:20a	Clear	Daylight	Wet	Angle (t-bone)	P.D. only
07248302	26-Dec-07 10:47a	Clear	Daylight	λίΩ	Angle (t-bone)	P.D. only
08000720	02-Jan-08 9:45a	Clear	Daylight	λία	Angle (t-bone)	P.D. only
08024358	08-Feb-08 11:30a	Clear	Daylight	Wet	Rear end	P.D. only
08027941	13-Feb-08 4:28p	Clear	Daylight	Wet	Rear end	P.D. only
08037702	28-Feb-08 3:18p	Clear	Daylight	, Au	Angle (t-bone)	P.D. only
08048172	15-Mar-08 12:45p	Clear	Daylight	λία	Rear end	P.D. only
08049504	17-Mar-08 4:15p	Clear	Daylight	Dry	Sideswipe	P.D. only
08054809	26-Mar-08 1:30p	Clear	Daylight	Dry	Angle (t-bone)	Non-fatal injury
08079809	03-May-08 2:40a	Fog, mist, smoke, dust	Dark	Wet	Approaching (head on)	P.D. only
08084758	10-May-08 11:46a	Clear	Daylight	Dry	Turning movement	P.D. only
08092736	21-May-08 9:23p	Clear	Dark	Dry	Turning movement	P.D. only
08096584	27-May-08 7:30a	Clear	Daylight	Dry	Turning movement	Other
08107283	10-Jun-08 8:30a	Rain	Daylight	Wet	Sideswipe	P.D. only
08112426	17-Jun-08 8:58a	Clear	Daylight	Dry	Turning movement	Non-fatal injury
08112531	17-Jun-08 11:45a	Clear	Daylight	Dry	Rear end	P.D. only
08049446	17-Jun-08 3:51p	Clear	Daylight	Dry	Angle (t-bone)	Non-fatal injury
08120271	27-Jun-08 3:25p	Clear	Daylight	Dry	Rear end	P.D. only
08120318	27-Jun-08 4:20p	Clear	Daylight	Dry	Angle (t-bone)	Non-fatal injury
08138615	22-Jul-08 8:40a	Clear	Daylight	Dry	Rear end	P.D. only
08201358	27-Aug-08 5:20p	Clear	Daylight	Dry	Rear end	P.D. only
08192860	05-Oct-08 4:51p	Clear	Daylight	Dry	Rear end	P.D. only
08199407	15-Oct-08 6:00a	Clear	Dark		SMV - animal or pedestrian	
08202134	18-Oct-08 3:35p	Clear	Daylight		Rear end	

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**LOCATION TOTAL COLLISIONS:** 

INTERSEC	INTERSECTION ID: INT_7352	2 MUNICIPALITY:BRAMPTON	MPTON	DESCRIPTIONBOVAIRD DR W @ MISSISSAUGA RD	@ MISSISSAUGA RD	contid
Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
08207271	27-Oct-08 4:19a	Clear	Dark	2	SMV Other	
08223316	19-Nov-08 8:31p	Snow	Dark		SMV - Other	P.D. only
09000291	01-Jan-09 11:27a	Clear	Davlight	Packed snow	Turning movement	7.0. only
88960060	17-Jan-09 10:15p	Snow	Dark	Loose snow	SMV - Other	ان. تا تا چیون در تا
09010577	19-Jan-09 8:00a	Other	Daylight	Sush	Turning movement	ייי פ פוס כי כי
09010367	19-Jan-09 8:00a	Other	Daylight	Wet	Turning movement	
09017016	28-Jan-09 12:00p	Other	Dawn	Packed snow	Rear end	ر الله : : : و الله : : : : : : : : : : : : : : : : : :
09028506	18-Feb-09 1:25p	Snow	Daylight	Wet	Rear end	ر اال الا الا
09033701	27-Feb-09 6:40a	Rain	Daylight	Wet	Turning movement	Non-fatal injury
09041155	11-Mar-09 3:30p	Clear	Daylight	2 0	Turning movement	
09042423	13-Mar-09 5:08p	Clear	Daylight	20	Rear end	yac □ a
09078720	09-May-09 8:40a	Rain	Daylight	Wet	Other	(iii) : : : :   4
09108955	22-Jun-09 12:01a	Clear	Dark	ماط	Rear end	(iii) :: 0
09109037	22-Jun-09 7:52a	Clear	Davlight		Rear end	ال ا
09124047	12-Jul-09 2:21p	Clear	Daylight	کا کا	Rear end	Non-fatal injury
09148732	15-Aug-09 8:50p	Clear	Dark	20	SMV - Other	P D only
09151929	20-Aug-09 9:59a	Clear	Daylight	20	Rear end	(iii) :::
09157369	27-Aug-09 2:53p	Clear	Daylight	` <u>ר</u> ם	Approaching (head on)	Non-fatal injury
09193186	18-Oct-09 7:41p	Clear	Dark, artificial	νΩ	Angle (t-bone)	P.D. only
09206362	08-Nov-09 10:00a	Clear	Daylight	Dry	Rear end	P.D. only
09214390	21-Nov-09 3:17p	Other	Other	Other	Other	Other
09215270	23-Nov-09 8:45a	Fog, mist, smoke, dust	Other	Dry	Rear end	P.D. only
09232938	21-Dec-09 10:27p	Clear	Dark	Dry	SMV - Other	P.D. only

ident											10
Classification of Accident	P.D. only	yluo Cl d	P.D. only	Other	P.D. only	P.D. only	P.D. only	Non-fatal injury	P.D. only	Non-fatal injury	LOCATION TOTAL COLLISIONS:
Initial Impact Type	Anale (t-bone)	Rear end	Rear end	Other	Angle (t-bone)	Rear end	Rear end	Rear end	Other	Approaching (head on)	LOCATION TO
Road 1 Surface Condition	Dry	Wet	Loose snow	Other	Dry	Dry	Wet	Wet	Dry	Wet	
Light	Daylight	Dusk	Dusk	Other	Daylight	Daylight	Dark	Dark, artificial	Daylight	Daylight	
<b>Environment Condition 1</b>	Clear	Clear	Snow	Other	Clear	Clear	Fog, mist, smoke, dust	Snow	Clear	Fog, mist, smoke, dust	
Date & Time	15-Aug-02 9:15a	13-Jan-03 4:50p	13-Jan-03 5:30p	24-Jul-03 9:45p	22-Jul-05 11:15a	05-Sep-06 5:30p	07-Jan-08 4:51p	26-Jan-08 7:10p	25-May-09 10:34a	19-Nov-09 1:50p	
Accident ID	020855	03007694	037694	030873	05000804	06174379S	08000020	08016264	09000665	09001319	

DESCRIPTIONMAYFIELD RD @ MISSISSAUGA RD

MUNICIPALITY:BRAMPTON

INTERSECTION ID: INT\_5888

Date & Time E	Ш	<b>Environment Condition 1</b>	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident	Ę
26-Oct-04 6:53a Fog, mist, smoke, dust	Fog, mist, smoke, dust		Dark	ΔΟ	SMV - Other	VID. Only	
			Dark	Wet	SMV - Other	Vino CI d	
			Daylight	20	SMV - Other	Vino CI A	
			Dark		SMV - animal or pedestrian	S only	
			Daylight		Approaching (head on)	Non-fatal injury	
			Daylight	בים	Angle (t-bone)	Non-fatal injury	
18-Jul-08 9:55a Clear			Daylight	בים	Turning movement	P.D. only	
			Daylight	סיל	Rear end	P.D. only	
			Daylight	, אַם סיי	Rear end	VIO. CIA	
			Dark	) O	Angle (t-bone)	Vino CI d	
14-Oct-08 7:06a Clear	Clear		Daylight	Dry	Turning movement	P.D. only	
					LOCATION TO	LOCATION TOTAL COLLISIONS:	7

DESCRIPTIONMISSISSAUGA RD @ WANLESS DR

**MUNICIPALITY:BRAMPTON** 

INTERSECTION ID: INT\_6391

Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
02003302	06-Jan-02 7:00p	Snow	Dark	92	SMV - Other	P.D. only
02027326	27-Feb-02 12:00p	Clear	Daylight	Loose sand or gravel	Sideswipe	P.D. only
02111768	30-Jun-02 12:20p	Clear	Daylight	Dry	Rear end	P.D. only
02227788	16-Dec-02 8:45a	Clear	Daylight	- <u>eo</u>	Approaching (head on)	Non-fatal injury
03003794		Clear	Dark	Wet	Angle (t-bone)	P.D. only
04029685	13-Feb-04 9:07a	Clear	Daylight	Loose snow	SMV - Other	P.D. only
04224367	10-Nov-04 8:10a	Clear	Dark	Dry	Turning movement	P.D. only
05006839	12-Jan-05 2:16p	Rain	Daylight	Wet	SMV - Other	Non-fatal injury
05011653	20-Jan-05 12:15p	Clear	Daylight	Dry	Rear end	P.D. only
05052080	22-Mar-05 7:55a	Clear	Daylight	Dry	Rear end	P.D. only
05148177	27-Jul-05 9:20p	Clear	Dark	Dry	Rear end	P.D. only
05225702	17-Nov-05 6:33p	Clear	Dark	Wet	Rear end	P.D. only
05249793	22-Dec-05 5:35p	Snow	Dark	Loose snow	SMV - Other	P.D. only
06012799	07-Feb-06 9:30a	Clear	Daylight	<b>e</b> 2	Rear end	P.D. only
07040471	05-Mar-07 12:00p	Snow	Daylight	Loose snow	Rear end	Non-fatal injury
07043865	10-Mar-07 7:31a	Freezing rain	Daylight	<u> </u>	SMV - Other	Non-fatal injury
07109139	13-Jun-07 8:25a	Clear	Daylight	Dry	Rear end	P.D. only
07157788	16-Aug-07 9:07a	Clear	Daylight	Dry	SMV - Other	P.D. only
07240766	14-Dec-07 7:30a	Snow	Daylight	lce	Rear end	P.D. only
08009843	16-Jan-08 5:20p	Clear	Dark	Dry	Rear end	P.D. only
08027223	12-Feb-08 5:30p	Snow	Daylight	lce	SMV - Other	P.D. only
08031271	18-Feb-08 9:04p	Snow	Dark	<u>99</u>	SMV - Other	P.D. only
08073896	24-Apr-08 8:00a	Clear	Daylight	Dry	Rear end	P.D. only
08193153	06-Oct-08 5:03a	Clear	Dark	Dry	Rear end	P.D. only
08213216	04-Nov-08 11:40a	Clear	Dusk	Dry	Rear end	Non-fatal injury
09048181	23-Mar-09 9:14a	Clear	Daylight	Dry	Rear end	P.D. only
09108663	21-Jun-09 5:15p	Clear	Daylight	Dry	Rear end	Non-fatal injury
09109461	22-Jun-09 5:21p	Clear	Daylight	Dry	Turning movement	Non-fatal injury
09127692	17-Jul-09 7:44a	Clear	Daylight	Dry	Rear end	P.D. only
09145741	11-Aug-09 9:02p	Clear	Dark	Dry	SMV - Other	P.D. only
09160296	31-Aug-09 5:50p	Clear	Daylight	Dry	Rear end	P.D. only
					LOCATION TC	LOCATION TOTAL COLLISIONS: 31

DESCRIPTIONMISSISSAUGA RD btwn BOVAIRD DR W & WANLESS DR

MUNICIPALITY:BRAMPTON

MIDBLOCK ID: 914

Accident ID	Date & Time	<b>Environment Condition 1</b>	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
05123541	30-Jun-05 5:20p	Clear	Daylight	ک۵	Rear end	P.D. only
06013127	22-Jan-06 7:41p	•	Dark	Dry	SMV - Other	P.D. only
07162887	23-Aug-07 2:24a	Rain	Dark	-	SMV - animal or pedestrian	
09237041	29-Dec-09 10:05a		Daylight	Dry	Sideswipe	
					LOCATION TO	LOCATION TOTAL COLLISIONS: 4

DESCRIPTIONMISSISSAUGA RD btwn WANLESS DR & MAYFIELD RD

MUNICIPALITY:BRAMPTON

MIDBLOCK ID: 375

# **Appendix E**

**Signal Warrant Analysis** 

Location	East-West Collector Road	at	Mississauga Road	
Year	2018			
Free Flow or R	estricted Flow Conditions?	R	(F/R)	

WARRANT	DESCRIPTION	REQUI	MINIMUM REMTENT FOR NE HIGHWAYS		COMPLIANC	
		FREE	RESTRICTED	SECTIO		ENTIRE
		FLOW	FLOW	NUMERICAL	%	%
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	978	100	35
VOLGINIE	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	89	35	
DELAY TO CROSS	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	889	100	100
TRAFFIC	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	91	100	

WARRANTED

- 1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
- 2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
- 3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
- ${\bf 4} \ \ {\bf The \ lowest \ sectional \ percentage \ governs \ the \ entire \ warrant}.$
- $5\,$  For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
- 6 The crossing volumes is defined as:
- (a) Left turns form both minor street approaches
- (b) The heaviest through volume from the minor street  $% \left( \frac{\partial f}{\partial x}\right) =\int_{0}^{\infty }dx^{2}dx^{$
- (c) 50% of the heavier left turn movement from major street when both of the following are met:
  - (i) the left turn volume > 120 vph
  - (ii) the left turn volume plus the opposing volume > 720 vph
- (d) Pedestrian crossing the major street

Location	Sandalwood Parkway	at	Mississauga Road
Year_	2018		
			_
Free Flow or	Restricted Flow Conditions?	R	(F/R)

WARRANT	DESCRIPTION	REQU	INIMUM IREMTENT FOR E HIGHWAYS	·	COMPLIANC	:E
		FREE	RESTRICTED	SECTIO	NAL	ENTIRE
		FLOW	FLOW	NUMERICAL	%	%
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	480	720	979	100	100
VOLUME	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	269	100	
DELAY TO CROSS	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	480	720	710	99	99
TRAFFIC	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	177	100	

WARRANTED

- 1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
- 2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
- 3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
- 4 The lowest sectional percentage governs the entire warrant.
- 5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
- 6 The crossing volumes is defined as:
- (a) Left turns form both minor street approaches
- (b) The heaviest through volume from the minor street
- (c) 50% of the heavier left turn movement from major street when both of the following are met:
  - (i) the left turn volume > 120 vph
  - (ii) the left turn volume plus the opposing volume > 720 vph
- (d) Pedestrian crossing the major street

Location	Wanless Drive	at	Mississauga Road	
Year	2018			
e Flow or Rest	ricted Flow Conditions?	R	(F/R)	

Free Flow or Restricted Flow Conditions?	R	(F /

WARRANT	DESCRIPTION	REQUI	INIMUM IREMTENT FOR E HIGHWAYS	COMPLIANCE			
			RESTRICTED	SECTIO	NAL	ENTIRE	
		FLOW	FLOW	NUMERICAL	%	%	
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	480	720	806	100	87	
VOLUME	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	221	87		
DELAY TO CROSS	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	480	720	585	81	81	
TRAFFIC	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	212	100		

WARRANTED

- 1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
- 2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
- 3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
- 4 The lowest sectional percentage governs the entire warrant.
- 5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
- 6 The crossing volumes is defined as:
- (a) Left turns form both minor street approaches
- (b) The heaviest through volume from the minor street
- (c) 50% of the heavier left turn movement from major street when both of the following are met:
  - (I) the left turn volume > 120 vph
  - (ii) the left turn volume plus the opposing volume > 720 vph
- (d) Pedestrian crossing the major street

Location	Buick Boulevard	at	Mississauga Road
Year	2031		
Free Flow or	Restricted Flow Conditions?	R	(F / R )

WARRANT	DESCRIPTION	REQUI	MINIMUM REMTENT FOR NE HIGHWAYS	COMPLIANCE			
		FREE	RESTRICTED	SECTIO	NAL	ENTIRE	
		FLOW	FLOW	NUMERICAL	%	%	
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	1277	100	29	
VOLUME	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	74	29		
DELAY TO CROSS	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	1203	100	83	
TRAFFIC	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	62	83		

NOT WARRANTED

- 1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
- 2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
- 3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
- 4 The lowest sectional percentage governs the entire warrant.
- $5\,$  For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
- 6 The crossing volumes is defined as:
- (a) Left turns form both minor street approaches
- (b) The heaviest through volume from the minor street
- (c) 50% of the heavier left turn movement from major street when both of the following are met:
  - (i) the left turn volume > 120 vph
  - (ii) the left turn volume plus the opposing volume > 720 vph
- (d) Pedestrian crossing the major street

Location	Collector Road C	at	Mississauga Road	
Year	2031			
Free Flow or Res	tricted Flow Conditions?	R	(F/R)	

WARRANT	DESCRIPTION	MINIMUM  REQUIREMTENT FOR COMPLIANCE >2 LANE HIGHWAYS				E
		FREE	RESTRICTED	SECTIO	NAL	ENTIRE
		FLOW	FLOW	NUMERICAL	%	%
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	1422	100	21
VOLUME	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	55	21	
DELAY TO CROSS	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	1368	100	59
TRAFFIC	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	45	59	·

NOT WARRANTED

- 1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
- 2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
- 3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
- 4 The lowest sectional percentage governs the entire warrant.
- 5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
- 6 The crossing volumes is defined as:
- (a) Left turns form both minor street approaches
- (b) The heaviest through volume from the minor street
- (c) 50% of the heavier left turn movement from major street when both of the following are met:
  - (i) the left turn volume > 120 vph
  - (ii) the left turn volume plus the opposing volume > 720 vph
- (d) Pedestrian crossing the major street

Location_	Collector Road D	at <u>Mississauga Road</u>					
Year_	2031						
Free Flow or	Restricted Flow Conditions?	R	(F / R )				

WARRANT	DESCRIPTION	REQUI	MINIMUM REMTENT FOR IE HIGHWAYS	COMPLIANCE			
		FREE	RESTRICTED	SECTIO	DNAL	ENTIRE	
		FLOW	FLOW	NUMERICAL	%	%	
MINIMUM VEHICULAR	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	945	100	19	
VOLUME	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	48	19		
DELAY TO CROSS	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	896	100	57	
TRAFFIC	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	43	57		

NOT WARRANTED

- 1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
- 2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
- 3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
- 4 The lowest sectional percentage governs the entire warrant.
- 5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
- 6 The crossing volumes is defined as:
- (a) Left turns form both minor street approaches
- (b) The heaviest through volume from the minor street
- (c) 50% of the heavier left turn movement from major street when both of the following are met:
  - (i) the left turn volume > 120 vph
  - (ii) the left turn volume plus the opposing volume > 720 vph
- (d) Pedestrian crossing the major street

Location _ Year _	Collector Road F 2031	at	Mississauga Road
Free Flow or	Restricted Flow Conditions?	R	(F / R )

WARRANT	DESCRIPTION	REQUI	MINIMUM REMTENT FOR IE HIGHWAYS	COMPLIANCE			
		FREE	RESTRICTED	SECTIO	NAL	ENTIRE	
	1	FLOW	FLOW	NUMERICAL	%	%	
MINIMUM VEHICULAR	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	853	100	17	
VOLUME	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	43	17		
DELAY TO CROSS	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	809	100	46	
TRAFFIC	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	34	46		

NOT WARRANTED

- 1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
- 2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
- 3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
- 4 The lowest sectional percentage governs the entire warrant.
- 5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
- 6 The crossing volumes is defined as:
- (a) Left turns form both minor street approaches
- (b) The heaviest through volume from the minor street  $% \left( \mathbf{b}\right) =\left( \mathbf{b}^{\prime }\right)$
- (c) 50% of the heavier left turn movement from major street when both of the following are met:
  - (I) the left turn volume > 120 vph
  - (ii) the left turn volume plus the opposing volume > 720 vph
- (d) Pedestrian crossing the major street

# **Appendix F**

2018 Intersection Capacity
Calculations – Do Nothing
Scenario

	•		-	1	-	1	4	1	1	1	↓	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	ሻ	<b>*</b>	7	Ť	4		ľ	1→		ř	1→	
Volume (vph)	61	698	68	160	367	43	21	122	37	86	546	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.8
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98	9-11-11-11-11-11-11-11-11-11-11-11-11-11	1.00	0.97		1.00	0.98	
FIt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	1824	1566	1716	1801		1750	1764		1716	1791	
Flt Permitted	0.50	1.00	1.00	0.09	1.00		0.09	1.00		0.66	1.00	
Satd. Flow (perm)	832	1824	1566	154	1801	ar Marin (1869) (1869)	157	1764	Mark Market San Property	1186	1791	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	698	68	160	367	43	21	122	37	86	546	95
RTOR Reduction (vph)	0	- 0	0	0	3	0	0	9	0	0	5	C
Lane Group Flow (vph)	61	698	68	160	407	0	21	150	0	86	636	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	pm+pt	• • • • • • • • • • • • • • • • • • • •		pm+pt	<u> </u>	_,,,	Perm		<u> </u>
Protected Phases	1 01111	4	1100	3	8		5	2		i Oiiii	6	
Permitted Phases	4	1	Free	8	•		2			6	•	
Actuated Green, G (s)	44.0	44.0	120.0	57.0	57.0		49.8	49.8		44.0	44.0	
Effective Green, g (s)	47.6	47.6	120.0	57.0	60.6		49.8	53.4		47.6	47.6	
Actuated g/C Ratio	0.40	0.40	1.00	0.48	0.50		0.42	0.44		0.40	0.40	
Clearance Time (s)	6.6	6.6		3.0	6.6		3.0	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	330	724	1566	203	910		102	785		470	710	
v/s Ratio Prot	000	c0.38	1000	c0.07	0.23		0.00	c0.09		710	c0.36	
v/s Ratio Perm	0.07		0.04	0.31	J		0.08			0.07		
v/c Ratio	0.18	0.96	0.04	0.79	0.45		0.21	0.19	200	0.18	0.90	
Uniform Delay, d1	23.6	35.4	0.0	27.8	19.0		27.6	20.2		23.5	33.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.89	0,87	
Incremental Delay, d2	0.6	25.1	0.1	20.6	0.7		2.1	0.5		0.1	1.9	
Delay (s)	24.1	60.5	0.1	48.4	19.7		29.7	20.7		21.1	31.5	
Level of Service	 C	55.5 E	A	<b>то.</b> т	В		C	C		- '' C	C C	
Approach Delay (s)		52.8		J	27.8		J	21.8		J	30.2	
Approach LOS		D			2,.0 C			21.0 C			C	
Intersection Summary												
HCM Average Control Delay			37.1	Н	CM Level	of Service	æ		D			
HCM Volume to Capacity ratio	)		0.90									
Actuated Cycle Length (s)		**************************************	120.0	Sı	ım of lost	time (s)		AND THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	12.0		Committee of the Commit	A STREET AND A STREET OF THE
ntersection Capacity Utilizatio	n		98.4%		U Level o		)		F			
Analysis Period (min)		The second secon	15	·								er-constagnings(g)
Description: Bovaird Dr. W												

	1	4	<b>†</b>	1	<b>\</b>	1
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	¥		1>			4
Volume (veh/h)	105	10	349	24	7	1572
Sign Control	Stop	eli (Shaqi Vage eli Jaconile Perre	Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph) Pedestrians Lane Width (m)	105	10	349	24	7	1572
Walking Speed (m/s) Percent Blockage Right turn flare (veh)						
Median type Median storage veh) Upstream signal (m)			None			None 306
pX, platoon unblocked	0.32					300
vC, conflicting volume	1947	361			373	
vC1, stage 1 conf vol	IVII	<b>501</b>			0,0	
vC2, stage 2 conf vol vCu, unblocked vol	2918	361			373	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	entropies or green Christel Street Street Street Street				entrocourt de entrett partici	
tF (s)	3.5	3.3			2.2	
p0 queue free %	0 5	99			99	
cM capacity (veh/h)	5	684			1185	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	115	373	1579			
Volume Left	105	0	7			en Kalenda kiriket sakaban Ministration da
Volume Right	10	24	0			
cSH	6	1700	1185			
Volume to Capacity	19.72	0.22	0.01			
Queue Length 95th (m)	Err	0.0	0.1			
Control Delay (s)	<b>Err</b> F	0.0	0.7			
Lane LOS Approach Delay (s)	Err	0.0	A 0.7			
Approach LOS	F	0.0	U.1			
Intersection Summary						
Average Delay 556.8 Intersection Capacity Utilization 106.4% Analysis Period (min) 15		ICI	U Level o	of Service		
			10			

		1	1	/>	-	Į.	
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	ካ	7	ĵ»			લ	
Volume (vph)	529	123	250	125	258	1110	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	3.0	3.0		4.7	3.0	
Lane Util. Factor	1.00	1.00	1.00			1.00	
Frt	1.00	0.85	0.96			1.00	
Flt Protected	0.95	1.00	1.00			0.99	TO THE REAL PROPERTY OF THE PR
Satd. Flow (prot)	1750	1566	1759			1825	
Flt Permitted	0.95	1.00	1.00			0.78	
Satd. Flow (perm)	1750	1566	1759			1436	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	529	123	250	125	258	1110	
RTOR Reduction (vph)	0	77	15	0	0	0	
Lane Group Flow (vph)	529	46	360	0	0	1368	
Turn Type	A	Perm			Perm		
Protected Phases	8		2			6	
Permitted Phases		8			6		
Actuated Green, G (s)	24.0	24.0	82.0			82.0	
Effective Green, g (s)	28.0	28.0	86.0			86.0	
Actuated g/C Ratio	0.23	0.23	0.72			0.72	
Clearance Time (s)	7.0	7.0	7.0			7.0	
Vehicle Extension (s)	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	408	365	1261			1029	
v/s Ratio Prot	c0.30		0.20				
v/s Ratio Perm		0.03				c0.95	
v/c Ratio	1.30	0.13	0.29			1.33	
Uniform Delay, d1	46.0	36.3	6.1			17.0	
Progression Factor	1.00	1.00	0.90			0.33	
Incremental Delay, d2	150.6	0.2	0.6			150.7	
Delay (s)	196.6	36.5	6.0			156.4	
Level of Service	F	D	Α			F	
Approach Delay (s)	166.4		6.0			156.4	
Approach LOS	F		Α	A 250 (C) 1 (A) 1		F	
ntersection Summary							
HCM Average Control Dela	ay		135.5	НС	CM Level	of Service	F
HCM Volume to Capacity r			1.32				
Actuated Cycle Length (s)		our property property of the p	120.0	Su	m of lost	time (s)	6.0
ntersection Capacity Utiliza	ation	•	32.8%		CONTRACTOR	of Service	H
Analysis Period (min)	947.III.0947.7.JJM956.314.0262.7747.3443.3456.	AND COLOR OF THE PROPERTY OF T	15			a de como a cala de forma de al d	
Critical Lane Group							

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Ty#		<b>₽</b>			4
Volume (veh/h)	203	17	318	70	14	1180
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph) Pedestrians Lane Width (m)	203	17	318	70	14	1180
Walking Speed (m/s) Percent Blockage Right turn flare (veh)		Inc.				
Median type Median storage veh) Upstream signal (m)			None			None
pX, platoon unblocked			The second secon			
vC, conflicting volume vC1, stage 1 conf vol vC2, stage 2 conf vol	1561	353	100 Bis		388	
/Cu, unblocked vol	1561	353			388	
tC, single (s) tC, 2 stage (s)	6.4	6.2			4.1	
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	98			99	
cM capacity (veh/h)	122	691			1170	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	220	388	1194			
Volume Left	203	0	14			
Volume Right	17	70	0			
cSH Volume to Conscitu	130 1,69	1700 0.23	1170 0,01			
Volume to Capacity Queue Length 95th (m)	1.69	0.23	0.01			
Queue Length 95th (m) Control Delay (s)	123.9 400.8	0.0	0.3			
Lane LOS	400.6 F	U.U	0.4 A			
Approach Delay (s) Approach LOS	400.8 F	0.0	0.4		hreat a second or	
Intersection Summary						
Average Delay		Newster 6 country in a season country	49.2	earri enament commissioners i somb		
ntersection Capacity Utili	ization		97.2%	ICI	J Level o	of Service
Analysis Period (min)			15			

		-	*	1	4-	4	1	1	1	-	↓	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations		44			4			€}>			€\$	
Volume (vph)	9	178	7	231	223	13	10	243	81	58	955	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	4-10-74-10-10-10-10-10-10-10-10-10-10-10-10-10-
Flpb, ped/bikes		1.00			0.85			1.00			1.00	
Frt	T-1	1.00	enter-Buddynester-NacCounter-Colff, eder-Buddy	ego Militario - A Militario -	1.00	allite on a Audit code a Audit Server And Freeze And Commission		0.97			1.00	Street Martines Add on Add
FIt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)	o de de marco de deservo de deservo de	1832	A SA	he halos is districtly their characterists.	1547	Parada taking da taking sa taking		1739	a-foliaco Auto Parcolo Enfano Autobaro es	S (4 m 1997)	1796	an de de de la constant de de la constant de la co
FIt Permitted		0.98			0.68			0.97			0.96	
Satd. Flow (perm)	nin (986) (01 November 1985)	1792	eka Marue Ar Gelan An Herro Ar Arbon		1079	Standarden zu zu zu der Bestricht der		1681		Manual Cabin to Manual Apin an	1731	YO 90 (HI) O AT GARTO AT GAIN
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	178	7	231	223	13	10	243	81	58	955	38
RTOR Reduction (vph)	0	1	0	0	1	0	0	9	0	0	1	0
Lane Group Flow (vph)	Ō	193	0	0	466	Ō	0	325	0	0	1050	Ō
Confl. Peds. (#/hr)	J	100	9	188	, 50	10	3	0_0		3	1000	
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			Perm		in the second	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8	-		2	_		6		
Actuated Green, G (s)		44.0			44.0			62.0		er en	62.0	
Effective Green, g (s)		48.0			48.0			66.0			66.0	
Actuated g/C Ratio		0.40			0.40			0.55			0.55	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		717			432			925			952	
v/s Ratio Prot					102			ULU			<b>552</b>	
v/s Ratio Perm		0.11			c0.43			0.19			c0.61	
v/c Ratio		0.27			1.08			0.35			1.10	
Uniform Delay, d1		24.2			36.0			15.1			27.0	
Progression Factor		1.00			1.00			1.06			0.51	
Incremental Delay, d2		0.2			66.3			1.00			58.0	
Delay (s)		24.4			102.3			17.0			71.6	
Level of Service		27.7 C			102.5			17.0 B			, 1.0 E	
Approach Delay (s)		24.4			102.3			17.0			71.6	
Approach LOS		24.4 C			F			17.0 B			71.0 E	
Intersection Summary												
HCM Average Control Delay			65.2	HC	CM Level	of Servic	е		Е			
HCM Volume to Capacity ratio	elektra de Ertamie Massellande in Am	2014/2014 (1880)	1.09	9 B1220 / 6-8 / 511 / 79 E122 / 19 5122 / 4-6		TO STATE STATE OF STA		1. C. 201. AND STEEDING STEEDING STEEDING				
Actuated Cycle Length (s)			120.0	Su	m of lost	time (s)			6.0			
ntersection Capacity Utilization	1	1	23.0%		U Level o		and a support of the support of the support		Н	ere obstator (1962) de POSE		
Analysis Period (min)			15									

	•	-	*	1	4-	1	-	1	1	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	ሻ	1		75	1→		ħ	1→		ሻ	1→	
Volume (vph)	61	698	68	160	367	43	21	122	37	86	546	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.0	3.0	and the same and the same and the same and	3.0	3.0	CONTRACTOR OF THE PARTY	3.4	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98	can control of the co	1.00	0.97	notes and defense of the second file	1.00	0.98	Statistical Annual A
FIt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1720	San Ariberta	1623	1627	demindration desired	1750	1584	EDWARD STREET	1653	1772	
FIt Permitted	0.52	1.00		0.07	1.00		0.12	1.00		0.50	1.00	
Satd. Flow (perm)	961	1720		124	1627	Standard and Alexandria and Alexandria	215	1584		878	1772	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	698	68	160	367	43	21	122	37	86	546	95
RTOR Reduction (vph)	0	3	0	0	3	0	0	9	0	0	5	0
Lane Group Flow (vph)	61	763	0	160	407	0	21	150	0	86	636	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			pm+pt			Perm			pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6	-	
Actuated Green, G (s)	52.0	52.0		65.9	65.9		30.7	30.7		40.9	40.9	
Effective Green, g (s)	55.6	55.6		65.9	69.5		34.3	34.3		44.5	44.5	
Actuated g/C Ratio	0.46	0.46		0.55	0.58		0.29	0.29		0.37	0.37	
Clearance Time (s)	6.6	6.6		3.0	6.6		6.6	6.6		7.0	6.6	
Vehicle Extension (s)	5.0	5.0		3.0	5.0		5.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	445	797		204	942		61	453		370	657	
v/s Ratio Prot	110	c0.44		c0.07	0.25		<b>J</b> ,	0.09		0.01	c0.36	
v/s Ratio Perm	0.06			0.36	00		0.10	0.00		0.07	<b>~~</b>	
v/c Ratio	0.14	0.96		0.78	0.43		0.34	0.33		0.23	0.97	
Uniform Delay, d1	18.5	31.1		31.1	14.2		33.9	33.8		25.4	37.1	
Progression Factor	1.00	1.00		1.00	1.00		0.70	0.66		1.00	1.00	
Incremental Delay, d2	0.3	22.4		17.7	0.7		13.9	1.8		0.3	28.1	
Delay (s)	18.7	53.4		48.7	14.8		37.6	24.2		25.7	65.1	
Level of Service	В	D		D	В		07.0 D	C		C	E	
Approach Delay (s)		50.9			24.4		J	25.8		9	60.5	
Approach LOS		D D			C			20.0 C			E	
ntersection Summary												
HCM Average Control Delay		,	45.4	Н	CM Level	of Servic	e ·		D			
HCM Volume to Capacity ratio			0.94						_			
Actuated Cycle Length (s)			120.0	Sı	ım of lost	time (s)			9.0			
ntersection Capacity Utilization	1	1	05.1%		U Level o				G			
Analysis Period (min)	p.ur9.45919675757556		15									
Description: Mayfield Rd												9645E

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EBR	EBT EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
7	<b>*</b> *	J.	1>	-	) j	- ↑		N.	1→	
148	1297 148	385	1500	147	256	1572	494	127	759	42
1900	1900 1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
3.5	3.5 3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.0		3.0	3.0		3.0	3.0		3.0	3.0	
1.00		1.00	1.00		1.00	1.00		1.00	1.00	
0.85		1.00	0.99		1.00	0.96		1.00	0.99	MORE CHEST AND SEE
1.00	AND THE RESIDENCE OF THE PARTY	0.95	1.00		0.95	1.00		0.95	1.00	
1566		1716	1804		1750	1763		1716	1813	
1.00	en al commencia e a construir e construir e a construir e construir e construir e construir e construir e construir e	0.09	1.00		0.08	1.00		0.08	1.00	
1566		167	1804		146	1763		142	1813	
1.00	AND DESCRIPTION OF THE PROPERTY OF THE PROPERT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
148	CONTRACTOR OF STREET STREET, SELECTION OF STREET, STRE	385	1500	147	256	1572	494	127	759	42
0	INDERSEASON PROCESSORS AND	0	3	0	0	9	0	0	2	0
148		385	1644	0	256	2057	0	127	799	0
2%		4%	3%	0%	2%	3%	2%	4%	3%	0%
Free		pm+pt	<b>U</b> //	0 70	pm+pt	0 /0	270	Perm	070	U 70
1 166	4	3	8		5 pini pt	2		i Giiii	6	
Free	STED TO THE SHALL BE SELECTED TO SHALL BE SELECTED TO SHALL BE SHA	8	•		2			6	v	
130.0		57.4	57.4		59.4	59.4		47.4	47.4	
130.0		57.4	61.0		59.4	63.0		51.0	51.0	
1.00	AND THE RESERVE OF THE PROPERTY OF THE PROPERT	0.44	0.47		0.46	0.48		0.39	0.39	
1.00	6.6	3.0	6.6		3.0	6.6		6.6	6.6	
	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
1566		241	846		178	854		56	711	
1500	017 1000	0.17	c0.91		0.10	c1.17		30	0.44	
0.09		0.17	UU.31		0.10	61.17		0.90	U. <del>44</del>	
0.09		1.60	1.94		1.44	2.41		TO THE WORLD THE WAR TO THE WAR TO THE WORLD	110	
0.09		39.2	34.5			33.5		2.27	1.12	
CONTRACTOR AND A CONTRACT OF A SHARE A STATE OF	CONTRACTOR	and a transfer of a property for a party of a control	The Secretary of Committee Secretary Secretary		36.0	carbot it carbot it carbot it carbot it carbot		39.5	39.5	
1.00		1.00	1.00 429.0		1.00	1.00		1.00	1.00	
0.1	entral contral	287.6 326.7	463.5		226.1	637.6		623.2	73.3	
0.1		SANDERNA GLEDA GREDA GREDO.			262.1	671.1		662.7	112.8	
Α		F	F		F	F		F	F	
	179.8 F		437.6 F			626.0 F			188.0 F	
477.3		Н	CM Level	of Servic	e		F			0.00000000000
		_								
NAME OF TAXABLE PARTY OF TAXABLE PARTY.	CONTRACTOR									MARIO SOLUTION
	NUTERATION CONTRACTOR STATEMENT OF THE S	IC	:U Level o	t Service			Н			
15	15						ing and a second second		NE etak Seefoor No o'r androe'r chif i'r	
		2.25 130.0 229.0% 15	2.25 130.0 Si 229.0% IC	2.25 130.0 Sum of lost 229.0% ICU Level o	2.25 130.0 Sum of lost time (s) 229.0% ICU Level of Service	2.25 130.0 Sum of lost time (s) 229.0% ICU Level of Service	2.25 130.0 Sum of lost time (s) 229.0% ICU Level of Service	2.25         130.0       Sum of lost time (s)       9.0         229.0%       ICU Level of Service       H	2.25         130.0       Sum of lost time (s)       9.0         229.0%       ICU Level of Service       H	2.25         130.0       Sum of lost time (s)       9.0         229.0%       ICU Level of Service       H

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Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	¥		1̂→			र्भ	
Volume (veh/h)	40	12	1428	98	9	586	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	40	12	1428	98	9	586	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage Right turn flare (veh)							
Median type			None			None	
Median storage veh)		and the above above					
Upstream signal (m)						315	
pX, platoon unblocked	3020 - 000 0 + 000 0 + 000 0 0 0 0 0 0 0 0						
vC, conflicting volume	2081	1477			1526		
vC1, stage 1 conf vol			automore from a Mahris Mahris A		D	**************************************	tor explain extra compart extract. And the extract extract extract extract extract extract extract extract extract.
vC2, stage 2 conf vol							
vCu, unblocked vol	2081	1477			1526		
tC, single (s)	6.4	6.2			4.1		
tC, 2 stage (s)					0.0		
tF (s)	3.5	3.3			2.2		
p0 queue free %	30	92			98		
cM capacity (veh/h)	57	155			437		
Direction, Lane #	WB 1	NB 1	SB 1				
/olume Total	52	1526	595	NEWSTERN SERVICE			
Volume Left	40	0	9				
Volume Right	12	98	0				
SH	67	1700	437				
Volume to Capacity	0.78	0.90	0.02				
Queue Length 95th (m)	27.2 <b>154</b> .0	0.0 0.0	0.5 0.6				
Control Delay (s) Lane LOS	154.U F	0.0	0.0 A				
Lane LOS Approach Delay (s)	154.0	0.0	0.6				
Approach LOS	134.0 F	0.0	0.0				
ntersection Summary							
Average Delay			3.9				
Intersection Capacity Utiliz	ation		96.1%	IC	U Level o	Service	F
Analysis Period (min)			15			And the second s	*  *** *** *** *** *** *** *** *** ***

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Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	ካ	7	ĵ.			ન	
Volume (vph)	416	260	994	567	129	333	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	No. of Contrast Contr
Total Lost time (s)	3.0	3.0	3.0			3.0	
Lane Util. Factor	1.00	1.00	1.00	CA WELLOW \$14500 WELLOW		1.00	
Frt	1.00	0.85	0.95			1.00	Les established
Flt Protected	0.95	1.00	1.00			0.99	
Satd. Flow (prot)	1750	1566	1752			1817	
Flt Permitted	0.95	1.00	1.00			0.09	
Satd. Flow (perm)	1750	1566	1752			170	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	416	260	994	567	129	333	
RTOR Reduction (vph)		206	17	0	0	0	
Lane Group Flow (vph)	416	54	1544	0	0	462	
Turn Type		Perm		•	Perm		
Protected Phases	8	1 01111	2		1 Omi	6	
Permitted Phases	~	8			6	<b>Y</b>	
Actuated Green, G (s)	6.0	6.0	100.0		4.7	100.0	
Effective Green, g (s)	10.0	10.0	104.0			104.0	
Actuated g/C Ratio	0.08	0.08	0.87			0.87	
Clearance Time (s)	7.0	7.0	7.0			7.0	
Vehicle Extension (s)	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	146	131	1518			147	
v/s Ratio Prot	c0.24	101	0.88			17/	
v/s Ratio Perm	UU.ZT	0.03	0.00			c2.71	
v/c Ratio	2.85	0.41	1.02			3.14	
Uniform Delay, d1	55.0	52.2	8.0			8.0	
Progression Factor	1.00	1.00	1.00			1.99	
Incremental Delay, d2	850.8	2.1	27.5			981.3	
Delay (s)	905.8	54.3	35.5			997.3	
Level of Service	903.0 F	<i>э</i> н.э D	33.3 D			991.3 F	
Approach Delay (s)	578.3	U	35.5			997.3	
Approach LOS	5/6.5 F		33.3 D			991.3 F	
• •	Г		U			r	
Intersection Summary							
HCM Average Control Dela			336.1	НС	CM Level	of Service	
HCM Volume to Capacity r	atio		3.11				
Actuated Cycle Length (s)			120.0	A PRINCIPAL OF COMMAND AND SECTION OF COMMAND	m of lost	PERSONAL PROGRAMMA PROGRAMMA CONTRACTOR AND PROGRAMMA PROGRAMA PROGRAMMA PROGRAMMA PROGRAMMA PROGRAMMA PROGRAMMA PROGRAMMA PRO	
Intersection Capacity Utiliza	ation		144.6%	IC	U Level o	of Service	
Analysis Period (min)			15				
Critical Lane Group							

	1	1	1	1	<b>\</b>	1
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Ty.		1→			4
Volume (veh/h)	81	23	1083	256	16	455
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph) Pedestrians	81	23	1083	256	16	455
Lane Width (m) Walking Speed (m/s)						
Percent Blockage Right turn flare (veh) Median type			None			None
Median storage veh) Upstream signal (m)			NUNC			INUIL
pX, platoon unblocked						
vC, conflicting volume	1698	1211			1339	
vC1, stage 1 conf vol	garangang 1994 ng Garang Anglid Hill (1997) 1995 (1994) (1994)			ryessenjah salam (Salah Shisalika)		
vC2, stage 2 conf vol						
vCu, unblocked vol	1698	1211	and the statement of th	The second section is a second section of the second secon	1339	**************************************
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)		COLORED COLORED			NEW PROPERTY OF THE PARTY OF TH	
tF (s)	3.5	3.3			2.2	
p0 queue free %	18	90			97	See Straighteach ann an Amhailte
cM capacity (veh/h)	98	222			515	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	104	1339	471			
Volume Left	81	0	16	ekonolikasi (K. Artolikasi (K. A		
Volume Right	23	256	0			
cSH	112	1700	515			
Volume to Capacity	0.93	0.79	0.03			
Queue Length 95th (m)	43.7	0.0	0.7			
Control Delay (s)	137.5	0.0	0.9			
Lane LOS	F	۸ ۸	A			
Approach Delay (s) Approach LOS	137.5 F	0.0	0.9			
Intersection Summary	1					
Average Delay			7.7			
Intersection Capacity Utili	zation		90.1%	ICI	l I l evel c	of Service
Analysis Period (min)	LUUII		15	10	O LEVEL	A OCI VICE
mayaa Fenuu (IIIII)			10			

	•	-	•	1	-	1		†	1	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			44			4			4	
Volume (vph)	31	154	12	101	136	19	13	774	318	11	358	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	20.000000000000000000000000000000000000	3.0	© 0:1764 (1090)000001646 (1.1644	142000 Tarabah 1420 Melantu 2000 Tarabah 1420 Tarabah 1420 Tarabah 1420 Tarabah 1420 Tarabah 1420 Tarabah 1420	3.0	and the state of t	1412.00 Tr. 2444.000000000000000000000000000000000	3.0	eller sold of a robble of pure liberator of the of	and the state of t	3.0	Drougestander auser
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes	many turner y tyrenet y Agenty or p	1.00	to no Advanto Advanto Advanta Advanta Adva	ANYON NY PARIS PANANYANIN'	1.00	bilan em hiller von bilan en Arber von Ar	amus Agensii physicitis physicitis s	1.00	- var 2 drawy 2 drawy 2 ddan gallan ac	y Cymre y Chanair, y dy mae'r (Cheann)	1.00	erintes (Control Signification of Signi
Flpb, ped/bikes		1.00			0.90			1.00			1.00	
Frt		0.99	ger ar a falleninkin plaje radio Pall i rav i Palen	aler her bester in griffe en en before en bester en	0.99	Alberto (Alberta ) Cliptora (Alberta) and		0.96			0.99	
FIt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1820			1623	ALINANAZ NANGONIA AZINAN		1732		249000HH0000H0000H0000H	1789	
Flt Permitted		0.92			0.71			0.99			0.97	
Satd. Flow (perm)		1682			1170			1723			1730	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	154	12	101	136	19	13	774	318	11	358	37
RTOR Reduction (vph)	0	3	0	0	4	0	0	7	0	Ö	2	0,
Lane Group Flow (vph)	0	194	0	0	252	0	. 0	1098	0	0	404	0
Confl. Peds. (#/hr)	J	104	U	188	202	10	U	1000	U	Ü	707	U
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm	2 /0	0 70	Perm	070	0 70	Perm	0 70	0 70	Perm	7 70	0 70
Protected Phases	reiiii	4		reiiii	8		reiiii	2		renn	6	
Permitted Phases	4	4		8	0		2	2		6	U	
SHILLE BOOK SENSON DATA CONTRACTOR AND	4	29.5		O	29.5			76.5		U	76.5	
Actuated Green, G (s)		29.5 33.5			29.5 33.5			70.5 80.5				
Effective Green, g (s)								0.67			80.5	
Actuated g/C Ratio		0.28			0.28			CONTRACTOR OF THE PROPERTY OF			0.67	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	CELOSAN CANA
Lane Grp Cap (vph) v/s Ratio Prot		470			327			1156			1161	
de autor de la companya del companya de la companya del companya de la companya del la companya de la companya		0.12			c0.22			c0.64			0.23	
v/s Ratio Perm		0.12			0.77			0.95			0.25	
v/c Ratio												
Uniform Delay, d1		35.2			39.7			17.9			8.5	
Progression Factor		1.00			1.00			1.20			1.44	
Incremental Delay, d2		0.6			10.8			9.2			0.8	
Delay (s)		35.8			50.5			30.7			13.0	
Level of Service		D			D			C			В	
Approach Delay (s)		35.8			50.5			30.7			13.0	
Approach LOS		D			D			С			В	
Intersection Summary												
HCM Average Control Delay			30.1	H(	CM Level	of Servic	е		С			
HCM Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			120.0	Su	ım of lost	time (s)			6.0			
Intersection Capacity Utilization	1	1	00.6%			f Service			G			
Analysis Period (min)			15									
- O-:H:II O									, page on page of the Popular		- The Mark Mark Control	

c Critical Lane Group

	•		*	1	-	1		†	1	<b>\</b>	<b> </b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	\$		15	1→		ሻ	1→		75	1→	
Volume (vph)	96	315	38	70	532	66	35	462	142	47	193	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1712		1623	1627		1750	1583		1653	1759	
Flt Permitted	0.18	1.00		0.41	1.00		0.55	1.00		0.25	1.00	
Satd. Flow (perm)	329	1712		694	1627		1012	1583		437	1759	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	96	315	38	70	532	66	35	462	142	47	193	49
RTOR Reduction (vph)	0	4	0	0	4	0	0	9	0	0	7	0
Lane Group Flow (vph)	96	349	0	70	594	0	35	595	0	47	235	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	48.4	48.4		48.4	48.4		58.4	58.4		58.4	58.4	
Effective Green, g (s)	52.0	52.0		52.0	52.0		62.0	62.0		62.0	62.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.52	0.52		0.52	0.52	
Clearance Time (s)	6.6	6.6		6.6	6.6		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	143	742		301	705		523	818		226	909	
v/s Ratio Prot		0.20			c0.37			c0.38			0.13	
v/s Ratio Perm	0.29			0.10			0.03			0.11		
v/c Ratio	0.67	0.47		0.23	0.84		0.07	0.73		0.21	0.26	
Uniform Delay, d1	27.2	24.2		21.4	30.3		14.5	22.5		15.7	16.2	
Progression Factor	1.00	1.00		1.00	1.00		1.52	1.41		1.00	1.00	
Incremental Delay, d2	15.0	1.0		0.8	9.9		0.1	2.3		2.1	0.7	
Delay (s)	42.2	25.2		22.3	40.3		22.2	33.9		17.8	16.9	
Level of Service	D	С		С	D		С	С		В	В	
Approach Delay (s)		28.8			38.4			33.3			17.0	
Approach LOS		С			D			С			В	
Intersection Summary												
HCM Average Control Dela			31.7	H	CM Level	of Service	е		С		erri alla erra el l'arrela di l'arrela el l'arrela el l'arrela el l'arrela el l'arrela el l'arrela el l'arrela	
HCM Volume to Capacity ra	atio		0.78									
Actuated Cycle Length (s)			120.0		um of lost				6.0	NAME OF THE OWNER OF THE OWNER.		Delegation and the second
Intersection Capacity Utiliza	ntion		88.6%	IC	U Level o	f Service			E			
Analysis Period (min)			15	and Ethylophyllyd and the control								(an and state of the state of t
Description: Mayfield Rd												

c Critical Lane Group

## **Appendix G**

2031 Intersection Capacity
Calculations – Do Nothing
Scenario

	•	-	*	1	-	1	1	1	-	<b>\</b>	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	<b>†</b>	7	ħ	1		ř	Ĵ→		'n	7-	
Volume (vph)	38	1992	663	894	1538	48	195	641	500	92	2292	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	00 1000 C	3.0	3.0	0970779-0779-08707-057
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	9:0000000000000000000000000000000000000	1.00	0.93		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	26.0 (20)	0.95	1.00	
Satd. Flow (prot)	1566	1824	1566	1716	1817	plane, britanni britanni britanni	1750	1712		1716	1822	
FIt Permitted	0.08	1.00	1.00	0.08	1.00		0.08	1.00		0.08	1.00	
Satd. Flow (perm)	132	1824	1566	146	1817		143	1712		139	1822	
Peak-hour factor, PHF	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	1992	663	894	1538	48	195	641	500	92	2292	23
RTOR Reduction (vph)	0	0	0	0	1	.0	0	20	000	0	0	_0
Lane Group Flow (vph)	38	1992	663	894	1585	0	195	1121	0	92	2315	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	pm+pt		0,0	pm+pt			Perm	<u> </u>	<b>0,0</b>
Protected Phases	1 01111	4	1100	3	8		5	2		1 01111	6	
Permitted Phases	4	•	Free	8	~		2			6	~	
Actuated Green, G (s)	46.4	46.4	140.0	68.4	68.4		58.4	58.4		48.4	48.4	
Effective Green, g (s)	50.0	50.0	140.0	68.4	72.0		58.4	62.0		52.0	52.0	
Actuated g/C Ratio	0.36	0.36	1.00	0.49	0.51		0.42	0.44		0.37	0.37	
Clearance Time (s)	6.6	6.6	,,,,,	3.0	6.6		3.0	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	47	651	1566	284	934		140	758		52	677	
v/s Ratio Prot	71	1.09	1300	c0.43	0.87		0.07	c0.65		32	c1.27	
v/s Ratio Perm	0.29	1.00	0.42	c1.11	0.01		0.51	00.00		0.66	01,21	
v/c Ratio	0.81	3.06	0.42	3.15	1.70		1.39	1.48		1.77	3.42	
Uniform Delay, d1	40.7	45.0	0.0	45.4	34.0		34.9	39.0		44.0	44.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	69.7	931.0	0.8	975.8	318.3		214.4	222.6		412.9	1092.5	
Delay (s)	110.4	976.0	0.8	1021.1	352.3		249.3	261.6		456.9	1136.5	
Level of Service	- 110.4 F	570.0 F	0.0 A	1021.1 F	502.5 F		240.5 F	201.0 F		+30.5 F	1130.3 F	
Approach Delay (s)		723.7		1	593.4		1	259.8		1	1110.5	
Approach LOS		F			555.4 F			200.0 F			F	
Intersection Summary												
HCM Average Control Delay			722.4	Н	CM Level	of Servic	e	enangan angan	F	i vi obri in in februaria designi ofessali	en de statisch de statisch de traub de statisch de statisch de	ide estados estados estados
HCM Volume to Capacity ra	tio		3.07									
Actuated Cycle Length (s)	SESSESSES SESSESSES COMPA	Takkasan kanan ma	140.0		um of lost		Edinios de la compansión	Salahan ing Salahan salah masa	9.0			
ntersection Capacity Utilizat	tion	:	300.5%	IC	U Level o	f Service	)		Н			
Analysis Period (min)	when it should be a state of the state of th		15	National Confession (Included Confession Con	un in Falernii Gas, gebilda hi	Antoninis Antoninis Antoninis Antoninis	arieros de del compression de la compression della compression del		to tall advopernously net visit on the			
Description: Bovaird Dr. W												

	•	-	*	<b></b>	4-	1	1	†	<b>/</b>	<b>\</b>	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			44			43-	
Volume (veh/h)	0	0	0	105	0	10	0	483	24	7	2086	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	105	0	10	0	483	24	7	2086	0
Pedestrians		Course Sensi Septiment									·	Samuella seria esta
Lane Width (m)												
Walking Speed (m/s)						CONTRACTOR AND AND AND						Section Confi
Percent Blockage			and the same									
Right turn flare (veh)								••				
Median type								None	of the same		None	
Median storage veh)								•			222	
Upstream signal (m)	0.00	0.00	0.00	0.00	0.00		0.00				303	
pX, platoon unblocked	0.30	0.30	0.30	0.30	0.30	405	0.30			F07		
vC, conflicting volume	2605	2607	2086	2595	2595	495	2086	and the second		507		A service of
vC1, stage 1 conf vol												
vC2, stage 2 conf vol vCu, unblocked vol	5235	5242	3481	5201	5201	495	3481			507		
tC, single (s)	5235 7.1	6.5	3401 6.2	7.1	6.5	6.2	3401 4.1			4.1		
tC, single (s)	7.1	0.5	0.2	7.1	0.0	0.2	7.1			4.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	98	100			99		
cM capacity (veh/h)	0	0	3	0	0	575	22			1058		
AND THE RESIDENCE AND A SECOND CONTRACTOR OF THE PROPERTY OF T	4000 4440 7000 4000 5000 5000 5000 5000	ACTION OF THE PROPERTY OF THE		98096-200 x 200 80 x 200 90 x 200 90 40 40		0,0	•			1000		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	115	507	2093								
Volume Left	0	105	0 <b>24</b>	7 0								
Volume Right	0 1700	10 0	24 22	1058								
cSH Values to Consiste		000.69	0.00	0.01								
Volume to Capacity Queue Length 95th (m)	0.00 2	.000.09 Err	0.00	0.01								
Control Delay (s)	0.0	Err	0.0	0.2					and the state of the state of			
Lane LOS	Ο.0	F	0.0	0.0 A								
Approach Delay (s)	0.0	Err	0.0	0.0								
Approach LOS	0.0 A	F	0.0	0.0								
Intersection Summary												
Average Delay	min complete according	oler-massenere en enter	423.6					500.000.500.900.500.000.000		VA. 1844 VA. 1845 S.	pagae arangagan aranga	
Intersection Capacity Utiliza	tion	•	133.4%	IC	U Level o	of Service			Н			
Analysis Period (min)			15						ndnýdguskýdduskoýdguskováta.	akalina akalinapika linanin Vino		SAME SAME SAME

	<b>*</b>	-	•	1	4-	1		1	<b>/</b>	<b>\</b>	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	1>		79	1>			4			44	
Volume (vph)	21	155	184	434	136	253	49	273	280	473	1350	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	CTT-MARKET - 0. THE OPENING TO SEE THE OPENING THE	A MARKAN STATE AND COLUMN AND COL	1.00	erren when any owner order
Frt	1.00	0.92		1.00	0.90			0.94			0.99	
Flt Protected	0.95	1.00	61 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.95	1.00			1.00	100 J. C.		0.99	tan-hata ra-hatanahata
Satd. Flow (prot)	1750	1692		1750	1662			1719			1807	
Flt Permitted	0.36	1.00		0.41	1.00	and the second section of the section of the second section of the section of the second section of the section of th	anne andere e electrica e electrica e elec	0.81		seems of the second distributions of the second	0.63	2003/02:203/02:203/02:2
Satd. Flow (perm)	672	1692		764	1662			1400	417 HT		1153	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	155	184	434	136	253	49	273	280	473	1350	99
RTOR Reduction (vph)	0	20	0	0	56	0	0	26	0	0	1	0
Lane Group Flow (vph)	21	319	0	434	333	0	0	576	0	0	1921	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2		19	6	
Permitted Phases	4			8			2		N-180-255-644-88	6		
Actuated Green, G (s)	47.0	47.0		47.0	47.0			59.0			59.0	
Effective Green, g (s)	51.0	51.0		51.0	51.0		TREACH TO STORY OF THE STORY	63.0			63.0	RATE DESCRIPTION OF THE PROPERTY OF THE PROPER
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.52			0.52	
Clearance Time (s)	7.0	7.0		7.0	7.0	28.4547.04042.001, 20.009		7.0			7.0	END-END-CERNAL ST
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	286	719		325	706			735			605	
v/s Ratio Prot		0.19			0.20							
v/s Ratio Perm	0.03			c0.57				0.41			c1.67	
v/c Ratio	0.07	0.44		1.34	0.47			0.78			3.17	
Uniform Delay, d1	20.5	24.5		34.5	24.8			23.0			28.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.32	
Incremental Delay, d2	0.1	0.4		170.4	0.5			8.2	and the second s		978.9	
Delay (s)	20.6	24.9		204.9	25.3			31.2			1016.6	
Level of Service	С	С		F	С			С			F	
Approach Delay (s)		24.6			120.0			31.2			1016.6	
Approach LOS		С			F			С			F	
Intersection Summary												
HCM Average Control Delay	'		561.2	Н	CM Level	of Servic	е		F			
HCM Volume to Capacity ra			2.35									
Actuated Cycle Length (s)		man marian en la sapenda (sapenda) (ship	120.0	Sı	ım of lost	time (s)			6.0			
ntersection Capacity Utilizat	ion	1	94.2%		U Level o				Н			
Analysis Period (min)			15	ar project facility (1990) (FR) (SA) (SA) (SA)								
Critical Lane Group												

	•	-	•	1	<b>←</b>	1	4	1	<b>/</b>	-	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			44-			44			4	
Volume (veh/h)	0	0	0	203	0	17	0	468	70	14	1714	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	203	0	17	0	468	70	14	1714	0
Pedestrians		nothy (aug nath) Annaruch) hear raithy (a annath	Photos Royal Arabitalisas	Navath Resett Resett Nove the			to have extense and the second of the country			all December of the second con-		
Lane Width (m)												
Walking Speed (m/s)		Fifther and change to the section and		DANGTON STREET				dan Kilara di Sanatinia e in Sa			erichisert staaren statue eert staare	Arbanettoneetteneet at
Percent Blockage								Section 1				
Right turn flare (veh)				acessaria annotation			derstangstangsamm.				TO ANN TO HE CANNESSED	GENEL THE GREEK
Median type								None			None	
Median storage veh)						To a ball water beautiful				F Johnson Billion Co.	CARRON NO PRESENT	
Upstream signal (m)												
pX, platoon unblocked												September 1980
vC, conflicting volume	2262	2280	1714	2245	2245	503	1714			538		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	0000	0000	4744	0045	0045	<b>500</b>	4744		and the second second	500		
vCu, unblocked vol	2262 7.1	2280 6.5	1714 6.2	2245 7.1	2245 6.5	503 6.2	1714 <b>4.1</b>			538		
tC, single (s)	7.1	0.5	0.2	7,1	0.0	0.2	4.1			4.1		
tC, 2 stage (s) tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	3.5 100	100	ა.ა 100	3.3 0	100	ა.ა 97	100			2.2 99		
cM capacity (veh/h)	28	39	112	29	41	569	370			1030		
50 mail (50 mail 170	9600 - EVENENBERGE BETTE FERSONS	OF SECTION CONTRACTOR SECTION	2004-002-00-00-00-00-00-00-00-00-00-00-00-00	Research to Activities and Committee of the	41	303	310			1030		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	220	538	1728								
Volume Left	0	203	0	14								
Volume Right	0	17	70	0								
SH	1700	32	370	1030								
Volume to Capacity	0.00	6.91	0.00	0.01								
Queue Length 95th (m)	0.0	Err	0.0	0.3								Anna de la composición dela composición de la composición de la composición de la composición dela composición de la composición dela composición dela composición de la composición dela composición de la composición dela composición del
Control Delay (s) Lane LOS	0.0	Err	0.0	0.1								
	A	F	0.0	A 0.1								
Approach Delay (s) Approach LOS	0.0 A	Err F	U.U	U. I			4					
•	А	Г										W5557/540557/510557/50
ntersection Summary			004.5									
Average Delay	•		884.9	,.								
ntersection Capacity Utiliza	tion	1	25.3%	IC	U Level o	T Service			Н			
Analysis Period (min)			15									

	•	-	*	1	4	1	1	1	1	<b>\</b>	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			44			€\$>			44	
Volume (vph)	10	265	8	308	336	19	11	363	109	94	1412	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	ATTENDED TO ANGEL TO AND ADDRESS OF THE PERSONS AND ADDRESS AND AD	3.0	ATTENNESS TO A SECTION OF THE PROPERTY OF THE PERSON OF TH		3.0	100 July and Co. Very left of the most over the	CENTRAL PARTIES IN THE STATE OF	3.0		2 - 2 - C - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt	Condition of Africa of Africano Ani	1.00	276,000,000,000,000,000		1.00	Miller on Addition Anderson An	ann y gan y gan y gan y gan y gan	0.97	en Arten de La Libraria de Carrella de	rildu wildu arildo rildo rildo ri	1.00	CO 40 META - PACCO A MARIA
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)	envigen divole Altre et Al	1834	man Adaman, Internativi Adaman, Adam	nerykyz er ysjoner pych er yn er e	1821	994 man (9 1940 p.) (9 min 19 19 19 19 1	General Walter Building Control of Control o	1741	an indicate in indicate in the second of the se		1797	um/Admos/dum.Adm.
Flt Permitted		0.98			0.60			0.95			0.93	
Satd. Flow (perm)		1794	er e		1110			1661			1684	techting autorities on physics.
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	265	8	308	336	19	11	363	109	94	1412	45
RTOR Reduction (vph)	0	1	0	0	1	0	0	9	0	0	1	0
Lane Group Flow (vph)	0	282	0	0	662	0	0	474	0	0	1550	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			Perm	T-1		Perm			Perm		
Protected Phases		4			8		J	2			6	
Permitted Phases	4	*		8	-		2			6		
Actuated Green, G (s)		42.0		•	42.0		_	64.0			64.0	
Effective Green, g (s)		46.0			46.0			68.0			68.0	
Actuated g/C Ratio		0.38			0.38			0.57			0.57	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		688	•		426			941			954	
v/s Ratio Prot		000			120			011			001	
v/s Ratio Perm		0.16			c0.60			0.29			c0.92	
v/c Ratio		0.41			1.55			0.50			1.62	
Uniform Delay, d1		27.1			37.0			15.8			26.0	
Progression Factor		1.00			1.00			1.13			1.00	
Incremental Delay, d2		0.4			261.0			1.5			286.0	
Delay (s)		27.5			298.0			19.3			312.0	
Level of Service		27.3 C			F			В			о. <u>г</u> .о F	
Approach Delay (s)		27.5			298.0			19.3			312.0	
Approach LOS		C			<b>-</b> 500.0			В			F	
Intersection Summary												
HCM Average Control Delay			234.4	Н	CM Level	of Servic	е		F			
HCM Volume to Capacity ratio			1.60									
Actuated Cycle Length (s)			120.0	Sı	um of lost	time (s)			6.0			
Intersection Capacity Utilization	n	1	172.8%		U Level o				Н			
Analysis Period (min)			15									
c Critical Lane Group												

	•	-	*	1	-	1	1	1	<b>/</b>	<b>\</b>	<b> </b>	<b>√</b>
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			44			4			43-	
Volume (veh/h)	0	0	0	147	0	4	0	368	24	3	1404	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	147	0	4	0	368	24	3	1404	0
Pedestrians		v1525-0000-04400-buogan 2-0440										intransiation and paragraph
Lane Width (m)												
Walking Speed (m/s)				auto articologia			Charles are standard					SENSENSENSENSE
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)					of Care Care Company or	Carter Confidence And						Marking and Control
Upstream signal (m)								348				
pX, platoon unblocked	0.89	0.89		0.89	0.89	0.89				0.89		ana arresante
vC, conflicting volume	1794	1802	1404	1790	1790	380	1404			392		
vC1, stage 1 conf vol					489							
vC2, stage 2 conf vol	4004	4040	1101	4000	4000	0.4.4	4 4 9 4			0=4		
vCu, unblocked vol	1831	1840	1404	1826	1826	241	1404			254		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)		4.0	0.0	2.5	4.0	2.2	0.0					
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100 52	100 67	100	0 <b>5</b> 3	100 <b>68</b>	99	100 486			100		
cM capacity (veh/h)		en liefer sen plat sen triffer sen l	171	20.000.000.000.000.000.000.000.000.000	68	710	486			1166		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	151	392	1407								
Volume Left	0	147	0	3								(Salatatialatatialata)
Volume Right	0	4	24	0								
cSH	1700	54	486	1166		e flores de la completa del la completa de la completa del la completa de la completa del la completa de la completa del l						districtivista anti-later
Volume to Capacity	0.00	2.80	0.00	0.00								
Queue Length 95th (m)	0.0	119.6	0.0	0.1						E and the state of the state of	and and the same	Arrichest Propin
Control Delay (s)	. 0.0	974.9	0.0	0.1								
Lane LOS	Α	F		A				Sanggip on Chanch bould do		raing describeration		
Approach Delay (s)	0.0	974.9	0.0	0.1								
Approach LOS	Α	F										
Intersection Summary												
Average Delay			75.6	<u></u>								
Intersection Capacity Utiliza	ation		96.3%	IC	U Level o	t Service			F			
Analysis Period (min)			15									

7. Collector Road	I CO IVIIS	sissau	ya Mu							200	I AIVI DU	Nothing
	<b>▶</b>	-	•	1	-	1	4	1	-	<b>\</b>	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		43-			44			43-			43-	
Volume (veh/h)	0	1	1	127	0	4	2	349	23	3	1264	0
Sign Control		Stop			Stop			Free			Free	8230
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	1	1	127	0	4	2	349	23	3	1264	0
Pedestrians			ATTANIN'I NO DESTRUMENTATIONS				#Newsell/Report Newsell/Report	di Assassi Princis None di Puenti Au		occupation and the second state of the second state of		
Lane Width (m)	and the second											
Walking Speed (m/s)												Townships (See St.)
Percent Blockage											Company Survey	
Right turn flare (veh)												
Median type					and the second			None			None	
Median storage veh)										107 (2007 2007 31 (2007 32 (2007		404214-8955449294
Upstream signal (m)	0.50	0.50	0.50	0.50	0.50					Service Service	350	
pX, platoon unblocked	0.56	0.56	0.56	0.56	0.56	000	0.56		***********			
vC, conflicting volume	1638	1646	1264	1636	1634	360	1264			372		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol vCu, unblocked vol	1749	1760	1075	1745	1742	360	1075			270		
tC, single (s)	7.1	1763 6.5	6.2	7.1	6.5	6.2	4.1			372 4.1		
tC, single (s)	1.1	0.0	0.2	1.1	0.0	0.2	4,1			4,1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	99	0	100	99	99			100		
cM capacity (veh/h)	37	46	148	37	48	684	360			1186		
The second secon			Comment the explainment pleases	der entitlete entit der entit der entit de	70	001	300			1100		
Direction, Lane # Volume Total	<u>EB 1</u>	WB 1 131	NB 1 374	SB 1 1267								
Volume Left	<b>2</b> 0	127	314 2	1207								
Volume Right	1	4	23	ა 0								
cSH	71	38	360	1186								
Volume to Capacity	0.03	3.48	0.01	0.00								
Queue Length 95th (m)	0.03	5,40 Err	0.01	0.00								
Control Delay (s)	57,4	Err	0.1	0.1								
Lane LOS	 Г	<u>,</u> F	о. <u>с</u> А	A				Ann a thorn an				
Approach Delay (s)	57.4	Err	0.2	0.1								
Approach LOS	F	F	V.L	V. 1		•						
Intersection Summary												
Average Delay			738.5									
Intersection Capacity Utiliza	ation		94.2%	IC	U Level o	f Service			F			
Analysis Period (min)			15		To the second constitution of the second constit					man and an analysis of the second		

			*	1	4-	*	1	1	1	-	↓	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	'n	1>		J.	13		1	1>		) j	1→	
Volume (vph)	101	1158	110	266	607	60	35	180	62	135	891	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.9
Total Lost time (s)	3.0	3.0		3.4	3.0	46470.0000000000000000000000000000000000	3.0	3.0	20 Period (Proceding Colors) (Proceding Colors)	3.4	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr	1.00	0.99	- Pachille substance delicated	1.00	0.99	Sports Sports Science Sports S	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1721	man Alberto Alberto Alberto A	1623	1628	200 mg 1964 mg 1464 mg 1456 mg 15	1750	1578	x 3550 3155 31 169 34 3455	1653	1771	25.000 Egil (170 g2702 190
FIt Permitted	0.30	1.00		0.06	1.00		0.10	1.00		0.40	1.00	
Satd. Flow (perm)	554	1721		103	1628		175	1578		694	1771	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	101	1158	110	266	607	60	35	180	62	135	891	158
RTOR Reduction (vph)	0	2	0	0	3	0	0	9	0	0	5	(
Lane Group Flow (vph)	101	1266	0	266	664	0	35	233	0	135	1044	(
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			pm+pt			Perm	, , , , ,		pm+pt	.,,,	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4	•		8			2	<del>-</del>		6	•	
Actuated Green, G (s)	59.4	59.4		75.4	75.4		38.4	38.4		51.4	51.4	
Effective Green, g (s)	63.0	63.0		79.0	79.0		42.0	42.0		55.0	55.0	
Actuated g/C Ratio	0.45	0.45		0.56	0.56		0.30	0.30		0.39	0.39	
Clearance Time (s)	6.6	6.6		7.0	6.6		6.6	6.6		7.0	6.6	
Vehicle Extension (s)	5.0	5.0		3.0	5.0		5.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	249	774		195	919		53	473		338	696	
v/s Ratio Prot	_,,	c0.74		c0.12	0.41		00	0.15		0.03	c0.59	
v/s Ratio Perm	0.18			0.65	<b></b>		0.20	· · · · ·		0.13		
v/c Ratio	0.41	1.64		1.36	0.72		0.66	0.49		0.40	1,50	
Uniform Delay, d1	25.9	38.5		46.4	22.4		42.8	40.2		29.1	42.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
ncremental Delay, d2	2.3	291.8		193.2	3.5		49.8	3.6		0.8	232.6	
Delay (s)	28.2	330.3		239.5	25.9		92.6	43.9		29.9	275.1	
Level of Service	C	F		F	C		F	D		C	-, o.,	
Approach Delay (s)	•	308.0			86.8		•	50.0		J	247.1	
Approach LOS		F			F			D			F	
ntersection Summary												
HCM Average Control Delay			215.0	Н	CM Level	of Servic	е		F			
HCM Volume to Capacity ratio	)		1.55									
Actuated Cycle Length (s)	THE RESIDENCE OF STREET, SALES	100000000000000000000000000000000000000	140.0	Sı	ım of lost	time (s)			9.4			CONTRACTOR DESIGNATION OF THE PARTY.
ntersection Capacity Utilization	n	1	59.7%		U Level o				Н			
Analysis Period (min)			-15						on and the state of	er er en er er er en er		
Description: Mayfield Rd												

1: Bova	ird Dr W	& Mississ	sauga Rd
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	•	-	>	<b> </b>	-	1	1	<b>†</b>	<b>/</b>	<b>&gt;</b>	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	'n	<b>↑</b>	7	ካ	4		J.	1→		75	1→	
Volume (vph)	114	2127	246	593	2502	164	426	2092	731	118	1065	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	1996) (1996) il 1996 i 1996 il 1996 i	3.0			3.0	3.0	KENNERS NAMED STREET
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99	200000000000000000000000000000000000000	1.00	0.96	NAMES OF STREET OF STREET STREET, STREET	1.00	0.99	# model on his model or
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	1824	1566	1716	1811	office and financial considering	1750			1716	1811	ON ALCOHOLOGICAL SPECIAL SPECI
FIt Permitted	0.07	1.00	1.00	0.07	1.00		0.10	1.00		0.10	1.00	
Satd. Flow (perm)	120	1824	1566	133	1811		182	1758		176	1811	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	114	2127	246	593	2502	164	426	2092	731	118	1065	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	9	0	0	1	0
Lane Group Flow (vph)	114	2127	246	593	2666	Ō	426	2814	0	118	1131	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	pm+pt		0,0	pm+pt		-,,	Perm	<b>.</b>	- 0,0
Protected Phases	TOITH	4	1100	3	8		5	2		1 Giiii	6	
Permitted Phases	4		Free	8	•		2	-		6	9	
Actuated Green, G (s)	51.4	51.4	140.0	73.4	73.4		53.4	53.4		37.4	37.4	
Effective Green, g (s)	55.0	55.0	140.0	73.4	77.0		53.4	57.0		41.0	41.0	
Actuated g/C Ratio	0.39	0.39	1.00	0.52	0.55		0.38	0.41		0.29	0.29	
Clearance Time (s)	6.6	6.6		3.0	6.6		3.0	6.6	•	6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	47	717	1566	285	996		215	716		52	530	
v/s Ratio Prot	71	c1,17	1300	0.28	c1.47		0.18	c1.60		JZ	0.62	
v/s Ratio Perm	0.95	61.17	0.16	0.20	61.47		0.10	U1.00		0.67	0.02	
v/c Ratio	2.43	2.97	0.16	2.08	2.68		1.98	3.93		2.27	2.13	
Uniform Delay, d1	42.5	42.5	0.10	46.4	2.00 31.5		40.2	41.5		49.5	49.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	701.1	888.7	0.2	498.2	757.2		457.9	1322.0		627.5	516.2	
Delay (s)	743.6	931.2	0.2	544.6	788.7		498.1	1363.5		677.0	565.7	
Level of Service	743.0 F	931.Z F	0.Z A	544.0 F	700.7 F		490.1 F	1303.5 F		677.0 F	505.7 F	
Approach Delay (s)	Г	830.5	Α	Г	744.3		Г	1250.0		Г	576.2	
Approach LOS		630.3 F			744.3 F			1230.0 F			370.Z F	
ntersection Summary												
HCM Average Control Dela	у		905.1	Н	ICM Level	of Service	e		F			
HCM Volume to Capacity ra			3.36									
Actuated Cycle Length (s)			140.0	S	um of lost	time (s)			9.0			
ntersection Capacity Utiliza	ition		324.5%	AND THE PROPERTY OF THE PROPER	CU Level o	200403-0009-00-0009-00-00-00-00-00-00-00-00-00			Н			
Analysis Period (min)	75.	200 <b>5</b> 28850000000000	15						**			
	Santoninia Establishe Bark	Sistematic contractions	danista sinasinas		resistantinasi saasaa		0.000.000.000.000.000.000				40540 0500 0400 040 0500 054	

Description: Bovaird Dr. W c Critical Lane Group

	•	-	>	1	4	*		<b>†</b>	<b>/</b>	<b>\</b>	<b>↓</b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		43			43-			4			4	
Volume (veh/h)	0	0	0	40	0	12	0	1883	98	9	802	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	40	0	12	0	1883	98	9	802	0
Pedestrians							School School School School					150400000000000000000000000000000000000
Lane Width (m)					elega value e							
Walking Speed (m/s)			Same and the same						entrare family vertica			anglish sa aksalis
Percent Blockage												
Right turn flare (veh)												
Median type				and the second second				None			None	
Median storage veh)											205	
Upstream signal (m)	0.90	0.90	0.90	0.90	0.90		0.90				305	
pX, platoon unblocked vC, conflicting volume	0.90 2764	2801	802	2752	2752	1932	802			1981		
vC, conflicting volume vC1, stage 1 conf vol	2/04	2001	002	2/32	2132	1932	002			1901		
vC1, stage 1 conf vol												
vCz, stage z com vor vCu, unblocked vol	2910	2951	722	2896	2896	1932	722			1981		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	7.1	0.0	U.L		0.0	0.2	7.1			7.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0.0	100	85	100			97		
cM capacity (veh/h)	7	13	383	9	14	83	789			291		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	52	1981	811								
Volume Left	0	40	0	9								
Volume Right	0	12	98	0								
cSH	1700	11	789	291		Charles (Art Carles Proster)	2000-04-200-05-20-20-20-20-20-20-20-20-20-20-20-20-20-	PALABATI STANDARD STANDARD		as case the amount of the discussive		contract for the property of
Volume to Capacity	0.00	4.71	0.00	0.03								
Queue Length 95th (m)	0.0	Err	0.0	0.7			CONTRACTOR OF STATEMENT				400 Miles (1900)	2010010-0111440010010
Control Delay (s)	0.0	Err	0.0	1.2								
Lane LOS	Α	F		Α								
Approach Delay (s)	0.0	Err	0.0	1.2								
Approach LOS	Α	F										
ntersection Summary												
Average Delay		aksaaniraani maan m	183.2	espanio españa espa								Attamentarizate (America)
Intersection Capacity Utiliza	ation		120.0%	IC	U Level o	of Service			Н			
Analysis Period (min)		CEOUGH COMPRESSION AND AND AND AND AND AND AND AND AND AN	15						akidaga ilgaridira kiris			Attorios trapas de central

o. canaawood i ai	ittaj u		Juage	<u>, , , , , , , , , , , , , , , , , , , </u>	1	1.2						
	•	-	*	1	-	•	4		1	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ካ	1>		ሻ	1→			4			4	
Volume (vph)	24	182	131	291	187	435	115	1153	817	234	433	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.94		1.00	0.90			0.95			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1750	1726		1750	1649			1740			1791	
Flt Permitted	0.12	1.00		0.43	1.00			0.91			0.21	
Satd. Flow (perm)	218	1726		786	1649			1591			379	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	182	131	291	187	435	115	1153	817	234	433	68
RTOR Reduction (vph)	0	22	0	0	36	0	0	19	0	0	3	0
Lane Group Flow (vph)	24	291	0	291	586	0	0	2066	0	0	732	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8	4 C. S.		2			6		
Actuated Green, G (s)	44.2	44.2		44.2	44.2			61.8			61.8	
Effective Green, g (s)	48.2	48.2	2010/09/2014/09/2015/2019	48.2	48.2			65.8			65.8	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.55			0.55	
Clearance Time (s)	7.0	7.0	and the second s	7.0	7.0	00040000040000000000000000000000000000		7.0			7.0	stance abdone elitition of elitin
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	88	693		316	662			872			208	
v/s Ratio Prot		0.17			0.36							
v/s Ratio Perm	0.11	\$24.000 D227 to 2010\$\$10.000 \$25,000 D25\$		c0.37	end filtre milytik von Einemikkliner.	P. Connect M. Connect L. Liver and P. Connect L.	or was the deliterate of the second	1.30	en internet internet in societies e	ndiday Milan di Can-Man	c1.93	
v/c Ratio	0.27	0.42		0.92	0.88			2.37			3.52	
Uniform Delay, d1	24.1	25.8	24-0-14-0-15-4-14-14-14-14-14-14-14-14-14-14-14-14-1	34.1	33.3	er transport of the state of the state of		27.1			27.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.21	
Incremental Delay, d2	1.7	0.4		30.9	13.4			620.0			1143.4	Para to Princes in Indiana de la constante de
Delay (s)	25.8	26.2		65.0	46.7			647.1			1176.1	
Level of Service	С	С		E	D		CO. 11 10 CO. 11	F	200000000000000000000000000000000000000	2000-1000 co 0000 co 1000 co 1	F	100 margaret (200 margaret)
Approach Delay (s)		26.2			52.5			647.1			1176.1	
Approach LOS		С			D			F			F	
Intersection Summary												
HCM Average Control Delay			557.8	Н	CM Level	of Service	е		F			
HCM Volume to Capacity rat	io		2.42									
Actuated Cycle Length (s)			120.0	Sı	ım of lost	time (s)			6.0	- Company and the second section 200		magair grade, comest, cor.
Intersection Capacity Utilizat	ion	1	70.3%		U Level o				Н			
Analysis Period (min)	en en france de la litera de quaga que da Augustina.		15			and the second s			name in the Business of the Control of State of			
c Critical Lane Group												

T. Balok Boale Valk	u & 141100	issaag	a ru							200	1111100	Touring
	•	-	•	1	-	*	1	1	<b>/</b>	<b>\</b>	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			44			44>	
Volume (veh/h)	0	0	0	81	0	23	0	1562	256	16	656	0
Sign Control		Stop	Acres (Marie Control of Control o	manufacture (A. St. v. v. A. St. v. St. v	Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	81	0	23	0	1562	256	16	656	0
Pedestrians						200.000	A Marine . Marine Marine	Carrier Sales Comment Sales Co	ar manner agente agent en jeden en	- Antonio Antonio Antonio Antonio Antonio	A CERT CONTRACTOR OF SECURITY	
Lane Width (m)												
Walking Speed (m/s)									e-Adam-Asm-AfreeAdom	de Signer, influenz de Signification de min-		di direpherelgi se pun
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)		t vilatahkin kumuta kuunata kumusi.										
Upstream signal (m)												
pX, platoon unblocked				books databas databas databas da	har-baker baker beren be			PRODUCTION CONTRACTOR				
vC, conflicting volume	2401	2506	656	2378	2378	1690	656			1818		
vC1, stage 1 conf vol	PELOTE AND PRESENCES					A COMPANIE DE PARTO DE LA COMP					tricish British Abbahri, Abbahri, Arbisol, Arbisol	and the second s
vC2, stage 2 conf vol												
vCu, unblocked vol	2401	2506	656	2378	2378	1690	656	90000000000000000000000000000000000000		1818		ni4040.ni0445.nii(445.co
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	ing.		4.1		
tC, 2 stage (s)			Africa Stages Substitute							funit Thaili Shakkhalikha	Saali Seiverbilden Seiverbilde	ministrativa in distriction di construccione di construcc
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	80	100			95	newski staliceski en er	HERE AND A THREE
cM capacity (veh/h)	18	27	465	23	33	115	931		and the grade of the second	337		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	104	1818	672								
Volume Left	0	81	0	16								
Volume Right	0	23	256	0								
	1700	28	931	337								
Volume to Capacity	0.00	3.72	0.00	0.05								
Queue Length 95th (m)	0.0	Err	0.0	1.1	orto-Kongress Kongress on state on the	erik menerakkan menik menerakkan ek	ST count No Steward No Steward No Steward I and					
Control Delay (s)	0.0	Err	0.0	1.6								
Lane LOS	A	F	SUANS EUROPUS LANCON DURING	Α	275Sun 250Sunggari wa 157	S-Streets Witness Comment of the Com		constitution and the second	article of the control of the contro	10.25 c.		
Approach Delay (s)	0.0	Err	0.0	1.6								
Approach LOS	Α	F										
Intersection Summary												
Average Delay		daga daga daga daga daga daga daga daga	401.3				Massacias seniro arribovom			n jegyptelingspatien van er een	MINISTER AND STREET STREET	20-0492049484444V
Intersection Capacity Utiliza	ation	1	15.3%	IC	U Level c	f Service			Н			
Analysis Period (min)			15									

	<b>▶</b>		*	<b>1</b>	4-	•	1	†	-	<b>\</b>	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		44			44			43			43-	
Volume (vph)	36	226	14	124	183	27	15	1160	409	16	534	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		3.0			3.0	West Control of Control of Control		3.0			3.0	
Lane Util, Factor		1.00			1.00			1.00			1.00	
Frt	i gerian sagi nahajig kuri ya geranga	0.99	- Carte (19 - Cart	ornes or sup a riger or petito	0.99			0.97			0.99	10175H-113G-144G-1
FIt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)	en annex seesayageasa	1824			1818			1736			1792	
FIt Permitted		0.91			0.63			0.99			0.93	
Satd. Flow (perm)		1669		ar, Teen at Marine States of Teening	1169			1725			1677	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	36	226	14	124	183	27	15	1160	409	16	534	43
RTOR Reduction (vph)	0	1	0	0	3	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	275	0	0	331	0	0	1574	0	0	591	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4	1202/02/2018/04/04/04/04		8			2			6		
Actuated Green, G (s)		32.4			32.4			73.6			73.6	
Effective Green, g (s)		36.4			36.4			77.6			77.6	
Actuated g/C Ratio		0.30			0.30			0.65			0.65	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		506			355			1116			1084	- COMMON STREET
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.28			c0.91			0.35	
v/c Ratio		0.54			0.93			1.41			0.54	
Uniform Delay, d1		34.9			40.6			21.2			11.6	
Progression Factor		1.00			1.00			1.12			1.00	
Incremental Delay, d2		1.2			30.9			185.1			2.0	
Delay (s)		36.1			71.6			208.8			13.5	
Level of Service		D			E			F			В	
Approach Delay (s)		36.1			71.6			208.8			13.5	
Approach LOS		D			E			F			В	
Intersection Summary												
HCM Average Control Delay			133.7	НС	CM Level	of Service	)		F			
HCM Volume to Capacity ratio			1.26									
Actuated Cycle Length (s)		actions on College State (1997) College	120.0	Su	m of lost	time (s)			6.0			
Intersection Capacity Utilizatio	n	1	35.7%		U Level o				Н			
Analysis Period (min)			15									
c Critical Lane Group												

	•	-	•	<b>*</b>	4	1	1	<b>†</b>	~	<b>\</b>	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			44			43-			4	
Volume (veh/h)	0	0	0	48	0	5	0	1134	89	4	545	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	48	0	5	0	1134	89	4	545	0
Pedestrians							Carrier Carrier Commission Commis					
Lane Width (m)												
Walking Speed (m/s)												Genelalmentament I
Percent Blockage												
Right turn flare (veh)											•	
Median type								None			None	
Median storage veh)								250				
Upstream signal (m)	0.07	0.07		0.07	0.07	0.07		352		0.07		
pX, platoon unblocked	0.37 <b>1736</b>	0.37	545	0.37	0.37	0.37	FAE			0.37		
vC, conflicting volume vC1, stage 1 conf vol	1/30	1776	545	1732	1732	1178	545			1223		
vC1, stage 1 conf vol												
vCz, stage z com voi vCu, unblocked vol	2141	2248	545	2128	2128	629	545			749		
tC, single (s)	7.1	6.5	6.2	2120 7.1	6.5	6.2	040 4.1			4.1		
tC, Single (s) tC, 2 stage (s)	7.1	0.5	0.2	1.1	0.0	0.2	4,1			4.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0.0	100	97	100			99		
cM capacity (veh/h)	13	15	538	13	18	178	1024			317		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	10	110	1024			317		
Volume Total	O		1223	549								
Volume Total Volume Left	0	<b>53</b> 48	1223	549 4								
Volume Right	0	40 5	89	0								
volume Right cSH	1700	14	1024	317								
Volume to Capacity	0.00	3.66	0.00	0.01								
Queue Length 95th (m)	0.0	Err	0.00	0.01								
Control Delay (s)	0.0	Err	0.0	0.3								
Lane LOS	0.0 A	F	0.0	А								
Approach Delay (s)	0.0	Err	0.0	0.4								
Approach LOS	A	F	<b>U.U</b>	U. 1								
Intersection Summary												
Average Delay	CONTRACTOR AND		290.5		skolikturalni iktoralni iktoralni iktoralni	o Attacke Consequence of the Consequence	N-treme Ganaga A-reservices	Marian in agrico				
Intersection Capacity Utiliza	ation		80.1%	IC	U Level o	f Service			D			
Analysis Period (min)		G tapata Stapata Stapane (stapata	15	and in the second s	project de la constante de la c	uire unirequipe autor on						enazal enezani-torrano

	•	-	*	<b>√</b>	-	*	4	1	<b>/</b>	<b>\</b>	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		43			€\$			44>			43-	
Volume (veh/h)	0	2	2	47	1	6	1	1050	88	4	473	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	2	2	47	1	6	1	1050	88	4	473	.0
Pedestrians		writer-excellen awellen andelen andelen		Navatah-perioh-perioh-perioh-p	sadisharati kusotikeratika	anto for a security of the sec		Property in acceptance of the control				
Lane Width (m)												
Walking Speed (m/s)	transfil Star at Different Norwall Star	CORPORATE CONTRACTOR CONTRACTOR	P-Protectiff Gast Affiliation of Pilliage Affilia	tanonitation of the second second	NOT THE PROPERTY AND ADDRESS OF THE PARTY OF				oneth Scopeth Works (Mount) Mount	NAME AND ADDRESS OF THE STREET A		NATIONAL PROPERTY NAMED IN COLUMN 1
Percent Blockage												
Right turn flare (veh)		otogasi egaseros o canas				rick profesional provisions	Company of a restrict score of the great					
Median type								None			None	
Median storage veh)		WED GROUP TO ANNEX ON MEDICAN ST		baata pagista menghipa					netalo antiro neta o retiro e	NS-100050440507085544		
Upstream signal (m)		arrage expenses				100					341	
pX, platoon unblocked	0.89	0.89	0.89	0.89	0.89		0.89					
vC, conflicting volume	1584	1621	473	1580	1577	1094	473			1138		
vC1, stage 1 conf vol			145254888445284F0E0		***********		480000000000000000000000000000000000000					
vC2, stage 2 conf vol					4-0-						A SHEET OF	
vCu, unblocked vol	1594	1636	344	1590	1587	1094	344			1138		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	100	37 75	99	98	100			99		
cM capacity (veh/h)	74	89	621	75	95	260	1079			614		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	4	54	1139	477								
Volume Left	0	47	1	4	orto Malaria (Salar tableskar tillak				iantiko etiko otika olik			This commission of the least
Volume Right	2	6	88	0								
cSH	155	82	1079	614	otrobelotrobelor obleko otrek				en menerala en Malenesia.	en Blad vo Mosettellad vinalada		
Volume to Capacity	0.03	0.66	0.00	0.01								
Queue Length 95th (m)	0.6	23.4	0.0	0.1		C.S. a.v.). Yan Olivia voj planet	g Constitution of the Constitution of		entytionetytionetytion			
Control Delay (s)	28.8	109.8	0.0	0.2								
Lane LOS	D	F	Α	Α	ration to the case							Sentitudent spend to
Approach Delay (s) Approach LOS	<b>28.8</b> D	109.8 F	0.0	0.2				4.0				
	ט											
Intersection Summary  Average Delay			3.7									
Average Delay Intersection Capacity Utilizati	on		82.6%	IC.	م امیما ا	f Service			Е			
mtersection Capacity Otilizati Analysis Period (min)	UII		02.0%	IV.	O FEAGU	ii Service						
anaiysis Feliod (IIIIII)			. เบ									

	•	-	•	<b> </b>	-	1	4	†	1	-	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ካ	1		ř	4		ሻ	1		ሻ	1	
Volume (vph)	160	525	64	116	879	96	54	733	237	68	297	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0		3.4	3.0		3.0	3.0		3.4	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.96		1.00	0.97	
FIt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1712		1623	1628		1750	1581		1653	1756	
Flt Permitted	0.08	1.00		0.11	1.00		0.49	1.00		0.07	1.00	
Satd. Flow (perm)	154	1712		186	1628		896	1581		126	1756	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	525	64	116	879	96	54	733	237	68	297	81
RTOR Reduction (vph)	0	3	0	0	3	0	0	9	0	0	7	0
Lane Group Flow (vph)	160	586	0	116	972	0	54	961	0	68	371	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	pm+pt			pm+pt			Perm			pm+pt		
Protected Phases	7	4		3	8			2		- 1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.2	44.4		48.6	41.6		48.2	48.2		58.4	58.4	
Effective Green, g (s)	61.4	48.0		55.8	45.2		51.8	51.8		62.0	62.0	entralia en National Autoritation
Actuated g/C Ratio	0.47	0.37		0.43	0.35		0.40	0.40		0.48	0.48	
Clearance Time (s)	7.0	6.6		7.0	6.6		6.6	6.6		7.0	6.6	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	237	632		197	566		357	630		140	837	
v/s Ratio Prot	c0.07	0.34		0.05	c0.60			c0.61		0.03	c0.21	
v/s Ratio Perm	0.25			0.20		and the second s	0.06			0.21		
v/c Ratio	0.68	0.93		0.59	1.72		0.15	1.53		0.49	0.44	
Uniform Delay, d1	29.2	39.3		28.1	42.4		25.0	39.1		29.0	22.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.4	20.5		4.4	330.0	The second secon	0.9	244.4		2.6	1.7	
Delay (s)	36.6	59.8		32.5	372.4		25.9	283.5		31.7	24.2	
Level of Service	D	E		С	F	Charles to the Charles to the Control of the Contro	С	F		C	С	
Approach Delay (s)		54.8			336.3			270.0			25.4	
Approach LOS		D	*		F			F			С	
Intersection Summary												
HCM Average Control Dela			210.2	Н	CM Level	of Service	e		F		MORCAN MARKATAN AND AND AND AND AND AND AND AND AND A	ne je najeje name i na
HCM Volume to Capacity r	atio		1.48									
Actuated Cycle Length (s)			130.0		um of lost				15.8			ENGERO ANTONO
Intersection Capacity Utiliz	ation	•	127.5%	IC	U Level o	of Service	r e		Н			
Analysis Period (min)	er filletowa (Advortivation Processing	Sub-co-state - publisher - sub-co-state - co-	15				Solombi Solombi Solombi estab		an Silveton Silveton -	despitato de la companione de la companion		
Description: Mayfield Rd												
Critical Lane Group												

c Critical Lane Group

## **Appendix H**

2018 Intersection Capacity
Calculations – Proposed
Improvements
(recommended in TTMP)

	٨		-	1	4	1	1	1	<b>/</b>	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ኻ	**	7*	ኻኻ	ተተ	74	ħ	**	7	ሻ	<b>1</b>	
Volume (vph)	24	1095	398	587	853	40	117	405	314	55	1659	15
ldeal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1566	3466	1566	3330	3466	1597	1750	3466	1566	1716	3462	
FIt Permitted	0.33	1.00	1.00	0.95	1.00	1.00	0.07	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	546	3466	1566	3330	3466	1597	122	3466	1566	928	3462	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	1095	398	587	853	40	117	405	314	55	1659	15
RTOR Reduction (vph)	0	0	0	0	0	22	0	0	155	0	1	0
Lane Group Flow (vph)	24	1095	398	587	853	18	117	405	159	55	1673	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	Prot		Perm	pm+pt		Perm	Perm		
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		Free			8	2		2	6		
Actuated Green, G (s)	35.4	35.4	140.0	21.0	59.4	59.4	67.4	67.4	67.4	57.4	57.4	
Effective Green, g (s)	39.0	39.0	140.0	21.0	63.0	63.0	67.4	71.0	71.0	61.0	61.0	
Actuated g/C Ratio	0.28	0.28	1.00	0.15	0.45	0.45	0.48	0.51	0.51	0.44	0.44	
Clearance Time (s)	6.6	6.6		3.0	6.6	6.6	3.0	6.6	6.6	6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	152	966	1566	500	1560	719	140	1758	794	404	1508	
v/s Ratio Prot		c0.32		c0.18	0.25		c0.04	0.12			c0.48	
v/s Ratio Perm	0.04		0.25			0.01	0.36		0.10	0.06		
v/c Ratio	0.16	1.13	0.25	1.17	0.55	0.03	0.84	0.23	0.20	0.14	1.11	
Uniform Delay, d1	38.1	50.5	0.0	59.5	28.1	21.4	32.3	19.3	18.9	23.7	39.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	73.1	0.4	97.8	0.7	0.0	41.8	0.3	0.6	0.7	59.4	
Delay (s)	39.1	123.6	0.4	157.3	28.8	21.4	74.1	19.6	19.5	24.4	98.9	
Level of Service	D	F	A	F	C	C	E	В	В	 C	F	
Approach Delay (s)	_	89.9		•	79.5	•	_	27.2	_	•	96.5	
Approach LOS		F			E			C			F	
Intersection Summary	3 3 9			E E E E	_	8 8 8 1			6 5 3			
			70.0	LIZ	CM Lovel	of Cond			E			
HCM Values to Caracity setion			79.8	п	CM Level	or Service	е		E			
HCM Volume to Capacity ratio			1.11	c.		time = (a)			40.0			
Actuated Cycle Length (s)			140.0		ım of lost		_		12.0			
Intersection Capacity Utilization	l	,	113.2%	iC	U Level c	o Service	;		Н			
Analysis Period (min)			15									
Description: Bovaird Dr. W												
c Critical Lane Group												

	1	1	<b>†</b>	<b>/</b>	-	1				
Movement	WBL	WBR	NBT	NBR	SBL	SBT				
Lane Configurations	ሻ	7	<u>ተ</u> ኑ		ሻ	ተተ				
Volume (veh/h)	105	10	349	24	7	1572				
Sign Control	Stop		Free			Free				
Grade	0%		0%			0%				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				
Hourly flow rate (vph)	105	10	349	24	7	1572				
Pedestrians										
Lane Width (m)										
Walking Speed (m/s)										
Percent Blockage										
Right turn flare (veh) Median type			None			None				
Median storage veh)			None			None				
Upstream signal (m)						300				
pX, platoon unblocked	0.78					300				
vC, conflicting volume	1161	186			373					
vC1, stage 1 conf vol	1101	100			0.0					
vC2, stage 2 conf vol										
vCu, unblocked vol	645	186			373					
tC, single (s)	6.8	6.9			4.1					
tC, 2 stage (s)										
tF (s)	3.5	3.3			2.2					
p0 queue free %	67	99			99					
cM capacity (veh/h)	314	824			1182					
Direction, Lane #	WB1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3	1711		
Volume Total	105	10	233	140	7	786	786			
Volume Left	105	0	0	0	7	0	0			
Volume Right	0	10	0	24	0	0	0			
cSH	314	824	1700	1700	1182	1700	1700			
Volume to Capacity	0.33	0.01	0.14	0.08	0.01	0.46	0.46			
Queue Length 95th (m)	10.8 22.1	0.3 9.4	0.0 0.0	0.0 0.0	0.1 8.1	0.0 0.0	0.0 0.0			
Control Delay (s) Lane LOS	22. I C	9.4 A	0.0	0.0	0. I ·	0.0	0.0			
Approach Delay (s)	21.0	^	0.0		0.0					
Approach LOS	Z 1.0	•	0.0		0.0					
Intersection Summary							· [- (5-1)		9 8 6 5	
Average Delay			1.2	-						
Intersection Capacity Utilizatio	n		60.9%	IC	U Level c	f Service		В		
Analysis Period (min)			15							

	1	1	1	<b>/</b>	-	1	
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	٦	7	<b>ት</b> ጉ		7	ተተ	
Volume (vph)	529	123	250	125	258	1110	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.85	0.95		1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1566	3325		1750	3500	
Flt Permitted	0.95	1.00	1.00		0.50	1.00	
Satd. Flow (perm)	1750	1566	3325		913	3500	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	529	123	250	125	258	1110	
RTOR Reduction (vph)	0	71	36	0	0	0	
Lane Group Flow (vph)	529	52	339	0	258	1110	
Turn Type		Perm			Perm		
Protected Phases	8		2			6	
Permitted Phases		8			6		
Actuated Green, G (s)	46.8	46.8	59.2		59.2	59.2	
Effective Green, g (s)	50.8	50.8	63.2		63.2	63.2	
Actuated g/C Ratio	0.42	0.42	0.53		0.53	0.53	
Clearance Time (s)	7.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	741	663	1751		481	1843	
v/s Ratio Prot	c0.30	0.00	0.10		0.00	c0.32	
v/s Ratio Perm	0.74	0.03	0.40		0.28	0.00	
v/c Ratio	0.71	0.08	0.19		0.54	0.60	
Uniform Delay, d1	28.6	20.6	15.0		18.7	19.7	
Progression Factor	1.00	1.00	1.00 0.2		1.08 4.0	1.03	
Incremental Delay, d2	3.3 31.9	0.1 20.7	0.2 15.2		4.0 24.1	1.4 21.7	
Delay (s) Level of Service	31.9 C	20.7 C	13.2 B		24.1 C	21.7 C	
Approach Delay (s)	29.8	C	15.2		C	22.1	
Approach LOS	29.0 C		13.2 B			22.1 C	
	C		U			U	
Intersection Summary							
HCM Average Control Delay			23.1	HC	CM Level	of Service	С
HCM Volume to Capacity ra	itio		0.65				
Actuated Cycle Length (s)			120.0		m of lost	٠,	6.0
Intersection Capacity Utiliza	tion		66.7%	IC	U Level (	of Service	C
Analysis Period (min)			15				
c Critical Lane Group							

	1	1	<b>†</b>	1	-	1	
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	ካ	7	<b>^</b>		ሻ	个个	
Volume (veh/h)	203	17	318	70	14	1180	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	203	17	318	70	14	1180	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s) Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh)			INOTIC			NONE	
Upstream signal (m)							
pX, platoon unblocked							
vC, conflicting volume	971	194			388		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	971	194			388		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	٥.	0.0			0.0		
tF (s) p0 queue free %	3.5 18	3.3 98			2.2 99		
cM capacity (veh/h)	247	815			99 1167		
	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total Volume Left	203 203	17	212	176	14	590	590
Volume Right	203	0 17	0 0	0 70	14 0	0 0	0 0
cSH	247	815	1700	1700	1167	1700	1700
Volume to Capacity	0.82	0.02	0.12	0.10	0.01	0.35	0.35
Queue Length 95th (m)	48.5	0.5	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	62.9	9.5	0.0	0.0	8.1	0.0	0.0
Lane LOS	F	Α			Α		
Approach Delay (s)	58.8		0.0		0.1		
Approach LOS	F						
Intersection Summary							
Average Delay			7.2	-			
Intersection Capacity Utilization	1		55.5%	IC	U Level o	f Service	В
Analysis Period (min)			15				

		-	*	<b>√</b>	-	1	1	1	1	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	朴		N.	<b>1</b>		M	**	7	ħ	44	
Volume (vph)	9	178	7	231	223	13	10	243	81	58	955	38
ldeal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3483		1767	3540		1785	3368	1597	1733	3418	
Flt Permitted	0.60	1.00		0.43	1.00		0.23	1.00	1.00	0.60	1.00	
Satd. Flow (perm)	1137	3483		802	3540		428	3368	1597	1089	3418	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	178	7	231	223	13	10	243	81	58	955	38
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	31	0	2	0
Lane Group Flow (vph)	9	182	0	231	232	0	10	243	50	58	991	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.6	11.6		35.7	35.7		70.3	70.3	70.3	70.3	70.3	
Effective Green, g (s)	15.6	15.6		39.7	39.7		74.3	74.3	74.3	74.3	74.3	
Actuated g/C Ratio	0.13	0.13		0.33	0.33		0.62	0.62	0.62	0.62	0.62	
Clearance Time (s)	7.0	7.0		7.0	7.0	*	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	148	453		435	1171		265	2085	989	674	2116	
v/s Ratio Prot		0.05		c0.09	0.07			0.07			c0.29	
v/s Ratio Perm	0.01	0.40		c0.08			0.02	0.40	0.03	0.05		
v/c Ratio	0.06	0.40		0.53	0.20		0.04	0.12	0.05	0.09	0.47	
Uniform Delay, d1	45.8	47.9		31.1	28.8		8.9	9.4	9.0	9.2	12.3	
Progression Factor	1.00	1.00		1.00	1.00		1.55	1.42	2.86	1.10	1.20	
Incremental Delay, d2	0.2	0.6		1.2	0.1		0.3	0.1	0.1	0.2	0.7	
Delay (s)	45.9	48.5		32.3	28.8		14.1	13.4	25.8	10.3	15.4	
Level of Service	D	D		С	C		В	B	С	В	B	
Approach Delay (s)		48.4			30.6			16.5			15.1	
Approach LOS		D			С			В			В	
Intersection Summary	harde d	A.A.A	3434	44 6 6 4	6.4.6.6	4.4.6.6	A Section			Salada S	de de de la	
HCM Average Control Delay			22.0	H	CM Level	of Service	е		С			
HCM Volume to Capacity ratio			0.49	_								
Actuated Cycle Length (s)			120.0		um of lost				6.0			
Intersection Capacity Utilization	n		62.2%	IC	U Level o	t Service			В			
Analysis Period (min)			15									
c Critical Lane Group												

	•		117	1	-	1	1	1	<b>/</b>	-	<b> </b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	<b>†</b>		7	<b>1</b>		ሻ	1	7	ሻ	<b>↑</b>	7"
Volume (vph)	61	698	68	160	367	43	21	122	37	86	546	95
ldeal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.4	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
FIt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	3268		1623	3092		1750	1648	1377	1653	1807	1566
FIt Permitted	0.51	1.00		0.15	1.00		0.27	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	942	3268		248	3092		504	1648	1377	1151	1807	<u> 1566</u>
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	698	68	160	367	43	21	122	37	86	546	95
RTOR Reduction (vph)	0	6	0	0	8	0	0	0	19	0	0	49
Lane Group Flow (vph)	61	760	0	160	402	0	21	122	18	86	546	46
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			pm+pt			Perm		Perm	Perm		Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	33.6	33.6		51.8	51.8		55.0	55.0	55.0	55.0	55.0	55.0
Effective Green, g (s)	37.2	37.2		55.4	55.4		58.6	58.6	58.6	58.6	58.6	58.6
Actuated g/C Ratio	0.31	0.31		0.46	0.46		0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	6.6	6.6		7.0	6.6		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	5.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	292	1013		284	1427		246	805	672	562	882	765
v/s Ratio Prot		c0.23		c0.07	0.13			0.07			c0.30	
v/s Ratio Perm	0.06			0.19			0.04		0.01	0.07		0.03
v/c Ratio	0.21	0.75		0.56	0.28		0.09	0.15	0.03	0.15	0.62	0.06
Uniform Delay, d1	30.5	37.2		22.6	20.0		16.4	17.0	15.9	17.0	22.5	16.2
Progression Factor	1.00	1.00		1.00	1.00		0.66	0.71	0.48	1.00	1.00	1.00
Incremental Delay, d2	0.7	3.8		2.6	0.2		0.7	0.4	0.1	0.6	3.3	0.2
Delay (s)	31.3	41.0		25.2	20.2		11.5	12.4	7.7	17.6	25.8	16.3
Level of Service	С	D		С	С		В	В	Α	В	С	В
Approach Delay (s)		40.3			21.6			11.3			23.6	
Approach LOS		D			С			• В			С	
Intersection Summary												
HCM Average Control Delay			20.4	1.17	CM Lovel	of Comileo						
			28.1	П	JIVI Level	of Service			C			
HCM Volume to Capacity ratio			0.66	٠.	6   4	4: (a)			0.4			
Actuated Cycle Length (s)			120.0		um of lost	` '			9.4			
Intersection Capacity Utilization Analysis Period (min)	ı		79.9% 15	IU	O Level 0	of Service			D			
` ,			10									
Description: Mayfield Rd c Critical Lane Group												
c Chilical Lane Group												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ħ	**	77	ሻሻ	**	7*	Ŋ	**	7	1	ተኩ	
Volume (vph)	70	1297	148	385	1500	147	256	1572	494	127	759	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.4	3.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
FIt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1566	3466	1566	3330	3466	1597	1750	3466	1566	1716	3444	
Flt Permitted	0.08	1.00	1.00	0.95	1.00	1.00	0.13	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	131	3466	1566	3330	3466	1597	244	3466	1566	155	3444	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	70	1297	148	385	1500	147	256	1572	494	127	759	42
RTOR Reduction (vph)	0	0	0	0	0	51	0	0	80	0	3	0
Lane Group Flow (vph)	70	1297	148	385	1500	96	256	1572	414	127	798	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	pm+pt		Free	Prot		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		. <u>.</u> 1	6	
Permitted Phases	4		Free			8	2		2	6		
Actuated Green, G (s)	50.0	46.8	140.0	13.0	52.6	52.6	64.0	53.0	53.0	47.0	43.0	
Effective Green, g (s)	57.2	50.4	140.0	13.0	56.2	56.2	64.0	56.6	56.6	54.2	46.6	
Actuated g/C Ratio	0.41	0.36	1.00	0.09	0.40	0.40	0.46	0.40	0.40	0.39	0.33	
Clearance Time (s)	7.0	6.6		3.0	6.6	6.6	3.0	6.6	6.6	7.0	6.6	
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	123	1248	1566	309	1391	641	305	1401	633	145	1146	
v/s Ratio Prot	0.03	0.37		c0.12	c0.43		c0.11	c0.45		0.05	0.23	
v/s Ratio Perm	0.20		0.09			0.06	0.28		0.26	0.29		
v/c Ratio	0.57	1.04	0.09	1.25	1.08	0.15	0.84	1.12	0.65	0.88	0.70	
Uniform Delay, d1	33.7	44.8	0.0	63.5	41.9	26.7	30.4	41.7	33.8	35.4	40.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.9	36.3	0.1	134.9	48.3	0.5	23.3	64.9	5.2	47.4	3.5	
Delay (s)	39.6	81.1	0.1	198.4	90.2	27.2	53.7	106.6	38.9	82.8	44.1	
Level of Service	D	F	Α	F	F	С	D	F	D	F	D	
Approach Delay (s)		71.2			106.1		_	86.4	_		49.4	
Approach LOS		· E			F			F			D	
Intersection Summary									111		_	2.8
HCM Average Control Dela	v		83.9	Ц	CM Level	of Consid	<b>10</b>		F			
HCM Volume to Capacity ra	•		1.10	П	CIVI LEVEI	UI SEIVIC	Е		Г			
Actuated Cycle Length (s)	200		140.0	Ç,	um of lost	timo (c)			9.0			
Intersection Capacity Utiliza	tion		140.0		U Level o				9.0 H			
Analysis Period (min)	ILIUII		110.7%	IC	O LEVEL	) OCIVICE	<b>7</b> .		П			
Description: Bovaird Dr. W			15									
c Critical Lane Group												
C CHILCAI LANE GIOUP												

	<b> </b>	1	<b>†</b>	1	-	1				
Movement	WBL	WBR	NBT	NBR	SBL	SBT				
Lane Configurations	*	7	ተኩ		ሻ	ተተ				
Volume (veh/h)	40	12	1428	98	9	586				
Sign Control	Stop		Free			Free				
Grade	0%		0%			0%				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				
Hourly flow rate (vph)	40	12	1428	98	9	586				
Pedestrians										
Lane Width (m)										
Walking Speed (m/s)										
Percent Blockage Right turn flare (veh)										
Median type			None			None				
Median storage veh)			140110			140110				
Upstream signal (m)						307				
pX, platoon unblocked										
vC, conflicting volume	1788	763			1526					
vC1, stage 1 conf vol										
vC2, stage 2 conf vol										
vCu, unblocked vol	1788	763			1526					
tC, single (s)	6.8	6.9			4.1					
tC, 2 stage (s)	2.5	2.2			2.2					
tF (s) p0 queue free %	3.5 44	3.3 97			2.2 98					
cM capacity (veh/h)	71	347			433					
										datast.
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3			
Volume Total	40 40	12	952	574	9	293	293			
Volume Left Volume Right	40 0	0 12	0 0	0 98	9	0 0	0 0			
cSH	71	347	1700	1700	433	1700	1700			
Volume to Capacity	0.56	0.03	0.56	0.34	0.02	0.17	0.17			
Queue Length 95th (m)	18.2	0.8	0.0	0.0	0.5	0.0	0.0			
Control Delay (s)	107.6	15.7	0.0	0.0	13.5	0.0	0.0			
Lane LOS	F	С			В					
Approach Delay (s)	86.4		0.0		0.2					
Approach LOS	F									
Intersection Summary										
Average Delay			2.1					_		
Intersection Capacity Utilizat	ion		57.6%	IC	U Level c	of Service		В	•	
Analysis Period (min)			15							

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Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	ኻ	7	<u>ተ</u> ቡ		79	十个	
Volume (vph)	416	260	994	567	129	333	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.85	0.95		1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1566	3309		1750	3500	
FIt Permitted	0.95	1.00	1.00		0.07	1.00	
Satd. Flow (perm)	1750	1566	3309		122	3500	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	416	260	994	567	129	333	
RTOR Reduction (vph)	0	173	47	0	0	0	
Lane Group Flow (vph)	416	87	1514	0	129	333	
Turn Type		Perm			pm+pt		
Protected Phases	8		2		1	6	
Permitted Phases		8			6		
Actuated Green, G (s)	36.0	36.0	57.5		70.0	70.0	
Effective Green, g (s)	40.0	40.0	61.5		70.0	74.0	
Actuated g/C Ratio	0.33	0.33	0.51		0.58	0.62	
Clearance Time (s)	7.0	7.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	583	522	1696		200	2158	
v/s Ratio Prot	c0.24		c0.46		c0.05	0.10	•
v/s Ratio Perm		0.06			0.33		
v/c Ratio	0.71	0.17	0.89		0.64	0.15	
Uniform Delay, d1	35.0	28.2	26.3		25.3	9.7	
Progression Factor	1.00	1.00	0.83		1.18	1.40	
Incremental Delay, d2	4.1	0.2	6.1		6.9	0.2	
Delay (s)	39.1	28.4	27.8		36.7	13.8	
Level of Service	D	С	С		D	В	
Approach Delay (s)	35.0		27.8			20.2	
Approach LOS	С		С			С	
Intersection Summary		ercer Jensen				Andrew Co	
HCM Average Control Delay			28.3	H	CM Level	of Service	C
HCM Volume to Capacity rat	io		0.81				
Actuated Cycle Length (s)			120.0	Su	ım of lost	time (s)	9.0
Intersection Capacity Utilizati	ion		85.8%	IC	U Level o	of Service	<b>E</b>
Analysis Period (min)			15				
c Critical Lane Group							

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Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	7	7	ተቡ		ሻ	ተተ	
Volume (veh/h)	81	23	1083	256	16	455	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	81	23	1083	256	16	455	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)			Mana			Mana	
Median type			None			None	
Median storage veh) Upstream signal (m)							
pX, platoon unblocked							
vC, conflicting volume	1470	670			1339		
vC1, stage 1 conf vol	1470	0/0			1000		
vC2, stage 2 conf vol							
vCu, unblocked vol	1470	670			1339		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	29	94			97		
cM capacity (veh/h)	114	400			511		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	81	23	722	617	16	228	228
Volume Left	81	0	0	0	16	0	0
Volume Right	0	23	0	256	0	0	0
cSH	114	400	1700	1700	511	1700	1700
Volume to Capacity	0.71	0.06	0.42	0.36	0.03	0.13	0.13
Queue Length 95th (m)	29.0	1.4	0.0	0.0	0.7	0.0	0.0
Control Delay (s)	90.7	14.6	0.0	0.0	12.3	0.0	0.0
Lane LOS	73.9	В	0.0		B 0.4		
Approach Delay (s) Approach LOS	7 ş.9 F		0.0		0.4		
	Г						
Intersection Summary			1 4				
Average Delay Intersection Capacity Utiliza Analysis Period (min)	ation		4.1 54.3% 15	IC	U Level o	of Service	Α
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	<b>*</b>	-	-	1	4	1	1	1	1	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	<b>†</b> \$		M	<b>1</b>		M	ተተ	. 7	ሻ	<b>◆</b> ₽	
Volume (vph)	31	154	12	101	136	19	13	774	318	11	358	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.99	
FIt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3467		1767	3504		1785	3368	1597	1733	3397	
Flt Permitted	0.65	1.00		0.58	1.00		0.48	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	1228	3467		1073	3504		900	3368	1597	501	3397	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	154	12	101	136	19	13	774	318	11	358	37
RTOR Reduction (vph)	0	4	0	0	9	0	0	0	116	0	6	0
Lane Group Flow (vph)	31	162	0	101	146	0	13	774	202	11	389	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	<u>0%</u>
Turn Type	Perm			pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.4	32.4		49.0	49.0		57.0	57.0	57.0	57.0	57.0	
Effective Green, g (s)	36.4	36.4		53.0	53.0		61.0	61.0	61.0	61.0	61.0	
Actuated g/C Ratio	0.30	0.30		0.44	0.44		0.51	0.51	0.51	0.51	0.51	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	372	1052		553	1548		458	1712	812	255	1727	
v/s Ratio Prot		0.05		c0.02	0.04			c0.23			0.11	
v/s Ratio Perm	0.03			c0.06			0.01		0.13	0.02		
v/c Ratio	0.08	0.15		0.18	0.09		0.03	0.45	0.25	0.04	0.23	
Uniform Delay, d1	29.9	30.5		19.9	19.5		14.7	18.8	16.6	14.8	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.42	1.12	1.93	1.05	0.93	
Incremental Delay, d2	0.4	0.3		0.2	0.0		0.1	0.6	0.5	0.3	0.3	
Delay (s)	30.3	30.9		20.1	19.5		21.0	21.7	32.5	15.9	15.5	
Level of Service	С	C		С	В		С	C	С	В	В	
Approach Delay (s)		30.8			19.8			24.8			15.5	
Approach LOS		,C			В			С			В	
Intersection Summary				. Galacia			6.6.6				4.53	
HCM Average Control Delay			22.8	H	CM Level	of Servic	е		С			
HCM Volume to Capacity rati	0		0.33									
Actuated Cycle Length (s)			120.0		ım of lost				6.0			
Intersection Capacity Utilization	on		41.6%	IC	U Level o	of Service			Α			
Analysis Period (min)			15									
c Critical Lane Group												

	*	-	*	<b>V</b>	-	1	•	†	1	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	朴体		15	↑p		ħ	*	7	ሻ	*	7
Volume (vph)	96	315	38	70	532	66	35	462	142	47	193	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
FIt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	3253		1623	3091		1750	1648	1377	1653	1807	1566
FIt Permitted	0.22	1.00		0.54	1.00		0.59	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	398	3253		923	3091		1095	1648	1377	622	1807	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	96	315	38	70	532	66	35	462	142	47	193	49
RTOR Reduction (vph)	0	9	0	0	9	0	0	0	69	0	0	24
Lane Group Flow (vph)	96	344	0	70	589	0	35	462	73	47	193	25
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	pm+pt			Perm			Perm		Perm	Perm		Perm
Protected Phases	7	4			- 8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	49.0	49.0		30.7	30.7		57.8	57.8	57.8	57.8	57.8	57.8
Effective Green, g (s)	52.6	52.6		34.3	34.3		61.4	61.4	61.4	61.4	61.4	61.4
Actuated g/C Ratio	0.44	0.44		0.29	0.29		0.51	0.51	0.51	0.51	0.51	0.51
Clearance Time (s)	7.0	6.6		6.6	6.6		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	342	1426		264	884		560	843	705	318	925	801
v/s Ratio Prot	c0.03	0.11			c0.19			c0.28			0.11	
v/s Ratio Perm	0.09			0.08			0.03		0.05	0.08		0.02
v/c Ratio	0.28	0.24		0.27	0.67		0.06	0.55	0.10	0.15	0.21	0.03
Uniform Delay, d1	21.7	21.2		33.1	37.8		14.8	19.9	15.1	15.5	16.0	14.5
Progression Factor	1.00	1.00		1.00	1.00		1.64	1.56	5.16	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2		1.1	2.5		0.2	2.4	0.3	1.0	0.5	0.1
Delay (s)	22.1	21.4		34.2	40.3		24.5	33.3	78.2	16.5	16.5	14.6
Level of Service	С	C		С	D		С	С	Ε	В	В	В
Approach Delay (s)		21.5			39.7			42.8			16.2	
Approach LOS		С			D	*		D			В	
Intersection Summary			a Constitution of					Adaba		6666	rin da la	Section 1
HCM Average Control Dela	ıy		33.4	Н	CM Level	of Service	<del>.</del>		С			
HCM Volume to Capacity ra	•		0.55									
Actuated Cycle Length (s)			120.0	Sı	um of lost	time (s)			9.4			
Intersection Capacity Utiliza	ation		67.3%			of Service	*		C			
Analysis Period (min)			15									
Description: Mayfield Rd												
c Critical Lane Group												

## **Appendix I**

2031 Intersection Capacity
Calculations – Proposed
Improvements
(without NSTC in place)

	*	-	*	1	-	4	4	<b>†</b>	1	-	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ካ	ተተተ	7	البواليو	ተተጉ		ሻሻ	ተተተ	7*	44	ተተተ	7
Volume (vph)	38	1992	663	894	1538	48	195	641	500	92	2292	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.4	3.0	3.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1566	4980	1566	3330	4962		3395	4980	1566	3330	4980	1597
FIt Permitted	0.10	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	163	4980	1566	3330	4962	4.00	3395	4980	1566	3330	4980	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	1992	663	894	1538	48	195	641	500	92	2292	23
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	212	0	0	4
Lane Group Flow (vph)	38	1992	663	894	1584	0	195	641	288	92	2292	19
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	pm+pt		Free	Prot	•		Prot	•	Perm	Prot		Perm
Protected Phases	7	4	<b>-</b>	3	8		5	2	0	1	6	•
Permitted Phases	4	40.0	Free	20.0	E0.0		7.0	40.0	2	4.0	47.0	47.0
Actuated Green, G (s)	44.0	40.8	140.0	26.0	59.6		7.0	46.0	46.0	4.0	47.0	47.0
Effective Green, g (s)	51.2	44.4	140.0	26.0	63.2 0.45		7.0 0.05	49.6 0.35	49.6	7.6 0.05	50.6	50.6
Actuated g/C Ratio	0.37 7.0	0.32	1.00	0.19 3.0	0.45 6.6		3.0	0.33 6.6	0.35 6.6	7.0	0.36	0.36
Clearance Time (s) Vehicle Extension (s)	3.0	6.6 5.0		5.0 5.0	5.0		5.0 5.0	5.0	5.0	3.0	6.6 <b>5</b> .0	6.6 5.0
	128	1579	1500	618	2240		170	1764	555	181	1800	577
Lane Grp Cap (vph) v/s Ratio Prot	0.01		1566	c0.27	0.32		c0.06	0.13	ວວວ	0.03		5//
v/s Ratio Prot v/s Ratio Perm	0.01	c0.40	c0.42	CU.21	0.32		CU.UU	0.13	0.18	0.03	c0.46	0.01
v/c Ratio	0.09	1.26	0.42	1.45	0.71		1.15	0.36	0.10	0.51	1.27	0.01
Uniform Delay, d1	29.8	47.8	0.42	57.0	30.9		66.5	33.5	35.7	64.4	44.7	28.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.00	123.0	0.8	210.0	1.00		114.1	0.6	3.4	9.8	127.5	0.1
Delay (s)	31.1	170.8	0.8	267.0	32.9		180.6	34.1	39.2	74.2	172.2	29.0
Level of Service	51.1 C	170.0 F	. 0.0 A	207.0 F	02.5 C		F	C	55.2 D	74.2 E	172.2 F	23.0 C
Approach Delay (s)		127.0	,,		117.3		'	57.4		_	167.1	Ū
Approach LOS		127.0 F			, , , , , ,			F .			. F	
Intersection Summary								_				
HCM Average Control Delay			124.7	Н	CM Level	of Service	Δ		F			
HCM Volume to Capacity rati	in		1.27	1.1	OIVI LEVEI	OI OCIVIO			•			
Actuated Cycle Length (s)	iO .		140.0	S	um of lost	time (s)			9.0			
Intersection Capacity Utilizati	ion	,	127.2%			of Service			- H			
Analysis Period (min)	<b>U</b> 11		15	10		, our vice			11			
Description: Boyaird Dr. W			10									
c Critical Lane Group												
5 Sittodi Lario Group												

	<u>*</u>	-		1	4	•	1	<b>†</b>	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations Volume (veh/h) Sign Control	0	<b>1</b> → 0 Stop	0	105	<b>f</b> → 0 Stop	10	0	<b>↑↑↑</b> 483 Free	24	<b>*</b> 7	<b>↑↑↑</b> 2086 Free	0
Grade Peak Hour Factor	1.00	0% 1.00	1.00	1.00	0% 1.00	1.00	1.00	0% 1.00	1.00	1.00	0%	1.00
Hourly flow rate (vph) Pedestrians Lane Width (m) Walking Speed (m/s) Percent Blockage	0	0	0	105	0	10	0	483	24	7	2086	0
Right turn flare (veh) Median type Median storage veh)								None			None	
Upstream signal (m)	0.70	0.70	0.70	0.70	0.70		0.70				303	
pX, platoon unblocked vC, conflicting volume vC1, stage 1 conf vol vC2, stage 2 conf vol	0.73 2271	0.73 2607	0.73 695	0.73 1204	0.73 2595	173	0.73 2086			507		
vCu, unblocked vol	1452	1911	0	0	1895	173	1199			507		
tC, single (s) tC, 2 stage (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free % cM capacity (veh/h)	100 66	100 49	100 793	86 744	100 50	99 840	100 423			99 1054		
								ND 4	00.4		00.0	00.4
Direction, Lane # Volume Total	EB 1 0	EB 2	WB 1 105	WB 2	NB 1 0	NB 2 193	NB 3 193	NB 4 121	SB 1	SB 2 834	SB 3 834	SB 4 417
Volume Left	0	0	105	0	0	0	0	0	7	004	034	417
Volume Right	0	Ö	0	10	Ö	Ö	Ö	24	0	0	0	0
cSH	1700	1700	744	840	1700	1700	1700	1700	1054	1700	1700	1700
Volume to Capacity	0.00	0.00	0.14	0.01	0.00	0.11	0.11	0.07	0.01	0.49	0.49	0.25
Queue Length 95th (m)	0.0	0.0	3.7	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	10.6	9.3	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.0
Lane LOS	Α	Α	В	Α					Α			
Approach Delay (s) Approach LOS	0.0 A		10.5 B		0.0				0.0			
Intersection Summary			444				13.34					
Average Delay Intersection Capacity Utiliza Analysis Period (min)	ation		0.5 57.8% 15	IC	U Level o	of Service			В			_

Movement   EBL   EBT   EBR   WBL   WBT   WBR   NBL   NBT   NBR   SBL   SBT   SBR   Lane Configurations   T
Volume (vph)         21         155         184         434         136         253         49         273         280         473         1350         99           Ideal Flow (vphpl)         1900         1000         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00
Ideal Flow (vphpl)
Total Lost time (s)
Lane Util. Factor         1.00         0.95         1.00         0.95         1.00         1.00         0.95         1.00         0.95         1.00         0.95         1.00         0.95         1.00         0.05         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85         1.00
Frt         1.00         0.92         1.00         1.00         0.85         1.00         1.00         0.85         1.00         1.00         0.85           Flt Protected         0.95         1.00         0.95         1.00         1.00         0.95         1.00         1.00         0.95         1.00         1.00         0.95         1.00         1.00         0.95         1.00         1.00         0.95         1.00         1.00         0.95         1.00         1.00         0.95         1.00         1.00         0.05         1.00
Fit Protected   0.95   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   0.95   1.00   1.00   1.00   0.95   1.00   1.00   1.00   0.95   1.00   1.00   1.00   0.47   1.00   1.00   0.95   0.95   1.00
Satd. Flow (prot)         1750         3215         1750         3500         1566         1750         3500         1566         1750         3500         1566         1750         3500         1566         1750         3500         1566         1750         3500         1566         1750         3500         1566         1750         3500         1566         1750         3500         1566         206         3500         1566         873         3500         1566           Peak-hour factor, PHF         1.00
Fit Permitted         0.67         1.00         0.25         1.00         1.00         0.11         1.00         1.00         0.47         1.00         1.00           Satd. Flow (perm)         1226         3215         457         3500         1566         206         3500         1566         873         3500         1566           Peak-hour factor, PHF         1.00
Satd. Flow (perm)         1226         3215         457         3500         1566         206         3500         1566         873         3500         1566           Peak-hour factor, PHF         1.00         <
Peak-hour factor, PHF         1.00
Adj. Flow (vph)         21         155         184         434         136         253         49         273         280         473         1350         99           RTOR Reduction (vph)         0         105         0         0         0         152         0         0         196         0         0         15           Lane Group Flow (vph)         21         234         0         434         136         101         49         273         84         473         1350         84           Turn Type         Perm         pm+pt         pm+pt
RTOR Reduction (vph)         0         105         0         0         0         152         0         0         196         0         0         15           Lane Group Flow (vph)         21         234         0         434         136         101         49         273         84         473         1350         84           Turn Type         Perm         pm+pt         Perm         pm-pt         Perm         pm+pt         Perm         pm-pt         Perm         pm+pt         Perm         pm-pt         4         4         4
Lane Group Flow (vph)         21         234         0         434         136         101         49         273         84         473         1350         84           Turn Type         Perm         pm+pt         4         3         8         2         2         6         6         6         6         6         6         <
Turn Type         Perm         pm+pt         Perm         pm-pt         Perm
Protected Phases 4 8 8 2 2 6 6 6 Actuated Green, G (s) 13.6 13.6 44.0 44.0 44.0 35.8 31.8 31.8 62.0 51.0 51.0 Effective Green, g (s) 17.6 17.6 48.0 48.0 48.0 43.8 35.8 35.8 66.0 55.0 55.0 Actuated g/C Ratio 0.15 0.15 0.40 0.40 0.40 0.36 0.30 0.30 0.55 0.46 0.46 Clearance Time (s) 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0
Permitted Phases         4         8         8         2         2         6         6           Actuated Green, G (s)         13.6         13.6         44.0         44.0         44.0         35.8         31.8         31.8         62.0         51.0         51.0           Effective Green, g (s)         17.6         17.6         48.0         48.0         48.0         43.8         35.8         35.8         66.0         55.0         55.0           Actuated g/C Ratio         0.15         0.15         0.40         0.40         0.40         0.36         0.30         0.30         0.55         0.46         0.46           Clearance Time (s)         7.0
Actuated Green, G (s) 13.6 13.6 44.0 44.0 44.0 35.8 31.8 31.8 62.0 51.0 51.0 Effective Green, g (s) 17.6 17.6 48.0 48.0 48.0 43.8 35.8 35.8 66.0 55.0 55.0 Actuated g/C Ratio 0.15 0.15 0.40 0.40 0.40 0.36 0.30 0.30 0.55 0.46 0.46 Clearance Time (s) 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0
Effective Green, g (s)       17.6       17.6       48.0       48.0       48.0       43.8       35.8       35.8       66.0       55.0       55.0         Actuated g/C Ratio       0.15       0.15       0.40       0.40       0.40       0.36       0.30       0.30       0.55       0.46       0.46         Clearance Time (s)       7.0
Actuated g/C Ratio       0.15       0.15       0.40       0.40       0.40       0.36       0.30       0.30       0.55       0.46       0.46         Clearance Time (s)       7.0 <t< td=""></t<>
Clearance Time (s)         7.0         3.0
Vehicle Extension (s)         3.0
Lane Grp Cap (vph)         180         472         478         1400         626         178         1044         467         679         1604         718           v/s Ratio Prot         0.07         c0.21         0.04         0.02         0.08         c0.16         c0.39           v/s Ratio Perm         0.02         c0.16         0.06         0.08         0.05         0.23         0.05           v/c Ratio         0.12         0.50         0.91         0.10         0.16         0.28         0.26         0.18         0.70         0.84         0.12           Uniform Delay, d1         44.5         47.1         29.7         22.5         23.1         26.8         32.0         31.2         17.0         28.7         18.6
v/s Ratio Prot     0.07     c0.21     0.04     0.02     0.08     c0.16     c0.39       v/s Ratio Perm     0.02     c0.16     0.06     0.08     0.05     0.23     0.05       v/c Ratio     0.12     0.50     0.91     0.10     0.16     0.28     0.26     0.18     0.70     0.84     0.12       Uniform Delay, d1     44.5     47.1     29.7     22.5     23.1     26.8     32.0     31.2     17.0     28.7     18.6
v/s Ratio Perm     0.02     c0.16     0.06     0.08     0.05     0.23     0.05       v/c Ratio     0.12     0.50     0.91     0.10     0.16     0.28     0.26     0.18     0.70     0.84     0.12       Uniform Delay, d1     44.5     47.1     29.7     22.5     23.1     26.8     32.0     31.2     17.0     28.7     18.6
v/c Ratio     0.12     0.50     0.91     0.10     0.16     0.28     0.26     0.18     0.70     0.84     0.12       Uniform Delay, d1     44.5     47.1     29.7     22.5     23.1     26.8     32.0     31.2     17.0     28.7     18.6
Uniform Delay, d1 44.5 47.1 29.7 22.5 23.1 26.8 32.0 31.2 17.0 28.7 18.6
$m{e}$
Description Foster 4.00 4.00 4.00 4.00 4.00 4.00 4.00 4.0
Incremental Delay, d2 0.3 0.8 20.8 0.0 0.1 0.8 0.6 0.8 2.4 4.3 0.3
Delay (s) 44.7 47.9 50.4 22.5 23.2 25.2 31.3 49.5 25.1 40.8 23.2
Level of Service D D D C C C D C
Approach Delay (s) 47.8 37.4 39.3 36.0
Approach LOS D D D
Intersection Summary
HCM Average Control Delay 38.0 HCM Level of Service D
HCM Volume to Capacity ratio 0.86
Actuated Cycle Length (s) 120.0 Sum of lost time (s) 9.0
Intersection Capacity Utilization 88.2% ICU Level of Service E
Analysis Period (min) 15
c Critical Lane Group

		-	*	1	4	1	1	<b>†</b>	1	1	<b></b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations Volume (veh/h) Sign Control Grade	0	0 Stop 0%	0	203	15 0 Stop 0%	17	0	468 Free 0%	<b>7</b> 0	<b>1</b> 4	1714 Free 0%	0
Peak Hour Factor Hourly flow rate (vph) Pedestrians Lane Width (m) Walking Speed (m/s)	1.00	1.00	1.00	1.00 203	1.00	1.00 17	1.00	1.00 468	1.00 70	1.00 14	1.00 1714	1.00
Percent Blockage Right turn flare (veh) Median type Median storage veh) Upstream signal (m)								None			None	
pX, platoon unblocked vC, conflicting volume vC1, stage 1 conf vol vC2, stage 2 conf vol	1993	2280	857	1353	2210	234	1714			538		
vCu, unblocked vol tC, single (s) tC, 2 stage (s)	1993 7.5	2280 6.5	857 6.9	1353 7.5	2210 6.5	234 6.9	1714 4.1			538 4.1		
tF (s) p0 queue free % cM capacity (veh/h)	3.5 100 35	4.0 100 39	3.3 100 301	3.5 0 107	4.0 100 43	3.3 98 768	2.2 100 366			2.2 99 1026		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB3	
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (m) Control Delay (s) Lane LOS Approach Delay (s) Approach LOS	0 0 0 1700 0.00 0.0 0.0 A 0.0 A	0 0 0 1700 0.00 0.0 0.0 A	203 203 0 107 1.89 125.9 501.6 F 463.6	17 0 17 768 0.02 0.5 9.8 A	0 0 0 1700 0.00 0.0 0.0	234 0 0 1700 0.14 0.0 0.0	234 0 0 1700 0.14 0.0 0.0	70 0 70 1700 0.04 0.0 0.0	14 14 0 1026 0.01 0.3 8.6 A 0.1	1143 0 0 1700 0.67 0.0 0.0	571 0 0 1700 0.34 0.0 0.0	
Intersection Summary Average Delay Intersection Capacity Utiliza Analysis Period (min)	ation	secos as pr	41.1 70.3% 15	IC	U Level o	of Service			С			

	•	-		1	•	4	1	<b>†</b>	-	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	<b>*</b>	7	ħ	个体		ሻ	44	7	ħ	ተኩ	
Volume (vph)	10	265	8	308	336	19	11	363	109	94	1412	45
ldeal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	
FIt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3500	1597	1767	3541		1785	3368	1597	1733	3421	
FIt Permitted	0.47	1.00	1.00	0.54	1.00		0.09	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	880	3500	1597	1010	3541		174	3368	1597	935	3421	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	265	8	308	336	19	11	363	109	94	1412	45
RTOR Reduction (vph)	0	0	5	0	4	0	0	0	45	0	2	0
Lane Group Flow (vph)	10	265	3	308	351	0	11	363	64	94	1455	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	40.0	40.0	40.0	40.0	40.0		66.0	66.0	66.0	66.0	66.0	
Effective Green, g (s)	44.0	44.0	44.0	44.0	44.0		70.0	70.0	70.0	70.0	70.0	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.58	0.58	0.58	0.58	0.58	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	323	1283	586	370	1298		102	1965	932	545	1996	
v/s Ratio Prot		0.08			0.10			0.11			c0.43	
v/s Ratio Perm	0.01		0.00	c0.30			0.06		0.04	0.10		
v/c Ratio	0.03	0.21	0.01	0.83	0.27		0.11	0.18	0.07	0.17	0.73	
Uniform Delay, d1	24.3	26.0	24.1	. 34.6	26.7		11.1	11.7	10.8	11.6	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.82	0.96	0.82	1.80	1.76	
Incremental Delay, d2	0.0	0.1	0.0	14.7	0.1		2.1	0.2	0.1	0.5	1.9	
Delay (s)	24.4	26.1	24.1	49.4	26.8		11.1	11.4	9.1	21.4	33.7	
Level of Service	С	С	С	D	С		В	В	Α	С	С	
Approach Delay (s)	•	26.0			37.3			10.9			33.0	
Approach LOS		С		*	D			В			С	
Intersection Summary							6.6.8					
HCM Average Control Delay			29.7	Н	CM Level	of Service	е		С			
HCM Volume to Capacity ratio	)		0.77									
Actuated Cycle Length (s)			120.0	Su	ım of lost	time (s)			6.0			
Intersection Capacity Utilizatio	n		81.5%	IC	U Level c	of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

	*	-	*	1	4	1	1	<b>†</b>	1	<b>\</b>	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	1	_	ሻ	B		_	44		_	414	_
Volume (veh/h)	0	0	0	147	0	4	0	368	24	3	1404	0
Sign Control		Stop			Stop			Free			Free	
Grade	4.00	0%	4.00	4.00	0%	4.00	4.00	0%	4.00	4.00	0%	4.00
Peak Hour Factor	1.00 0	1.00 0	1.00 0	1.00 147	1.00 0	1.00 4	1.00 0	1.00 368	1.00 24	1.00	1.00 1404	1.00
Hourly flow rate (vph) Pedestrians	U	U	U	147	U	4	U	300	24	3	1404	U
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								358				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	1598	1802	702	1088	1790	196	1404			392		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1582	1788	702	1066	1776	164	1404			363		
tC, single (s)	7.5	6.5	6.9	*6.7	6.5	6.9	4.1			4.1		
tC, 2 stage (s)		4.0	0.0									
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	34	100	100	100			100		
cM capacity (veh/h)	72	79	381	223	81	842	482			1179		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	179			
Volume Total	0	0	147	4	184	208	705	702				
Volume Left	0	0	147	0	0	0	3	0				
Volume Right	0	0	0	4	0	24	0	0				
cSH	1700	1700	223	842	482	1700	1179	1700				
Volume to Capacity Queue Length 95th (m)	0.00 0.0	0.00	0.66 30.8	0.00	0.00	0.12 0.0	0.00 0.1	0.41 0.0				
Control Delay (s)	0.0	0.0	30.6 47.6	9.3	0.0	0.0	0.1	0.0				
Lane LOS	0.0 A	0.0 A	47.0 E	9.3 A	0.0	0.0	0. i	0.0				
Approach Delay (s)	0.0		46.6		0.0		0.0					
Approach LOS	Α		40.0 E		0.0		0.0					
Intersection Summary				4.9.20		9-6-6-3	belonde de		100			
Average Delay Intersection Capacity Utiliza Analysis Period (min)	ation		3.6 60.7% 15	IC	U Level o	of Service	!		В			

<sup>\*</sup> User Entered Value

			<u> </u>									
	•	-	•	1	+	1		<b>†</b>	1	<b>\</b>	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations Volume (veh/h)	<b>*</b> *1	<b>}</b>	1	<b>127</b>	<b>1</b>	4	2	4 <b>1 5</b> 349	23	3	4 <b>1</b> - 1264	0
Sign Control Grade		Stop 0%			Stop 0%			Free 0%			Free 0%	
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
Hourly flow rate (vph) Pedestrians Lane Width (m) Walking Speed (m/s)	0	1	1	127	0	4	2	349	23	3	1264	0
Percent Blockage Right turn flare (veh)												
Median type Median storage veh)								None			None	
Upstream signal (m)											348	
pX, platoon unblocked	0.74	0.74	0.74	0.74	0.74		0.74					
vC, conflicting volume vC1, stage 1 conf vol vC2, stage 2 conf vol	1452	1646	632	1004	1634	186	1264			372		
vCu, unblocked vol	901	1163	0	292	1148	186	645			372		
tC, single (s) tC, 2 stage (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	73	100	100	100			100		
cM capacity (veh/h)	170	142	799	465	145	824	690			1183		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	0	2	127	4	176	198	635	632				
Volume Left	0	0	127	0	2	0	. 3	0				
Volume Right	0	1	0	4	0	23	0	0				
cSH	1700	241	465	824	690	1700	1183	1700				
Volume to Capacity	0.00 0.0	0.01 0.2	0.27 8.4	0.00	0.00	0.12	0.00	0.37				
Queue Length 95th (m) Control Delay (s)	0.0	20.1	8.4 15.6	0.1 9.4	0.1 0.1	0.0 0.0	0.1 0.1	0.0 0.0				
_ane LOS	0.0 A	20.1 C	15.0 C	9.4 A	0. i A	0.0	0.1 A	0.0				
Approach Delay (s)	20.1	C	15.4	^	0.1		0.0					
Approach LOS	C		C		0.1		0.0		*			
ntersection Summary												
Average Delay ntersection Capacity Utiliza Analysis Period (min)	tion		1.2 62.4% 15	IC	U Level o	of Service			В			

	٠	<b>→</b>	*	1	4	*	1	<b>†</b>	~	-	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ካ	<b>^</b>	7	ሻ	ተቡ		J.	<b>十</b> 个	7	ħ	个孙	
Volume (vph)	101	1158	110	266	607	60	35	180	62	135	891	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
FIt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1750	3336	1377	1623	3094		1750	3131	1377	1653	3365	
Flt Permitted	0.40	1.00	1.00	0.08	1.00		0.09	1.00	1.00	0.62	1.00	
Satd. Flow (perm)	733	3336	1377	139	3094		174	3131	1377	1076	3365	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	101	1158	110	266	607	60	35	180	62	135	891	158
RTOR Reduction (vph)	0	0	19	0	6	0	0	0	40	0	12	0
Lane Group Flow (vph)	101	1158	91	266	661	0	35	180	22	135	1037	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
	Perm		Perm	pm∻pt	***************************************	· Wile Wat with all the comment	Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4	•	4	8			2	_	2	6	ŭ	
Actuated Green, G (s)	46.0	46.0	46.0	68.0	68.0		38.8	38.8	38.8	38.8	38.8	
Effective Green, g (s)	49.6	49.6	49.6	68.0	71.6		42.4	42.4	42.4	42.4	42.4	
Actuated g/C Ratio	0.41	0.41	0.41	0.57	0.60		0.35	0.35	0.35	0.35	0.35	
Clearance Time (s)	6.6	6.6	6.6	3.0	6.6		6.6	6.6	6.6	6.6	6.6	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	303	1379	569	314	1846		61	1106	487	380	1189	
v/s Ratio Prot	000	c0.35	000	c0.13	0.21		٥.	0.06	101	000	c0.31	
v/s Ratio Perm	0.14	00.00	0.07	0.35	0.21		0.20	0.00	0.02	0.13	00.01	
v/c Ratio	0.33	0.84	0.16	0.85	0.36		0.57	0.16	0.04	0.36	0.87	
Uniform Delay, d1	24.0	31.6	22.1	34.6	12.4		31.5	26.6	25.5	28.7	36.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.22	1.14	2.36	1.00	1.00	
Incremental Delay, d2	1.4	5.2	0.3	18.6	0.2		33.6	0.3	0.2	2.6	9.0	
Delay (s)	25.3	36.8	22.4	53.2	12.7		72.0	30.5	60.4	31,3	45.2	
Level of Service	C C	D	C	D	В		, <u>2</u> .0	C	E	C C	70.2 D	
Approach Delay (s)	Ū	34.8	J		24.2		_	42.4	l	J	43.6	
Approach LOS		C			C			72 <del>.</del> D			70.0 D	
											J	
Intersection Summary	refrequely		Augustus (				Carlo de					
HCM Average Control Delay			35.5	H	CM Level	of Service			D			
HCM Volume to Capacity ratio			0.85					•				
Actuated Cycle Length (s)			120.0	Sı	ım of lost	time (s)			9.0			
Intersection Capacity Utilization		-	97.2%	IC	U Level o	of Service			F			
Analysis Period (min)			15									
Description: Mayfield Rd												
c Critical Lane Group												

1. Bovana Br vv & Wississauga ra												Vollicit
	*	-	•	1	-	1	4	1	<b>/</b>	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	ተተተ	7	ሻሻ	ተተኈ		44	<b>**</b>	7	ايراير	ተተተ	i"
Volume (vph)	114	2127	246	593	2502	164	426	2092	731	118	1065	67
ldeal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.4	3.0	3.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1566	4980	1566	3330	4943		3395	4980	1566	3330	4980	1597
FIt Permitted	0.08	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	135	4980	1566	3330	4943		3395	4980	1566	3330	4980	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	114	2127	246	593	2502	164	426	2092	731	118	1065	67
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	121	0	0	22
Lane Group Flow (vph)	114	2127	246	593	2661	0	426	2092	610	118	1065	45
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	pm+pt		Free	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free						2			. 6
Actuated Green, G (s)	49.4	45.4	140.0	20.0	57.4		20.7	47.4	47.4	4.0	34.7	34.7
Effective Green, g (s)	56.6	49.0	140.0	20.0	61.0		20.7	51.0	51.0	7.6	38.3	38.3
Actuated g/C Ratio	0.40	0.35	1.00	0.14	0.44		0.15	0,36	0.36	0.05	0.27	0.27
Clearance Time (s)	7.0	6.6		3.0	6.6		3.0	6.6	6.6	7.0	6.6	6.6
Vehicle Extension (s)	3.0	5.0		5.0	5.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	132	1743	1566	476	2154		502	1814	570	181	1362	437
v/s Ratio Prot	0.05	0.43		c0.18	c0.54		c0.13	c0.42		0.04	0.21	
v/s Ratio Perm	0.30		0.16						0.39			0.03
v/c Ratio	0.86	1.22	0.16	1.25	1.24		0.85	1.15	1.07	0.65	0.78	0.10
Uniform Delay, d1	34.6	45.5	0.0	60.0	39.5		58.1	44.5	44.5	64.9	47.0	38.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.4	104.6	0.2	127.3	110.1		13.8	75.8	57.6	8.1	4.5	0.5
Delay (s)	75.0	150.1	0.2	187.3	149.6		72.0	120.3	102.1	73.0	51.5	38.5
Level of Service	E	F	A	F	F		E	F	F	E	D	D
Approach Delay (s)	_	131.8		•	156.5		_	109.8	•	_	52.9	_
Approach LOS		F			F			F			D	
Intersection Summary			1 2 2 3									
HCM Average Control Delay	(6) - 12		123.1	Ш	CM Lovel	of Servic	^		F			
HCM Volume to Capacity ratio			1.18	11	CIVI LEVEI	OI SEIVIC	<b>C</b>		Г.			
Actuated Cycle Length (s)	,		140.0	٠.	ım of loof	time (e)			0.0			
Intersection Capacity Utilization	'n		140.0		um of lost	of Service			9.0 H			
Analysis Period (min)			115.4%	IC	O LEVEL	JI SELVICE			П			
Description: Bovaird Dr. W			10									
c Critical Lane Group												
c Chucai Lane Group												

Z. Concetor Road	O G IVIIS	313344	iga itu							O 1 1 111 V	riai iiiipic	7701110111
	•	-	•	1	<b>←</b>	1		†	1	<b>\</b>	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations Volume (veh/h) Sign Control Grade	<b>آ</b> 0	1→ 0 Stop 0%	0	<b>ሻ</b> 40	1; 0 Stop 0%	12	0	<b>↑↑↑</b> 1883 Free 0%	98	9	<b>↑↑↑</b> 802 Free 0%	0
Peak Hour Factor Hourly flow rate (vph) Pedestrians Lane Width (m) Walking Speed (m/s) Percent Blockage	1.00	1.00	1.00	1.00 40	1.00	1.00 12	1.00	1.00 1883	1.00 98	1.00	1.00 802	1.00
Right turn flare (veh) Median type Median storage veh) Upstream signal (m) pX, platoon unblocked								None			None 302	
vC, conflicting volume vC1, stage 1 conf vol vC2, stage 2 conf vol	1460	2801	267	2217	2752	677	802			1981		
vCu, unblocked vol tC, single (s) tC, 2 stage (s)	1460 7.5	2801 6.5	267 6.9	2217 7.5	2752 6.5	677 6.9	802 4.1			1981 4.1		
tF (s) p0 queue free % cM capacity (veh/h)	3.5 100 85	4.0 100 18	3.3 100 731	3.5 0 24	4.0 100 19	3.3 97 395	2.2 100 817			2.2 97 288		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (m) Control Delay (s) Lane LOS Approach Delay (s) Approach LOS	0 0 0 1700 0.00 0.0 0.0 A 0.0 A	0 0 0 1700 0.00 0.0 0.0 A	40 40 0 24 1.70 38.3 693.1 F 536.5 F	12 0 12 395 0.03 0.7 14.4 B	0 0 0 1700 0.00 0.0 0.0	753 0 0 1700 0.44 0.0 0.0	753 0 0 1700 0.44 0.0 0.0	475 0 98 1700 0.28 0.0 0.0	9 9 0 288 0.03 0.7 17.9 C	321 0 0 1700 0.19 0.0 0.0	321 0 0 1700 0.19 0.0 0.0	160 0 0 1700 0.09 0.0
Intersection Summary Average Delay Intersection Capacity Utiliz Analysis Period (min)	ation		9.9 48.6% 15	IC	CU Level o	of Service		· · · · · · · · · · · · · · · · · · ·	· A			

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Ŋ.	44		Ŋ	<b>^</b>	7	J.	ተተ	7	*	**	7
Volume (vph)	24	182	131	291	187	435	115	1153	817	234	433	68
ldeal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	3280		1750	3500	1566	1750	3500	1566	1750	3500	1566
Flt Permitted	0.63	1.00		0.26	1.00	1.00	0.50	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	1168	3280		485	3500	1566	921	3500	1566	176	3500	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	182	131	291	187	435	115	1153	817	234	433	68
RTOR Reduction (vph)	0	113	0	0	0	190	0	0	268	0	0	25
Lane Group Flow (vph)	24	200	0	291	187	245	115	1153	549	234	433	43
Turn Type	Perm	_		pm+pt	_	Perm	Perm	_	Perm	pm+pt		Perm
Protected Phases		4		3	8		_	2		1	6	
Permitted Phases	4			8		8	2	=4.0	2	6	=0.4	6
Actuated Green, G (s)	12.6	12.6		33.6	33.6	33.6	51.0	51.0	51.0	72.4	72.4	72.4
Effective Green, g (s)	16.6	16.6		37.6	37.6	37.6	55.0	55.0	55.0	72.4	76.4	76.4
Actuated g/C Ratio	0.14	0.14		0.31	0.31	0.31	0.46	0.46	0.46	0.60	0.64	0.64
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	162	454		342	1097	491	422	1604	718	348	2228	997
v/s Ratio Prot	0.00	0.06		c0.13	0.05	0.40	0.40	0.33	0.05	c0.10	0.12	0.00
v/s Ratio Perm	0.02	0.44		c0.14	0.47	0.16	0.12	0.70	c0.35	0.30	0.40	0.03
v/c Ratio	0.15	0.44		0.85	0.17	0.50	0.27	0.72	0.76	0.67	0.19	0.04
Uniform Delay, d1	45.5	47.4		34.6	29.9	33.5	20.1	26.3	27.1	25.8	9.0	8.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.19	1.28	1.86	1.01	1.31	2.06
Incremental Delay, d2	0.4	0.7		18.0	0.1	0.8	0.9	1.6	4.5	9.8	0.2	0.1
Delay (s)	45.9	48.1		52.6	30.0	34.3	24.9	35.3	54.8	35.7	12.1	16.8
Level of Service	D	D		D	C	С	С	D	D	D	B	В
Approach Delay (s)		48.0			39.3			42.4 D			20.0	
Approach LOS		D			D			ט			С	
Intersection Summary	19-28-3-1									5-7-6-5		
HCM Average Control Delay			38.1	H	CM Level	of Service	e		D			
HCM Volume to Capacity ratio	)		0.78									
Actuated Cycle Length (s)			120.0		um of lost	٠,			9.0			
Intersection Capacity Utilizatio	n		83.5%	IC	U Level	of Service			Ε			
Analysis Period (min)			15									
c Critical Lane Group												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations Volume (veh/h) Sign Control Grade	<b>"</b> 1	0 Stop 0%	0	<b>8</b> 1	<b>1→</b> 0 Stop 0%	23	<b>آ</b> ر 0	1562 Free 0%	<b>2</b> 56	<b>1</b> 6	656 Free 0%	0
Peak Hour Factor Hourly flow rate (vph) Pedestrians Lane Width (m) Walking Speed (m/s) Percent Blockage	1.00 0	1.00	1.00	1.00 81	1.00	1.00	1.00	1.00 1562	1.00 256	1.00 16	1.00 656	1.00
Right turn flare (veh) Median type Median storage veh) Upstream signal (m) pX, platoon unblocked								None			None	
vC, conflicting volume vC1, stage 1 conf vol vC2, stage 2 conf vol	1492	2506	328	1922	2250	781	656			1818		
vCu, unblocked vol tC, single (s) tC, 2 stage (s)	1492 7.5	2506 6.5	328 6.9	1922 7.5	2250 6.5	781 6.9	656 4.1			1818 4.1		
tF (s) p0 queue free % cM capacity (veh/h)	3.5 100 77	4.0 100 27	3.3 100 668	3.5 0 39	4.0 100 39	3.3 93 338	2.2 100 927	·		2.2 95 333		
Direction, Lane #	EB 1	EB 2	WB 1	WB2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (m) Control Delay (s) Lane LOS Approach Delay (s) Approach LOS	0 0 0 1700 0.00 0.0 0.0 A 0.0 A	0 0 0 1700 0.00 0.0 0.0 A	81 81 0 39 2.08 66.3 720.0 F 564.4	23 0 23 338 0.07 1.7 16.4 C	0 0 0 1700 0.00 0.0 0.0 0.0	781 0 0 1700 0.46 0.0 0.0	781 0 0 1700 0.46 0.0 0.0	256 0 256 1700 0.15 0.0 0.0	16 16 0 333 0.05 1.1 16.3 C	437 0 0 1700 0.26 0.0 0.0	219 0 0 1700 0.13 0.0 0.0	and developed the control of the con
Intersection Summary  Average Delay Intersection Capacity Utiliz Analysis Period (min)	ation		22.7 59.3% 15	IC	U Level o	of Service			В			

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	J.	ተተ	7	ħ	个孙		ሻ	<b>^</b>	7	3/2	44	
Volume (vph)	36	226	14	124	183	27	15	1160	409	16	534	43
ldeal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3500	1597	1767	3501		1785	3368	1597	1733	3404	
Flt Permitted	0.62	1.00	1.00	0.46	1.00		0.40	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	1165	3500	1597	854	3501		747	3368	1597	322	3404	w
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	36	226	14	124	183	27	15	1160	409	16	534	43
RTOR Reduction (vph)	0	0	11	0	9	0	0	0	157	0	5	0
Lane Group Flow (vph)	36	226	3	124	201	0	15	1160	252	16	572	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	20.3	20.3	20.3	36.0	36.0		70.0	70.0	70.0	70.0	70.0	
Effective Green, g (s)	24.3	24.3	24.3	40.0	40.0		74.0	74.0	74.0	74.0	74.0	
Actuated g/C Ratio	0.20	0.20	0.20	0.33	0.33		0.62	0.62	0.62	0.62	0.62	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	236	709	323	381	1167		461	2077	985	199	2099	
v/s Ratio Prot		0.06		c0.03	0.06			c0.34			0.17	
v/s Ratio Perm	0.03		0.00	c0.07			0.02		0.16	0.05		
v/c Ratio	0.15	0.32	0.01	0.33	0.17		0.03	0.56	0.26	0.08	0.27	
Uniform Delay, d1	39.4	40.8	38.2	28.9	28.3		9.0	13.4	10.5	9.3	10.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.50	1.30	4:94	0.84	0.86	
Incremental Delay, d2	1.4	1.2	0.0	0.5	0.1		0.1	0.9	0.5	8.0	0.3	
Delay (s)	40.7	42.0	38.3	29.4	28.4		13.6	18.3	52.3	8.6	9.5	
Level of Service	D	D	D	С	. C		В	В	D	Α	Α	
Approach Delay (s)		41.6			28.7			27.0			9.4	
Approach LOS		D			С			С			Α	
Intersection Summary							A.E.A.				S. Seeley	
HCM Average Control Delay			24.9	H	CM Level	of Service	)		С			
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			120.0		ım of lost	` ' .		*	6.0			
Intersection Capacity Utilization	1		55.2%	IC	U Level o	of Service			В			
Analysis Period (min)			15									
c Critical Lane Group					-							

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Ŋ	1>		76	4			44			414	
Volume (veh/h)	0	0	0	48	0	5	0	1134	89	4	545	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	48	0	5	0	1134	89	4	545	0
Pedestrians				-								
Lane Width (m)				•								
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)				•								
Median type								None			None	
Median storage veh)								250				
Upstream signal (m)	0.80	0.80		0.80	0.80	0.80		350		0.80		
pX, platoon unblocked vC, conflicting volume	1125	0.60 1776	272	1459	1732	612	545			1223		
vC1, stage 1 conf vol	1123	1770	212	1409	1/32	012	040			1223		
vC1, stage 1 conf vol												
vCu, unblocked vol	646	1463	272	1065	1408	2	545			769		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	7.0	0.0	· 0.0	7.0	0.0	0.5	7.1			7.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	66	100	99	100			99		
cM capacity (veh/h)	281	101	725	140	109	862	1020			670		
· · · · · · · · · · · · · · · · · · ·								CD 0		0,0		
Direction, Lane # Volume Total	EB 1 0	EB 2 0	WB 1 48	WB 2	NB 1 567	NB 2 656	SB 1 276	SB 2 272		2 2 2		5 7
Volume Total Volume Left	0	0	48	0	0	0.00	4	0				
Volume Right	0	0	0	5	0	89	0	0				
cSH	1700	1700	140	862	1020	1700	670	1700				
Volume to Capacity	0.00	0.00	0.34	0.01	0.00	0.39	0.01	0.16				
Queue Length 95th (m)	0.0	0.0	10.6	0.01	0.0	0.0	0.01	0.0				
Control Delay (s)	0.0	0.0	43.5	9.2	0.0	0.0	0.1	0.0				
Lane LOS	A	A	.0.0 E	Α	0.0	0.0	A	0.0				
Approach Delay (s)	0.0	, ,	40.3	, ,	0.0		0.1					
Approach LOS	A		E		0.0		0.1					
ntersection Summary	(4) (4) (4)											0.7045
Average Delay			1.2									
Intersection Capacity Utiliza	49.2%	IC	U Level o	of Service	!		Α					
Analysis Period (min)			15									

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	Þ		7	Þ			414			414	
Volume (veh/h)	0	0	0	48	0	5	0	1134	89	4	545	0
Sign Control		Stop			Stop			Free			Free	
Grade	4.00	0%	4.00	4.00	0%	4.00	4.00	0%	4.00	4.00	0%	4.00
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
Hourly flow rate (vph)	0	0	0	48	0	5	0	1134	89	4	545	0
Pedestrians Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)								,110110			Horio	
Upstream signal (m)											359	
pX, platoon unblocked	1.00	1.00	1.00	1.00	1.00		1.00					
vC, conflicting volume	1125	1776	272	1459	1732	612	545			1223		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1125	1776	272	1459	1731	612	544			1223		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	47	100	99	100			99		
cM capacity (veh/h)	157	81	726	90	87	436	1020			566		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	0	0	48	5	567	656	276	272				
Volume Left	0	0	48	0	0	0	4	0				
Volume Right	0	0	0	5	0	89	0	0				
cSH	1700	1700	90	436	1020	1700	566	1700				
Volume to Capacity	0.00	0.00	0.53	0.01	0.00	0.39	0.01	0.16				
Queue Length 95th (m)	0.0	0.0	18.0	0.3	0.0	0.0	0.2	0.0				
Control Delay (s)	0.0	0.0	83.7	13.3	0.0	0.0	0.3	0.0				
Lane LOS	A	Α	F	В			A					-
Approach Delay (s)	0.0		77.0		0.0		0.1					e
Approach LOS	Α		F						ourse it charter	000000000000000000000000000000000000000		
ntersection Summary	F-3-5-7											
Average Delay			2.3	. =					_			
Intersection Capacity Utiliza		49.2%	IC	U Level o	of Service			Α				
Analysis Period (min)			15									

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	ተተ	7	J.	<b>†</b>		ħ	<b>^</b>	7	*	ተቡ	
Volume (vph)	160	525	64	116	879	96	54	733	237	68	297	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.97	
FIt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1750	3336	1377	1623	3093		1750	3131	1377	1653	3336	
FIt Permitted	0.19	1.00	1.00	0.40	1.00		0.48	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	353	3336	1377	679	3093		878	3131	1377	468	3336	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	525	64	116	879	96	54	733	237	68	297	81
RTOR Reduction (vph)	0	0	31	0	8	0	0	0	57	0	18	0
Lane Group Flow (vph)	160	525	33	116	967	0	54	733	180	68	360	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	56.5	56.5	56.5	56.5	56.5		50.3	50.3	50.3	50.3	50.3	
Effective Green, g (s)	60.1	60.1	60.1	60.1	60.1		53.9	53.9	53.9	53.9	53.9	
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50		0.45	0.45	0.45	0.45	0.45	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6		6.6	6.6	6.6	6.6	6.6	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	177	1671	690	340	1549		394	1406	619	210	1498	
v/s Ratio Prot		0.16			0.31			c0.23			0.11	
v/s Ratio Perm	c0.45		0.02	0.17			0.06		0.13	0.15		
v/c Ratio	0.90	0.31	0.05	0.34	0.62		0.14	0.52	0.29	0.32	0.24	
Uniform Delay, d1	27.3	17.7	15.3	18.0	21.7		19.4	23.8	20.9	21.3	20.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.23	1.26	1.58	1.00	1.00	
Incremental Delay, d2	43.1	0.2	0.1	1.3	1.1		0.6	1.2	1.0	· 4.1	0.4	
Delay (s)	70.4	18.0	15.4	19.3	22.9		24.6	31.1	34.2	25.4	20.8	
Level of Service	Ε	В	В	В	С		С	С	С	С	С	
Approach Delay (s)		29.0			22.5			31.5			21.5	
Approach LOS		С			С	*		С			С	
Intersection Summary		111		2223	1888		888					
HCM Average Control Delay			26.6	Н	M Level	of Service	<u> </u>		С			
HCM Volume to Capacity ra			0.72	110	DIVI LEVEI	OI SEIVICE	7		C			
Actuated Cycle Length (s)	itiO		120.0	Sı.	ım of lost	time (c)			6.0			
Intersection Capacity Utiliza	tion		77.3%			of Service			0.0 D			
Analysis Period (min)	uon		11.376	10	O FEACI (	I OCI VICE			U			
Description: Mayfield Rd			10									
c Critical Lane Group												
c Ontioal Lane Gloup												

	•			

## **Appendix J**

2031 Intersection Capacity
Calculations – Proposed
Improvements
(with NSTC in place)

	•	-	*	1	-	1		1	1	-	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	ሻ	ተተተ	7	ايراير	ተተጉ		ሻ	ተተተ	7	ሻ	ተተተ	7
Volume (vph)	47	2471	822	662	1138	36	117	385	300	59	1467	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.
Total Lost time (s)	1.0	1.0	3.0	3.0	3.0		3.0	3.0	3.0	3.4	1.0	1.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	SON CONTRACTOR STATES OF	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1566	4980	1566	3330	4961		1750	4980	1566	1716	4980	1597
FIt Permitted	0.23	1.00	1.00	0.95	1.00		0.12	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	377	4980	1566	3330	4961	Agent State of the	215	4980	1566	794	4980	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	47	2471	822	662	1138	36	117	385	300	59	1467	15
RTOR Reduction (vph)	0	0	022	0	2	0	0	0	219	0	0	- 4
Lane Group Flow (vph)	47	2471	822	662	1172	0	117	385	81	59	1467	11
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm	070	Free	Prot	<u> </u>	070	pm+pt	070	Perm	pm+pt	0/0	Perm
Protected Phases	reiiii	4	LICC	3	8		ритърс 5	2	r Giiii	7 J	6	r Gill
Permitted Phases	4	7	Free	•	J		2	4	2	6	v	6
Actuated Green, G (s)	57.4	57.4	140.0	24.0	82.4		41.2	34.2	34.2	39.6	36.4	36.4
Effective Green, g (s)	61.0	61.0	140.0	24.0	86.0		41.2	37.8	37.8	46.8	40.0	40.0
	0.44	0.44	1.00	0.17	0.61		0.29	0.27	0.27	0.33	0.29	0.29
Actuated g/C Ratio	4.6	4.6	1.00	3.0	6.6		3.0	6.6	6.6	7.0	4.6	4.6
Clearance Time (s)	4.0 5.0	4.0 5.0		5.0 5.0	5.0		5.0 5.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)		THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TW	4500		A COLUMN TO THE PARTY OF THE PA			200000000000000000000000000000000000000			THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT	
Lane Grp Cap (vph)	164	2170	1566	571	3047		140	1345	423	310	1423	456
v/s Ratio Prot		c0.50		c0.20	0.24		c0.04	0.08	0.05	0.01	c0.29	
v/s Ratio Perm	0.12		c0.52				0.20		0.05	0.05		0.01
v/c Ratio	0.29	1.14	0.52	1.16	0.38		0.84	0.29	0.19	0.19	1.03	0.03
Uniform Delay, d1	25.5	39.5	0.0	58.0	13.6		41.1	40.4	39.3	32.3	50.0	36.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.4	68.6	1.3	90.0	0.2		41.8	0.5	1.0	0.3	32.2	0.1
Delay (s)	29.8	108.1	1.3	148.0	13.8		82.9	41.0	40.3	32.6	82.2	36.1
Level of Service	С	F	Α	F	В	en a compresentation de la compresentation de la compresentation de la compresentation de la compresentation d	F	D	D	С	F	D
Approach Delay (s)		80.7			62.2			46.8			79.8	
Approach LOS		F			E			D			E	
ntersection Summary												
HCM Average Control Delay			72.4	· H	CM Level	of Service	e	en e Maria de aleman en en escala de el deservo	Е			
HCM Volume to Capacity ratio	)		1.06									
Actuated Cycle Length (s)			140.0	Sı	um of lost	time (s)			7.0			
ntersection Capacity Utilization	n		114.8%		U Level o				Н			÷
Analysis Period (min)		· · · · · · · · · · · · · · · · · · ·	15	er virositate (Alderda)								
Description: Bovaird Dr. W												

	•	-		1	4-	1	•	†	1		1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	4		۲	1		J.	ተተኩ		) j	ተተጉ	
Volume (veh/h)	14	14	14	81	7	9	17	328	14	4	1160	18
Sign Control		Stop			Stop			Free			Free	•
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	14	14	14	81	7	9	17	328	14	4	1160	18
Pedestrians	rofi (anglista anglista anglista anglista an	Citizen (ale estable en julio e e					of the Wheeven agent the w	Constituent to an experience of the constituent to a cons		nerott Sourcett Aberopt Source Chic	and Marcal Marcal Physical Process Process	stolyperatoris, mark rhyacorboli
Lane Width (m)		0000										
Walking Speed (m/s)									undi Jamel General Lennis			
Percent Blockage												
Right turn flare (veh)				and the state of the state of			Tantania an				en angelagen anna an	arresentario de la composición de la c
Median type								None			None	
Median storage veh)											22.	
Upstream signal (m)											381	
pX, platoon unblocked vC, conflicting volume	1333	1553	396	785	1555	116	1178			240	V-871 2-11 2-12	
vC, conflicting volume vC1, stage 1 conf vol	1333	1000	390	/00	1000	110	11/0			342		
vC1, stage 1 conf vol												
vCz, stage z com vor vCu, unblocked vol	1333	1553	396	785	1555	116	1178			342		
C, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			342 4.1		
tC, 2 stage (s)	1.5	0.0	0.0	7.5	0.0	0.5	7.1			7.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	87	98	67	94	99	97			100		
cM capacity (veh/h)	103	109	604	243	108	914	589			1214		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	14	28	81	16	17	131	131	80	4	464	464	250
Volume Left	14	0	81	0	17	0	0	0	4	0	0	230
Volume Right	0	14	0	9		0	0	14	0	0	0	18
cSH	103	184	243	215	589	1700	1700	1700	1214	1700	1700	1700
Volume to Capacity	0.14	0.15	0.33	0.07	0.03	0.08	0.08	0.05	0.00	0.27	0.27	0.15
Queue Length 95th (m)	3.4	4.0	10.6	1.8	0.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Control Delay (s)	45.3	28.0	27.0	23.1	11.3	0.0	0.0	0.0	8.0	0.0	0.0	0.0
Lane LOS	Ε	D	D	С	В				Α			
Approach Delay (s)	33.8		26.4		0.5				0.0			
Approach LOS	D		D	-	-carren-especial desirable est cond	Marie and American State of the Second	*		200000000000000000000000000000000000000	rangembe Herite benganbangan terd		20c1620c16600000
ntersection Summary												
Average Delay	and the second of the second o		2.5	A-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0								
ntersection Capacity Utiliza	ition		45.6%	IC	U Level o	of Service	)		Α			
Analysis Period (min)			15						n and a second control of			

	•	-	•	<b> </b>	-		<b>~</b>	1	1	<b>\</b>	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ነ	<b>^</b> 1>		19	<b>^</b>	7	*	<b>^</b>	7	ነ	十十	7
Volume (vph)	30	225	267	451	141	263	29	161	165	312	891	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	gagantosis entragaran discorbos	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	3215		1750	3500	1566	1750	3500	1566	1750	3500	1566
Flt Permitted	0.66	1.00	dett er her großt er branzene	0.17	1.00	1.00	0.20	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	1220	3215		322	3500	1566	376	3500	1566	1193	3500	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	225	267	451	141	263	29	161	165	312	891	65
RTOR Reduction (vph)	0	104	0	0	0	134	0	0	89	0	0	14
Lane Group Flow (vph)	30	388	0	451	141	129	29	161	76	312	891	51
Turn Type	Perm			pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	18.9	18.9		54.9	54.9	54.9	51.1	51.1	51.1	51.1	51.1	51.1
Effective Green, g (s)	22.9	22.9		58.9	58.9	58.9	55.1	55.1	55.1	55.1	55.1	55.1
Actuated g/C Ratio	0.19	0.19		0.49	0.49	0.49	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	233	614		551	1718	769	173	1607	719	548	1607	719
v/s Ratio Prot	and the second	0.12		c0.23	0.04			0.05			0.25	
v/s Ratio Perm	0.02			c0.18		0.08	0.08		0.05	c0.26		0.03
v/c Ratio	0.13	0.63		0.82	0.08	0.17	0.17	0.10	0.11	0.57	0.55	0.07
Uniform Delay, d1	40.3	44.7		28.2	16.2	17.0	19.0	18.4	18.4	23.8	23.5	18.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.92	0.90	0.96	1.49	1.48	1.84
Incremental Delay, d2	0.3	2.1		9.2	0.0	0.1	2.1	0.1	0.3	3.9	1.3	0.2
Delay (s)	40.5	46.8		37.4	16.2	17.1	19.7	16.7	18.1	39.4	36.2	33.6
Level of Service	D	D		D	В	В	В	В	. В	D	D	С
Approach Delay (s)		46.5			27.6			17.6			36.8	
Approach LOS	DATE OF THE PARTY	D	24 A S S S S S S S S S S S S S S S S S S		С			В			D	
Intersection Summary												
HCM Average Control Dela	у		33.6	H	CM Level	of Service	e		С			
HCM Volume to Capacity ra	atio		0.70									
Actuated Cycle Length (s)			120.0	Sı	um of lost	time (s)			6.0			
Intersection Capacity Utiliza	ation		81.1%	IC	U Level	of Service	1		D			
Analysis Period (min)		-	15			The state of the s	The both the free for the first state of					
c Critical Lane Group												

	•	-	*	1	-	1	1	1	<b>/</b>	1	1	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	'n	1₃		'n	1		ሻ	<b>^</b>	۳	ሻ	<b>↑</b> ₽	
Volume (veh/h)	14	14	14	99	16	15	16	290	47	8	1012	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	14	14	14	99	16	15	16	290	47	8	1012	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)						er, handlandkaan ka sa		tatana fili kangta di kenalatan anta				GLECKE THE MOTOR CONT.
Percent Blockage												
Right turn flare (veh)							ARREST AREA OF THE SAME					
Median type								None			None	
Median storage veh)											Tarina established	and the state of the
Upstream signal (m)												
pX, platoon unblocked	4004		-40	005	4000		4004					
vC, conflicting volume	1234	1403	512	865	1362	145	1024			337		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	4004	4400	F40	٥٥٠	4000	445	4004			207		
vCu, unblocked vol	1234 7.5	1403 6.5	512 6.9	865 7.5	1362 6.5	145 6.9	1024 <b>4</b> .1			337		
tC, single (s)	7.5	0.0	0.9	7.0	0.5	6.9	4.1			4.1		
tC, 2 stage (s) tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	3.5 88	4.0 90	ა.ა 97	5.5 54	4.0 89	98	2.2 98			99	and the second	
cM capacity (veh/h)	117	134	507	217	142	876	674			1219		
	en/(meye/megilimeniilimeni/filmesidikantu	2010.49-7270.000.00.00.000.000.000	SET-100-2-2 (CON-1277-17-17-17-17-17-17-17-17-17-17-17-17-1	SCHOOL STATE OF SHEET AND STATE OF SHEET S	es 2017 subground (November)	\$94273.T0042342495275759423424	(20) (20) (20) (20) (20) (20) (20) (20)		AB 4	1897/2004 (BR)2022 (CB)(2022 (CB) (2022 (CB)	48.8	
Direction, Lane # Volume Total	EB 1 14	EB 2	WB 1	WB 2	NB 1 16	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Left	14	<b>28</b> 0	<b>99</b> 99	<b>31</b> 0	16	<b>14</b> 5 0	145	47	8 8	675	349	
Volume Left Volume Right	14	14	99	15	16 0	0	0	0 <b>4</b> 7	8 0	0	0 12	
cSH	117	213	217	239	674	1700	1700	47 1700	1219	1700	1700	
Volume to Capacity	0.12	0.13	0.46	239 0.13	0.02	0.09	0.09	0.03	0.01	0.40	0.21	
Queue Length 95th (m)	3.0	3.4	16.7	3.3	0.02	0.09	0.09	0.03	0.01	0.40	0.0	
Control Delay (s)	40.0	24.5	34.9	22.3	10.5	0.0	0.0	0.0	8.0	0.0	0.0	
Lane LOS	40.0 E	24.3 C	34.9 D	22.3 C	10.5 B	0.0	U.U	U.U	0.U A	0.0	0.0	
Approach Delay (s)	29.7	U	31.9	U	0.5				0.1			
Approach LOS	29.1 D		31.9 D		0.0				U. I	•		75. F. F.
••	ט		U									
Intersection Summary			2.0									
Average Delay			3.6	10		4 01			A			
Intersection Capacity Utiliza	шоп		52.2%	IC	u Levei (	of Service			Α			
Analysis Period (min)			15									

	<b>→</b>	-	•		-		4	†	1	<b>\</b>	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Y	<b>^</b>	7	'n	<b>^</b>		T	<b>^</b>	7	ሻ	<b>†</b> ‡	
Volume (vph)	14	364	12	277	303	17	7	210	63	54	819	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1.00	1.00	0.85	1.00	1.00	
FIt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3500	1597	1767	3541	AND ASSESSMENT AND ASSESSMENT	1785	3368	1597	1733	3421	to we do not read the second of
Flt Permitted	0.56	1.00	1.00	0.33	1.00		0.22	1.00	1.00	0.61	1.00	
Satd. Flow (perm)	1048	3500	1597	611	3541	Man N. S. Carolle, Ch. (2002) 1. (2011) 1. (2011) 1. (2011)	419	3368	1597	1106	3421	athle (Affection Medical Action)
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	364	12	277	303	17	7	210	63	54	819	26
RTOR Reduction (vph)	0	0	9	0	4	0	0	0	34	0	2	0
Lane Group Flow (vph)	14	364	3	277	316	0	7	210	29	54	843	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	22.0	22.0	22.0	55.0	55.0		51.0	51.0	51.0	51.0	51.0	
Effective Green, g (s)	26.0	26.0	26.0	59.0	59.0		55.0	55.0	55.0	55.0	55.0	
Actuated g/C Ratio	0.22	0.22	0.22	0.49	0.49		0.46	0.46	0.46	0.46	0.46	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	227	758	346	589	1741		192	1544	732	507	1568	<u> </u>
v/s Ratio Prot		0.10	0,10	c0.12	0.09		.02	0.06	, 02	001	c0.25	
v/s Ratio Perm	0.01		0.00	c0.11			0.02	7,7	0.02	0.05		
v/c Ratio	0.06	0.48	0.01	0.47	0.18		0.04	0.14	0.04	0.11	0.54	
Uniform Delay, d1	37.3	41.1	36.9	19.1	17.0		17.9	18.8	17.9	18.5	23.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.04	0.98	1.20	1.74	1.58	
Incremental Delay, d2	0.5	2.2	0.0	0.6	0.1		0.4	0.2	0.1	0.4	1.2	
Delay (s)	37.8	43.3	36.9	19.7	17.1		18.9	18.5	21.6	32.5	38.3	
Level of Service	D D	, ro.o	D	В	В		70.0	.о.о	<b>-1.</b> 0	C	D	
Approach Delay (s)	,	42.9			18.3		J	19.2	J	-	37.9	
Approach LOS		, <u>2.</u> 5			' B			В			D D	
Intersection Summary												
HCM Average Control Dela	ıy		31.0	Н	CM Level	of Servic	е		С			•
HCM Volume to Capacity ra			0.50									
Actuated Cycle Length (s)			120.0	Sı	ım of lost	time (s)			6.0	e inclusive en este con Alberta (PARTA (PART		Addition control of
Intersection Capacity Utiliza	ation		65.5%		U Level c				С			
Analysis Period (min)			15		and the second of the second o				en e		ren-erasser on district at \$500	
c Critical Lane Group												

	<b>▶</b>	-	•	<b>~</b>	<b>←</b>	1		†	1	<b>\</b>	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	) Y	1→		٦	1			474			414	
Volume (veh/h)	0	0	0	132	0	4	0	213	14	2	814	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	132	0	4	0	213	14	2	814	0
Pedestrians			obs. control consistence with									
Lane Width (m)												
Walking Speed (m/s)	estata est interestricas en trace	others and an area	Polisina Markal volt Thomas Nationalis		NAMES TO A STREET OF THE STREE	ndTStandStandStandStandStan	ath Visionath Providth Visionath Visiona		punt Novembrasan Novembras			Managara and and a second
Percent Blockage		e e										
Right turn flare (veh)												Santalantalannis
Median type								None			None	
Median storage veh)					0572850000000000000000000000000000000000	Walter State Commission of the				5000000000000000000		DIRECTOR CONTROL
Upstream signal (m)								352				
pX, platoon unblocked												
vC, conflicting volume	928	1045	407	631	1038	114	814			227		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	000	4045	407	004	4000	444	044					
vCu, unblocked vol	928	1045	407	631	1038	114	814			227		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s) tF (s)	3.5	4.0	3.3	3.5	4.0	2.2	2.2			2.2		
ור (s) p0 queue free %	ა.ა 100	100	ა.ა 100	ა.ა 64	100	3.3 100	2.2 100 ·			100		
cM capacity (veh/h)	221	227	593	365	229	918	809			1339		
A.D. SALTTERNAN, 1700-1-14 (1904-1906) 100-140-140-140-140-140-140-140-140-140-	AND THE STREET SHEET OF THE SECTION OF THE SEC	PERSONAL PROPERTY OF THE PROPE	0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0		-64-0780-08-02-04-02-04-04-04-04-04-04-04-04-04-04-04-04-04-	eselliteres una sellitera esellitera esellitera es	NUMBER OF STREET			1339		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	0	0	132	4	106	120	409	407				
Volume Left	0	0	132	0	0	0	2	0				
Volume Right	0	0	0	4	0	14	0	0				
cSH	1700	1700	365	918	809	1700	1339	1700				Reference Cherry
Volume to Capacity	0.00	0.00	0.36	0.00	0.00	0.07	0.00	0.24				
Queue Length 95th (m)	0.0	0.0	12.2	0.1	0.0	0.0	0.0	0.0				
Control Delay (s)	0.0	0.0	20.3 C	8.9	0.0	0.0		0.0				
Lane LOS	. A 0.0	Α		A	0.0		A 0.0					
Approach Delay (s)			20.0		U.U		0.0					
Approach LOS	Α		С									
Intersection Summary												
Average Delay			2.3	10		-f C:						
Intersection Capacity Utiliza	шОП		42.9%	IC	U Level (	of Service	V		Α			
Analysis Period (min)			15									

	<u> </u>	-	>	1	-	1	1	1	1	<b>\</b>	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	'n	4		٢	1			414			414	
Volume (veh/h)	14	14	14	51	9	9	17	188	17	29	696	25
Sign Control		Stop			Stop			Free		- Mary 100	Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	14	14	14	51	9	9	17	188	17	29	696	25
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)			54 (448) 54 (449) 84 (45) 47 (44)						augustus samuest star augustus armieris star augustus			
Upstream signal (m)											347	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92				0220-22000-227220	1.01.00 C C C C C C C C C C C C C C C C C C
vC, conflicting volume	908	1006	360	658	1010	102	721			205		
vC1, stage 1 conf vol		n det skennen av det graden er		unes and artists and de-						05.0042.0875.0445.07		kalang ang pangang ang pan
vC2, stage 2 conf vol		ACT CONTRACTOR										
vCu, unblocked vol	714	820	115	440	825	102	509			205		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)			encestra pertugia	NAMES OF THE PERSONS ASSESSED.								
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	95	. 98	88	97	99	98			98		
cM capacity (veh/h)	273	271	837	420	269	933	963			1364		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	14	28	51	18	111	111	377	373				
Volume Left	14	0	51	0	17	0	29	0	·		win PSANON PSANON WAA STOWN AAN	eKistanto Waldento Walanto Y
Volume Right	0	14	0	9	0	17	0	25				
cSH	273	410	420	418	963	1700	1364	1700	ianofialanofialanofialanofial		en sakinia mokinian Oliviano Ministro	otiskas otiskas valiskas v
Volume to Capacity	0.05	0.07	0.12	0.04	0.02	0.07	0.02	0.22				
Queue Length 95th (m)	1.2	1.7	3.1	1.0	0.4	0.0	0.5	0.0				
Control Delay (s)	18.9	14.4	14.7	14.0	1.5	0.0	0.8	0.0				
Lane LOS	С	В	В	В	Α		Α		e constituent transcore	Arthur de la companya del companya del companya de la companya de		Seesakoeta oetas
Approach Delay (s)	15.9	100	14.6		0.7	,100	0.4					
Approach LOS	С		В									
Intersection Summary												
Average Delay	on Salago & Salago de Salago de Acercado Salago de	Stoppic Stoppic Storm to Air	2.0			was deposed to a gain the season in the		Service State Service Service	-			ACCIDITATION OF THE PERSON OF
Intersection Capacity Utiliza	ition		54.1%	IC	U Level o	of Service			Α			
Analysis Period (min)		Nasanijasankasanke ma	15	gage (gagagaleo analeo an i-r-			Stagonal competition and				050,589,50,588,6ee60,4.1	programma programma (

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EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
'n	<b>^</b>	74	P)	<b>ት</b> ቕ		¥	<b>^</b>	7	ሻ	<b>↑</b> \$	
117	1344	128	232	523	53	25	130	44	77	508	90
1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
1750	3336	1377	1623	3094		1750	3131	1377	1653	3365	V1111340-1013401-1440
0.44	1.00	1.00	0.07	1.00		0.24	1.00	1.00	0.66	1.00	
802	3336	1377	118	3094		445	3131	1377	1153	3365	900-8-1200-1-070T t- 8-1700p
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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					2%						2%
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	56.2	56.2	and the second of the second o	75.6			31.2			31.2	
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	ensemble separation of president						9,42,511,614,62,515,621,412,42,74,61	ACCESTED STREET, STREE			
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	117 1900 3.5 3.0 1.00 1.00 0.95 1750 0.44 802 1.00 117 0 117 2% Perm 4 56.2 59.8 0.50 6.6 5.0 400 0.15 0.29 17.7 1.00 0.9 18.5 B	117 1344 1900 1900 3.5 3.5 3.0 3.0 1.00 0.95 1.00 1.00 0.95 1.00 1750 3336 0.44 1.00 802 3336 1.00 1.00 117 1344 0 0 0 117 1344 2% 7% Perm  4 56.2 56.2 59.8 59.8 0.50 0.50 6.6 6.6 5.0 5.0 400 1662 0.40 0.15 0.29 0.81 17.7 25.3 1.00 1.00 0.9 3.4 18.5 28.7 B C 27.0 C	117 1344 128 1900 1900 1900 3.5 3.5 3.5 3.0 3.0 3.0 1.00 0.95 1.00 1.00 1.00 0.85 0.95 1.00 1.00 1750 3336 1377 0.44 1.00 1.00 802 3336 1377 1.00 1.00 1.00 117 1344 128 0 0 20 117 1344 108 2% 7% 16% Perm Perm 4 4 4 56.2 56.2 56.2 59.8 59.8 59.8 0.50 0.50 0.50 6.6 6.6 6.6 5.0 5.0 5.0 400 1662 686 0.40 0.15 0.08 0.29 0.81 0.16 17.7 25.3 16.4 1.00 1.00 1.00 0.9 3.4 0.2 18.5 28.7 16.6 B C B 27.0 C	117 1344 128 232 1900 1900 1900 1900 3.5 3.5 3.5 3.5 3.0 3.0 3.0 3.0 3.0 1.00 0.95 1.00 1.00 1.00 1.00 0.85 1.00 0.95 1.00 1.00 0.95 1750 3336 1377 1623 0.44 1.00 1.00 0.07 802 3336 1377 118 1.00 1.00 1.00 1.00 117 1344 128 232 0 0 0 20 0 117 1344 108 232 2% 7% 16% 10% Perm Perm Pm+pt 4 3 4 4 8 56.2 56.2 56.2 75.6 59.8 59.8 59.8 75.6 0.50 0.50 0.50 0.63 6.6 6.6 6.6 3.0 5.0 5.0 5.0 3.0 400 1662 686 280 0.40 0.40 0.11 0.15 0.08 0.41 0.29 0.81 0.16 0.83 17.7 25.3 16.4 34.7 1.00 1.00 1.00 1.00 0.9 3.4 0.2 17.9 18.5 28.7 16.6 52.7 B C B D 27.0 C	17	N	117	T	T	N	T

		-	*	1	4	•		↑	1	-	↓	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	T	ተተተ	7	14/4	ተተጉ		7	ተተተ	7	Y	ተተተ	7
Volume (vph)	141	2637	306	486	2051	135	273	1339	468	71	639	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.4	3.0	3.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
FIt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1566	4980	1566	3330	4943		1750	4980	1566	1716	4980	1597
FIt Permitted	0.06	1.00	1.00	0.95	1.00		0.17	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	100	4980	1566	3330	4943		305	4980	1566	249	4980	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	2637	306	486	2051	135	273	1339	468	71	639	40
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	118	0	0	21
Lane Group Flow (vph)	141	2637	306	486	2181	0	273	1339	350	71	639	19
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	pm+pt		Free	Prot			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free				2		2	6		6
Actuated Green, G (s)	71.4	62.4	140.0	17.0	66.4		44.4	34.2	34.2	28.6	25.4	25.4
Effective Green, g (s)	78.6	66.0	140.0	17.0	70.0		44.4	37.8	37.8	35.8	29.0	29.0
Actuated g/C Ratio	0.56	0.47	1.00	0.12	0.50		0.32	0.27	0.27	0.26	0.21	0.21
Clearance Time (s)	7.0	6.6		3.0	6.6		3.0	6.6	6.6	7.0	6.6	6.6
Vehicle Extension (s)	3.0	5.0		5.0	5.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	188	2348	1566	404	2472		262	1345	423	135	1032	331
v/s Ratio Prot	0.07	c0.53		c0.15	0.44		c0.12	c0.27	,20	0.03	0.13	001
v/s Ratio Perm	0.35		0.20				0.21		0.22	0.11		0.01
v/c Ratio	0.75	1.12	0.20	1.20	0.88		1.04	1.00	0.83	0.53	0.62	0.06
Uniform Delay, d1	36.9	37.0	0.0	61.5	31.3		40.8	51.0	48.0	42.8	50.5	44.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.7	61.7	0.3	112.7	5.0		67.0	23.5	16.7	3.7	2.8	0.3
Delay (s)	60.7	98.7	0.3	174.2	36.3		107.8	74.5	64.7	46.4	53.3	44.8
Level of Service	E	F	A	F	D		F	E	E	D	D	D
Approach Delay (s)	_	87.2	, ,		61.4			76.7	_	5	52.2	
Approach LOS		F			E			E			D	
Intersection Summary												
HCM Average Control Dela	y		73.6	Н	CM Level	of Servic	æ		· E			
HCM Volume to Capacity ra	atio		1.09									
Actuated Cycle Length (s)			140.0	Sı	ım of lost	time (s)			9.0			monte en anna 1100 p. et 2
Intersection Capacity Utiliza	ation		108.0%		U Level o		l		G			
Analysis Period (min)			15	and the second s					erover neur er	n ann a-main an deachadailte agus agus agus agus agus agus agus agus		
Description: Bovaird Dr. W												
Critical Lane Group	vernes armine section of a particular to the deliver	- executar est and all plants for the	-4-1-1-1-1-4-5-DDD-45-0-2-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	or manufacture (SCO) of MANUFACTURE						>= = + 024 F000 + 02 A4E 0, QA(190 QA)		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Y	1>		'n	7.		ሻ	ተተ <sub>ጉ</sub>		'n	ተተጉ	
Volume (veh/h)	14	14	14	29	10	12	12	1081	57	5	464	1
Sign Control		Stop			Stop			Free	THE WASTERLANDSCORE CONTRACTOR AND ACTUAL CO		Free	Marie Marie Paris (Marie Marie
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	14	14	14	29	10	12	12	1081	57	5	464	1
Pedestrians				More of Proventing and Proventing		ACCOMISSION PLANTS CONTROL		en de competitui de compe				
Lane Width (m)												
Walking Speed (m/s)	rational files and Comparison on Linear	Committee and Characteristics				e-Kii Park Mil Varensii Spansii Spansii Spans		Charles have represented a contra	navnikosztinosztikasmi	por difference de la constitución de la constitució	ones (17 January 1880 - Franch II Victor (1884) Paragon	ti Angrati Yaganti Angrati P
Percent Blockage								o es unes				
Right turn flare (veh)												
Median type						NOTE OF BUILDING		None		estario de la compansión de la compansió	None	
Median storage veh)											2.2	- Programma and the
Upstream signal (m)											308	
pX, platoon unblocked		4000	,	4646								
vC, conflicting volume	876	1636	155	1319	1608	389	465			1138		
vC1, stage 1 conf vol												
/C2, stage 2 conf vol	076	4000	455	4040	4000	200	405			4400		April Marie Comme
vCu, unblocked vol	876	1636	155	1319	1608	389	465			1138		
tC, single (s)	7.5	6.5	6.9	*7.3	6.5	6.9	4.1			4.1		
:C, 2 stage (s) :F (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
r (s) o0 queue free %	ა.s 94	4.0 86	3.3 98	3.5 73	4.0 90	3.3 98	2.2 99			2.2 99		
cM capacity (veh/h)	94 217	98	863	108	102	90 610	1093			610		
	0.0000000000000000000000000000000000000	CAN AND DESIGNATION OF SHIP	2015-14-100-16-100-16-100-16-10-10-10-10-10-10-10-10-10-10-10-10-10-	Physical Control of the Control of t	750 CONTRACTOR BACCOL BACCOL	sed Average out to expense	14 (10 (10 (10 (10 (10 (10 (10 (10 (10 (10			mentide sentide entide entide		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	14	28	29	22	12	432	432	273	5	186	186	94
Volume Left	14	0	29	0	12	0	0	_0	5	0	0	0
Volume Right	0	14	0	12	0	0	1700	57	0	0	0	1
SH	217	176	108	187	1093	1700	1700	1700	610	1700	1700	1700
/olume to Capacity	0.06	0.16	0.27	0.12	0.01	0.25	0.25	0.16	0.01	0.11	0.11	0.06
Queue Length 95th (m)	1.6 22.7	4.2 29.3	7.6 <b>50</b> .0	3.0 <b>26</b> .9	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Control Delay (s) Lane LOS	22.1 C	SAN SERVICE AND SERVICE SERVICE SERVICES	50.0 E	nu esti kara de variation un esti de sun a	8.3 A	0.0	0.0	0.0	11.0	0.0	0.0	0.0
Lane LOS Approach Delay (s)	27.1	D	40.0	D	0.1				B 0.1			
Approach LOS	27.1 D		40.0 E		U. I				. U.1			
••	ט											
ntersection Summary			4.0									
Average Delay			1.9									
ntersection Capacity Utiliza	ITION		37.1%	IC	U Level (	of Service			Α			
Analysis Period (min)			15									

<sup>\*</sup> User Entered Value

	•	-	•		-	1	•	1	<b>/</b>	<b>\</b>	1	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	<u>ተ</u> ጉ		*	<b>个个</b>	74	ካ	<b>十</b> 个	7	ካ	十十	7
Volume (vph)	31	238	172	303	194	452	76	761	539	138	256	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lane Util. Factor	1.00	0.95	6000 Met 04:10000 delegan	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
FIt Protected	0.95	1.00	imin Adiento Palie no Ariento A	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	3280		1750	3500	1566	1750	3500	1566	1750	3500	1566
Flt Permitted	0.63	1.00	ACTOR SECURITION SECTION	0.31	1.00	1.00	0.58	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1160	3280		580	3500	1566	1068	3500	1566	448	3500	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	238	172	303	194	452	76	761	539	138	256	40
RTOR Reduction (vph)	0	104	0	0	0	124	0	0	305	0	0	22
Lane Group Flow (vph)	31	306	0	303	194	328	76	761	234	138	256	18
Turn Type	Perm			pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	22.8	22.8		47.0	47.0	47.0	52.8	48.0	48.0	55.2	49.2	49.2
Effective Green, g (s)	26.8	26.8	100000000000000000000000000000000000000	51.0	51.0	51.0	60.8	52.0	52.0	63.0	53.2	53.2
Actuated g/C Ratio	0.22	0.22		0.42	0.42	0.42	0.51	0.43	0.43	0.52	0.44	0.44
Clearance Time (s)	7.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	259	733		473	1488	666	591	. 1517	679	344	1552	694
v/s Ratio Prot		0.09		c0.12	0.06		0.01	c0.22		c0.03	0.07	
v/s Ratio Perm	0.03	Control Translationer (Herografi)	The color has a color for section has a color	0.15	5 10 10 00 cm 10 24 cm 10 24 cm 10 24 cm	c0.21	0.06		0.15	0.18	210x 0350x 4550x 650x 6	0.01
v/c Ratio	0.12	0.42		0.64	0.13	0.49	0.13	0.50	0.34	0.40	0.16	0.03
Uniform Delay, d1	37.2	39.9	and Million District Million D.	24.7	21.0	25.1	15.3	24.6	22.6	16.3	20.1	18.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.61	1.64	2.70
Incremental Delay, d2	0.9	1.7	terroritation (14720 pell) Propositio	3.0	0.0	0.6	0.1	1.2	1.4	0.8	0.2	0.1
Delay (s)	38.1	41.7		27.7	21.0	25.7	15.4	25.8	24.0	27.0	33.0	50.8
Level of Service	D	D	27.000000000000000000000000000000000000	С	С	С	В	С	С	С	С	D
Approach Delay (s)		41.4			25.4			24.5			32.8	
Approach LOS		D			С			С		and the state of t	С	######################################
Intersection Summary			·									
HCM Average Control Delay	/		28.2	HC	CM Level	of Service	ce		С			
HCM Volume to Capacity ra	tio		0.50									
Actuated Cycle Length (s)			120.0	Su	ım of lost	time (s)			5.0	name in regulations do long the fig. (1999)	eriver Andelega and a little cardings bandle	
Intersection Capacity Utiliza	tion		70.9%	IC	U Level o	of Service	)		С			
Analysis Period (min)			15							en e		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
c Critical Lane Group		•										

	•		•	<b> </b>	4	1	•	1	1	-	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Ϋ́	1→		*5	ĵ.,		ሻ	<b>^</b>	7	'n	<b>1</b>	
Volume (veh/h)	14	14	14	62	15	22	15	928	148	9	357	23
Sign Control		Stop			Stop	•	AND THE PHASE OF THE PHASE PARTY.	Free	CELEVIORE SECURE SECURE	-81,865,00,000,000,000,000,000,000	Free	activiti Planti di Silveti (N. Wagiti
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	14	14	14	62	15	22	15	928	148	9	357	23
Pedestrians		nti Provinti Visir otti Provinti Provi	d Mark of the contribution of the east	Value and Arcanol for a collection of the						marks and the artists of the		
Lane Width (m)									67.652			
Walking Speed (m/s)									arteen" for text of Manager Colours and S	a colt harmine and boarding	are to the sear to be sear their eventual const	Three Cobsession Locality
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)								Karatera da de la composición de la co				easterstance
Upstream signal (m)												
pX, platoon unblocked	040	4400	400	4470	4050	101	200			4070		
vC, conflicting volume	910	1492	190	1176	1356	464	380			1076		Contract
vC1, stage 1 conf vol												
vC2, stage 2 conf vol vCu, unblocked vol	910	1492	190	1176	1356	464	380		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1076		
tC, single (s)	7.5	6.5	6.9	*7.2	6.5	6.9	4.1			4.1		
C, Strigle (s)	1.5	0.0	0.5	1.2	0.0	0.9	4.1			4.1		
tF (s)	3.5	4.0	3,3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	88	98	57	90	96	99			99		
cM capacity (veh/h)	199	119	820	144	144	545	1175			644		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	14	28	62	37	15	464	464	148	9	238	142	
Volume Left	14	0	62	0	15	0	0	0	9	230	0	
Volume Right	0	14	02	22	0	0	0	148	0	0	23	
cSH	199	208	144	256	1175	1700	1700	1700	644	1700	1700	
Volume to Capacity	0.07	0.13	0.43	0.14	0.01	0.27	0.27	0.09	0.01	0.14	0.08	
Queue Length 95th (m)	1.7	3.5	14.6	3.8	0.3	0.0	0.0	0.0	0.3	0.0	0.0	
Control Delay (s)	24.5	25.0	47.8	21.4	8.1	0.0	0.0	0.0	10.7	0.0	0.0	
Lane LOS	С	С	E	С	Α				В			San
Approach Delay (s)	24.8		38.0	_	0.1				0.2			
Approach LOS	С		Ε									
ntersection Summary												
Average Delay			3.1									
ntersection Capacity Utiliza	ition		47.4%	IC	U Level o	of Service			Α			
Analysis Period (min)			15									

User Entered Value

	•	-	*	1	+-	1	1	1	1	1	<b> </b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	<b>^</b>	۳	N,	<b>ሶ</b> ች		7	<b>^</b>	7	75	†Դ	
Volume (vph)	50	310	19	119	176	26	9	673	237	9	310	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	# # # # # # # # # # # # # # # # # # #	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98	Right (Dyers: Alphabet Celer)	1.00	1.00	0.85	1.00	0.99	genegative to province
FIt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3500	1597	1767	3501		1785	3368	1597	1733	3404	
FIt Permitted	0.62	1.00	1.00	0.45	1.00		0.52	1.00	1.00	0.32	1.00	
Satd. Flow (perm)	1174	3500	1597	829	3501		973	3368	1597	581	3404	A POST POST POST
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	310	19	119	176	26	9	673	237	9	310	25
RTOR Reduction (vph)	0	0	13	0	10	0	0	0	119	0	5	0
Lane Group Flow (vph)	50	310	6	119	192	0	9	673	119	9	330	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm	,	Perm	pm+pt	0,0		Perm	0/0	Perm	Perm	1/0	<u> </u>
Protected Phases	1 OIIII	4	1 OIIII	3	8		i Giiii	2	1 Giiii	1 Gilli	6	
Permitted Phases	4	•	4	8	•		2	-	2	6	U	
Actuated Green, G (s)	32.7	32.7	32.7	50.0	50.0		56.0	56.0	56.0	56.0	56.0	
Effective Green, g (s)	36.7	36.7	36.7	54.0	54.0		60.0	60.0	60.0	60.0	60.0	
Actuated g/C Ratio	0.31	0.31	0.31	0.45	0.45		0.50	0.50	0.50	0.50	0.50	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	359	1070	488	485	1575		487	1684	799	291	1702	
v/s Ratio Prot	555	c0.09	700	c0.03	0.05		407	c0.20	פפו	291	0.10	
v/s Ratio Perm	0.04	60.03	0.00	0.08	0.00		0.01	60.20	0.07	0.02	0.10	
v/c Ratio	0.14	0.29	0.00	0.00	0.12		0.01	0.40	0.07	0.02	0.19	
Uniform Delay, d1	30.2	31.7	29.0	19.8	19.2		15.1	18.7	16.2	15.2	16.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.54	1.47	4.24	0.90	0.84	
Incremental Delay, d2	0.8	0.7	0.0	0.3	0.0		0.1	0.6	0.3	0.90	0.04	
Delay (s)	31.0	32.4	29.1	20.0	19.2		23.3	28.2	69.0	13.9	14.3	
Level of Service	- 51.0 C	32.4 C	29.1 C	20.0 C	13.2 B		23.3 C	20.2 C	. 09.0 E	13.9 В	14.3 B	
Approach Delay (s)	C	32.1	U	· ·	19.5		U	38.7	L	D	14.3	
Approach LOS		32.1 C			В			56.7 D			14.3 B	
Intersection Summary												
HCM Average Control Delay			30.0	Н	CM Level	of Service	e	•	С			
HCM Volume to Capacity ratio	)		0.34									
Actuated Cycle Length (s)	a garanteen argent (Alba Paris P	on and a state of the state of	120.0	Sı	ım of lost	time (s)			9.0			
Intersection Capacity Utilization	n		43.8%		U Level o				Α			
Analysis Period (min)			15		eamounteers considered Television							
C Critical Lane Group												

AECOM Synchro 7 - Report

	<b>▶</b>	-	*	1	-	1	4	1	1	<b>\</b>	<b> </b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Pi,	4		7	1			414			414	
Volume (veh/h)	0	0	0	46	0	5	0	658	52	2	316	0
Sign Control		Stop			Stop			Free			Free	
Grade		· 0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	46	0	5	0	658	52	2	316	0
Pedestrians		erit anniboseritaanin tasu	P. Charles Theorem (Charles Charles Charles		CONTRACTOR OF THE STATE OF THE			1 Face-attributed the coefficient and three		anti-Nuovoti Russansi kassatti (ku v	er haa ookkkin aatoko aatoka aaso	Visanditie Navado Neovado V
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage							and the second					
Right turn flare (veh)											Da de Na Gerestia de Madeiro	SONO SERVICE AND EST
Median type					100 miles 180 miles	and the second second		None			None	
Median storage veh)		a, compositivação acom									tanenalaerines (u. s. 111)	
Upstream signal (m)								356				
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		PERSONAL PROPERTY OF THE PERSON NAMED IN COLUMN 1
vC, conflicting volume	654	1030	158	846	1004	355	316			710		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	005	004	450	500	775		040			440		
vCu, unblocked vol	385	804	158	599	775	52	316			448		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	3.5	4.0	3.3	0 F	4.0	2.2	2.2			2.2		
tF (s) p0 queue free %	ა.ა 100	100	ა.ა 100	<b>3.5</b> 87	100	<b>3.3</b> 99	100					
	488	282	859	345	293	99				100 995		
cM capacity (veh/h)				See of the	en transferanti seco	Service of the Servic	1241			995		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	0	0	46	5	329	381	160	158				
Volume Left	0	0	46	0	0	0	2	0				
Volume Right	0	0	0	5	0	52	0	0				
cSH	1700	1700	345	901	1241	1700	995	1700			Skip king king king	interpretation
Volume to Capacity	0.00	0.00	0.13	0.01	0.00	0.22	0.00	0.09				
Queue Length 95th (m)	0.0	0.0	3.5	0.1	0.0	0.0	0.0	0.0			Acriandia esta	
Control Delay (s)	0.0	0.0	.17.0	9.0	0.0	0.0	0.1	0.0				
Lane LOS	A	Α	C	A			A			dest and the second		
Approach Delay (s)	0.0		16.2		0.0		0.1					
Approach LOS	Α		С									
Intersection Summary												
Average Delay		ener in description	0.8									
Intersection Capacity Utiliza	ation		34.8%	IC	U Level c	of Service			Α			
Analysis Period (min)			15									A465A65A665

	•	-	*	1	-	1	•	1	1	<b>\</b>	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	<b>\$</b>		ሻ	ĵ.			414			413	MATERIA DE PARTICIONA
Volume (veh/h)	14	14	14	24	5	5	32	580	45	10	232	6
Sign Control		Stop			Stop	7		Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	14	14	14	24	5	5	32	580	45	10	232	6
Pedestrians			and the second s			er Stafferen - Will princip Staffer Apr Staffer for	2001-0-400-0-2001-0-2000-0-2000-0-2000-0-2000-0-2000-0-2000-0-2000-0-2000-0-2000-0-2000-0-2000-0-2000-0-2000-0	ears on helicinesh dasses Arbanes Arbanes Arbanes		a Neis nach für er alle Starter der Gerter	and a control of the second of	81-950/04/04/05/05/05/05/05/05/05/05/05/05/05/05/05/
Lane Width (m)												
Walking Speed (m/s)	nandri Coma etti Sonaa etti Sonaa etti Coma etti Sonaa etti Sonaa etti Sonaa etti Sonaa etti Sonaa etti Sonaa											
Percent Blockage												
Right turn flare (veh)			DS table Stability (apacts a control	Nashib Arahob Sharab Hoarat Nis	erodi i - eumli i - eumli i - eumli i -						-	
Median type						and a		None			None	
Median storage veh)			to new territorio accionist					Microsoft a restalporte a com de			Wildelie Steine Steine Steine	
Upstream signal (m)			- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	and the second							357	
pX, platoon unblocked					00.0000.000 <u>.000</u> .0000.00		t kinni negazenzan				Control Americanis Africa	
vC, conflicting volume	616	944	119	824	924	312	238			625		
vC1, stage 1 conf vol												ARMAN CANAL
vC2, stage 2 conf vol	040	044	440	004	004	040	000	Andrew Control				
vCu, unblocked vol	616	944	119	824	924	312	238			625		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	A 150 150		4.1		
tC, 2 stage (s) tF (s)	3.5	4.0	3.3	3.5	4.0	2.2	2.2			2.2		
ור (s) p0 queue free %	96	4.0 94	3.3 98	3.5 90	4.0 98	3.3 99	2.2 98			2.2 99		
cM capacity (veh/h)	357	94 252	910	244	259	683	1326			99 952		
	AND THE PERSON NAMED IN COLUMN TO A STREET OF THE PERSON NAMED IN COLUMN	1.00 m. 1.00 m	KIDEN ENGTHENENGTHEN GREGERICHEN		residerestiderestiderestide	AND THE RESERVE OF THE PROPERTY OF THE PROPERT	#5-00-08-00-00-00-00-00-00-00-00-00-00-00-			902		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total Volume Left	14 14	<b>28</b> 0	24 24	10	322	335	126	122				
Volume Right	14 0	14	24 0	0 5	32 0	0 <b>4</b> 5	10 0	0 6				
volume Right cSH	357	394	244	375	1326	45 1700	952	1700				
Volume to Capacity	0.04	0.07	0.10	0.03	0.02	0.20	0.01	0.07				
Queue Length 95th (m)	0.04	1.7	2.5	0.03	0.02	0.20	0.01	0.07				
Control Delay (s)	15.5	14.8	21.4	14.9	1.0	0.0	0.2	0.0				
_ane LOS	10.5 C	14.0 B	C	14.3 B	1.0 A	0.0	0.0 A	. 0.0				
Approach Delay (s)	15.1	U	19.5	U	0.5		0.4					
Approach LOS	C		, 13.5 C		0.0		U. <del>4</del>					
ntersection Summary												
Average Delay			1.7									
ntersection Capacity Utiliza	ition		50.8%	IC	U Level o	of Service	1		À			
Analysis Period (min)		\$0500000 gazzonazaz	15								And the second s	

	•		*	1	<b>←</b>	*	1	1	1	-	↓	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	<b>^</b>	7	ħ	<b>ት</b> ጮ		T	<b>^</b>	7	ľ	<b>ተ</b> ፑ	
Volume (vph)	186	609	74	100	756	83	31	418	135	49	214	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3,5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1750	3336	1377	1623	3093		1750	3131	1377	1653	3335	
FIt Permitted	0.17	1.00	1.00	0.42	1.00		0.54	1.00	1.00	0.42	1.00	
Satd. Flow (perm)	320	3336	1377	720	3093		992	3131	1377	737	3335	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	186	609	74	100	756	83	31	418	135	49	214	59
RTOR Reduction (vph)	0	0	32	0	8	0	0	0	59	0	18	0
Lane Group Flow (vph)	186	609	42	100	831	0	31	418	76	49	255	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	pm+pt		Perm	Perm			Perm		Perm	Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	65.3	65.3	65.3	43.1	43.1		41.5	41.5	41.5	41.5	41.5	
Effective Green, g (s)	68.9	68.9	68.9	46.7	46.7		45.1	45.1	45.1	45.1	45.1	
Actuated g/C Ratio	0.57	0.57	0.57	0.39	0.39		0.38	0.38	0.38	0.38	0.38	
Clearance Time (s)	7.0	· 6.6	6.6	6.6	6.6		6.6	6.6	6.6	6.6	6.6	\$40\$2005660000
Vehicle Extension (s)	3.0	5.0	5.0	5.0	5.0		5.0	5.0	5,0	5.0	5.0	
Lane Grp Cap (vph)	408	1915	791	280	1204		373	1177	518	277	1253	
v/s Ratio Prot	c0.07	0.18		00	c0.27		3.3	c0.13	0.10		0.08	
//s Ratio Perm	0.19		0.03	0.14			0.03		0.06	0.07	0,00	
//c Ratio	0.46	0.32	0.05	0.36	0.69		0.08	0.36	0.15	0.18	0.20	
Jniform Delay, d1	15.7	13.3	11.2	26.0	30.6		24.1	27.0	24.7	25.0	25.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1,19	1.13	2.10	1.00	1.00	
ncremental Delay, d2	0.8	0.2	0.1	1.6	2.2		0.4	0.8	0.6	1.4	0.4	
Delay (s)	16.5	13.5	11.3	27.6	32.8		29.1	31.3	52.6	26.4	25.7	
Level of Service	.о.о В	В	В	_,.o	C		 C	C C	D	C	20.7 C	
Approach Delay (s)	-	14.0	J	•	32.3		J	36.1		J	25.8	
Approach LOS		В			C C			D D			C	
ntersection Summary												
HCM Average Control Dela	٧		26.5	Н	CM Level	of Servic	е		С			
HCM Volume to Capacity ra			0.51						-			
Actuated Cycle Length (s)			120.0	Sı	ım of lost	time (s)			9.4			
ntersection Capacity Utiliza	ation		66.2%		U Level o				C			
Analysis Period (min)			15									3075537502
Description: Mayfield Rd			10									
Critical Lane Group				1010011 (P <b>in</b> ited)								

AECOM Synchro 7 - Report

# **Appendix K**

**Roundabout Analysis Outputs** 



## **Output Tables**

## Mississauga Road EA

## Mississauga Road and Mayfield Road 2018 AM

#### **Run Information**

\* Basic Parameters:

Intersection Type: Roundabout

Driving on the right-hand side of the road

Input data specified in Metric units

Model Defaults: US HCM (Metric)

Peak Flow Period (for performance): 15 minutes

Unit time (for volumes): 60 minutes.

Delay definition: Control delay

Geometric delay included

HCM Delay Model option selected

HCM Queue Model option selected

Level of Service based on: Delay (HCM method) Queue definition: Back of queue, 95th Percentile

## **Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

From	То	Mov		Flow	Rate	Flow	Peak Flow
	Approach					Scale	
West: May	field Road N	W					
	South	2R	Right	59	11	1.00	1.00
	East	2T	Thru	660	50	1.00	1.00
	North	5L	Left	64	1	1.00	1.00
South: Mi	ssissauga Ro	oad S					
	West	3L	Left	29	1	1.00	1.00
	East	8R	Right	38	7	1.00	1.00
	North	81	Thru	77	13	1.00	1.00
East: May	field Road H	<u> </u>					
	West	6T	Thru	494	26	1.00	1.00
	South	1L	Left	171	19	1.00	1.00
	North	6R	Right	29	1	1.00	1.00
North: Mis	ssissauga Ro	ad N					
	West	4R	Right	98	2	1.00	1.00
	South	4T	Thru	509	21	1.00	1.00
	East	7L	Left	69	6	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

Mov ID		Lef	it	Thr	ough	Rig	ht
10		LV	HV	LV	HV	LV	HV
	l flows Mayfie			as u	sed by	the pro	gram
5L	_	64	1	0	0	0	0
2T	_	- 0	0	660	50	0	0
2R	R	0	0	0	0	59	11
South:	Missis	ssauga	Road	S			
3L		29 -	1	0	0	0	0
8T	T	0	0	77	13	0	0
8R	R	0	0	0	0	38	7
East:	Mayfie:	Ld Roa	.d E				
1L	-	L71	19	0	0	0	0
6T	T	0	0	494	26	0	0
6R	R	0	0	0	0	29	1
North:	Missis	sauga	Road	 N			
7L		69	6	0	0	0	0
4 T	T	0	0	509	21	0 1	0
4R	R	0	0	0	0	98	2

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mov	Lei	t	Thro	ugh	Rig	ht 
ID	Total	%HV	Total	%HV	Total	%HV
Demand flo West: Mayf			r as use	d by tl	ne progr	am
5L L	65	1.5	. 0	0.0	0	0.0
2T T	. 0	0.0	710	7.0	.0	0.0
2R R	0	0.0	0	0.0	70	15.7
South: Mis	sissauga	Road	S			
3L L	30	3.3	0	0.0	0	0.0
8T T	0	0.0	90		0	0.0
8R R	0	0.0	0	0.0	45	15.6
East: Mayf	ield Roa	ıd E				
1L L	190	10.0	0	0.0	0	0.0
6T T	0	0.0	520	5.0	0	0.0
6R R	0	0.0	0	0.0	30	3.3
North: Mis	sissauga	Road	N			
7L L	75	8.0	0	0.0	0	0.0
,		0 0	530	4 0	0	0.0
4T T	Ü	0.0	330	7.0	0	0.0

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout
                                   Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap.
                                                           0-D
               Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) h) (pcu/h) Effect
Diam
 (m)
           (m)
West: Mayfield Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 795 5.8 807 0 N 0.889
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 850 6.7 867 0 N 0.834
East: Mayfield Road E
                      Entry/Circulating Flow Adjustment: Medium
 Environment Factor: 1.20
 30 10 50 2 2 4.00 185 7.8 193 0 N 0.977
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 740 6.2 751 0 N 0.928
______
```

#### Table R.1 - Roundabout Gap Acceptance Parameters

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
                Flow Aver Aver In-Bnch Prop
                                                                   Foll-up
   No. Type
                                                     _____
                               Dist Headway Bunched Hdwy Dist Headway (m) (s) (s) (m) (s)
                  Rate Speed
                (pcu/h) (km/h) (m) (s)
                   West: Mayfield Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Dominant 807 34.6 42.9 1.33 0.484 3.66 35.2 Thru 1 Dominant 807 34.6 42.9 1.33 0.484 3.73 35.9
                                                                     2.54
     2 Subdominant 807
                       34.6
                               42.9 1.33 0.484
                                                      3.83
                                                            36.9
                                                                     2.66
Right 2 Subdominant 807 34.6 42.9 1.33 0.484
                                                    4.16
                                                           40.0
                                                                   2.89
-----
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Dominant 867 36.9 42.6 1.17 0.465
Thru 1 Dominant 867 36.9 42.6 1.17 0.465
                                                     3.59
                                                             36.8
                                                                     2.52
                                                           40.3
                                                                     2.76
                                                      3.93
2 Subdominant 867 36.9 42.6 1.17 0.465
Right 2 Subdominant 867 36.9 42.6 1.17 0.465
                                                            41.9
                                                     4.09
                                                                     2.87
                                                     4.13
                                                             42.3
                                                                     2.90
East: Mayfield Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 193 32.2 166.9 1.55 0.166 4.56 40.8
Thru 1 Subdominant 193 32.2 166.9 1.55 0.166
2 Dominant 193 32.2 166.9 1.55 0.166
                                                      4.35
                                                             38.9
                                                                     2.70D
2 Dominant 193 32.2 166.9 1.55 0.166 4.35 38.9
Right 2 Dominant 193 32.2 166.9 1.55 0.166 4.33 38.8
                                                                     2.70
```

North: Mississauga Road N Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium Left 1 Subdominant 751 35.1 46.8 1.07 0.387 3.90 Thru 1 Subdominant 751 35.1 46.8 1.07 0.387 3.79 38.0 2.69 Thru 1 Subdominant 751 35.1 36.9 2.61 46.8 1.07 0.387 46.8 1.07 0.387 2 Dominant 751 35.1 2 Dominant 751 35.1 3.72 36.3 2.57 Right 2 Dominant 3.72 36.3 2.56

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

## **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

Mov		Demand Flow (veh/h)	HV	Flow	HV	Adjust. Flow (pcu/h)	Cap. (veh	Deg. Satn	Spare Cap.	Lane Util (%)	Deg. Satn x
		(VeII/II)		(veii/ii)	. (o)	(peu/II)		хр	(0)	(0)	×
West:	May	field R	oad W								
5L 1		65	1.5	795	5.8		106	0.85	39	100	0.613
2T :		710		795	5.8			0.85		100	0.614
2R I	3	70	15.7	795	5.8	807	114	0.85	38	100	0.614*
South	 : Мі	ssissau	ga Roa	id S							
3L 1		30	3.3	850	6.7	867	214	0.85	506	100	0.140
8T :	Г	90	14.4	850	6.7	867	641	0.85	505	100	0.140
8R I	3.	45	15.6	850	6.7	867	320	0.85	504	100	0.141
 East:	Max	field R	oad E								
1L I		190	10.0	185	7.8	193	562	0.85	151	100	0.338
6T T		520	5.0	185	7.8	193	1539	0.85	152	100	0.338
6R E	ξ .	30	3.3	185	7.8	193	8 9	0.85	152	100	0.337
North:	 : Mi	ssissau	ra Roa	d N							
7L I		75	8.0	740	6.2	751	166	0.85	88	100	0.452
4T T	-	530	4.0	740	6.2	751	1171	0.85	88	100	0.453
4R F	ξ.	100	2.0	740	6.2	751	221	0.85	88	100	0.452

#### **Table S.3 - Intersection Parameters**

```
Intersection Level of Service = B
Worst movement Level of Service = B
Average intersection delay (s/pers) = 10.5
Largest average movement delay (s) = 18.6
Largest back of queue, 95% (m) = 43
Performance Index = 49.40
```

Degree of saturation (highest)	=	0.614
Practical Spare Capacity (lowest)	=	38 %
Effective intersection capacity, (veh/h)	=	3997
Total vehicle flow (veh/h)	=	2455
Total person flow (pers/h)	=	2946
Total vehicle delay (veh-h/h)	=	7.14
Total person delay (pers-h/h)	=	8.57
Total effective vehicle stops (veh/h)	=	1956
Total effective person stops (pers/h)	=	2348
Total vehicle travel (veh-km/h)	=	1559.9
Total cost (\$/h)	=	690.54
Total fuel (L/h)	=	211.2
Total CO2 (kg/h)	==	529.34

**Table S.5 - Movement Performance** 

Mov ID		Total Delay	Total Delay		_		Longest 95% Ba			
		(veh-h/h)	(pers-h/h	n) (sec)		Rate	(vehs)	(m)		(km,
West:	May	field Roa	 d W							
5L	L	0.34	0.40	18.6	0.80	1.03	5.4	43	1.65	4
2T	T	2.36	2.83	12.0	0.80	0.98	5.4	43	16.03	48
2R	R	0.27	0.32	13.7	0.80	0.99	5.3	43	1.62	4
South	. — : Мі	ssissauga	Road S							
3L	L	0.13	0.16	15.6	0.65	0.87	0.8	7	0.67	45
8 T	T	0.23	0.27	9.1	0.65	0.73	0.8	7	1.73	5 (
8R	R	0.13	0.16	10.7	0.65	0.82	0.8	7	0.91	5
East:	May	field Road	 d E							
1L	L	0.72	0.86	13.7	0.40	0.70	2.3	19	3.81	4
6Т	T	0.93	1.12	6.4	0.40	0.53	2.3	18	8.52	52
6R	R	0.06	0.08	7.5	0.40	0.58	2.3	18	0.51	5
North:	Mi	.ssissauga	Road N							
7L	L	0.34	0.41	16.4	0.67	0.94	3.0	24	1.72	45
4 T	T	1.35	1.62	9.2	0.67	0.79	3.0	24	10.26	50
	R	0.28	0.34	10.2	0.67	0.85	3.0	. 04	1.99	5 (

## **Table S.6 - Intersection Performance**

Total Flow	Deg. Satn	Total Delay (veh-h/h)	Total Delay	Aver. Delay	Prop. Queued	Eff. Stop Rate	Longest Queue	Perf. Index	Aver. Speed (km/h)
	0.614	l Road W 2.96		12.6	0.80	0.98	43	19.29	48.0
South: N	lississ	auga Road 0.49	S						
	0.338	Road E							
North: M	Mississ 0.453	auga Road 1.98	N 2.37	10.1	0.67	0.81	24	13.96	50.0
ALL VEHI	CLES:	7.14							

INTERSECTION (persons):
2946 0.614 8.57 10.5 0.63 0.80 49.40 49.6

Queue values in this table are 95% back of queue (metres).

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

Lane No.	(veh	(veh	Satn	Aver. Delay (sec)	Stop		ck	Length
1 LT	Mayfield 436 409	709	0.614					
1 LT	Mississa 87 78	620	0.140			0.8		
1 LT	Mayfield 365 375	1079	0.338				18.6 18.3	
1 LT	Mississa 346 359	765	0.453					

## **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

ALC: 12								
Lane No.					Cap (veh	(veh	Deg. Satn	Util
1 LT	Mayfie 65 0	371	0					
1 LT	: Missi 30 0	57	0	87				
1 LT	Mayfie 190 0	175	0					
1 LT	Missi 75 0	271	0	346				

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

(veh         (veh         Rate         Queue           /h)         /h)         (%)         x         (sec)         (veh)   West: Mayfield Road W 5L L 65 106 100 0.613 18.6 1.03 5.4 2T T 710 1156 100 0.614* 12.0 0.98 5.4	Perf.
/h)     /h)     (%)     x     (sec)     (veh)       West:     Mayfield Road W       5L L     65     106     100     0.613     18.6     1.03     5.4       2T T     710     1156     100     0.614*     12.0     0.98     5.4	Index
West: Mayfield Road W 5L L 65 106 100 0.613 18.6 1.03 5.4 2T T 710 1156 100 0.614* 12.0 0.98 5.4	
5L L 65 106 100 0.613 18.6 1.03 5.4 2T T 710 1156 100 0.614* 12.0 0.98 5.4	
2T T 710 1156 100 0.614* 12.0 0.98 5.4	
	1.65
	16.03
2R R 70 114 100 0.614* 13.7 0.99 5.3	1.62
South: Mississauga Road S	
3L L 30 214 100 0.140 15.6 0.87 0.8	0.67
8T T 90 641 100 0.140 9.1 0.73 0.8	1.73
8R R 45 320 100 0.141 10.7 0.82 0.8	0.91
East: Mayfield Road E	
1L L 190 562 100 0.338 13.7 0.70 2.3	3.81
6T T 520 1539 100 0.338 6.4 0.53 2.3	8.52
6R R 30 89 100 0.337 7.5 0.58 2.3	0.51
North: Mississauga Road N	
7L L 75 166 100 0.452 16.4 0.94 3.0	1.72
4T T 530 1171 100 0.453 9.2 0.79 3.0	10.26
4R R 100 221 100 0.452 10.2 0.85 3.0	1.99

<sup>\*</sup> Maximum degree of saturation

#### Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mov ID	Total	Cost Total \$/h	Total	Total	Total	Total
West: Mayfiel	Ld Road W					
5L L	5.6	19.79	0.024	1.18	0.035	13.9
2T T	63.1	204.74	0.246	13.28	0.412	158.1
2R R	7.8	23.58	0.029	1.72	0.053	19.6
	76 4	248.11	0.299	16.18	0.500	191.0
	70.1					
 South: Missis						
		 d S	0.011	0.52	0.016	6.3
	ssauga Road 2.5	 d S				
3L L	ssauga Road 2.5	3 S 8.76 27.64		1.89	0.060	22.8
3L L 8T T	2.5 9.1 4.8	3 S 8.76 27.64	0.033 0.018	1.89 1.05	0.060 0.033	22.8 12.2
3L L 8T T	2.5 9.1 4.8 16.4	8.76 27.64 14.47	0.033 0.018	1.89 1.05	0.060 0.033	22.8 12.2
3L L 8T T 8R R	2.5 9.1 4.8 ———————————————————————————————————	8.76 27.64 14.47	0.033 0.018 0.061	1.89 1.05	0.060 0.033	22.8
3L L 8T T 8R R East: Mayfiel	2.5 9.1 4.8 16.4 d Road E	8.76 27.64 14.47	0.033 0.018  0.061	1.89 1.05 3.47 4.02	0.060 0.033  0.108	22.8 12.2 41.2 47.7

	61.4	201.81	0.238	12.31	0.389	154.
North: Mississa	uga Roa	 d N				
7L L	7.3	24.21	0.029	1.57	0.047	18.
4T T	41.9	139.72	0.167	8.53	0.268	105.
4R R		25.84				
		189.76				
TNTEDGECTION	211 2	690.54	0 825	43.65	1.362	529.
		·				
PARAMETERS USED	IN COST	r calcula:				
	IN COST	r calcular			0.900	
PARAMETERS USED	IN COST	F CALCULA'  (\$/L) factor	FIONS		0.900 0.70	
PARAMETERS USED  Pump price o Fuel resourc	IN COS!	F CALCULA!  (\$/L) factor st to fuel	FIONS	=, =,	0.900 0.70 3.0	
PARAMETERS USED  Pump price o Fuel resourc Ratio of run Average inco	IN COST	r CALCULA (\$/L) factor st to fuel	FIONS		0.900 0.70 3.0 19.00	
PARAMETERS USED  Pump price o Fuel resourc Ratio of run Average inco	IN COST	r CALCULA( (\$/L) factor st to fuel ) (1000 kg)	FIONS	= = =	0.900 0.70 3.0 19.00 0.40 1.4	
PARAMETERS USED  Pump price o Fuel resourc Ratio of run Average inco	IN COST	F CALCULA!  (\$/L) factor st to fuel  (1000 kg) (1000 kg)	rions 	= = = =	0.900 0.70 3.0 19.00 0.40	

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout Fuel Cost HC CO NOX Rate Rate Rate Rate Rate Rate Rate ID Rate L/100km \$/km g/km g/km g/km West: Mayfield Road W 0.45 0.543 26.81 0.791 317.6 0.46 0.551 29.73 0.923 353.8 5L L 12.7 2T T 14.1 0.54 0.658 39.40 1.211 17.9 449.7 14.3 0.46 0.559 30.28 0.935 358.7 South: Mississauga Road S 0.523 25.86 0.770 308.9 3L L 12.3 0.43 8T T 16.0 0.49 0.578 33.42 1.057 402.8 17.3 0.52 0.626 37.40 1.160 434.0 15.6 0.48 0.580 33.02 1.029 393.1 East: Mayfield Road E 1L L 14.8 0.572 31.39 0.953 0.48 372.1 23.93 24.09 6T T 12.3 0.41 0.474 0.774 0.40 0.485 6R R 11.8 0.750 295.7 13.0 0.43 0.501 25.95 0.821 324.7 North: Mississauga Road N 
 7L L
 14.5
 0.48
 0.577
 31.04
 0.933

 4T T
 12.6
 0.42
 0.501
 25.59
 0.805

 4R R
 12.2
 0.41
 0.509
 25.60
 0.784
 364.0 314.8 305.9 12.7 0.42 0.510 26.21 0.816 319.1

INTERSECTION: 13.5 0.44 0.529 27.98 0.873 339.3

Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

Lane No.	Dema					_	Eff Grn (secs)	_		_	
	L	Т	R	Tot		Satf.	1st 2nd	×	(sec)	(m)	(m)
West:			load W	!							
1 LT 2 TR	65	371 339	70	436 409	6 9			0.614 0.614			500 500
	65	710	70	845	7			0.614	12.6	43	
South:	Miss	issau	iga Ro	ad S							
1 LT 2 TR	30	57 33	45	87 78	11 15			0.140 0.140	11.2 10.1	7 7	500 500
	30	90	45	165	13			0.140	10.7	7	
East:					13 			0.140	10.7	7	
 East: 1 LT 2 TR	 Mayfi		 oad E		13  8 5			0.338	10.7 10.2 6.5	19	
1 LT	 Mayfi	 eld R 175	 oad E	365	8			0.338	10.2	19	500 500
1 LT 2 TR	 Mayfi 190  190	eld R 175 345  520	30 30 30	365 375  740	8 5			0.338	10.2	19 18	
1 LT	 Mayfi 190  190  Miss	eld R 175 345  520  issau 271	 oad E 30  30  ga Ro	365 375  740	8 5			0.338 0.338 0.338	10.2	19 18 19	500
1 LT 2 TR  North: 1 LT	Mayfi 190  190  Miss 75	eld R 175 345  520  issau 271	30 30 30 30 ga Ro	365 375  740  ad N 346	8 5 6 5 3			0.338 0.338 0.338	10.2 6.5 8.3	19 18 19	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mov ID	Mov Typ	Flow	(veh	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest 95% Ba (vehs)	ck
West: M	avfield	Road W						
5L L	-	65	106	0.613	18.6	В	5.4	43
2T T		710	1156	0.614*	12.0	В	5.4	43
2R R		70	114	0.614*	13.7	В	5.3	43
 South:	Mississ	 auga Roa	 d S					
South:	Mississ	auga Roa 30		0.140	15.6	В	0.8	7
	Mississ	30			15.6 9.1		0.8 0.8	7 7
3L L	Mississ	30	214	0.140	9.1	Α		
3L L 8T T 8R R	Mississ	30 90 45	214 641	0.140	9.1	Α	0.8	7
3L L 8T T 8R R		30 90 45	214 641	0.140	9.1	Α	0.8	7
3L L 8T T 8R R  East: M		30 90 45 Road E	214 641 320	0.140 0.141 	9.1 10.7	А В  В	0.8	7 7

Nort	h: Mississau	ıga Roac	i N					
7L	T .	75	166	0.452	16.4	В	3.0	24
4T	T	530	1171	0.453	9.2	A	3.0	24
4R	R	100	221	0.452	10.2	В	3.0	24
ALL	VEHICLES:	2455		0.614	10.5	В	5.4	43

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

\* Maximum v/c ratio, or critical green periods

### **Table D.0 - Geometric Delay Data**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

From	то		Negn	Negn Speed	Negn Dist.	Appr. Dist.	Downstream	n Distance
Approach	Approach	Turn	(m)	(km/h)	(m)	(m)	(m)	User Spec?
West: May	field Road	w						
_	South	Right	35.0	32.5	19.4	500	140	No
	East	Thru	57.3	39.1	47.1	500	136	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mis	ssissauga :	 Road S						
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: Mayf	ield Road	E						
	West	Thru	57.3	39.1	47.1	500	134	No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mis	sissauga 1	Road N						
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

#### **Table D.1 - Lane Delays**

					Delay	(secon	ds/vel	n)		
	Deg.	Stop-	-line	Delay	Acc.	Queu:	ing	Stopd		
Lane	Satn	1st	2nd	Total	Dec.	Total	MvUp	(Idle)	Geom	Control
No.	Х	d1	d2	dSL	dn	dq	dqm	di	dig	dic
West:	Mayfield	Road	w							
1 LT	0.614	4.3	2.0	6.2	5.1	1.1	1.0	0.1	6.5	12.8

2 TR	0.614	4.6	2.1	6.7	5.2	1.5	1.4	0.1	5.8	12.4
South:	Missis	sauga I	Road S							
1 LT	0.140	3.2	0.0	3.2	3.9	0.0	0.0	0.0	8.0	11.2
2 TR	0.140	3.6	0.0	3.6	4.0	0.0	0.0	0.0	6.5	10.1
East:	Mayfield	d Road	E							
1 LT	0.338	1.0	0.0	1.0	2.3	0.0	0.0	0.0	9.2	10.2
2 TR	0.338	1.0	0.0	1.0	2.6	0.0	0.0	0.0	5.6	6.5
North:	Mississ	sauga I	Road N							
		2 2	0 5	3.8	4.2	0.1	0.1	0.0	7.0	10.8
1 LT	0.453	3.3	0.5	3.0	4.4	0.1	0.1	0.0	, . 0	10.0

#### **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

Lane			Geom.	Rate Overall h	_	Rate
1 LT	0.80	0.08		0.98		
	 			0.98 	0.801	0.25
1 LT	0.58	0.00	0.19	0.77 0.79		
1 LT	0.27	0.00		0.62 0.53		
1 LT	0.63	0.03	0.17	0.83		

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued

## Table D.3A - Lane Queues (veh)

Tana	Deg. Ovrfl. ane Satn Queue -			Average (veh)				Percentile (veh)				
No.	Satii X	No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Stor. Ratio	
West:	Mayfie	ld Road W	₹									
1 LT	0.614	0.3	1.4	0.3	1.8	3.1	3.8	4.4	5.4	6.3	0.09	
2 TR	0.614	0.3	1.4	0.3	1.7	3.1	3.8	4.3	5.3	6.2	0.09	
South:	Missi	ssauga Ro	ad S			,						
1 LT	0.140	0.0	0.2	0.0	0.2	0.5	0.6	0.6	0.8	0.9	0.01	
2 TR	0.140	0.0	0.2	0.0	0.2	0.5	0.5	0.6	0.8	0.9	0.01	

East:	Mayfiel	d Road I	£								
L LT	0.338	0.0	0.7	0.0	0.7	1.3	1.6	1.9	2.3	2.7	0.04
TR	0.338	0.0	0.7	0.0	0.7	1.4	1.6	1.9	2.3	2.7	0.04
Jorth			and N								
	 : Missis	_									
	 : Missis 0.453	sauga Ro	oad N 0.9	0.1	1.0	1.7	2.1	2.4	3.0	3.5	0.05

Values printed in this table are back of queue (vehicles).

#### **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 AM Intersection ID: 1 Roundabout

	Deg.				res)		Percentile (metres)				Queue Stor.
Lane No.	Satn x	Queue - No		Nb2			85%			98%	Ratio
West:	Mayfie	ld Road	w								
1 LT	0.614	2.4	11.4	2.7	14.2	25.0	30.6	34.9	43.4	50.5	0.0
2 TR	0.614	2.4	11.4	2.7	14.1	24.9	30.6	34.8	43.3	50.4	0.0
South:	: Missi	ssauga R	oad S								
l LT	0.140	0.0	2.1	0.0	2.1	3.9	4.7	5.3	6.5	7.6	0.0
2 TR	0.140	0.0	2.1	0.0	2.1	3.9	4.7	5.3	6.6	7.6	0.0
East:	Mayfie	ld Road :	E .			7 x + 1					
l LT	0.338	0.0	5.9	0.0	5.9	10.9	13.3	15.0	18.6	21.5	0.0
2 TR	0.338	0.0	5.8	0.0	5.8	10.7	13.0	14.8	18.3	21.2	0.0
Jorth.	Missi	ssauga R	nad N								
		0.6		0.7	7.6	13.8	16.9	19.1	23.7	27.5	0.0
		0.6		0.7	7.5	13.7	16.8	19.0	23.6	27.3	0.0

Values printed in this table are back of queue (metres).

## Table D.4 - Movement Speeds (km/h) and Geometric Delay

	Ar	 	eeds	Exit	Speeds	~	 Move-up 	Av. Sec	tion Spd	Geom
Mov	_	·					2nd			Delav
ID	Cr	ruise	Negn		Cruise	Grn	Grn	_	Overall	-
West	: Mayfi	eld R	oad W							
5L	L	65.0	25.7	25.7	65.0	18.6		44.0	43.4	12.4
2 T	T	65.0	39.1	39.1	65.0	18.5		48.6	48.6	5.5
2R	R	65.0	32.5	32.5	65.0	17.8		47.5	47.1	7.1
Sout	h: Miss	issau	ga Road	s						
3L	L	65.0	25.7	25.7	65.0			45.9	45.9	12.4
81	T	65.0	39.1	39.1	65.0			50.9	50.9	5.7
8R	R	65.0	32.5	32.5	65.0			50.1	50.1	7.1
East	: Mayfi	eld R	oad E							
1L	L	65.0	25.7	25.7	65.0			47.0	47.0	12.6

6T T 6R R	7 - 7 -	39.1	39.1 32.5			52.9 51.8	52.9 51.8	5.5 6.6
North:	Mississau	ga Road	N					
7L L	65.0	25.7	25.7	65.0	18.1	45.4	45.4	12.6
4T T	65.0	39.1	39.1	65.0	18.4	50.8	50.8	5.4
4R R	65.0	32.5	32.5	65.0	18.4	50.0	50.0	6.6

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Mayfield 2018 AM G:\PROJECTS\105163 Mississagua Road Class EA\Sidra\Mississauga Rd EA Aug 14.aap Processed Aug 14, 2009 03:57:26PM

A1492, AECOM, Small Office

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## **Output Tables**

## Mississauga Road EA

## Mississauga Road and Mayfield Road 2018 PM

#### **Run Information**

\* Basic Parameters:

Intersection Type: Roundabout

Driving on the right-hand side of the road

Input data specified in Metric units

Model Defaults: US HCM (Metric)

Peak Flow Period (for performance): 15 minutes

Unit time (for volumes): 60 minutes.

Delay definition: Control delay

Geometric delay included

HCM Delay Model option selected

HCM Queue Model option selected

Level of Service based on: Delay (HCM method) Queue definition: Back of queue, 95th Percentile

## **Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1

Roundabout

From Approach	To Approach	Mov ID	Turn		HV	Scale	Peak Flow Factor
West: May	field Road	w					
	South	2R	Right	34	6	1.00	1.00
	East	2T	Thru	298	22	1.00	1.00
	North	5L	Left	103	.2	1.00	1.00
South: Mi	ssissauga R	oad S					
	West	3L	Left	59	1	1.00	1.00
	East	8R	Right	185	35	1.00	1.00
	North	8T	Thru	370	60	1.00	1.00
East: May:	field Road	E .					
	West	6T	Thru	694	36	1.00	1.00
	South	1L	Left	95	10	1.00	1.00
	North	6R	Right	44	1	1.00	1.00
North: Mis	ssissauga R	oad N					
	West	4R	Right	49	1	1.00	1.00
	South	4T	Thru	154	6	1.00	1.00
	East	7L	Left	32	3	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

Mov ID	L	eft	Thr	ough	Right		
10	TA	HV	ΓΛ	HV	TA	HV	
	flows in		ır as u	sed by	the pr	ogram	
west: Ma 5L L	ayfield R 103	oad W. 2	0	0	0	0	
2T T	103	0	298	22	0	0	
21 1 2R R	0	0	296 0	0	34	6	
South: N	Mississau	ga Road	d S				
3L L	59	1	0	0	0	0	
8T T	0	0	370	60	0	0	
8R R	0	0	0	0	185	35	
East: Ma	yfield R	oad E	, , ,				
1L L	95	11	0	0	0	0	
6T T	0	0	694	37	0	0	
6R R	0	0	0	0	44	1	
North: M	ississau	ga Roac	. – – – – . I N				
7L L	32	3	0	0	0	0	
4T T	0	0	154	6	0	0	
4R R	0	0	0	0	49	1	

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mov	Le	ft	Thro	ough	Ri	ght
ID	Total	%HV	Total	L %HV	Tota	1 %HV
Demand flow	s in v	eh/hou:	r as use	ed by t	he prog	ram
West: Mayfi						
5L L	105	1.9	. 0	0.0	0	0.0
2T T						
2R R	. 0	0.0	0	0.0	40	15.0
South: Miss	issaug	a Road	s			
			0	0.0	0	0.0
					0	
8R R						
East: Mayfi	eld Ro	 ad E				
1L L			0	0.0	0	0.0
6T T	0	0.0	731	5.1	0	0.0
6R R						
North: Miss	issaug	 a Road	N			
7L L	_			0.0	0	0.0
			160		0	
4R R						
Unit Time f	or Volu	 umes =	60 min	utes		

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM \,
Intersection ID: 1
Roundabout
                              Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
         Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) h) (pcu/h) Effect
Diam
 (m)
     (m)
                                  (pcu/h) Effect
 _____
West: Mayfield Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 300 6.6 307 0 N 0.968
______
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 460 5.9 468 0 N
                                                 0 954
East: Mayfield Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 595 10.7 634 0 N 0.921
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 895 5.4 903 0 N 0.836
```

#### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout
  ______
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
   No. Type
                  Flow Aver Aver In-Bnch Prop
                   Rate Speed Dist Headway Bunched Hdwy Dist Headway (pcu/h) (km/h) (m) (s) (s) (m) (s)
                  (pcu/h) (km/h) (m) (s)
West: Mayfield Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Dominant 307 32.9 107.2 1.46 0.239 4.29 39.2
                                                                         2.73
                         32.9 107.2 1.46 0.239
32.9 107.2 1.46 0.239
Thru 1 Dominant
                     307
                                                         4.38
                                                                40.0
                                                                         2.78
      2 Subdominant 307
                                                       4.38
                                                                40.0
                                                                         2.78D
Right 2 Subdominant 307 32.9 107.2 1.46 0.239 4.72 43.1
                                                                       3.00D
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Dominant 468 35.0 74.9 1.15 0.279 4.07 39.6
Thru 1 Dominant 468 35.0 74.9 1.15 0.279 4.43 43.2
                                                                         2.67
                                                                         2.91
2 Subdominant 468 35.0 74.9 1.15 0.279
Right 2 Subdominant 468 35.0 74.9 1.15 0.279
                                                              43.2
                                                         4.43
                                                                         2.91D
                                                       4.51
                                                                43.9
                                                                         2.96D
 ------
East: Mayfield Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 634 35.4 55.8 1.44 0.429 4.10 40.3 Thru 1 Subdominant 634 35.4 55.8 1.44 0.429 3.90 38.4
                                                                         2.77
Thru 1 Subdominant 634 35.4
2 Dominant 634 35.4
Right 2 Dominant 634 35.4
                                                         3.90 38.4
                                                                       2.64
                                55.8 1.44 0.429 3.87 38.1
55.8 1.44 0.429 3.86 37.9
                                                                 38.1
                                                                         2.62
                                                                        2.61
```

North: Mississauga Road N Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 40.6 1.10 0.456 40.6 1.10 0.456 Left 1 Subdominant 903 36.6 3.81 2.68 Thru 1 Subdominant 903 36.6 3.68 37.4 2.59 3.56 2 Dominant 903 36.6 40.6 1.10 0.456 36.2 2.51 Right 2 Dominant 903 36.6 40.6 1.10 0.456 3.56 36.2 2.51

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value  $\frac{1}{2}$ 

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

#### **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

Mov				ing M	ovement	Total	Prac.	 Prac.	Lane	Deg.
ID	Demand			-	Adjust.	Cap.	Deg.	Spare	Util	Satn
	Flow (veh/h)	HV (%)	Flow (veh/h)	HV (%)	Flow (pcu/h)	(veh /h)	Satn xp	Cap.	(%)	×
West: M	Mayfield R	oad W								4.
5L L 2T T 2R R	105 320 40	1.9 6.9 15.0	300 300 300	6.6 6.6	307 307 307	439 1337 167	0.85 0.85 0.85	255 255 255	100 100 100	0.239 0.239 0.240
South:	Mississau	ga Roa	 nd S							
3L L	60	1.7	460	5.9	468	137	0.85	94	100	0.438
8T T	430	14.0	460	5.9	468	984	0.85	95	100	0.437
8R R	, 220	15.9	460	5.9	468	504	0.85	95	100	0.437
East: M	ayfield R	oad E								
1L L	106	10.4	595	10.7	634	190	0.85	52	100	0.558*
		5.1	595	10.7	634	1310	0.85	52	100	0.558*
6R R	45	2.2	595	10.7	634	81	0.85	53	100	0.556
North:	Mississau	ga Roa	d N							
7L L	35	8.6	895	5.4	903	187	0.85	354	100	0.187
4T T	160	3.7	895	5.4	903	856	0.85	355	100	0.187
4R R	50	2.0	895	5.4	903	267	0.85	354	100	0.187

#### **Table S.3 - Intersection Parameters**

_				
	Intersection Level of Service	=	А	
	Worst movement Level of Service	=	В	
	Average intersection delay (s/pers)	=	9.9	
	Largest average movement delay (s)	=	17.4	
	Largest back of queue, 95% (m)	=	38	
	Performance Index	=	45.25	

Degree of saturation (highest)	= , .	0.558
Practical Spare Capacity (lowest)	=	52 %
Effective intersection capacity, (veh/h)	=	4125
Total vehicle flow (veh/h)	=	2302
Total person flow (pers/h)	=	2762
Total vehicle delay (veh-h/h)	=	6.36
Total person delay (pers-h/h)	=	7.63
Total effective vehicle stops (veh/h)	=	1782
Total effective person stops (pers/h)	=	2139
Total vehicle travel (veh-km/h)	=	1460.5
Total cost (\$/h)	=	658.55
Total fuel (L/h)	=	205.1
Total CO2 (kg/h)	=	514.46

#### **Table S.5 - Movement Performance**

Mov ID		Delay		. Delay	Queued	Stop	95% Ba	ack	Index	Spee
		(veh-h/h)	(pers-h/h	n) (sec)		Rate	(vehs)	(m)		(km/h
West: N	Mayi	ield Roa	d W							
5L :	L	0.40	0.48	13.8	0.45	0.73	1.4	1,1	2.12	46.
		0.62						11	5.34	52.
2R I	R	0.09	0.11	8.5	0.45	0.64	1.4	12	0.70	51.
South:	Mis	sissauga	Road S							
		0.25		15.2	0.60	0.85	2.9	24	1.31	46.
8T :	Г	1.02	1.22	8.5	0.60	0.69	2.9	24	7.95	51.
8R I	R	0.61	0.73	10.0	0.61	0.78	2.9	25	4.25	50.
 East: N	 Maví	ield Road	 d E							
	_		0.61	17.4	0.74	0.98	4.7	38	2.56	44.
6T :	Г	2.05	2.47	10.1	0.74	0.89	4.8		15.31	
6R I	3	0.14	0.17	11.1	0.74	0.93	4.8	38	0.96	49.
 North:	Mis	sissauga	Road N							
7L I		0.15		15.8	0.66	0.90	1.0	8	0.79	45.
4T 7	r	0.38	0.45	8.5	0.66	0.70			2.99	
				9.5		0.77		8	0.96	50

#### **Table S.6 - Intersection Performance**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout
West: Mayfield Road W
               1.34 8.6 0.45 0.61 12 8.17 50.9
465 0.240 1.11
______
South: Mississauga Road S
710 0.438 1.88 2.26 9.5 0.60 0.73 25 13.52
                                           50.5
East: Mayfield Road E
882 0.558 2.71 3.25 11.0 0.74 0.90 38 18.83 49.4
North: Mississauga Road N
245 0.187 0.66 0.80 9.7 0.66 0.74 8 4.74
                                           49.9
ALL VEHICLES:
2302 0.558
         6.36 7.63 9.9 0.63 0.77 38 45.25 50.1
```

INTERSECTION (persons):
2762 0.558 7.63 9.9 0.63 0.77 45.25 50.1

Queue values in this table are 95% back of queue (metres).

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

Lane (	veh (	veh	Satn	Delay	Stop		ck	Length
No.	/h)	/h)	X	(sec)	Rate	(vehs)	(m)	(m)
West: Mayf	ield R	load	W					
1 LT	236	985	0.239	10.0	0.64	1.4	11.3	500.0
2 TR								
South: Mis								
1 LT	361	826	0.437	9.6	0.72	2.9	24.2	500.0
2 TR	349	799	0.437	9.5	0.75	2.9	24.8	500.0
East: Mayf.	ield R	oad	E					
1 LT	435	779	0.558	12.0	0.92	4.7	37.9	500.0
2 TR	447	802						
North: Mis	sissau	ga R						
1 LT	119	634	0.187	10.7	0.77	1.0	8.3	500.0
2 TR	126	677	0.187	8.8	0.72	1.1	8.3	500.0

#### Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

Lane No.					Min Cap (veh /h)	(veh	Deg. Satn	
West: 1 LT 2 TR	105	131	0		150 150		0.239 0.239	
	60	301	0	361	150 150			
	106	329	0		150 150			
North: 1 LT 2 TR	35	_	0	119	119 126			

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

Mov	Mov Typ	Dem Flow (veh	Total Cap. (veh	Lane Util	Deg. Satn	Aver. Delay	Eff. Stop Rate	95% Back of Queue	Perf. Index
		/h)	/h)	(용)	Х	(sec)	21.02.00	(veh)	
West: M	ayfiel	 d Road	. W						
5L L		105	439	100	0.239	13.8	0.73	1.4	2.12
2T T		320	1337	100	0.239	6.9	0.56	1.4	5.34
2R R		40	167	100	0.240	8.5	0.64	1.4	0.70
South: 1	Missis	 sauga	 Road S						
3L L		60	137	100	0.438	15.2	0.85	2.9	1.31
8T T		430	984	100	0.437	8.5	0.69	2.9	7.95
8R R		220	504	100	0.437	10.0	0.78	2.9	4.25
East: Ma	ayfiel	d Road	E						
1L L		106	190	100	0.558*	17.4	0.98	4.7	2.56
6T T		731	1310	100	0.558*	10.1	0.89	4.8	15.31
6R R		45	81	100	0.556	11.1	0.93	4.8	0.96
North: N	dissis:	sauga :	 Road N						
7L L		35	187	100	0.187	15.8	0.90	1.0	0.79
4T T		160	856	100	0.187	8.5	0:70	1.1	2.99
4R R		5.0	267	100	0.187	9.5	0.77	1.1	0.96

<sup>\*</sup> Maximum degree of saturation

## Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM

Intersection ID: 1

Roundabout

Mov ID		Cost Total \$/h			Total	Total
West: Mayfiel		30.12	0.036	1 70	0.054	21 5
2T T 2R R	26.3		0.100	5.20	0.167	66.0
	39.1	127.91	0.151	7.88	0.249	98.0
 South: Missis	sauga Road					
3L L	5.0	17.44	0.021	1.04	0.031	12.5
8T T	43.0	130.93	0.154	8.88	0.282	108.0
8R R	23.5	70.26	0.085	5.07	0.158	59.2
	71.4	218.64	0.261	15.00	0.471	179.6
East: Mayfiel	d Road E					
1L L	11.0	35.70	0.043	2.37	0.071	27.6
_	60.2	198.31	0.238	12.44	0.389	150.8
6T T	60.2	190.31	0.230	14.77	0.505	100.0

	74.7	245.80	0.296	15.55	0.483	187.
orth: Mississa	uga Roa	d N				
7L L			0.014	0.73	0.022	8.
4T T	12.6	42.10	0.050	2.57	0.081	31.
4R R	3.8	12.90	0.016	0.80	0.024	9.
	19.8	66.20				
INTERSECTION:	205 1			42.51		
ARAMETERS USEC						
ARAMETERS USEC	) IN COS	r Calcula'				
ARAMETERS USED	IN COST	F CALCULA!			0.900	
ARAMETERS USED	o IN COST	F CALCULA!	FIONS	=	0.70	)
ARAMETERS USED  Pump price of Fuel resource Ratio of run	o IN COS!	F CALCULA! (\$/L) factor st to fue:	FIONS	=	0.70	)
ARAMETERS USED  Pump price o Fuel resourc Ratio of run Average inco	o IN COST	F CALCULA! (\$/L) factor st to fue:	FIONS	=	0.70 3.0 19.00	) ) )
ARAMETERS USED  Pump price of Fuel resource Ratio of run Average inco	of fuel eccost ining cosme (\$/h)	[ CALCULA: (\$/L) factor st to fue:	FIONS	= =	0.70 3.0 19.00 0.40	) ) )
ARAMETERS USED  Pump price of Fuel resource Ratio of run Average inco Time value fught vehicl	of fuel ee cost ining cos me (\$/h) actor e mass	[ CALCULA( (\$/L) factor st to fue.	FIONS	= = = =	0.70 3.0 19.00 0.40	0 0 0 0 0
ARAMETERS USED  Pump price of Fuel resource Ratio of run Average inco	of fuel ee cost ining cos me (\$/h) factor e mass e mass	(\$/L) factor st to fue: (1000 kg)	rions  L cost	= = = = =	0.70 3.0 19.00 0.40	0 0 0 0 0 0 4

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA

Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout Fuel Cost HC CO NOX CO2 ID Rate Rate Rate Rate Rate L/100km \$/km g/km g/km g/km g/km West: Mayfield Road W 0.43 0.512 25.21 0.756 303.9 5L L 12.1 0.831 0.42 2 т. т 13.1 0.495 25.83 327.6 2R R 16.8 0.50 0.602 35.62 1.115 422.2 13.2 0.43 0.508 26.50 0.837 329.9 \_\_\_\_\_ South: Mississauga Road S 12.3 3L L 0.43 0.520 25.70 0.767 307.6 399.0 8т т 0.48 0.570 32.83 1.042 15.9 8R R 17.1 0.51 0.620 36.98 1.150 431.3 0.49 0.581 33.45 1.050 400.6 15.9 East: Mayfield Road E 15.4 0.50 0.602 33.20 0.997 1L L 0.846 27.05 327 9 6т т 13.1 0.43 0.518 6R R 12.4 0.42 0.517 26.10 0.795 309.6 13.3 0.44 0.529 27.79 0.863 334.4 North: Mississauga Road N 0.47 14.4 0.572 30.81 0.927 362.0 7L L 25.49 4T T 12.5 0.42 0.499 0.803 314.1 12.2 0.41 0.508 25.54 0.782 305.5 4R R 12.8 0.43 0.512 26.31 0.818 319.7

INTERSECTION: 14.0 0.45 0.539 29.11 0.910 352.2

Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

Lane									Longest Queue	
									(m)	
West:	Mayfi	eld R	load W			 				
1 LT 2 TR		131 189	40	236 229	5 8		0.239 0.239	10.0		500 500
	105	320	40	465	6		0.239	8.6	12	
South:	Miss	issau	ga Ro	ad S		 				
1 LT 2 TR		129	220		12 15			9.6 9.5		500 500
	60			710		 	0.437	9.5	25	
East:	 Mavfi	 eld R	oad E			 				
1 LT 2 TR		329 402	45	435 447	6 5		0.558 0.558	12.0 10.2		500 500
	106	731	45	882	6	 	0.558	11.0	38	
North:	Miss	 issau	ga Ro	 ad N		 				
1 LT 2 TR	35	84 76		119 126	5 3			10.7	8 8	500 500
	35	160	50	245	4	 	0.187	9.7	8	
ALL VE	HICLE	==== S		Total Flow 2302	HV 8	· · · · · · · · · · · · · · · · · · ·	Max X 0.558	Aver. Delay 9,9	Queue	===:

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mov Mov ID Typ	Flow (veh	(veh	of	-		Longest 95% Ba (vehs)	ck
West: Mayfiel	.d Road W						
5L L		439	0.239	13.8	В	1.4	11
2T T	320	1337	0.239	6.9	A	1.4	11
2R R	40	167	0.240	8.5	A	1.4	12
South: Missis	sauga Roa	 d S					
	60		0.438	15.2	В	2.9	24
8T T	430	984	0.437	8.5	A	2.9	24
8R R	220	504	0.437	10.0	A	2.9	25
Cast: Mayfiel	d Road E						
1L L	106	190	0.558*	17.4	В	4.7	38
6T T	731	1310	0.558*	10.1	В	4.8	38
			0.556		В	4.8	38

Nort	h: Mississaug	ra Road N	1					
7L	L	35	187	0.187	15.8	В	1.0	8
4 T	T	160	856	0.187	8.5	A	1.1	8
4R	R	50	267	0.187	9.5	A	1.1	8
ALL	VEHICLES:	2302		0.558	9.9	A	4.8	38

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

\* Maximum v/c ratio, or critical green periods

#### Table D.0 - Geometric Delay Data

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

-									
	From	To .		Negn Radius	Negn Speed	Negn Dist.	Appr. Dist.	Downstream	n Distance
	Approach		Turn	(m)	(km/h)	(m)	(m)	(m)	User Spec?
	West: May:	field Road	W						
		South	Right	35.0	32.5	19.4	500	140	No
		East	Thru	57.3	39.1	47.1	500	136	No
		North	Left	19.0	25.7	74.6	500	176	No
	South: Mis	ssissauga :	Road S						
		West	Left	19.0	25.7	74.6	500	176	No
		East	Right	35.0	32.5	19.4	500	140	No
		North	Thru	57.3	39.1	47.1	500	143	No
-	East: Mayi	field Road	E						
		West	Thru	57.3	39.1	47.1	500	134	No
		South	Left	19.0	25.7	74.6	500	184	No
		North	Right	35.0	32.5	19.4	500	126	No
_	North: Mis	ssissauga 1	Road N						
		West	Right	35.0	32.5	19.4	500	126	No
		South	Thru	57.3	39.1	47.1	500	133	No
	+ 1	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

#### Table D.1 - Lane Delays

```
Deg. Stop-line Delay Acc. Queuing Stopd
Lane Satn 1st 2nd Total Dec. Total MvUp (Idle) Geom Control
No. x dl d2 dSL dn dq dqm di dig dic
```

<sup>&</sup>quot; Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

1 LT	Mayfield 0.239 0.239	1.4	0.0	1.4	2.6		0.0	0.0	8.6 5.8	10.0
South:	Mississ	auga F	load S							
			0.2	2.8	3.8	0.0	0.0	0.0	6.8	9.6
2 TR	0.437	2.7	0.2	2.9	3.7	0.0	0.0	0.0	6.6	9.5
1 LT 2 TR	0.558 0.558			4.7 4.6	4.6	0.3 0.0	0.2	0.0	7.2 5.6	12.0
North:	MISSISS	auga ĸ	caa N							
		_		3.2	4.0	0.0	0.0	0.0	7.5	10.7

## Table D.2 - Lane Stops

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

Lane			Geom.	Rate Overall h	Queued	Rate
1 LT	0.33	0.00		0.64 0.58		
1 LT	0.51	0.01	0.19	0.72 0.75		
1 LT	0.73	0.06		0.92 0.89		
1 LT	0.59	0.00	0.18	0.77 0.72	0.658 0.656	

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued  $\frac{1}{2}$ 

## **Table D.3A - Lane Queues (veh)**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

Deg. Lane Satn		Ovrfl.		Average (veh)			Percentile (veh)				
No.	X	Queue - No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Stor. Ratio
West:	Mayfie	ld Road	w								
l LT	0.239	0.0	0.5	0.0	0.5	0.8	1.0	1.2	1.4	1.7	0.02
? TR	0.239	0.0	0.5	0.0	0.5	0.8	1.0	1.2	1.4	1.7	0.02

South: Mississauga Road S

1 LT 2 TR	0.437 0.437	0.0	0.9 0.9	0.0 0.0	0.9 0.9	1.7 1.7	2.1 2.1	2.3	2.9	3.4 3.4	0.05 0.05
East:	Mayfield	d Road E	 3								
1 LT	0.558	0.2	1.3	0.2	1.5	2.7	3.4	3.8	4.7	5.5	0.08
2 TR	0.558	0.2	1.3	0.2	1.5	2.8	3.4	3.8	4.8	5.5	0.08
North 1 LT 2 TR	: Mississ 0.187 0.187	sauga Ro 0.0 0.0	oad N 0.3 0.3	0.0	0.3	0.6 0.6	0.8	0.9	1.0	1.2	0.02

Values printed in this table are back of queue (vehicles).

#### **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Mayfield Road 2018 PM Intersection ID: 1 Roundabout

T 0 10 0	Deg.			,							Queue Stor.
	Satn x	~	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio
		ld Road									
1 LT	0.239	0.0	3.6	0.0	3.6	6.7	8.1	9.2	11.3	13.1	0.02
2 TR	0.239	0.0	3.7	0.0	3.7	6.8	8.3	9.4	11.6	13.5	0.02
South:	: Missi	ssauga R	oad S								
1 LŢ	0.437	0.3	7.4	0.3	7.8	14.1	17.2	19.6	24.2	28.1	0.05
2 TR	0.437	0.3	7.6	0.4	7.9		17.6				
East:	Mayfie	ld Road	 Е								
1 LT	0.558	1.5	10.5	1.8	12.3	21.9	26.8	30.5	37.9	44.1	0.08
2 TR	0.558	1.5	10.4	1.8	12.3	21.8	26.7	30.3	37.7	43.8	0.08
North:	Missi	ssauga R	oad N								
1 LT	0.187	0.0	2.6	0.0	2.6	4.9	6.0	6.7	8.3	9.6	0.02
2 TR	0.187	0.0	2.6	0.0	2.6	4.9	6.0	6.7	8.3	9.6	0.02

Values printed in this table are back of queue (metres).

## Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mov ID	App. Sp  Cruise	eeds  Negn		Speeds  Cruise	Queue M  1st Grn	Move-up 2nd Grn	Av. Sect		Geom Delay (sec)
West: Ma 5L L 2T T 2R R	65.0 65.0	oad W 25.7 39.1 32.5	25.7 39.1 32.5	65.0 65.0 65.0			46.8 52.5 51.4	46.8 52.5 51.4	12.4 5.5 7.1
South: M 3L L 8T T 8R R	65.0 65.0	ga Road 25.7 39.1 32.5	d S 25.7 39.1 32.5	65.0 65.0 65.0	22.2 21.4 21.5		46.1 51.3 50.4	46.1 51.3 50.4	12.4 5.7 7.1

East: May	field R	oad E						
1L L	65.0	25.7	25.7	65.0	19.6	44.7	44.6	12.6
6T T	65.0	39.1	39.1	65.0	19.9	50.3	50.3	5.5
6R R	65.0	32.5	32.5	65.0	19.9	49.2	49.2	6.6
North: M: 7L L	65.0	25.7	25.7	65.0		45.0	45 0	
						45.9	45.9	12.6
4T T 4R R	65.0 65.0	39.1	39.1 32.5	65.0 65.0		50.9 50.1	50.9 50.1	12.6 5.4 6.6

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Mayfield 2018 PM G:\PROJECTS\105163 Mississagua Road Class EA\Sidra\Mississauga Rd EA Aug 14.aap Processed Aug 14, 2009 03:57:26PM

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## **Output Tables**

## Mississauga Road EA

## Mississauga Road and Sandalwood Parkway 2018 AM

#### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout
Driving on the right-hand side of the road
Input data specified in Metric units
Model Defaults: US HCM (Metric)
Peak Flow Period (for performance): 15 minutes
Unit time (for volumes): 60 minutes.
Delay definition: Control delay
Geometric delay included
HCM Delay Model option selected
HCM Queue Model option selected
Level of Service based on: Delay (HCM method)

Queue definition: Back of queue, 95th Percentile

#### **Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

From Approach	To Approach	Mov ID	Turn	Flow LV	Rate HV	Flow Scale	Peak Flow Factor
South: Mi	ssissauga R	oad S					
	East	8R	Right	108	2	1.00	1.00
	North	8T	Thru	249	51	1.00	1.00
East: San	dalwood Par	kway E					4 4
	South North	1L 6R	Left Right		5 2	1.00	1.00
 North: Mi		6R					
 North: Mi	North	6R					

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

#### Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

		Left		Through		ht	
ID		HV	ΓΛ	HV	ΓΛ	HV	
Demand flo				ed by	the pro	gram	
South: Mis	sissaug 0			5.1	0	0	
8R R	0	0	0	0	108	2	
 East: Sand	alwood	 Parkwa	 у Е				
1L L	270	6	- 0	0	0	0	
1L L		6	- 0	0 0	0 113		
1L L 6R R	270 0	6 0 	0 0	0 0			
1L L 6R R  North: Mis	270 0	6 0  a Road	0 0 	0	113	2	

#### Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout -----ID Total %HV Total %HV Total %HV Demand flows in veh/hour as used by the program South: Mississauga Road S 0 0.0 8T T 0 0.0 300 17.0 0 0.0 8R R 0 0.0 0.0 0.0 110 1.8 East: Sandalwood Parkway E 1L L 276 2.2 0 0.0 0 0.0 6R R 0 0.0 0 0.0 115 1.7 0 0.0 North: Mississauga Road N \_\_\_\_\_\_ 7L L 250 2.0 0 0.0 0 0.0 4T T 0 0.0 780 4.0 0 0.0 Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes Flow Rates include effects of Flow Scale and Peak Flow Factor

#### **Table R.O - Roundabout Basic Parameters**

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent

Diam (m)	Width (m)				y Lane s Width (m)	(veh/		_	Incl.	Cap. Constr. Effect	
South:		_									
	conment	: Facto	or: 1.2	20 :	Entry/Cir						
			_	_							
30  East: S	10  Sandalw	50  rood Pa	arkway	E	4.00 						0.96
30  East: S	10  Sandalw conment	50  ood Pa Facto	arkway or: 1.2	E 20 1		culati	ng Flo	w Adjus	tment:	Medium	
30  East: S Envir 30 	10 Sandalw Sonment 10 Missis	50 wood Pa Facto 50 ssauga	arkway or: 1.2 2 Road N	E 20 1	Entry/Cir 4.00	culati 300	ng Flo 17.0	w Adjus 336	tment:	Medium N	0.96
30  East: S Envir 30 	10 Sandalw Sonment 10 Missis	50 wood Pa Facto 50 ssauga	arkway or: 1.2	E 20 1	Entry/Cir 4.00  Entry/Cir	cculati 300 	ng Flo 17.0 	w Adjus 336	tment:	Medium N	

### Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA

2 Dominant

Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout \_\_\_\_\_\_ Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap Type Flow Aver Aver In-Bnch Prop Rate Speed Dist Headway Bunched Hdwy Dist Headway (pcu/h) (km/h) (m) (s) (s) (m) (s) \_\_\_\_\_\_ South: Mississauga Road S Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium Thru 1 Subdominant 250 25.7 102.9 2.00 0.262 4.90 35.1 3.08D 2 Dominant 250 25.7 102.9 2.00 0.262 2 Dominant 250 25.7 102.9 2.00 0.262 4.90 35.1 3.08 Right 2 Dominant 4.38 31.3 2.75 East: Sandalwood Parkway E Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 2.72

Left 1 Dominant 336 39.1 116.3 1.23 0.223 4.25 Right 2 Subdominant 336 39.1 116.3 1.23 0.223 5.32 57.8 North: Mississauga Road N Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium Left 1 Subdominant 275 25.7 93.6 2.00 0.284 4.23 30.2 2.67D 93.6 2.00 0.284 93.6 2.00 0.284 275 25.7 275 25.7 Thru 1 Subdominant 275 4.23 30.2 2.67D

4.23

30.2

2.67

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

#### **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

ID	Demand	1177	m1		Adjust.		_	Spare	Util	Satn
	Flow (veh/h)	HV (%)	Flow (veh/h)	HV (%)	Flow (pcu/h)	•	Satn xp	Cap. (%)	(%)	x
South: M	Mississau	ga Roa	d S							
8T T	300	17.0	250	2.0	250	1354	0.85	284	100	0.222
8R R	110	1.8	250	2.0	250	497	0.85	284	100	0.221
East: Sa 1L L 6R R	andalwood 276 115	Parkw 2.2 1.7	300	17.0 17.0	336	-	0.85	202	100	0.282
					336 	734 	0.85 	443 	100	0.157 
North: M	ississauq				336	734	0.85	443	100	0.157
 North: M 7L L				2.0	275	734  506	0.85	443  72	100	0.157

#### **Table S.3 - Intersection Parameters**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout
  Intersection Level of Service = A
Worst movement Level of Service = B
Average intersection delay (s/pers) = 9.3
Largest average movement delay (s) = 14.2
Largest back of queue, 95% (m) = 31
Performance Index = 33.58
                                                          = 31
= 33.58
= 0.494
   Performance Index
   Degree of saturation (highest)
Practical Spare Capacity (lowest)
                                                              3704
                                                                      72 %
   Effective intersection capacity, (veh/h) =
                                           = 1831
   Total vehicle flow (veh/h)
                                                                 2197
4.73
   Total person flow (pers/h)
   Total vehicle delay (veh-h/h)
                                                                 5.67
   Total person delay (pers-h/h)
   Total effective vehicle stops (veh/h)
Total effective person stops (pers/h)
                                                                  1168
1402
   Total vehicle travel (veh-km/h)
                                                               1174.9
   Total cost ($/h)
                                                                 502.57
   Total fuel (L/h)
                                                                 151.4
   Total CO2 (kg/h)
                                                                 379.41
```

#### **Table S.5 - Movement Performance**

		Total Delay			_		Longest 95% Ba			
10		(veh-h/h)		i) (sec)	~	Rate		(m)		(km/h
South	. Mi:	ssissauga	Road S							
8 T	T	0.60	0.72	7.2	0.44	0.56	1.4	12	5.10	52.
8R	R	0.24	0.29	7.9	0.43	0.60	1.4	12	1.89	51.
East:	San	dalwood Pa	arkway E							
1L	L	1.06	1.28	13.9	0.47	0.75	1.7	13	5.63	46.
6R	R	0.27	0.33	8.6	0.46	0.66	0.8	6	2.06	51.
North:	Mis	ssissauga	Road N							
7L	L	0.98	1.18	14.2	0.56	0.74	4.0	31	5.24	46.
4T	T	1.56	1.87	7.2	0.56	0.59	4.0	31	13.66	51.

**Table S.6 - Intersection Performance** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Sath Delay Delay Delay Queued Stop Queue Index Speed (veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m) (km/h) Delay Delay Queued Stop Queue Index Speed \_\_\_\_\_\_ South: Mississauga Road S 410 0.222 0.84 1.01 7.4 0.44 0.57 12 6.99 East: Sandalwood Parkway E 391 0.282 1.34 1.61 12.3 0.47 0.73 13 7.68 47.9 North: Mississauga Road N 1030 0.494 2.54 3.05 8.9 0.56 0.63 31 18.90 50.2 ALL VEHICLES: 1831 0.494 4.73 5.67 9.3 0.51 0.64 31 33.58 50.1 INTERSECTION (persons): 5.67 9.3 0.51 0.64 33.58 Queue values in this table are 95% back of queue (metres).

# **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

:	Dem Flow	Cap	_			Q u e 95% Ba	ck	Lane
Lane No.	(veh /h)			-	-	(vehs)		Length (m)
South: I	Mississ	auga R	oad S					
1 T	198	894	0.222	7.3	0.57	1.4	12.1	500.0
2 TR	212	957	0.222	7.5	0.58	1.4	11.5	500.0
East: Sa	andalwo	od Par	 kway E					
1 L	276	979	0.282	13.9	0.75	1.7	13.2	500.0
2 R	115	734	0.157	8.6	0.66	0.8	6.4	500.0
North: N	Mississ	auga R	oad N					
1 LT	515	1042	0.494	10.6	0.67	4.0	31.4	500.0
2 T	515	1042	0.494	7.2	0.59	4.0	31.6	500.0

### **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

-----

Lane No.		Thru			(veh		Deg. Satn x	Lane Util %
South: 1 T 2 TR	Missi 0 0	198		198	150 150		0.222	
East: : 1 L 2 R	Sanda] 276 0	wood 0 0	Parkw 0 115	276	150 115	979 734	0.282 0.157	
North: 1 LT 2 T		.ssaug 265 515				1042 1042	0.494 0.494	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util	Satn	Aver. Delay	Stop Rate	95% Back of Queue (veh)	Perf. Index
South: 8T T 8R R	Missis	300	Road S 1354 497		0.222 0.221		0.56 0.60		5.10 1.89
East: S 1L L 6R R	Sandalwo	276	rkway E 979 734			13.9 8.6		1.7 0.8	5.63
North: 7L L 4T T	Mississ	_	Road N 506 1578	100		14.2 7.2			5.24

<sup>\*</sup> Maximum degree of saturation

# Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Mov ID	Fuel Total L/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
South: Missi 8T T 8R R	ssauga Road 30.9 8.1	92.44 27.57	0.107 0.033	6.23 1.67	0.201 0.052	77.8 20.4
	39.0	120.01	0.140	7.90	0.252	98.1

East: Sandalwood Parkway E

6R R		79.35 28.94				
	31.2	108.29	0.131	6.46	0.195	78.1
North: Mississa	uga Road	 d N				
7L L	20.7	72.40	0.087	4.31	0.129	51.7
4T T	60.5	201.87	0.239	12.09	0.384	151.5
	81.2	274.28	0.326	16.40	0.513	203.2
INTERSECTION:	151.4	502.57	0.598	30.76	0.961	379.4
PARAMETERS USED	IN COST	r calcula'	TIONS			
PARAMETERS USEL	O IN COST	r calcula	TIONS			
Pump price c	f fuel	(\$/L)	TIONS		0.900	
Pump price o	of fuel e cost i	 (\$/L) factor		=	0.70	)
Pump price of Fuel resource Ratio of run	of fuel e cost i	(\$/L) factor st to fue		=	0.70	)
Pump price of Fuel resource Ratio of run Average inco	of fuel se cost ining cost	(\$/L) factor st to fue		= =	0.70 3.0 19.00	) ) )
Pump price of Fuel resource Ratio of rum Average inco	of fuel e cost in uning cost ome (\$/h)	(\$/L) factor st to fue.	l cost	= = =	0.70 3.0 19.00 0.40	) ) )
Pump price of Fuel resource Ratio of run Average inco	of fuel e cost in ining cost ome (\$/h) actor e mass	(\$/L) factor st to fue:	l cost	= = = = =	0.70 3.0 19.00 0.40	) ) ) ) 1
Pump price of Fuel resource Ratio of run Average inco	of fuel ee cost ining cos me (\$/h) actor e mass e mass	(\$/L) factor st to fue: (1000 kg) (1000 kg)	l cost	= = =	0.70 3.0 19.00 0.40 1.4	) ) ) ) 1
Pump price of Fuel resource Ratio of run Average inco	of fuel e cost in ing cosme (\$/h) actor e mass e mass e idle f	(\$/L) factor st to fue: (1000 kg) (1000 kg) Fuel rate	l cost	= = = = = =	0.70 3.0 19.00 0.40	0 0 0 0 1 1 0

### Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout Fuel Cost HC CO NOX Rate Rate Rate Rate Mov ID . Rate L/100km \$/km g/km g/km g/km q/km \_\_\_\_\_\_\_ South: Mississauga Road S 8T T 16.4 0.49 0.566 8R R 11.9 0.40 0.488 0.566 33.02 1.062 0.488 24.28 0.754 411.9 296.9 \_\_\_\_\_ 15.2 0.47 0.545 30.69 0.980 East: Sandalwood Parkway E 1L L 12.2 0.43 0.514 25.29 0.757 6R R 11.9 0.40 0.491 24.45 0.758 304.6 298.1 \_\_\_\_\_\_ 12.1 0.42 0.507 25.06 0.758 302.8 North: Mississauga Road N 12.3 0.43 0.518 25.57 0.764 12.3 0.41 0.487 24.62 0.783 7L L 25.57 0.764 306.6 308.6 12.3 0.42 0.495 24.87 0.778 308.1 INTERSECTION: 12.9 0.43 0.509 26.18 0.818 322.9

# **Table S.14 - Summary of Input and Output Data**

Lane No.						%HV	Adj. E Basic Satf. 1:	(secs)	Sat	Delay	Queue	Lane
Sout 1 T 2 TR			198 102	110	ad S 198 212	9				7.5	12 12	500 500
					410				0.222			
	: San 27	6		115	way E 276 115					8.6	13 6	500
	27				391					12.3		
	25	0	265		ad N 515 515	3 4				10.6 7.2	31 32	500 500
	25	o	780	0	1030	3			0.494	8.9	32	
ALL Y	JEHIC:	LES	=====		Total Flow 1831				Max X 0.494	Aver. Delay 9.3	Queue	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

ID Typ	(veh	Cap.	of			Longest 95% Ba (vehs)	ck
 South: Mississa	auga Roa	d S					
8T T ,	_		0.222	7.2	A	1.4	12
8R R	110	497		7.9		1.4	
East: Sandalwoo 1L L 6R R	276	4	0.282 0.157	13.9 8.6		1.7 0.8	13 6
North: Mississa	auga Roa	 d N					
7L L	250	506	0.494*	14.2	В	4.0	31
4T T	780	1578	0.494*	7.2	A	4.0	31
ALL VEHICLES:	1831		0.494	9.3	 А	4.0	31

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

\* Maximum v/c ratio, or critical green periods

<sup>&</sup>quot; Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

From	То		Negn	Negn	Negn	Appr. Dist.	Downstre	am Distance
Approach		Turn	Radius (m)	(km/h)	(m)	(m)	(m)	User Spec?
South: Mis	ssissauga	Road S						
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Sand	dalwood Pa	rkway E						
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mis	ssissauga	Road N						
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

# **Table D.1 - Lane Delays**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

Lane No.	Deg. Satn x	-	line 2nd	Delay	Acc. Dec.		ing MvUp	Stopd		Control dic
South:	Mississ	auga F	Road S	 3						
1 T	0.222 0.222	1.5	0.0	1.5						
East: S	Sandalwo	od Par	kway	E						
	0.282 0.157						0.0	0.0		13.9 8.6
North:	Mississ	auga F	oad N	1						
	0.494 0.494									10.6
dn is	average	stop-	start	delay	for a	 ll vehi	cles	queued	and u	inqueued

### **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

Lane No.	Deg. Satn x		fectiv he2	Geom.	Rate Overall h	-	Move-up Rate hqm
South: 1 T 2 TR	Missi 0.222 0.222	0.32	0.00	0.25	0.57 0.58	0.440 0.433	0.00
1 L	Sandal 0.282 0.157	0.38	0.00	0.38	0.75 0.66	0.473 0.464	
North: 1 LT 2 T	Missi: 0.494 0.494	0.41	0.00	N 0.25 0.20	0.67 0.59	0.560 0.560	0.00

hig is the average value for all movements in a shared lane  $% \left( 1\right) =\left( 1\right) \left( 1\right)$ 

 $\ensuremath{\mathsf{hqm}}$  is average queue move-up rate for all vehicles queued and unqueued

# Table D.3A - Lane Queues (veh)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

T	Deg.	n Queue		ge (veh)			Percen	tile (v	eh)		Queue Stor. Ratio
Lane No.	Satn x		Nb1	Nb2	Nb	70%	85%	90%	95%	98%	
South:	Missi	ssauga Ro	oad S								
1 T	0.222	0.0	0.4	0.0	0.4	0.8	1.0	1.1	1.4	1.6	0.02
2 TR	0.222	0.0	0.4	0.0	0.4	0.8	1.0	1.1	1.4	1.6	0.02
East:	Sandal	wood Parl	 kway E								
1 L	0.282	0.0	0.5	0.0	0.5	1.0	1.2	1.4	1.7	2.0	0.03
2 R	0.157	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.8	1.0	0.01
North:	Missi	ssauga Ro	oad N								
		0.0	1.3	0.0	1.3	2.3	2.9	3.2	4.0	4.7	0.06
2 T	0.494	0.0	1.3	0.0	1.3	2.3	2.9	3.2	4.0	4.7	0.06

Values printed in this table are back of queue (vehicles).

# **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3

Roundabout

Lane	Deg. Satn	Ovrfl. Queue No		ge (metr		Percentile (metres)					Queue - Stor.
No.	x		Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio
		ssauga R									
1 T	0.222	0.0	3.8	0.0	3.8	7.1	8.6	9.8	12.1	14.0	0.02
2 TR	0.222	0.0	3.6	0.0	3.6	6.8	8.3	9.4	11.5	13.4	0.02
East:	Sandal	wood Parl	kway E								
1 L	0.282	0.0	4.2	0.0	4.2	7.8	9.4	10.7	13.2	15.3	0.03
2 R	0.157	0.0	2.0	0.0	2.0	3.8	4.6	5.2	6.4	7.4	0.01

North: Mississauga Road N

1 LT	0.494	0.0	10.1	0.0	10.1	18.2	22.3	25.3	31.4	36.5	0.06
2 T	0.494	0.0	10.2	0.0	10.2	18.3	22.4	25.5	31.6	36.7	0.06

Values printed in this table are back of queue (metres).

# Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 AM Intersection ID: 3 Roundabout

	7 C		m	0	~	Move-up	7 C+	C	G =
Mov	App. Sp	eeas		speeds		2nd	Av. Sect	-	Geom Delay
ID	Cruise	Negn	Negn	Cruise	Grn	Grn	Running	Overall	(sec)
South: 1	Mississau	ga Road	d S						
8T T	65.0	39.1	39.1	65.0			52.6	52.6	5.8
8R R	65.0	32.5	32.5	65.0			51.6	51.6	6.6
East: Sa	andalwood	Parkwa	 ау Е						
1L L	65.0	25.7	25.7	65.0			46.7	46.7	12.4
6R R	65.0	32.5	32.5	65.0			51.3	51.3	6.6
North: N	 Mississau	ga Road	1 N						
7L L	65.0	25.7	25.7	65.0			46.3	46.3	12.4
4T T	65.0	39.1	39.1	65.0			51.6	51.6	5.4

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Sandalwood 2018 AM G:\PROJECTS\105163 Mississauga Road Class EA\Sidra\Mississauga Rd EA Aug 14.aap Processed Aug 14, 2009 03:57:26PM

A1492, AECOM, Small Office

Produced by SIDRA Intersection 3.2.2.1563

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# **Output Tables**

# Mississauga Road EA

# Mississauga Road and Sandalwood Parkway 2018 PM

#### **Run Information**

### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

From	To	Mov		Flow	Rate	Flow	Peak Flow
Approach	Approach	ID	Turn	LV	HV	Scale	Factor
South: M	ississauga R	oad S					
	East	8R	Right	397	8	1.00	1.00
	North	8T	Thru		136	1.00	1.00
	 ndalwood Par						<u></u>
	South	1L	Left	328	.7	1.00	1.00
	North	6R	Right		5	1.00	1.00
North: M:	ississauga R	oad N					
	South	4 T	Thru	346	14	1.00	1.00
	East	7L	Left	118	2	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

### Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout Mov Left Through Right ID \_\_\_\_\_ LV HV LV HV LV HV \_\_\_\_\_\_ Demand flows in veh/hour as used by the program South: Mississauga Road S 8T T 0 0 664 136 0 8R R 0 0 0 0 397 0 8 East: Sandalwood Parkway E st: Sandalwood Parkway E

1L L 328 7 0 0 0 0

6R R 0 0 0 0 240 5 North: Mississauga Road N  $$^{7L}\ L$$  118 2 0 0 0 0 0 4T T 0 0 346 14 0 0 \_\_\_\_\_ Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes Flow Rates include effects of Flow Scale and Peak Flow Factor

# Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

Mov ID	Lef	t	Thro	ugh	Righ	t
10	Total %HV		Total	%HV	Total	%HV
Demand flow South: Miss				d by th	ie progra	m
8T T	0	0.0	800	17.0	0	0.0
8R R	0	0.0	0	0.0	405	2.0
East: Sanda	lwood P	arkway	E			
1L L	335	2.1	0	0.0	0	0.0
6R R	0	0.0	0	0.0	245	2.0
North: Miss	issauga	Road N				
7L L	120	1.7	0	0.0	0	0.0
4T T	0	0.0	360	3.9	0	0.0

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

### **Table R.O - Roundabout Basic Parameters**

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

```
Island Width Diam. Circ. Entry Lane
                                    Flow %HV Adjust. %Exit Cap.
                                                                      0-D
 Diam
                  Lanes Lanes Width (veh/
                                                Flow Incl. Constr. Factor
                                                (pcu/h)
 (m)
             (m)
                  (m)
                                     h)
                                                        Effect
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 120 2.0 120 0 N 0.984
East: Sandalwood Parkway E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
  30 10 50 2 2 4.00 800 17.0 896 0 N 0.903
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 335 2.0 335 0 N 0.942
```

### **Table R.1 - Roundabout Gap Acceptance Parameters**

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Turn Lane Lane ---- Circulating/Exiting Stream ---

	e Cir e Flow A				-	Foll-up	
	Rate S	peed Dist km/h) (m)	Headway :	Bunched	Hdwy	Dist	Headway
South: Mississa Environment F	-	Entry/Circ	culating :	Flow Adjus	tment:	Medium	
Thru 1 Subdomi				0.136			2.96
	t 120						
Right 2 Dominan	t 120	25.7 214.5	2.00	0.136	4.18	29.9	2.55
East: Sandalwoo Environment F	actor: 1.20						
Left 1 Dominan							
Right 2 Subdomi	nant 896	39.1 43.6	1.30	0.513	3.86	41.9	2.72
North: Mississa Environment F Left 1 Subdomi Thru 1 Subdomi 2 Dominan	actor: 1.20 nant 335 nant 335	25.7 76.8 25.7 76.8	2.00	0.335	4.25 4.26	30.4	2.72D

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

### **Table S.2 - Movement Capacity Parameters**

Mov

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

ID	Demand	1177	<b>7</b> 1		Adjust.	-	-	-	Util	Satn
	Flow (veh/h)				Flow (pcu/h)			-	(%)	х
South:	Mississau	ga Roa	ad S							
8T T	800	17.0	120	2.0	120	1509	0.85	60	100	0.530
8R R	405	2.0	120	2.0	120	764	0.85	60	100	0.530
	Sandalwood		-							
1L L		2.1	800		896 896			81 121		0.469 0.385
1L L 6R R	335	2.1	800 800							
1L L 6R R	335 245 Mississau	2.1 2.0  ga Roa	800 800 	17.0		636	0.85	121		

#### **Table S.3 - Intersection Parameters**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout
   Intersection Level of Service = A
Worst movement Level of Service = B
Average intersection delay (s/pers) = 9.4
Largest average movement delay (s) = 17.3
Largest back of queue, 95% (m) = 39
Performance Index = 42.35
   Degree of saturation (highest) = 42.35
Practical Spare Capacity (lowest) = 60
Effective intersection capacity (1)
   Effective intersection capacity, (veh/h) = 60 %

Total vehicle flow (veh/h) = 2005
   Total person flow (pers/h)
                                                                     2718
   Total vehicle delay (veh-h/h)
                                                                   5.89
7.07
   Total person delay (pers-h/h)
                                                                    1472
   Total effective vehicle stops (veh/h) =
   Total effective person stops (pers/h)
                                                                      1767
                                                                 1442.3
   Total vehicle travel (veh-km/h)
   Total cost ($/h)
                                                                  638.60
   Total fuel (L/h)
                                                                    196.9
   Total CO2 (kg/h)
                                                                    493.82
```

# **Table S.5 - Movement Performance**

Mov		Total Delay (veh-h/h)	Delay	Delay (sec)	Queued	Stop Rate	95% Ba	ack (m)	Index	Spe
South	: M:	ississauga	Road S							
8T	T	1.50	1.80	6.8	0.43	0.51	4.8	39	13.64	52
8R	R	0.83	1.00	7.4	0.41	0.55	4.8	39	6.95	51
East:	Sar	ndalwood P	 arkway E							
1L	L	1.61	1.93	17.3	0.73	0.97	3.4	26	7.97	44
6R	R	0.77	0.92	11.3	0.70	0.88	2.4	19	5.10	49
North	 : Мі	.ssissauga	Road N							
7L	L	0.47	0.56	14.1	0.52	0.74	1.8	14	2.49	46
4 T	Т	0.71	0.86	7.1	0.52	0.59	1.8	14	6.21	51

**Table S.6 - Intersection Performance** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

Flow	Satn	Total Delay (veh-h/h)	Delay	Delay	Queued	Stop	Queue	Index	Speed
		sauga Road 2.33	2.80				39		
	0.469	ood Parkway 2.37	y E 2.85	14.7					
480	Mississ 0.254	sauga Road 1.18	N 1.42	8.9					
ALL VEH 2265	ICLES: 0.530	5.89	7.07	9.4	0.52	0.65	39	42.35	50.2
INTERSE	CTION (	(persons):							
Queue v	alues i	n this tak	ole are 9	5% bacl	of que	ue (me	etres).		

### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

Lane	Dem Flow (veh	(veh		Delay	Stop	Que 95% Ba  (vehs)	.ck	Lane Length (m)
110.	/ 11/	/ 11/	Δ.	(300)	Macc	( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	(111)	(111)
South: M	iccicc	21102 P						
				C 0	0 F1	4 . 7	41 0	E00 0
1 T						4.7		
2 TR	637	1202	0.530	7.1	0.53	4.8	39.0	500.0
East: Sa	ndalwo	od Par	kway E					
1 L	335	715	0.468	17.3	0.97	3.4	26.1	500.0
2 R	245	636	0.385	11.3	0.88	2.4	18.9	500.0
North: M	ississ	auga R	oad N					
1 LT		944		10.6	0.66	1.8	13.7	500.0
2 Т		943			0.59			500.0
2 1	240	743	0.234	/ • ±	0.09	1.0	13.0	300.0

# **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

\_\_\_\_\_

Lane Util
% 
100
100
100
100
100
100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util	Deg. Satn x	Aver. Delay (sec)			Perf. Index
South:	Missis	sauga	Road S						
8T T		800	1509	100	0.530*	6.8	0.51	4.8	13.64
8R R		405	764	100	0.530*	7.4	0.55	4.8	6.95
East: S	Sandalw	ood Pa	arkway E						
1 L L		335	715	100	0.469	17.3	0.97	3.4	7.97
6R R		245	636	100	0.385	11.3		2.4	5.10
7 70		243	636	100	0.363	11.3	0.00	2.4	3.10
Month.			Dood N						
North:	MISSIS	_							
7L L		120	472	100	0.254	14.1			2.49
4T T		360	1415	100	0.254	7.1	0.59	1.8	6.21

<sup>\*</sup> Maximum degree of saturation

# Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

Mov	Fuel	Cost	HC	CO	NOX	CO2
ID	Total L/h	Total \$/h	Total kg/h	Total kg/h	Total kg/h	Total kg/h
South: Missi	issauga Road	. S				
8T T	82.2	245.92	0.284	16.54	0.533	206.9
8R R	29.9	101.24	0.123	6.10	0.190	74.8
	112.1	347.16	0.407	22.64	0.723	281.6

East: Sandalwood Parkway E

1L L 6R R		100.06 64.21				
	47.2	164.27	0.199	9.92	0.297	118.1
North: Mississa	uga Road	i N				
7L L 4T T	27.7	34.64 92.54	0.109	5.50		
		127.17			0.237	94.1
INTERSECTION:	196.9	638.60	0.757	40.12	1.257	493.8
PARAMETERS USEC						
Pump price o	f fuel	(\$/L)		=	0.900	)
Fuel resourc				=	0,0	
Ratio of run Average inco	_		l cost		3.0 19.00	
Time value f					0.40	
Light vehicl						)
-	e mass (	(1000 ka)		_	1.4	
Heavy venici		(1000 kg) (1000 kg)			1.4 11.0	
Light vehicl	e mass (	1000 kg)		=	11.0	
	e mass ( e idle f	1000 kg) uel rate	(L/h)	=	11.0 1.350	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout CO NOX Rate Rate Cost Fuel HC CO2 Mov ID Rate Rate Rate Rate Rate L/100km \$/km g/km g/km g/km South: Mississauga Road S 8T T 16.3 0.49 0.564 32.86 1.058 410.9 8R R 11.8 0.40 0.487 24.16 0.751 296.1 ------14.8 0.46 0.538 29.95 0.956 372.5 East: Sandalwood Parkway E 
 1L L
 12.5
 0.44
 0.534
 26.35
 0.781

 6R R
 12.3
 0.42
 0.515
 25.94
 0.791
 313.5 308.9 12.5 0.43 0.526 26.19 0.785 311.7 North: Mississauga Road N 7L L 12.2 0.43 4T T 12.2 0.41 0.516 25.44 0.761 0.482 24.27 0.775 305.7 306.3 \_\_\_\_\_\_ 12.2 0.41 0.491 24.58 0.771 306.1 INTERSECTION: 13.6 0.44 0.525 27.82 0.872 342.4

# Table S.14 - Summary of Input and Output Data

Lane	Dema	ind Fl	ow (v			Eff Grn (secs)				
	L	T	R			1st 2nd		_		
South:	Miss	issau	ga Ro	ad S		 				
1 T					17				41	500
2 TR		232	405	637	7	 	0.530	7.1	39	500
	0	800	405	1205	12		0.530	7.0	41	
East:	Sanda	lwood	Park	 way E		 				
1 L	335			335	2		0.468	17.3	26	500
2 R				245	2	 	0.385	11.3	19	500
	335	0		580	2		0.468	14.7	26	
North:	Miss	issau	ga Ro	ad N		 				
1 LT	120	120		240	3		0.254	10.6	14	500
2 T		240		240	4.		0.254	7.1	14	500
	120	360	0	480	3.		0.254	8.9	14	
ALL VE	===== HICLE	===== S	_====	Total	===== %		Max	Aver.	Max	
				Flow	HV		X	Delay	Queue	
				2265	8		0.530	9.4	39	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

Mov ID	Mov Typ	Flow (veh	•	5	Aver. Delay (sec)		Longest 95% Ba (vehs)	ck
South:	Mississa	uga Roa	 d S					
8T T		800	1509	0.530*	6.8	A	4.8	39
8R R		405	764	0.530*	7.4	A	4.8	39
East: S	andalwoo	d Parkwa	 av E	·				
_			-	0.469	17.3	В	3.4	26
.6R R				0.385.	11.3	, B	2.4	19
North:	 Mississa		 d N					
7L L		120	472	0.254	14.1	В	1.8	14
4T T		360	1415	0.254	7.1	A	1.8	14
ALL VE	HICLES:	2265		0.530	9.4	 А	4.8	39

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

\* Maximum v/c ratio, or critical green periods

<sup>&</sup>quot; Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

From To			Negn Radius	Negn	Negn Dist.	Appr. Dist.	Downstream	Distance
	proach		(m)	(km/h)	(m)	(m)	(m)	User Spec?
South: Missi	ssauga	Road S						
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Sandal	wood Pa	rkway E						
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Missi	ssauga :	Road N						
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

# **Table D.1 - Lane Delays**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

Lane No.	Deg. Satn x	1st	2nd d2	Delay Total dSL	Acc. Dec. dn	Queu: Total	ing MvUp dqm	Stopd (Idle) di	Geom dig	dic
South:	Mississ	auga R								
1 T	0.530	1.0	0.0	1.0	2.8	0.0	0.0	0.0	5.8	6.8
	0.530								6.3	7.1
	Sandalwo									
1 L	0.468	4.0	0.8	4.9	3.6	1.3	0.8	0.5	12.4	17.3
	0.385								6.6	11.3
	Mississ									
1 LT	0.254	1.7	0.0	1.7	3.0	0.0	0.0	0.0	8.9	10.6
2 T	0.254	1.7	0.0	1.7	3.4	0.0	0.0	0.0	5.4	7.1
dn is	average	stop-	start	delay	for a	ll vehi	cles	queued	and u	ınqueued

### **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

\_\_\_\_\_

Lane No.	Deg. Satn x			_	Rate Overall h	-	Move-up Rate hqm
1 T	Missi 0.530 0.530	0.26	0.00		0.51 0.53	0.431	
1 L	Sandal 0.468 0.385	0.73	0.04	0.19	0.97	0.732 0.704	
1 LT	Missi 0.254 0.254	0.39	0.00		0.66	0.520 0.520	0.00

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued

# Table D.3A - Lane Queues (veh)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

T	Deg.	Ovrfl.		ge (veh)		Percentile (veh)					Queue
Lane No.	Satn x	Queue - No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Stor. Ratio
South:	: Missi	ssauga R	oad S								
1 T	0.530	0.0	1.5	0.0	1.5	2.7	3.4	3.8	4.7	5.5	0.08
2 TR	0.530	0.0	1.6	0.0	1.6	2.8	3.4	3.9	4.8	5.6	0.08
East:	Sandal	wood Par	kway E								
1 L	0.468	0.1	1.0	0.1	1.1	2.0	2.4	2.7	3.4	3.9	0.05
2 R	0.385	0.0	0.7	0.0	0.8	1.4	1.7	2.0	2.4	2.8	0.04
North:	Missi	ssauga R	oad N								
1 LT	0.254	0.0	0.6	0.0	0.6	1.0	1.3	1.4	1.8	2.0	0.03
2 T	0.254	0.0	0.6	0.0	0.6	1.0	1.3	1.4	1.8	2.0	0.03

Values printed in this table are back of queue (vehicles).

# **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

T	Deg.	Ovrfl.	Avera	ge (met:	•	Percentile (metres)					Queue Stor.
Lane No.	Satn x	Queue - No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio
South	: Missi	ssauga R	oad S								
1 T	0.530	0.0	13.4	0.0	13.4	23.8	29.2	33.2	41.2	47.9	0.08
2 TR	0.530	0.0	12.7	0.0	12.7	22.5	27.6	31.4	39.0	45.3	0.08
East:	Sandal	wood Pari	kway E								
1 L	0.468	0.9	7.5	0.9	8.4	15.2	18.6	21.1	26.1	30.3	0.05
2 R	0.385	0.4	5.7	0.3	6.0	11.0	13.5	15.3	18.9	21.9	0.04

North: Mississauga Road N

1 LT	0.254	0.0	4.3	0.0	4.3	8.0	9.8	11.1	13.7	15.9	0.03
2 T	0.254	0.0	4.4	0.0	4.4	8.1	9.9	11.2	13.8	16.0	0.03

Values printed in this table are back of queue (metres).

# Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2018 PM Intersection ID: 3 Roundabout

Mov ID	App. Sp				 1st	Move-up  2nd Grn	Av. Sect		Geom Delay (sec)
South: M	ississau	ga Roac	1 S						
8T T	65.0	39.1	39.1	65.0			52.7	52.7	5.8
8R R	65.0	32.5	32.5	65.0			51.7	51.7	6.6
East: Sa	ndalwood	Parkwa	 цу Е						
1L L	65.0	25.7	25.7	65.0	17.8		44.9	44.5	12.4
6R R	65.0	32.5	32.5	65.0	17.2		49.3	49.1	6.6
North: M:	ississau	ga Roac	l N						
7L L	65.0	25.7	25.7	65.0			46.5	46.5	12.4
4T T	65.0	39.1	39.1	65.0			51.9	51.9	5.4

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Sandalwood 2018 PM G: $\PROJECTS\105163$  Mississauga Road Class EA\Sidra\Mississauga Rd EA Aug 14.aap Processed Aug 14, 2009 03:57:26PM

A1492, AECOM, Small Office

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# **Output Tables**

# Mississauga Road EA

# Mississauga Road and Wanless Road 2018 AM

#### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout
Driving on the right-hand side of the road
Input data specified in Metric units
Model Defaults: US HCM (Metric)
Peak Flow Period (for performance): 15 minutes
Unit time (for volumes): 60 minutes.
Delay definition: Control delay
Geometric delay included
HCM Delay Model option selected
HCM Queue Model option selected
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

# Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

From	To	Mov		Flow	Rate	Flow	Peak Flow
Approach	Approach	ID	Turn	LV	HV	Scale	Factor
West: Wan	less Road W				٠.		., .
	South	2R	Right	5	. 0	1.00	1.00
	East	2T	Thru	137	3	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mi	ssissauga R	oad S					
	West		Left	10	0	1.00	1.00
	East	8R	Right	73	2	1.00	1.00
	North	8T	Thru	158	32	1.00	1.00
East: Wan	less Road E						
	West	6T	Thru	368	7	1.00	1.00
	South	1L	Left	309	6	1.00	1.00
	North	6R	Right	10	0	1.00	1.00
North: Mi	ssissauga R	oad N					
	West	4R	Right	34	1	1.00	1.00
	South	4T	Thru	749	31	1.00	1.00
	East	7L	Left	150	5	1.00	1.00

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

Mov		I	Left	Th	rough	Rig	ht
ID		ΓΛ	HV	LV	HV	TA	HV
			veh/hour	as	used by	the pro	gram
West:	Wanles	s Ro	oad W				
5L	_	5	1	0	0	0	0
	T	0	- 0	137	3	0	0
2R	R	0	0	0	0	. 5	1
South:	: Missi	ssau	ıga Road S	- <b></b> -			
			1	0	0	0	0
81	T	0	0	158	32	0	0
8R	R·	0	0	0	0	73	2
 East:	Wanles	s Ro	ad E				
1L	L :	309	6	0	0	0	0
6T	T	0	0	368	7	0	0
6R	R	0	0	0	0	10	1
North:	Missis	ssau	ıga Road 1	1			
7L	L :	150	5	0	0	0	0
$4\mathrm{T}$	T	0	0	749	31	0	0
4R	R	0	0	Ö	. 0	34	1

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

Mov	Lei	Et	Thro	ugh	Rig	ht
ID	Total	%HV	Total	%HV	Total	VH%
Demand flo	ws in ve	eh/hour	as use	d by th	e progr	am
West: Wanl	ess Road	W f				
5L L	6	16.7	Ó	0.0	0	0.0
2T T	0	0.0	140	2.1	0,	0.0
2R R	0 .	0.0	0	0.0	6	16.7
South: Miss	sissauga	Road	s			
3L L				0.0	. 0	0.0
8T T	0	0.0	190	16.8	0	0.0
8R R	0	0.0	0	0.0	75	2.7
 East: Wanle	ess Roac	 i E				
1L L	315	1.9	0	0.0	0	0.0
6T T	0		375		0	0.0
6R R	0	0.0	0	0.0	11	9.1
North: Miss	sissauga	Road	N			
7L L			0	0.0	0	0.0
4T T			780		0	
			0		35	

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout
                                   Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) h) (pcu/h) Effect
West: Wanless Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 1250 3.4 1251 0 N 0.793
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 300 2.5 300 0 N
East: Wanless Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 205 15.9 228 0 N 0.974
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 700 2.0 700 0 N 0.930
```

#### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
No. Type Flow Aver Aver In-Bnch Prop ------
                   Rate Speed Dist Headway Bunched Hdwy Dist Headway
                  (pcu/h) (km/h) (m) (s)
                                                       , (s)
West: Wanless Road W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1251 34.1 27.2 1.27 0.635 3.85 36.4
                                 27.2 1.27
27.2 1.27
                                                0.635
0.635
                                                           3.45
Thru 1 Subdominant 1251
                            34.1
                                                                    32.6
                                                                            2.53
2 Dominant 1251 34.1 27.2 1.27 0.635 3.23
Right 2 Dominant 1251 34.1 27.2 1.27 0.635 3.61
                                                                   30.6
                                                                            2.38
_____
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 300 32.0 106.6 1.52 0.242 4.48 39.8 Thru 1 Subdominant 300 32.0 106.6 1.52 0.242 4.81 42.8
                                                                            2.85D
                                                                            3.06D
2 Dominant 300 32.0 106.6 1.52 0.242
Right 2 Dominant 300 32.0 106.6 1.52 0.242
                                                           4.81
                                                                  38.2
                                                          4.30
                                                                          2.73
          _____
East: Wanless Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 228 38.1 167.3 1.25 0.159 4.34 46.0 Thru 1 Subdominant 228 38.1 167.3 1.25 0.159 4.34 46.0
                                                                            2.72D
                                                                            2.72D
2 Dominant 228 38.1 167.3 1.25
Right 2 Dominant 228 38.1 167.3 1.25
                                               0.159
0.159
                                                          4.34
                                                                   46.0
                                                                            2.72
                                                                 47.9
                                                                          2.83
                                                          4.52
```

North: Mississauga Road N Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium Left 1 Subdominant 700 32.9 47.0 1.03 0.355 3.82 2.61 Thru 1 Subdominant 700 32.9 47.0 1.03 0.355 3.82 34.9 2.61 2 Dominant 700 700 32.9 47.0 1.03 0.355 47.0 1.03 0.355 3.78 2.58 34.6 Right 2 Dominant 32.9 3.78 34.5 2.58

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

# **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

Mov	Demand Flow	HV	Flow	HV	Adjust.	Cap. (veh	Deg. Satn	Prac. Spare Cap.	Lane Util	Deg. Satn
	(veh/h)	(왕)	(veh/h)	(용)	(pcu/h)	/h)	xp	(용)	(용)	X
West: W	anless Ro	ad W								
5L L 2T T 2R R	6 140 6	16.7 2.1 16.7	1250 1250 1250	3.4 3.4 3.4	1251 1251 1251	40 944 40	0.85 0.85 0.85		100 100 100	0.150 0.148 0.150
South:	Mississau	ga Roa	ad S							
3L L 8T T 8R R	11 190	9.1 16.8 2.7	300 300	2.5 2.5 2.5	300 300 300	73 1253 495	0.85 0.85 0.85	464 461 461	100 100 100	0.151 0.152 0.152
East: W	anless Ro	ad E								
1L L 6T T 6R R	315 375 11	1.9 1.9 9.1	205 205 205	15.9 15.9 15.9	228 228 228	962 1145 34	0.85 0.85 0.85	160 160 163	100 100 100	0.327 0.328 0.324
North:	Mississau	ga Roa	id N							
7L L 4T T 4R R	155	3.2 4.0 2.9	700 700 700	2.0 2.0 2.0	700 700 700	257 1292 58	0.85 0.85 0.85	41 41 41	100 100 100	0.603 0.604 0.603

### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

```
Intersection Level of Service = B
Worst movement Level of Service = B
Average intersection delay (s/pers) = 10.2
Largest average movement delay (s) = 17.5
Largest back of queue, 95% (m) = 39
Performance Index = 41.28
```

Degree of saturation (highest)	=	0.604	
Practical Spare Capacity (lowest)	= .	41 %	
Effective intersection capacity, (veh/h)	-	3477	
Total vehicle flow (veh/h)	=	2099	
Total person flow (pers/h)	=	2519	
Total vehicle delay (veh-h/h)	=	5.98	
Total person delay (pers-h/h)	=	7.17	
Total effective vehicle stops (veh/h)	= .	1621	
Total effective person stops (pers/h)	=	1945	
Total vehicle travel (veh-km/h)	=	1342.3	
Total cost (\$/h)	=	568.55	
Total fuel (L/h)	=	169.6	
Total CO2 (kg/h)	==	424.74	
· · · · · · · · · · · · · · · · · · ·			

### **Table S.5 - Movement Performance**

Mov		Total Delay (veh-h/h)		Delay	Queued	Stop	95% Ba	ck	Index	
West:	Wan	less Road	w							
5L	L	0.03	0.03	17.5	0.73	0.92	0.9	7	0.14	44.
2T	T	0.40	0.48	10.3	0.74	0.84	0.9	7	2.92	50.
2R	R	0.02	0.02	11.1	0.74	0.88	0.9	7	0.13	49.
South	 : Mi	ssissauga	Road S							
		0.04		13.9	0.42	0.72	0.8	7	0.22	46
8T	Т	0.38	0.46	7.2	0.42	0.57	0.8	7	3.18	52
8R	R	0.17	0.20	8.0	0.42	0.61	0.8	7	1.28	51
 East:	Wan	less Road	E							
1L	L	1.18	1.42	13.5	0.42	0.71	2.1	16	6.31	46.
<b>6</b> T	T	0.67	0.81	6.5	0.42	0.54	2.1	16	6.15	52
6R	R	0.02	0.03	7.7	0.42	0.61	2.1	17	0.19	51
North:	Mi	ssissauga	Road N							
		0.74		17.2	0.73	0.99	4.9	39	3.72	44
4 T		2.21		10.2	0.73	0.91	4.9			
4R			0.13	11.3	0.73				0.74	

# **Table S.6 - Intersection Performance**

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

Flow	Satn ) x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
	Wanless	Road W	0.54						
		sauga Road 0.59	0.71	7.7	0.42	0.58	7	4.68	52.2
		1.88	2.25						49.8
970	Mississ 0.604	sauga Road 3.06		11.4	0.73	0.93	39	20.76	
ALL VE	HICLES:		7.17						

INTERSECTION (persons):
2519 0.604 7.17 10.2 0.59 0.77 41.28 49.8

Queue values in this table are 95% back of queue (metres).

# **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

Lane (v	em ow Cap eh (veh /h) /h)	Satn	Delay	Stop	ack	Length
West: Wanle	as Pood W				 	
	72 487	0.148				
South: Miss: 1 LT 1: 2 TR 1:	34 881	0.152				
	ss Road E 51 1071 50 1070	0.327				
North: Miss 1 LT 48 2 TR 48	82 798	0.604				

# **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

Lane No.					Cap (veh	(veh	Deg. Satn x	Util
1 LT	Wanles 6 0	66	0					
1 LT	: Missi 11 0	123	0	134	134 142			
1 LT	Wanles 315 0	36	0		150 150			
North: 1 LT 2 TR			0	482	150 150			

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

Mov	Mov Typ	Dem Flow		Lane Util	_	Aver. Delay		95% Back of	
		(veh /h)		(%)	x	(sec)	Rate	Queue (veh)	
est: W	anless	Road	w						
5L L		6	40	100	0.150	17.5	0.92	0.9	0.14
2T T			944		0.148			0.9	
2R R		6	40	100	0.150	. 11.1	0.88	0.9	0.13
outh:	Mississ	sauga	Road S						
3L L		11	73	100	0.151	13.9	0.72	0.8	0.22
8T T			1253		0.152	7.2	0.57	0.8	3.18
8R R		75	495	100	0.152	8.0	0.61	0.8	1.28
ast: W	anless	Road	 Е						
1L L		315	962	100	0.327	13.5	0.71	2.1	6:31
6T T		375	1145	100	0.328	6.5	0.54	2.1	6.15
6R R		11	34	100	0.324	7.7	0.61	2.1	0.19
orth:	Mississ	auga	Road N						
7L L		_	257	100	0.603	17.2	0.99	4.9	3.72
4T T		780	1292	100	0.604*	10.2	0.91	4.9	16.30
4R R		35	58	100	0.603	11.3	0.94	4.9	0.74

<sup>\*</sup> Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA

Mississauga Road and Wanless Road 2018 AM

Intersection ID: 2

Roundabout

Mov	Fuel	Cost		CO	NOX	CO2
ID	Total L/h		Total kg/h			
West: Wanles:	s Road W					
5L L	0.5	1.74	0.002	0.10	0.003	1.2
2T T	10.6	36.12	0.043	2.16	0.067	26.5
2R R	0.4	1.52	0.002	0.09	0.003	1.1
	11.5	39.38	0.047	2.35	0.073	28.8
 South: Missi			0.047	2.35	0.073	28.8
South: Missis		S				
	 ssauga Road	s 3.15	0.004	0.19	0.006	2.3
3L L	ssauga Road 0.9	3.15 58.36	0.004 0.067	0.19 3.92	0.006 0.126	2.3 49.1
3L L 8T T	ssauga Road 0.9 19.5 5.7	3.15 58.36	0.004 0.067 0.023	0.19 3.92 1.17	0.006 0.126 0.036	2.3 49.1
3L L 8T T 8R R	ssauga Road 0.9 19.5 5.7  26.1	S 3.15 58.36 19.09	0.004 0.067 0.023	0.19 3.92 1.17	0.006 0.126 0.036	2.3 49.1 14.3
3L L 8T T 8R R	ssauga Road 0.9 19.5 5.7  26.1	S 3.15 58.36 19.09	0.004 0.067 0.023 0.094	0.19 3.92 1.17	0.006 0.126 0.036 0.168	2.3 49.1 14.3
3L L 8T T 8R R East: Wanless	ssauga Road 0.9 19.5 5.7 26.1	3.15 58.36 19.09	0.004 0.067 0.023 0.094	0.19 3.92 1.17 5.28	0.006 0.126 0.036 0.168	2.3 49.1 14.3 65.6

North: Mississau 7L L 4T T 4R R	uga Road 13.5 62.4 2.7 78.6	47.07 207.81 9.19	0.057 0.250 0.011	2.86 12.84 0.57	0.085 0.401 0.017	33 156 6
7L L 4T T 4R R	13.5 62.4 2.7 78.6	47.07 207.81 9.19	0.250 0.011  0.318	12.84	0.401 0.017	156 6
4T T 4R R -	62.4 2.7  78.6	207.81 9.19	0.250 0.011  0.318	12.84	0.401 0.017	156 6
4R R .	2.7  78.6	9.19	0.011	0.57	0.017	6 
	78.6		0.318			
INTERSECTION:			0.318			
INTERSECTION:	169.6					196
		568.55		34.58		424
Pump price of					0.900	
Fuel resource				=	0.,0	
Ratio of runr	-		l cost	=	3.0 19.00	
Average incom Time value fa				=	0.40	
Light vehicle		(1000 kg)			1.4	
Heavy vehicle					11.0	
Light vehicle			(L/h)		1.350	
				=		
Heavy vehicle						

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

5L L 2T T 2R R South: M: 3L L 8T T 8R R	nless Ro	/100km 	0.41 0.41 0.41 S	g/km 0.516 0.493 0.499 0.494 0.511 0.563	24.54 24.27 24.53 25.13 32.81	0.766 0.738  0.763  0.754 1.057	3 2  3  3 4
2T T 2R R  South: M: 3L L 8T T 8R R  East: War		11.8 12.0 11.6 	0.41 0.41 0.41 s 0.42 0.49	0.493 0.499  0.494  0.511 0.563	24.54 24.27 24.53 25.13 32.81	0.766 0.738  0.763  0.754 1.057	31 2: 31 4:
2T T 2R R  South: M: 3L L 8T T 8R R  East: War		12.0 11.6 	0.41 0.41 0.41 s 0.42 0.49	0.493 0.499  0.494  0.511 0.563	24.54 24.27 24.53 25.13 32.81	0.766 0.738  0.763  0.754 1.057	3
2R R  South: M: 3L L 8T T 8R R  East: War		11.6 12.0 	0.41 0.41 s 0.42 0.49	0.499  0.494  0.511 0.563	24.27 24.53 25.13 32.81	0.738 0.763 0.754 1.057	3:
South: M: 3L L 8T T 8R R  East: War	ississau	12.0 ga Road 12.1 16.3 12.2	0.41 S 0.42 0.49	0.494  0.511 0.563	24.53 25.13 32.81	0.763 0.754 1.057	3
3L L 8T T 8R R 	ississau	ga Road 12.1 16.3 12.2	S 0.42 0.49	0.511	25.13 32.81	0.754 1.057	3:
3L L 8T T 8R R 	ississau	12.1 16.3 12.2	0.42	0.563	32.81	1.057	4
3L L 8T T 8R R 		12.1 16.3 12.2	0.42	0.563	32.81	1.057	4
8R R East: War 1L L		12.2	0.49 0.41	0.563 0.495	32.81 24.98	1.057 0.777	
East: War			0.41	0.495	24.98	0.777	3
1L L		15 0					
1L L		13.0	0.46	0.543	30.37	0.969	3
	nless Roa	ad E .					
		12.1	0.42	0.511	25.12	0.754	3
6T T		11.3	0.39	0.455	21.94	0.708	2
6R R		11.8	0.40	0.487	24.20	0.752	2
		11.7	0.41	0.482	23.46	0.730	2
North: Mi	ississau	ga Road	N				
7L L		12.9	0.45	0.544	27.32	0.810	32
4T T		12.7	0.42	0.509	26.15	0.818	3:
4R R		12.4	0.42	0.517	26.11	0.795	30
		12.7	0.43	0.515	26.35	0.816	3.

Table S.14 - Summary of Input and Output Data

Mississauga Road EA

Mississauga Road and Wanless Road 2018 AM

Intersection ID: 2

Roundabout

Lane							Eff Grn (secs)				
NO.							1st 2nd				
West:	Wanle										
1 LT	6			72	3			0.148		7	
2 TR				80					10.1		500
				152					10.6		
South:	Miss	issaug	ja Ro	ad S							
1 LT		123			16					7	
2 TR		67	75	142	9			0.152	7.6	7	500
	11	190	75	276	13			0.152	7.7	7	
East:	 Wanle	ss Roa	ad E								
1 LT	315	36		351	2				12.8		500
2 TR		339	11	350	2			0.327	6.5	17	500
	315	375	11	701	2			0.327	9.6	17	
North:	Miss	issaug	ga Ro	 ad N							
1 LT		327			4				12.5		
2 TR		453		488	4				10.2	39 	500
				970					11.4		
ALL VE	HICLE	===== S		Total	===== %	======		Max	Aver.	Max	
				Flow	HV			X ,	Delay	Queue	
				2099	4			0.604	10.2		

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mississauga Road EA

Mississauga Road and Wanless Road 2018 AM

Intersection ID: 2

Roundabout

Mov ID	Mov Typ	Flow	Cap.	-	Delay		Longest 95% Ba (vehs)	ck
				(v/c)			( ,	(/
West: W	anless	 Road W						
5L L		6	40	0.150	17.5	В	0.9	7
2T T		140	944	0.148	10.3	В	0.9	7
2R R		6	40	0.150	11.1	В	0.9	7
south:	Mississ	auga Roa	 d S					
3L L		11	73	0.151	13.9	В	0.8	7
8T T		190	1253	0.152	7.2	A	0.8	7
8R R		75	495	0.152	8.0	A	0.8	7
East: W	anless	Road E						
1L L		315	962	0.327	13.5	В	2.1	16
6T T		375	1145	0.328	6.5	A	2.1	16
6R R		11	34	0.324		A	2.1	17

North	: Mississaug	a Road	N					
7L :	L	155	257	0.603	17.2	В	4.9	39
4T	T ,	780	1292	0.604*	10.2	В	4.9	39
4R	R	35	58	0.603	11.3	В '	4.9	39
ALL	VEHICLES:	2099		0.604	10.2	В	4.9	39

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

\* Maximum v/c ratio, or critical green periods

# **Table D.0 - Geometric Delay Data**

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

From To		Negn	Negn Speed	_	Appr. Dist.	Downstream	Distance
Approach Approach	Turn	(m)	(km/h)		(m)	(m)	User Spec?
West: Wanless Road	w						
South	Right	35.0	32.5	19.4	500	123	No
East	Thru	57.3	39.1	47.1	500	131	No
North	Left	19.0	25.7	74.6	500	175	No
South: Mississauga	Road S						
West	Left	19.0	25.7	74.6	500	176	No
East	Right	35.0	32.5	19.4	500	127	No
North	Thru	57.3	39.1	47.1	500	146	No
East: Wanless Road	E						
West	Thru	57.3	39.1	47.1	500	131	No
South	Left	19.0	25.7	74.6	500	176	No
North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga	Road N						
West	Right	35.0	32.5	19.4	500	126	No
South	Thru	57.3	39.1	47.1	500	133	No
East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

# Table D.1 - Lane Delays

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

```
Deg. Stop-line Delay Acc. Queuing Stopd
Lane Satn 1st 2nd Total Dec. Total MvUp (Idle) Geom Control
No. x d1 d2 dSL dn dq dqm di dig dic
```

<sup>&</sup>quot; Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

1 LT	Wanless 0.148 0.148	5.1	0.0	5.1 4.7					6.0 5.5	
South:	Mississ 0.152	-		1.5	2.7	0 0	0 0	0.0	6.3	 7.
	0.152									
East: N	Wanless	Road :	 E							
	0.327						0.0		11.7	
North:	Mississ	auga 1	Road N							
	0.604 0.604									
dn is	average	stop	-start	delay	for al	ll vehi	cles	queued	and u	nqueu

# **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

	tn		Geom.	Rate Overall h	Queued	Rate
West: Wan 1 LT 0.1 2 TR 0.1	48 0.73	0.00				
South: Mi 1 LT 0.1 2 TR 0.1	52 0.31	0.00	0.27			
East: Wan 1 LT 0.3 2 TR 0.3	27 0.30	0.00				
North: Mi: 1 LT 0.6 2 TR 0.6	_	0.07	0.14		0.732 0.731	

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued  $\,$ 

# Table D.3A - Lane Queues (veh)

Mississauga Road EA

Mississauga Road and Wanless Road 2018  ${\rm AM}$ 

Intersection ID: 2

Roundabout

Deg. Ovrfl. Lane Satn Oueue -			Avera	Average (veh)			Percentile (veh)				Queue
No.	x	No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Stor. Ratio
West:	Wanles	s Road W									
1 LT	0.148	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.9	1.0	0.01
2 TR	0.148	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.9	1.0	0.01

South: Mississauga Road S

1 LT 2 TR	0.152 0.152	0.0 0.0	0.3	0.0	0.3	0.5	0.6 0.6	0.7 0.7	0.8	1.0	0.01 0.01
 East:	Wanless	Road E									
1 LT	0.327	0.0	0.7	0.0	0.7	1.3	1.5	1.7	2.1	2.5	0.03
2 TR	0.327	0.0	0.7	0.0	0.7	1.3	1.5	1.7	2.1	2.5	0.03

Values printed in this table are back of queue (vehicles).

# **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

Lane	Deg.	Ovrfl. Oueue -									Queue
No.	Satn x	~	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio
	Wanles	s Road W			2.1						
2 TR	0.148	0.0	2.2							8.0	
South	: Missis	ssauga R	oad S								
	0.152	0.0	2.2	0.0	2.3			5.6		8.0	0.01
		s Road E									
	0.327	0.0		0.0	5.2 5.3	9.7 9.7					0.03
North:	: Missis	ssauga Ro	oad N								
1 LT 2 TR		1.9 1.9			12.6 12.6		27.3 27.4		38.6 38.8		0.08

Values printed in this table are back of queue (metres).

# Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Wanless Road 2018 AM Intersection ID: 2 Roundabout

	App. Sp	eeds	Exit	Speeds	Queue N		Av. Sect	ion Snd	Geom
Mov					1st	2nd			Delay
ID 	Cruise	Negn	Negn	Cruise	Grn	Grn	Running	Overall	(sec)
West:	Wanless Ro	ad W							
5L L	65.0	25.7	25.7	65.0			45.6	44.3	12.3
2T T	65.0	39.1	39.1	65.0			50.3	50.1	5.4
2R R	65.0	32.5	32.5	65.0			49.5	49.1	6.5
South:	Mississau	ga Roa	d S						
3L L	65.0	25.7	25.7	65.0			46.9	46.9	12.4
8T T	65.0	39.1	39.1	65.0			52.7	52.7	5.8
8R R	65.0	32.5	32.5	65.0			51.7	51.7	6.6

East: War	less Ro	ad E						
1L L	65.0	25.7	25.7	65.0		46.9	46.9	12.4
6T T	65.0	39.1	39.1	65.0		52.7	52.7	5.4
6R R	65.0	32.5	32.5	65.0		51.6	51.6	6.6
	.ssissau	_		c= 0				
7L L	65.0	25.7	25.7	65.0	18.6	44.6	44.6	12.4
		_		65.0 65.0	18.6 18.7	44.6 50.3	44.6 50.3	12.4 5.4
7L L	65.0	25.7	25.7					

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Wanless 2018 AM G:\PROJECTS\105163 Mississauga Road Class EA\Sidra\Mississauga Rd EA Aug 14.aap Processed Aug 14, 2009 03:57:26PM

A1492, AECOM, Small Office

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# **Output Tables**

# Mississauga Road EA

# Mississauga Road and Wanless Road 2018 PM

#### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout

Driving on the right-hand side of the road Input data specified in Metric units Model Defaults: US HCM (Metric)

Peak Flow Period (for performance): 15 minutes

Unit time (for volumes): 60 minutes. Delay definition: Control delay

Geometric delay included

HCM Delay Model option selected HCM Queue Model option selected

Level of Service based on: Delay (HCM method)

Queue definition: Back of queue, 95th Percentile

### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

From Approach	To Approach		Turn			Flow Scale	Peak Flow Factor
West: Wan	less Road	W					
	South	2R	Right	5	0	1.00	1.00
	East	2T	Thru	113		1.00	
	North	5L	Left	10	0	1.00	1.00
South: Mi	ssissauga	Road S					
	West	3L	Left	39	1	1.00	1.00
	East	8R	Right	276	9	1.00	1.00
	North	8T	Thru	506	104	1.00	1.00
East: Wan	less Road	E					
	West	6Т	Thru	328	7	1.00	1.00
	South	1L	Left	279	6	1.00	1.00
	North	6R	Right	20	0	1.00	1.00
North: Mis	ssissauga	Road N					
	West	4R	Right	20	0	1.00	1.00
	South	4T	Thru	278	12	1.00	1.00
	East	7L	Left	29	1	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

Mov ID		Le	eft	Thi	rough	Rigl	nt
ID	•	ΓΛ	HV	ΓΛ	HV	TA	HV
			zeh/hour	as ı	ised by	the pro	gram
West:	Wanles	s Roa	ad W				
5L	L	10	1	0	0	0	0
2Т	T	0 -	0	113	2	0	0
2R	R	0	0	0	0	5	1
South:	: Missis	ssaud	ga Road	S .			
3L			1	0	0	0	0
81	T	0	0	506	104	0	0
8R	R	0	0	0	0	276	9
East:	Wanles	s Roa	ad E				
1L	L 2	279	6	0	0	0	0
6T	T	0	0	328	7	0	0
6R	R	0	0	0	0	20	1
North:	Missis	ssauc	ga Road 1	N-			
7L	L	29	1	0	0	0	0
4T	T	0	0	278	12	0	0
4 R	P	0	0 -	0	Ω	20	1

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

Mov	Left			Thro	Rig	Right		
ID	Total	%HV		 Iotal	%HV	Total	%HV	
Demand flow West: Wanle			r a	s use	d by th	e progr	am	
5L L	.55 Roud			0	0.0	0	0.0	
2T T	0	0.0		115	1.7	0	0.0	
2R R	0	0.0		0	0.0	6	16.7	
 South: Miss	issauga	Road	s					
3L L	40	2.5		0	0.0	0	0.0	
8T T	0	0.0		610	17.0	0	0.0	
8R R	0	0.0		0	0.0	285	3.2	
East: Wanle	ss Road							
1L L	285	2.1		0	0.0	0	0.0	
6T T	0	0.0		335	2.1	0	0.0	
6R R	0	0.0		0	0.0	21	4.8	
North: Miss	issauga	Road	N					
7L L	30	3.3		0	0.0	0	0.0	
4T T	0	0.0		290	4.1	0	0.0	
4R R	0	0.0		0	0.0	21	4.8	

### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout
                               Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) h) (pcu/h) Effect
West: Wanless Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 605 3.0 605 0 N 0.950
_______
South: Mississauga Road S
                    Entry/Circulating Flow Adjustment: Medium
 Environment Factor: 1.20
                  2 4.00 155 2.2 155 0 N
 30 10 50 2
East: Wanless Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 660 15.9 733 0 N 0.927
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 660 2.0 660 0 N 0.900
```

# **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout
______
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
            Type Flow Aver Aver In-Bnch Prop
    No.
                                                            ----- Foll-up
                   Rate Speed Dist Headway Bunched Hdwy Dist Headway
                  (pcu/h) (km/h) (m) (s)
                                                           (s) (m)
                   _______
West: Wanless Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 605 32.1 53.1 1.50 0.425 4.06 36.2
                                                                          2.62
Thru 1 Subdominant 605 32.1 53.1 1.50 0.425 3.89 34.8 2.62 2 Dominant 605 32.1 53.1 1.50 0.425 3.89 34.8 2.62 Right 2 Dominant 605 32.1 53.1 1.50 0.425 4.35 38.8 2.92
                                                0.425
0.425
 South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 155 35.7 230.0 1.23 0.109 4.33 42.9 Thru 1 Subdominant 155 35.7 230.0 1.23 0.109 4.84 47.9
                                                                            2.67
                                                                            2.98
2 Dominant 155 35.7 230.0 1.23 0.109 4.77
Right 2 Dominant 155 35.7 230.0 1.23 0.109 4.27
                                                                   47.2
                                                                  42.2
                                                                           2.63
 ______
East: Wanless Road E
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium Left 1 Subdominant 733 38.1 51.9 1.28 0.438 3.79 40.1 Thru 1 Subdominant 733 38.1 51.9 1.28 0.438 3.79 40.1
                                                                            2.60
                                                                   40.1 2.60
2 Dominant
Right 2 Dominant
                     733 38.1
733 38.1

      51.9
      1.28
      0.438
      3.74

      51.9
      1.28
      0.438
      3.75

                                                                   39.6
                                                                           2.57
                                                                          2.58
                                                                   39.7
```

North: Mississauga Road N
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium

Left 1 Subdominant 660 32.5 49.3 1.08 0.352 3.85 34.8 2.61

Thru 1 Subdominant 660 32.5 49.3 1.08 0.352 3.85 34.8 2.62
2 Dominant 660 32.5 49.3 1.08 0.352 3.83 34.6 2.60

Right 2 Dominant 660 32.5 49.3 1.08 0.352 3.83 34.6 2.60

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

### **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

Mov	Demand Flow (veh/h)	HV (%)	Flow	HV	Novement Adjust. Flow (pcu/h)	Cap. (veh	Deg. Satn	Spare Cap.	Lane Util (%)	Deg. Satn x
West: Wa	nless Roa	 ad W								
5L L 2T T	11 115	9.1	605 605 605	3.0 3.0 3.0	605 605 605	138 1443 75	0.85 0.85 0.85	966 967 963	100 100 100	0.080 0.080 0.080
South: M	ississau	ra Roa	id S							
3L L	40 610	2.5	155 155 155	2.2	155 155 155	92 1409 658	0.85 0.85 0.85	96 96 96	100 100 100	0.435* 0.433 0.433
East: Wa	nless Roa	ad E								
	285 335 21		660	15.9 15.9 15.9	733 733 733	693 814 51	0.85 0.85 0.85	107 107 106	100 100 100	0.411 0.412 0.412
North: M	ississaud	ra Roa	d N							
7L L	30	3.3 4.1 4.8	660 660 660	2.0 2.0 2.0	660 660 660	139 1343 97	0.85 0.85 0.85	294 294 293	100 100 100	0.216 0.216 0.216

### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

Intersection Level of Service = A
Worst movement Level of Service = B
Average intersection delay (s/pers) = 9.1
Largest average movement delay (s) = 16.0
Largest back of queue, 95% (m) = 28
Performance Index = 37.63
Degree of saturation (highest) = 0.435
Practical Spare Capacity (lowest) = 96 %

Effective intersection capacity, (veh/h)	=	4713
Total vehicle flow (veh/h)	=	2049
Total person flow (pers/h)	=	2459
Total vehicle delay (veh-h/h)	=	5.16
Total person delay (pers-h/h)	=	6.19
Total effective vehicle stops (veh/h)	=	1360
Total effective person stops (pers/h)	=	1632
Total vehicle travel (veh-km/h)	=	1304.2
Total cost (\$/h)	=	568.13
Total fuel (L/h)	=	174.3
Total CO2 (kg/h)	==	437.06

#### **Table S.5 - Movement Performance**

Mov					-		Longest			
ID		_	_	-	Queued	_	95% Back			Speed
		(veh-h/h) (pers-h/h) (sec)					(vehs) (m)			(km/h)
West:	Wan.	less Road	W							
		0.04								
2T	T	0.24	0.29	7.6	0.52	0.64	0.4	3 ,	2.00	51.
2R	R	0.01	0.02	8.8	0.52	0.69	0.4	3	0.11	50.
South	Mi:	ssissauga	Road S							
3L	L	0.15	0.18	13.4	0.41	0.68	3.2	28	0.81	46.
8T	T	1.15	1.38	6.8	0.41	0.53	3.3	27	10.22	52.
8R	R	0.59	0.71	7.5	0.40	0.57	3.3	27	4.84	51.
East:	Wan:	less Road	E							
1L	L	1.27	1.52	16.0	0.67	0.92	2.7	21	6.47	45.
6T	$\mathbf{T}$	0.83	1.00	8.9	0.67	0.76	2.7	21	6.39	50.
6R	R	0.06	0.07	10.1	0.67	0.83	2.7	21	0.41	50.
North:	Mis	ssissauga	Road N							
7L	L	0.12	0.15	14.8	0.59	0.85	1.2	10	0.64	46.
$4\mathrm{T}$	T	0.63	0.75	7.8	0.59	0.64	1.2	10	5.12	51.
4 R	R	0.05	0.06	8.9	0.59	0.72	1.2	10	0.38	50.

### **Table S.6 - Intersection Performance**

Mississauga Road EA

Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Delay Queued Stop Queue Index Speed (veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m) (km/h) (veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m) West: Wanless Road W 132 0.080 0.30 0.36 8.3 0.52 0.65 3 2.33 51.3 \_\_\_\_\_ South: Mississauga Road S 935 0.435 1.89 2.27 7.3 0.41 0.55 28 15.87 52.2 East: Wanless Road E 641 0.412 2.16 2.59 12.1 0.67 0.84 21 13.27 48.2 North: Mississauga Road N 341 0.216 0.80 0.96 8.5 0.59 0.66 10 6.15 50.8 ALL VEHICLES: 2049 0.435 5.16 6.19 9.1 0.53 0.66 28 37.63 50.6 INTERSECTION (persons):

2459 0.435 6.19 9.1 0.53 0.66 37.63 50.6

Queue values in this table are 95% back of queue (metres).

### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

	Lane		_	_			Que 95% Ba	ck	Lane Length
	No.				_	-		(m)	_
	West: Wa	nless 1	 Road W						
				0.080	8.8	0.66	0.4	3.3	500.0
	2 TR	66	826	0.080	7.8	0.64	0.4	3.3	500.0
	South: M	ississ	auga Ro	ad S					
	1 LT				7.4	0.54	3.2	27.7	500.0
	2 TR	486	1123	0.433	7.2	0.55	3.3	26.6	500.0
•	East: Wa	nless 1	 Road E						
	1 LT	318	772 (	0.411	15.3	0.91	2.7	21.0	500.0
	2 TR	323	786 (	0.411	9.0	0.77	2.7	21.1	500,.0
	North: M	ississa	auga Ro	oad N					
	1 LT				9.0	0.68	1.2	9.6	500.0
	2 TR	171	793 (	0.216	7.9	0.65	1.2	9.6	500.0

## **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

Lane No.		Thru	Rig	Tot	Cap (veh	(veh	Deg. Satn	Util
1 LT		ss Roa 55	0	66			0.080	
1 LT		409	0	449			0.433 0.433	
1 LT		33	0				0.411 0.411	
1 LT	Missi 30 0	140	0	170		786 793	0.216	

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

Mov	Mov Typ	Dem Flow (veh	Cap.	Lane Util			Stop	95% Back of Queue	
		/h)	/h)	(용)	х	(sec)		(veh)	
West	 Wanless	Road	w						
5L L	waniebb		138	100	0.080	14.7	0.77	0.4	0.23
2T T		115	1443	100	0.080	7.6	0.64	0.4	2.00
2R R		6	75	100	0.080	8.8	0.69	0.4	0.11
South:	Missis	sauga	Road S						
3L L		_		100	0.435*	13.4	0.68	3.2	0.81
8T T		610	1409	100	0.433	6.8	0.53	3.3	10.22
8R R		285	658	100	0.433	7.5	0.57	3.3	4.84
East: 1	Wanless	Road	 Е						
1L L		285	693	100	0.411	16.0	0.92	2.7	6.47
6T T		335	814	100	0.412	8.9	0.76	2.7	6.39
6R R		21	51	100	0.412	10.1	0.83	2.7	0.41
 North:	Missis	sauga	Road N						
7L L				100	0.216	14.8	0.85	1.2	0.64
4T T		290	1343	100	0.216	7.8	0.64	1.2	5.12
4R R		21	97	100	0.216	8.9	0.72	1.2	0.38

<sup>\*</sup> Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mov ID	Fuel Total L/h		Total		Total	Tota
West: Wanles	s Road W					
5L L	0.9	3.18	0.004	0.19	0.006	2.
2T T	8.4	28.59	0.034	1.65	0.053	20.
2R R	0.4	1.47	0.002	0.09	0.003	1.
	9.7	33.23	0.039	1.92	0.061	24.
South: Missi	ssauga Road	. S				
South: Missi 3L L	ssauga Road 3.3		0.014	0.68	0.020	8.
	3.3					
3L L	3.3 62.5	11.44	0.216	12.54	0.404	157.
3L L 8T T	3.3 62.5 21.6	11.44 187.01	0.216 0.088	12.54 4.42	0.404 0.138	157. 54.
3L L 8T T	3.3 62.5 21.6  87.4	11.44 187.01 72.40	0.216 0.088	12.54 4.42	0.404 0.138	157. 54.
3L L 8T T 8R R	3.3 62.5 21.6  87.4	11.44 187.01 72.40 270.85	0.216 0.088  0.317	12.54 4.42	0.404 0.138  0.563	157. 54. 219.
3L L 8T T 8R R	3.3 62.5 21.6  87.4 s Road E 23.8	11.44 187.01 72.40 270.85	0.216 0.088  0.317 	12.54 4.42 17.64 5.00	0.404 0.138  0.563 	157. 54. 219.
3L L 8T T 8R R East: Wanles:	3.3 62.5 21.6 	11.44 187.01 72.40 	0.216 0.088  0.317  0.101 0.102	12.54 4.42 17.64  5.00 5.05	0.404 0.138  0.563  0.149 0.159	157. 54. 219. 59. 62.

North: Mississa	uga Road	N				
	-		0.011	0.54	0.016	6.
4T T	22.6	75.41	0.090	4.54	0.144	56.
4R R	1.6	5.37	0.007	0.33	0.010	4.
	26.7			5.40	0.170	67.
INTERSECTION:	174.3					437.
ARAMETERS USED	IN COST	CALCULA	rions			
Pump price o	f fuel (	\$/L)	FIONS	· =	0.500	
Pump price o	f fuel (Se cost fa	\$/L) actor		· =	0.70	
Pump price o Fuel resource Ratio of run:	f fuel (Se cost fa	\$/L) actor			0.70	
Pump price o Fuel resource Ratio of run Average incom	f fuel (Se cost faning cost	\$/L) actor		=	0.70 3.0 19.00	
Pump price o Fuel resource Ratio of run Average inco	f fuel (Se cost faning cost me (\$/h)	\$/L) actor t to fuel		=	0.70 3.0 19.00 0.40	
Pump price o Fuel resource Ratio of run: Average inco Time value f. Light vehicle	f fuel (Se cost faning cost me (\$/h) actor e mass (3	\$/L) actor t to fuel		= = = = =	0.70 3.0 19.00 0.40 1.4	
Fuel resource Ratio of run Average incommunity Time value for Light vehicle Heavy vehicle	f fuel (se cost faning cost me (\$/h) actor e mass (1	\$/L) actor t to fuel 1000 kg)	L cost	= = =	0.70 3.0 19.00 0.40 1.4 11.0	
Pump price o Fuel resource Ratio of run: Average inco Time value f. Light vehicle	f fuel (see cost faning cost me (\$/h) actor e mass (see mass (see idle fuel fuel cost fanished)	\$/L) actor t to fuel 1000 kg) 1000 kg) uel rate	l cost	= = =	0.70 3.0 19.00 0.40 1.4	

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mov ID	Fuel Rate L/100km		HC Rate g/km			CO2 Rate g/km
 West: Wanless	Road W					
5L L	12.2	0.43	0.516	25.44	0.761	306.
2T T	11.6	0.39	0.467	22.78	0.727	289.
2R R	11.3	0.39	0.480	23.15	0.713	284.
	11.6	0.40	0.472	23.03	0.729	290.
 South: Mississ	auga Road	s				
3L L	12.1		0.510	25.10	0.753	303.
8T T	16.3		0.562		1.054	409.
8R R	12.2	0.41	0.494	24.90	0.776	304.
	14.8	0.46	0.539	29.98	0.956	373.
Cast: Wanless	Road E					
1L L	12.4	0.44	0.526	26.01	0.774	310.
6T T	11.9	0.40	0.484	23.97	0.753	296.
6R R	12.2	0.41	0.508	25.59	0.784	306.
	12.1	0.42	0.504	24.96	0.764	303.
Jorth: Mississ	auga Road	N				
7L L	12.6	0.44	0.528	26.47	0.792	316.
4T T	12.4	0.41	0.491	24.87	0.789	310.
4R R	12.1	0.41	0.502	25.15	0.774	303.
	12.4	0.42	0.495	25.03	0.788	310.
INTERSECTION:	13.4	0.44	0.516	27.11	0.852	335.

**Table S.14 - Summary of Input and Output Data** 

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

Lane No.						Adj. Eff Grn Basic (secs)				
	L	T	R	Tot		Satf. 1st 2nd	х	(sec)	(m)	(m)
West:	Wanle	ss Ro	ad W							
1 LT	11	55		66	3		0.080	8.8	3	500
2 TR		60	6	66	3		0.080	7.8	3	500
	11	115	6	132	3		0.080	8.3	3	
South:	Miss	issau	iga Ro	ad S						
1 LT					16		0.433	7.4	28	500
2 TR		201	285	486	9		0.433	7.2	27	500
	40	610	285	935	12	<del></del>	0.433	7.3	28	
East:	Wanle	ss Ro	ad E							
l LT	285	33		318	2		0.411	15.3	21	500
2 TR		302	21	323	2		0.411	9.0	21	500
	285	335	21	641	,2		0.411	12.1	21	
North:	Miss	issau	ga Ro	ad N			-			
l LT	30	140	_	170	4		0.216	9.0	10	500
2 TR		150	21	171	4		0.216	7.9	10	500
	30	290		341	_		0.216	8.5	10	
	HICLE			Total			====== Max	Aver.	Max	
ALL VE				Flow	LITZ		X	Dolass	A	
ALL VE				FIOW	ΠV		Δ.	ретау	Queue	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mov	Mov			Deg.			Longest 95% Ba	
							(vehs)	
		/h)	/h)	(v/c)	(sec)		( v.e.115 )	(111)
West: W	anless E	Road W						
5L L		11	138	0.080	14.7	В	0.4	. 3
2T T		115	1443	0.080	7.6	A	0.4	3
2R R		6	. 75	0.080	8.8	A	0.4	3
3L L 8T T 8R R		40 610	92 1409		6.8	A	3.2 3.3 3.3	27
East: W	anless F	Road E						
1L L		285	693	0.411	16.0	В	2.7	21
6T T		335	814	0.412	8.9	A	2.7	21
6R R		21	51	0.412	10.1	В	2.7	21
North: I	Mississa	uga Roa	 d N					
7L L		30	139	0.216	14.8	В	1.2	10
4T T		290	1343	0.216	7.8	A	1.2	10

4R	R	21	97	0.216	8.9	A	1.2	10
ALL	VEHICLES:	2049		0.435	9.1	Α	3.3	2,8
		the state of the s						

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

### **Table D.0 - Geometric Delay Data**

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

D	m -		Negn	_	Negn	Appr.	Downstream	n Distance
From Approach	To Approach	Turn	Radius (m)	Speed (km/h)	Dist. (m)	Dist. (m)	(m)	User Spec?
West: Wanl	ess Road	w						
	South	Right	35.0	32.5	19.4	500	123	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mis	sissauga	Road S						
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	127	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Wanl	ess Road	E						
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mis	sissauga	Road N						
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
4	East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

### **Table D.1 - Lane Delays**

Lane	Deg. Satn	Stop-	·line	_	Acc.	(second Queu:	ing	Stopd	Geom	Control
No.	х	d1	d2		dn	dq	dqm	di	dig	
West: 1 LT 2 TR	Wanless 0.080 0.080	Road W 2.3 2.3	0.0 0.0	2.3	3.3	0.0	0.0	0.0	6.5 5.5	8.8 7.8

Maximum v/c ratio, or critical green periods

Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

1 LT	Missis: 0.433 0.433	1.0 0.9	0.0	1.0 0.9	2.7	0.0	0.0	0.0	6.4 6.3	7. 7.
East:	Wanless	Road 1	 E							
1 LT	0.411	3.3	0.3	3.6	3.4	0.3	0.3	0.0	11.7	15.
2 TR	0.411	3.2	0.3	3.5	4.4	0.0	0.0	0.0	5.5	9.
North:	Missis	sauga I	Road N							
1 LT	0.216	2.4	0.0	2.4	3.7	0.0	0.0	0.0	6.7	9.0
2 TR	0.216	2.3	0.0	2.3	3.8	0.0	0.0	0.0	5.6	7.

## **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2 Roundabout

Lane No.	Deg. Satn x			_	Rate Overall h	_	_
West: 1 LT 2 TR	Wanles 0.080 0.080	0.42	0.00	0.23			
1 LT	: Missi 0.433 0.433	0.27	0.00	0.27	0.54 0.55		
East: 1 LT 2 TR	Wanles 0.411 0.411	0.66	0.02	0.23 0.15	0.91 0.77	0.667 0.666	
North 1 LT 2 TR	: Missi 0.216 0.216	0.48	0.00	0.20	0.68 0.65	0.587 0.587	0.00

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued  $\,$ 

## **Table D.3A - Lane Queues (veh)**

Ta	ne.	_	Ovrfl. Oueue		ge (veh)			Percen	tile (ve	eh)		Queue Stor.
No		X	No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio
1	LT	Wanless 0.080 0.080	Road W 0.0 0.0	0.1	0.0	0.1	0.3	0.3	0.3	0.4	0.5 0.5	0.01
1	$_{ m LT}$	Missis 0.433 0.433	sauga Ro 0.0 0.0	ad S 1.0 1.0	0.0	1.0	1.9 1.9	2.3	2.6 2.6	3.2 3.3	3.7 3.8	0.06

East:	Wanless	Road E									
1 LT	0.411	0.0	0.8	0.0	0.9	1.6	1.9	2.2	2.7	3.1	0.04
2 TR	0.411	0.0	0.8	0.0	0.9	1.6	1.9	2.2	2.7	3.2	0.04
No w+ h	Mingin	anian De	n d M								
North	: Missis	sauga Ro	oad N								
1 T.M	0 016										
T T.I.	0.216	0.0	0.4	0.0	0.4	0.7	0.9	1.0	1.2	1.4	0.02
	0.216	0.0	0.4	0.0	0.4	0.7 0.7	0.9 0.9	1.0 1.0	$\frac{1.2}{1.2}$	1.4 $1.4$	0.02

Values printed in this table are back of queue (vehicles).

## **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Wanless Road 2018 PM Intersection ID: 2

T	Deg.	Ovrfl.		ge (meti			Percent				Queue
Lane No.	Satn x	No	Nb1	Nb2		70%				98%	Stor. Ratio
	: Wanles 0.080	s Road W 0.0 0.0	1.0 1.0	0.0		2.0			3.3 3.3		0.01
1 LT			oad S 8.9 8.5		8.9 8.5						0.06
1 LT	0.411	s Road E 0.4 0.4	6.3 6.4		6.7 6.7	12.3 12.3			21.0 21.1		0.04
North 1 LT 2 TR	0.216	ssauga R 0.0 0.0	oad N 3.0 3.0	0.0	3.0 3.0	5.6 5.7	6.9 6.9	7.8 7.8	9.6 9.6	11.1	0.02

Values printed in this table are back of queue (metres).

## Table D.4 - Movement Speeds (km/h) and Geometric Delay

	App. Sp	oods	Fvi+	Spoods	-	Move-up	λπ Soci	tion Spd	Geom
Mov	App. Sp	eeus		speeus	1st				Delay
ID	Cruise	Negn	Negn	Cruise				Overall	(sec)
West: W	anless Ro	ad W							
5L L	65.0	25.7	25.7	65.0			46.5	46.5	12.4
2T T	65.0	39.1	39.1	65.0			51.9	51.9	5.4
2R R	65.0	32.5	32.5	65.0			50.9	50.9	6.5
South: I	Mississau	ga Roac							
3L L	65.0	25.7	25.7	65.0			46.9	46.9	12.4
8T T	65.0	39.1	39.1	65.0			52.8	52.8	5.8
8R R	65.0	32.5	32.5	65.0			51.8	51.8	6.6
East: Wa	anless Ro	ad E							
1L L	65.0	25.7	25.7	65.0	18.6		45.6	45.6	12.4
6T T	65.0	39.1	39.1	65.0	18.7		50.8	50.8	5.4

6R R	65.0	32.5	32.5	65.0	18.7	50.0	50.0	6.6
North:	Mississau	iga Roac	l N			 		
7L L	65.0	25.7	25.7	65.0		46.2	46.2	12.4
4T T	65.0	39.1	39.1	65.0		51.4	51.4	5.4
4R R	65.0	32.5	32.5	65.0		50.5	50.5	6.6

"Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Wanless 2018 PM G:\PROJECTS\105163 Mississauga Road Class EA\Sidra\Mississauga Rd EA Aug 14.aap Processed Aug 14, 2009 03:57:26PM

A1492, AECOM, Small Office

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# **Output Tables**

## Mississauga Road EA

## Mississauga Road and Mayfield Road 2031 AM TTMP

### **Run Information**

\* Basic Parameters:

Intersection Type: Roundabout

Driving on the right-hand side of the road

Input data specified in Metric units

Model Defaults: US HCM (Metric)

Peak Flow Period (for performance): 15 minutes

Unit time (for volumes): 60 minutes.

Delay definition: Control delay

Geometric delay included

HCM Delay Model option selected

HCM Queue Model option selected

Level of Service based on: Delay (HCM method) Queue definition: Back of queue, 95th Percentile

## Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

_								
	From Approach	To Approach	Mov ID	Turn	Flow LV	Rate HV	Flow Scale	Peak Flow Factor
-	West: May	field Road	 W					
	_	South	2R	Right	76	14	1.00	1.00
		East	2T	Thru	1172	88	1.00	1.00
		North	5L	Left	64	1	1.00	1.00
-	South: Mi	ssissauga R	oad S					
		West	3L	Left	25	. 0	1.00	1.00
		East	8R	Right	59	11	1.00	1.00
		North	8T	Thru	86	14	1.00	1.00
_	East: May	field Road 1	 3					
		West	6Т	Thru	527	93	1.00	1.00
		South	1L	Left	176	19	1.00	1.00
		North	6R	Right	29	1	1.00	1.00
_	North: Mis	ssissauga Ro	oad N					
		West	4R	Right	98	2	1.00	1.00
		South	4T	Thru	538	22	1.00	1.00
		East	7L	Left	74	6	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Mov	Le	eft	Thro	ough	Rig	jht
ID	LV	HV	LV	HV	ΓΛ	HV
Demand fi			ır as us	sed by	the pro	gram
West: May	•	oad W				
	64	1	0	0	0	0
2T T	0	0	1172	88	0	0
2R R	0	0	0	0	76	14
South: M	ississauc	ja Roac				
3L L	25	1	0	0	0	0
8T T	0	0	86	14	0	0
8R R	0	0	0	0	. 59	11
East: May	field Ro	ad E				
1L L			0	0	0	0
6T T	0	0	527	93	0	0
6R R	0	0	0	0	29	1
North: Mi	ississauc	a Road	l N			
7L L	74	6	0	0	0	0
4T T	0	0	538	22	0	0
4R R	0	0	0	0	98	2

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Mov ID	Lef	t	Thro	ugh	Rig	ht
10	Total	%HV	Total	%HV	Total	%HV
	ows in ve		as use	d by th	ne progr	am
_	field Roa 65		0		0	0.0
	0			7.0		0.0
2R R	7	0.0		0.0		15.6
South: Mi	ssissauga	Road	s			
3L L	26	3.8	0	0.0	. 0	0.0
8T T	0	0.0	100	14.0	0	0.0
8R R	0	0.0	0	0.0	70	15.7
East: May	field Roa	d E				
1L L	195	9.7	0	0.0	0	0.0
6T T	0	0.0	620	15.0	0	0.0
6R R	0	0.0	0	0.0	30	3.3
North: Mi	ssissauga	Road 1	 N			
7L L	80	7.5	0	0.0	0	0.0
4T T	0	0.0	560	3.9	0	0.0
4R R	0	0.0	0	0.0	100	2.0

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout
                                  Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
           Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) h) (pcu/h) Effect
Diam
 (m)
           (m)
West: Mavfield Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 835 5.8 848 0 N
                                          848 0 N 0.869
  Exclusive Slip lane (exiting flow): 755 5.5
                                          765
                                                        0.889
------
South: Mississauga Road S
 Environment Factor: 1.20
                      Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 1405 6.8 1434 0 N 0.617
_____
East: Mayfield Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10
         5.0
               2
                    2 4.00 190 8.3 199
                                              0 и
                                                        0.970
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 840 13.5 912 0 N 0.893
```

#### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
                     Flow Aver Aver In-Bnch Prop ----- Foll-up Rate Speed Dist Headway Bunched Hdwy Dist Headway
       No.
             Type
                    (pcu/h) (km/h) (m) (s)
                                                                  (s)
                                                                         (m)
West: Mayfield Road W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 848 34.7 40.9 1.32 0.497 3.70 35.6
Thru 1 Subdominant 848 34.7 40.9 1.32 0.497 3.77 36.4
2 Dominant 848 34.7 40.9 1.32 0.497 3.69 35.5
Right 3 Excl. Slip 765E 35.7 46.6 1.27 0.448 3.69 36.5
                                                                                    2.59
                                                                           36.4
                                                                                    2.64
                                                                        35.5
36.5
                                                                                    2.58
                                                                                    2.58
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1434 37.7 26.3 1.07 0.620 3.33 34.9
Thru 1 Subdominant 1434 37.7 26.3 1.07 0.620 2 Dominant 1434 37.7 26.3 1.07 0.620
                                                                  3.63
3.37
                                                                           38.0
                                                                                    2.71
                                                                           35.4
                                                                                    2.52
Right 2 Dominant 1434 37.7 26.3 1.07 0.620 3.43 35.9
East: Mayfield Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Dominant 199 32.8 164.6 1.56 0.172 4.50 41.0 2.80 Thru 1 Dominant 199 32.8 164.6 1.56 0.172 4.71 42.9 2.93
      2 Subdominant 199 32.8 164.6 1.56 0.172 4.71 42.9 2.93D
```

Right	2 Subdominant	199	32.8	164.6	1.56	0.172	4.30	39.2	2.68D
North	: Mississauga R	oad N							
Env	ironment Factor	: 1.20	Entr	y/Circu	lating	Flow Adj	ustment:	Medium	
Left	1 Subdominant	912	35.6	39.0	1.05	0.445	3.76	37.1	2.65
Thru	1 Subdominant	912	35.6	39.0	1.05	0.445	3.66	36.2	2.59
	2 Dominant	912	35.6	39.0	1.05	0.445	3.55	35.1	2.51
Right	2 Dominant	912	35.6	39.0	1.05	0.445	3.55	35.1	2.50

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

- E Exiting flow for slip lane traffic
- D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

## **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Mov ID	Demand		Oppos	ing M	ovement Adjust.			Prac. Spare	Lane Util	Deg. Satn
	Flow (veh/h)	HV (%)	Flow (veh/h)		Flow (pcu/h)		Satn xp	Cap. (%)	(%)	×
West: N	Mayfield R	oad W								
5L L	65	1.5	835	5.8	848	66	0.85	-14	100	0.985
2T T		7.0		5.8	848	1275		-14	100	0.988*
2R R	90	15.6	755	5.5	765	741	0.85	600	100	0.121
South:	Mississau	ga Roa	nd S			7				
3L L	26			6.8	1434	93	0.85	204	100	0.280
8T T	100	14.0	1405	6.8	1434	357	0.85	.203	100	0.280
8R R	70	15.7	1405	6.8	1434	250	0.85	204	100	0.280
East: M	Mayfield R	oad E								
1L L	-	9.7	190	8.3	199	468	0.85	104	100	0.417
6T T	620	15.0	190	8.3	199	1489	0.85	104	100	0.416
6R R	30	3.3	190	8.3	199	72	0.85	104	100	0.417
North:	Mississau	ra Roa	d N							
7L L	80	7.5		13.5	912	152	0.85	62	100	0.526
4T T	560	3.9	840	13.5	912	1065	0.85	62	100	0.526
4R R	100	2.0	840	13.5	912	190	0.85	62	100	0.526

#### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Intersection Level of Service = C
Worst movement Level of Service = D
Average intersection delay (s/pers) = 20.7
Largest average movement delay (s) = 42.3

```
Largest back of queue, 95% (m)
                                               177
Performance Index
                                            91.07
Degree of saturation (highest)
                                            0.988
Practical Spare Capacity (lowest)
                                            -14
3234
                                               -14 %
Effective intersection capacity, (veh/h) =
Total vehicle flow (veh/h)
                                              3196
Total person flow (pers/h)
                                        =
                                              3835
Total vehicle delay (veh-h/h)
                                            18.38
                                           22.06
Total person delay (pers-h/h)
                                            3607
4329
Total effective vehicle stops (veh/h)
Total effective person stops (pers/h)
                                            2026.4
Total vehicle travel (veh-km/h)
                                        = 1057.91
Total cost ($/h)
Total fuel (L/h)
                                             313.1
Total CO2 (kg/h)
                                             785.42
```

#### **Table S.5 - Movement Performance**

Mov		Total	Total	Aver.	Prop.	Eff.	Longest	Queue	Perf.	Aver.
ID		Delay	Delay	Delay	Queued	Stop	95% Ba	ck	Index	Speed
		(veh-h/h)	(pers-h/h	n) (sec)		Rate	(vehs)	(m)		(km/h)
Vest:	May	field Roa	d W							
5L	L	0.76	0.92	42.3	1.00	1.65	21.6	173	2.81	30.5
2Т	Т	12.31	14.77	35.2	1.00	1.65	21.9	177	51.05	32.4
2R	R	0.23	0.28	9.3	0.59	0.72	0.7	6	1.67	50.7
South	. Mi	.ssissauga	Road S							
3L	L	0.14	0.16	18.8	0.81	0.95	1.7	14	0.69	43.3
8 T	T	0.33	0.40	12.0	0.81	0.90	1.7	14	2.35	48.8
8R	R	0.25	0.30	13.1	0.82	0.92	1.7	14	1.65	47.7
ast:	May	field Roa	 d E							
1L	L	0.75	0.90	13.9	0.46	0.71	3.1	26	4.00	46.7
6T	T	1.20	1.44	7.0	0.46	0.55	3.1	26	10.57	52.4
6R	R	0.07	0.08	7.8	0.46	0.60	3.1	26	0.52	51.3
orth:	. Mi	ssissauga	Road N							
7L	L	0.39	0.47	17.7	0.74	0.98	3.8	30	1.93	44.3
4 T	T	1.62	1.95	10.4	0.74	0.91	3.8	30	11.72	50.1
4 R	R	0.32	0.38	11.4	0.74	0.93	3.8	3.0	2.12	49.0

#### Table S.6 - Intersection Performance

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout
____________
West: Mayfield Road W
1415 0.988 13.30 15.97 33.8 0.97 1.59 177 55.53
                                 33.1
______
South: Mississauga Road S
196 0.280 0.72 0.87 13.3 0.81 0.91 14
                                 47.6
                             4.68
------
East: Mayfield Road E
East: Mayfield Road E
845  0.417  2.02  2.42  8.6  0.46  0.59  26  15.09
                                 50.9
North: Mississauga Road N
740 0.526 2.33 2.80 11.4 0.74 0.92 30 15.76 49.2
------
```

ALL VEHICLES:
3196 0.988 18.38 22.06 20.7 0.77 1.13 177 91.07 40.7

INTERSECTION (persons):
3835 0.988 22.06 20.7 0.77 1.13 91.07 40.7

Queue values in this table are 95% back of queue (metres).

### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM  $\mathtt{TTMP}$ Intersection ID: 1 Roundabout Dem Flow Cap Deg. Aver. Eff. 95% Back Lane (veh (veh Satn Delay Stop ------/h) /h) x (sec) Rate (vehs) (m) Lane Length West: Mayfield Road W 36.1 1.65 1 LT 652 660 0.989 21.6 173.0 500.0 2 T 673 681 0.989 34.9 1.65 21.9 176.6 90 741 0.121 3 R 9.3 0.72 0.7 5.8 75.0 South: Mississauga Road S 1 LT 95 338 0.280 13.9 0.91 1.7 13.8 500.0 101 361 0.280 12.6 0.91 1.7 14.5 2 TR 500.0 \_\_\_\_\_\_ East: Mayfield Road E 426 1023 0.416 10.1 0.62 3.1 26.2 419 1006 0.416 7.1 0.55 3.1 26.4 1 LT 500.0 2 TR 500.0 \_\_\_\_\_\_\_ North: Mississauga Road N 500.0 1 LT 360 683 0.526 12.2 0.93 3.8 29.7 2 TR 380 723 0.526 10.6 0.91 3.8 29.8 500.0

## **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Lane No.					Min Cap (veh /h)	Cap (veh	Satn	Util
West:	 Mavfie	eld Ro	ad W					
	-			652	150	660	0.989	100
2 T	0	673	0	673	150	681	0.989	100
3 R	0	0	90	90	90	741	0.121	100
South:	Missi	ssaug	a Roa	. <b></b> .d S				
1 LT	26	69	0	95	95	338	0.280	100
2 TR	0	31	70	101	101	361	0.280	100
East:	 Mayfie	eld Ro	 ad E					
1 LT	195	231	0	426	150	1023	0.416	100
2 TR	0	389	30	419	150	1006	0.416	100
North:	Missi	ssaug	a Roa	 d N				
1 LT	80	280	0	360	150	683	0.526	100
2 TR	0	280	100	380	150	723	0.526	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Mov	Mov	Dem	Total	Lane	Deg.	Aver.	Eff.	95%	Perf.
ID	Тур	Flow	Cap.	Util	Satn	Delay	-	Back of	Index
		(veh	(veh				Rate	Queue	
		/h)	/h)	(왕)	X	(sec)		(veh)	
West: M	avfiel	d Road	 . W						
5L L	-	65		100	0.985	42.3	1.65	21.6	2.81
2T T		1260	1275	100	0.988*			21.9	
2R R	(Slp)	90	741	100	0.121	9.3	0.72	0.7	1.67
South:	Missis	sauga	 Road S						
3L L		26	93	100	0.280	18.8	0.95	1.7	0.69
8T T		100	357	100	0.280			1.7	
8R R		7,0	250	100	0.280	13.1	0.92	1.7	1.65
 East: M	avfiel	d Road	 Е						
1L L	-	195	468	100	0.417	13.9	0.71	3.1	4.00
6T T		620	1489	100	0.416	7.0	0.55	3.1	10.57
6R R		30	72	100	0.417	7.8	0.60	3.1	0.52
 North:	Missis	sauga	 Road N						
7L L		80	152	100	0.526	17.7	0.98	3.8	1.93
4T T		560		100	0.526	10.4		3.8	11.72
4R R		100	190	100	0.526	11.4		3.8	2.12
4R R		100	190 	100	0.526 	11.4	0.93	3.8	2.1

<sup>\*</sup> Maximum degree of saturation

## **Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Mov ID		Cost Total \$/h	Total		NOX Total kg/h	
West: Mayfi	eld Road W					
5L L	6.5	25.53	0.029	1.34	0.038	16.3
2T T	132.7	481.13	0.552	28.39	0.845	332.
2R R	9.5	28.52	0.034	2.03	0.064	24.0
	148.7	535.17	0.616	31.77	0.947	372.9
South: Miss	issauga Road					
3L L	2.2	7.89	0.009	0.46	0.014	5.5
8T T	10.4	31.89	0.038	2.23	0.070	26.2
8R R	7.7	23.28	0.028	1.70	0.052	19.
	20.4	63.07	0.076	4.39	0.136	51.2

19.6 61.6	186.71	0.217	12.44	0.399	154.9
83.4	257.42	0.302	17.06	0.540	209.6
ssauga Roa	 d N				
44.9	149.67	0.180	9.25	0.289	112.5
60.6					
N: 313.1					
		FIONS			
		l cost			
_					
те тате т	uer rate	(T) 11)		1.350	
	61.6 2.2 83.4 ssauga Roa 7.9 44.9 7.7 60.6 N: 313.1 SED IN COST	19.6 63.16 61.6 186.71 2.2 7.55  83.4 257.42  Ssauga Road N 7.9 26.28 44.9 149.67 7.7 26.30  60.6 202.25  N: 313.1 1057.91  SED IN COST CALCULAS  e of fuel (\$/L) arce cost factor running cost to fuel factor cle mass (1000 kg) cle mass (1000 kg)	19.6 63.16 0.076 61.6 186.71 0.217 2.2 7.55 0.009  83.4 257.42 0.302  83.4 257.42 0.302  83.4 257.42 0.302  83.4 257.42 0.302  83.4 257.42 0.302  60.6 202.25 0.244  81: 313.1 1057.91 1.237  8ED IN COST CALCULATIONS  8 of fuel (\$/L) arce cost factor cunning cost to fuel cost accome (\$/h) a factor ccle mass (1000 kg) ccle mass (1000 kg)	19.6 63.16 0.076 4.16 61.6 186.71 0.217 12.44 2.2 7.55 0.009 0.46  83.4 257.42 0.302 17.06  83.4 257.42 0.302 17.06  Ssauga Road N 7.9 26.28 0.032 1.70 44.9 149.67 0.180 9.25 7.7 26.30 0.032 1.63  60.6 202.25 0.244 12.58  N: 313.1 1057.91 1.237 65.79  SED IN COST CALCULATIONS  e of fuel (\$/L) = cost factor = cunning cost to fuel cost = come (\$/h) = factor = cole mass (1000 kg) = cole cole cole cole cole cole cole cole	19.6 63.16 0.076 4.16 0.126 61.6 186.71 0.217 12.44 0.399 2.2 7.55 0.009 0.46 0.014  83.4 257.42 0.302 17.06 0.540  Ssauga Road N 7.9 26.28 0.032 1.70 0.051 44.9 149.67 0.180 9.25 0.289 7.7 26.30 0.032 1.63 0.050  60.6 202.25 0.244 12.58 0.389  N: 313.1 1057.91 1.237 65.79 2.012  SED IN COST CALCULATIONS  Comparison of the cost and comparison of the cost of the co

## Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID:  $\ensuremath{\mathrm{1}}$ 

Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate \$/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Mayfield 5L L 2T T 2R R	Road W 14.7 16.7 17.0	0.58 0.61 0.51	0.660 0.697 0.609	30.65 35.81 36.12	0.876 1.065 1.131	368.1 419.7 426.4
	16.7	0.60	0.689	35.57	1.060	417.6
South: Mississa 3L L 8T T 8R R	uga Road 12.6 16.6 17.7	S 0.45 0.51 0.53	0.540 0.607 0.650	26.44 35.41 38.85	0.784 1.107 1.198	316.2 416.7 445.5
	16.4.	0.51	0.612	35.35	1.094	412.6
Cast: Mayfield 1L L 6T T 6R R	Road E 14.9 15.8 11.9	0.48 0.48 0.40	0.576 0.556 0.491	31.63 31.88 24.46	0.959 1.024 0.758	373.8 396.9 298.3
	15.4	0.48	0.559	31.57	0.999	387.9
lorth: Mississa 7L L 4T T 4R R	uga Road 14.7 12.7 12.4	N 0.49 0.42 0.42 0.43	0.586 0.510 0.518	26.15	0.943 0.820 0.796	368.1 319.1 310.2 323.6
				32.47		387.6

Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Lane	Dema	and Fl				_			Deg Sat		Longest Queue	
	L	T	R	Tot		Satf.	1st	2nd	x	(sec)	(m)	(m)
West:	Mayfi	leld F	Road W	,								
1 LT	65	587		652	6				0.989			500
2 T 3 R		673	90	673 90	7 16					34.9 9.3		500 75
	65	1260	90	1415	7				0.989	33.8	177	
South:	Miss	sissau	iga Ro	ad S								
1 LT 2 TR	26	69 31	70	95 101	11 15				0.280 0.280	13.9 12.6	14 14	500 500
	26	100	70	196	13				0.280	13.3	14	
East:	Mayfi	eld R	load E									
1 LT	195	231		426	13					10.1		500
2 TR		389	30	419	14				0.416	7.1	26	500
	195	620	30	845	13				0.416	8.6	26	
North:	Miss	issau	.ga Ro	ad N								
1 LT 2 TR	80	280 280		360 380	5				0.526 0.526	12.2 10.6		500 500
	80	560	100	740	4				0.526	11.4	30	
ALL VE	HICLE	:==== :S		Total Flow 3196	#V 9				Max X 0.988	Aver. Delay 20.7	Max Queue 177	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Mov	Mov Typ		Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest 95% Ba (vehs)	ck
West: N	Mayfield	Road W						
5L L	-	65	66	0.985	42.3	D	21.6	173
2T T		1260	1275	0.988*	35.2	D	21.9	177
2R R	(Slp)	90	741	0.121	9.3	A	0.7	6
South:	Mississ	 auga Roa	 d S					
3L L		26	93	0.280	18.8	В	1.7	14
8T T		100	357	0.280	12.0	В	1.7	14
8R R		70	250	0.280	13.1	В	1.7	14

East: Mayfield Road E

1L L 6T T 6R R	195 620 30	468 1489 72	0.417 0.416 0.417	13.9 7.0 7.8	B A A	3.1 3.1 3.1	26 26 26
North: Missis	sauga Road	d N					
7L L	80	152	0.526	17.7	В	3.8	30
4T T	560	1065	0.526	10.4	В	3.8	30
4R R	100	190	0.526	11.4	В	3.8	30
ALL VEHICLES	: 3196		0.988	20.7	C	21.9	177

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

 $^{\star}$  Maximum v/c ratio, or critical green periods

### **Table D.0 - Geometric Delay Data**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

	<b>m</b> - *		Negn	Negn	Negn	Appr.	Downstream	Distance
From Approach	To Approach	Turn	(m)	Speed (km/h)	Dist. (m)	Dist.	(m)	User Spec?
West: May	field Road	 L W						
	South	Right	41.0	34.5	19.3	500	141	No
	East	Thru	57.3	39.1	47.1	500	136	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mi	ssissauga	Road S						
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: May	field Road	 . E						
-	West	Thru	57.3	39.1	47.1	500	144	No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mis	ssissauga	 Road N						
	West	Right	35.0	32.5	19.4	500	. 126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

## **Table D.1 - Lane Delays**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

<sup>&</sup>quot; Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Lane	Satn	1st	2nd		Dec.	Total	MvUp	-		Control dic
	Mayfield 0.989 0.989 0.121	6.2 6.0	23.7 23.4	29.4	6.6	22.8	11.8	11.0	5.5	34.9
1 LT	: Mississ 0.280 0.280	6.3	0.1	6.4						
1 LT	Mayfield 0.416 0.416	1.2	0.0					0.0		
1 LT	: Mississa 0.526 0.526	4.0	1.2	5.2						
dn is	average	stop-	-start	delay	for a	ll vehi	cles	queued	and u	inqueued

## **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

Lane No.				_	Rate Overall	_	
1 LT 2 T	Mayfie 0.989 0.989 0.121	1.00	0.65 0.65	0.00	1.65 1.65 0.72		1.86
1 LT	: Missi 0.280 0.280	0.81	0.00	0.10	0.91 0.91		
1 LT		0.32	0.00		0.62 0.55		
North 1 LT 2 TR		0.74	0.06		0.93 0.91	0.738 0.735	

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued  $\frac{1}{2}$ 

## **Table D.3A - Lane Queues (veh)**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP

Intersection ID: 1

Roundabout

	_	Ovrfl.			•			Queue			
Lane	Satn	Queue ·									Stor.
No.	x	No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio

2 T 0.989 4.2 3.0 5.0 8.0 11.6 14.8 17.2 21.9 25.9 0.3 R 0.121 0.0 0.2 0.0 0.2 0.4 0.5 0.5 0.7 0.8 0.0		and the second second										
2 T 0.989 4.2 3.0 5.0 8.0 11.6 14.8 17.2 21.9 25.9 0.3 R 0.121 0.0 0.2 0.0 0.2 0.4 0.5 0.5 0.7 0.8 0.0	West:	Mayfiel	d Road V	v								
3 R 0.121 0.0 0.2 0.0 0.2 0.4 0.5 0.5 0.7 0.8 0.6  South: Mississauga Road S 1 LT 0.280 0.0 0.5 0.0 0.5 1.0 1.2 1.3 1.7 1.9 0.0 2 TR 0.280 0.0 0.5 0.0 0.5 1.0 1.2 1.4 1.7 2.0 0.0  East: Mayfield Road E 1 LT 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0 2 TR 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0  North: Mississauga Road N 1 LT 0.526 0.2 1.0 0.2 1.2 2.2 2.7 3.0 3.8 4.4 0.0	1 LT	0.989	4.1	3.0	4.9	7.8	11.4	14.6	16.9	21.6	25.5	0.35
South: Mississauga Road S 1 LT 0.280	2 T	0.989	4.2	3.0	5.0	8.0	11.6	14.8	17.2	21.9	25.9	0.35
1 LT 0.280 0.0 0.5 0.0 0.5 1.0 1.2 1.3 1.7 1.9 0.0 2 TR 0.280 0.0 0.5 0.0 0.5 1.0 1.2 1.4 1.7 2.0 0.0 East: Mayfield Road E 1 LT 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0 2 TR 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0 North: Mississauga Road N 1 LT 0.526 0.2 1.0 0.2 1.2 2.2 2.7 3.0 3.8 4.4 0.0	3 R	0.121	0.0	0.2	0.0	0.2	0.4	0.5	0.5	0.7	0.8	0.08
2 TR 0.280 0.0 0.5 0.0 0.5 1.0 1.2 1.4 1.7 2.0 0.0  East: Mayfield Road E 1 LT 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0 2 TR 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0  North: Mississauga Road N 1 LT 0.526 0.2 1.0 0.2 1.2 2.2 2.7 3.0 3.8 4.4 0.0	South	: Missis	sauga Ro	oad S								
East: Mayfield Road E 1 LT 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0 2 TR 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0	1 LT	0.280	0.0	0.5	0.0	0.5	1.0	1.2	1.3	1.7	1.9	0.03
1 LT 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0 2 TR 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0 North: Mississauga Road N 1 LT 0.526 0.2 1.0 0.2 1.2 2.2 2.7 3.0 3.8 4.4 0.0	2 TR	0.280	0.0	0.5	0.0	0.5	1.0	1.2	1.4	1.7	2.0	0.03
2 TR 0.416 0.0 1.0 0.0 1.0 1.8 2.2 2.5 3.1 3.6 0.0	East:	Mayfiel	d Road E	 3								
North: Mississauga Road N 1 LT 0.526 0.2 1.0 0.2 1.2 2.2 2.7 3.0 3.8 4.4 0.0	1 LT	0.416	0.0	1.0	0.0	1.0	1.8	2.2	2.5	3.1	3.6	0.05
1 LT 0.526 0.2 1.0 0.2 1.2 2.2 2.7 3.0 3.8 4.4 0.0	2 TR	0.416	0.0	1.0	0.0	1.0	1.8	2.2	2.5	3.1	3.6	0.05
1 LT 0.526 0.2 1.0 0.2 1.2 2.2 2.7 3.0 3.8 4.4 0.0	North	· Missis	sauga Ro	ad N								
			_		0.2	1 2	2 2	2 7	3.0	3 8	4 4	0.06
												0.06
	2 TR	0.526 	0.2 	1.1	0.2	1.2	2.2	2.7	3.1	3.8 	4.4	. U

Values printed in this table are back of queue (vehicles).

## **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

T	Deg.	Ovrfl.		ge (met:			Percen	tile (m	etres)		Queue Stor.
Lane No.	Satn x	Queue - No	Nb1	Nb2		70%	85%	90%	95%	98%	Ratio
West:	Mayfie	ld Road	w								
1 LT 2 T 3 R	0.989 0.989 0.121	33.2 33.9 0.0	23.7 24.1 1.8	38.9 39.9 0.0	62.6 64.0 1.8	91.6 93.4 3.4	116.6 119.0 4.1	135.4 138.2 4.7	173.0 176.6 5.8	204.3 208.6 6.7	0.35 0.35 0.08
South	: Missi	ssauga R	oad S								
1 LT 2 TR	0.280	0.0	4.3	0.0	4.4 4.6	8.1 8.5	9.8 10.3	11.1 11.7	13.8 14.5	15.9 16.8	0.03
East:	Mayfie	ld Road :	= E								
1 LT 2 TR	0.416	0.0	8.4 8.5	0.0	8.4 8.5	15.3 15.4	18.6 18.8	21.2 21.3	26.2 26.4	30.4 30.7	0.05
North	: Missi	ssauga R	oad N								
1 LT 2 TR	0.526 0.526	1.3	8.3 8.3	1.3	9.6 9.6	17.2 17.3	21.0	23.9 24.0	29.7	34.4 34.6	0.06

Values printed in this table are back of queue (metres).

## Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Intersection ID: 1 Roundabout

	App. Speeds	Exit Speeds	-	Move-up	Av. Secti	on Spd	Geom
Mov			1st	2nd			Delay
ID	Cruise Negn	Negn Cruise	Grn	Grn	Running O	verall	(sec)
lest: M	Mayfield Road W						
5L L	65.0 25.7	25.7 65.0	18.2		36.6	30.5	12.4

	65.0 65.0				18.2		32.4 50.7	
South: Mi	ississau	iga Roa	d S					
3L L	65.0	25.7	25.7	65.0	15.9	45.2	43.3	12.4
8T T	65.0	39.1	39.1	65.0	15.6	49.7	48.8	5.7
8R R	65.0	32.5	32.5	65.0	16.0	49.0	47.7	7.1
6T T	field R 65.0 65.0 65.0	25.7 39.1	39.1	65.0		52.4	46.7 52.4 51.3	5.7
North: Mi	ssissau	ga Road	 d N					
7L L	65.0	25.7	25.7	65.0	17.1	44.7	44.3	12.6
4T T	65.0	39.1	39.1	65.0	17.4	50.1	50.1	5.4
4R R	65.0	32.5	32.5	65.0	17.4	49.0	49.0	6.6

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mayfield 2031 AM TTMP

C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap Processed Jan 12, 2010 11:59:18AM

A1492, AECOM, Small Office

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# **Output Tables**

## Mississauga Road EA

## Mississauga Road and Mayfield Road 2031 PM TTMP

### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout
Driving on the right-hand side of the road
Input data specified in Metric units
Model Defaults: US HCM (Metric)
Peak Flow Period (for performance): 15 minutes
Unit time (for volumes): 60 minutes.
Delay definition: Control delay
Geometric delay included
HCM Delay Model option selected
HCM Queue Model option selected
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

## Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

From Approach	To Approach	Mov ID					Peak Flow Factor
Wost: May	field Road V						
west. May	South	v 2R	Right	5.5	10	1.00	1.00
	East	2T	Thru				
	North						1.00
	ssissauga Ro						
	West	3L	Left	74	1	1.00	1.00
	East	8R	Right	294	56	1.00	1.00
	North	8T	Thru	400	65	1.00	1.00
East: May	field Road E	3					
	West	6T	Thru	727	128	1.00	1.00
	South	1L	Left	95	10	1.00	1.00
	North	6R	Right	49	1	1.00	1.00
North: Mi	ssissauga Ro	ad N					
	West	4R	Right	54	1	1.00	1.00
	South	4T	Thru	163	7	1.00	1.00
	East	7L	Left	32	3	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Mov	Le	ft	Thr	ough	Ric	jht
ID	LV	HV	ΓΛ	HV	ΓΛ	HV
Demand flo	ws in v	eh/hour	as u	sed by	the pro	gram
West: Mayf						
5L L	103	2	0	0	0	0
2T T	0	0	921	69	0	0
2R R	0	. 0	0	0	55	10
 South: Mis	sissaug	a Road	 S			
3L L	74	2	0	0	0	0
8T T	0	0	400	65	0	0
8R R	0	0	0	0	294	56
 East: Mayf	ield Ro	ad E				
1L L	95	11	0	0	0	0
6T T	0	0	727	128	0	0
6R R	0	0	0	0	49	1
 North: Mis	sissaug	a Road 1				
7L L	32	3	0	0	0	0
4T T	0	0	163	7	0	0
4R R	0	0	Ω	0	54	1

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Mov	Lef	t	Thro	ugh	Rig	ht
10	Total	%HV	Total	%HV	Total	%HV
Demand flow West: Mayf			as use	d by th	e progr	am
5L L	105	1.9	0	0.0	0	0.0
2T T	0	0.0	990	7.0	0	0.0
2R R	0	0.0	0	0.0	65	15.4
South: Mis	sissauga	Road	s			
3L L	76	2.6	0	0.0	0	0.0
8T T	0	0.0	465	14.0	0	0.0
8R R	0	0.0	0	0.0	350	16.0
East: Mayf	ield Roa	 .d E				
1L L	106	10.4	0	0.0	0	0.0
6T T	0	0.0	855	15.0	0	0.0
6R R	0	0.0	0	0.0	50	2.0
North: Mis:	 sissauga	Road	N			
7L L	. 35	8.6	0	0.0	0	0.0
4T T	0	0.0	170	4.1	0	0.0
4R R	0	0.0	0	0.0	55	1.8

### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout
                                   Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) (m) (pcu/h) Effect
 _____
West: Mayfield Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 310 6.5 317 0 N 0.961 Exclusive Slip lane (exiting flow): 275 6.3 280 0 N 0.968
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 1130 6.6 1152 0 N
East: Mayfield Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 645 10.7 687 0 N 0.865
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 1035 13.6 1126 0 N 0.729
```

### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
                       Flow Aver Aver In-Bnch Prop ----- Foll-up Rate Speed Dist Headway Bunched Hdwy Dist Headway
       No. Type
                      (pcu/h) (km/h) (m) (s)
                                                                    (s)
                                                                            (m)
                                                                                     (s)
West: Mayfield Road W
   Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Dominant 317 33.1 104.5 1.45 0.243 4.19 38.5 Thru 1 Dominant 317 33.1 104.5 1.45 0.243 4.27 39.2
                                                                                       2.67
                                                                                     2.72
2 Subdominant 317 33.1 104.5 1.45 0.243 4.27 Right 3 Excl. Slip 280E 34.0 121.2 1.41 0.214 4.19
                                                                           39.2
                                                                                     2.72D
                                                                            39.6
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1152 37.4 32.5 1.03 0.520 3.47 36.1
Thru 1 Subdominant 1152 37.4 32.5 1.03 0.520 3.78 2 Dominant 1152 37.4 32.5 1.03 0.520 3.62 Right 2 Dominant 1152 37.4 32.5 1.03 0.520 3.68
                                                                              39.4 2.75
                                                                              37.6
                                                                           38.3 2.68
East: Mayfield Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 687 35.4 51.5 1.53 0.475 4.03 39.6
Thru 1 Subdominant 687 35.4 51.5 1.53 0.475 4.21 41.4
2 Dominant 687 35.4 51.5 1.53 0.475 4.17 41.0
                                                                                     2.75
                                                                                    2.85
```

687 35.4 51.5 1.53 0.475 3.79 37.3 2.59 Right 2 Dominant North: Mississauga Road N Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium Left 1 Subdominant 1126 36.8 32.7 1.10 0.535 3.66 37.4 Thru 1 Subdominant 1126 36.8 32.7 1.10 0.535 3.53 2.56 2 Dominant 1126 Right 2 Dominant 1126 32.7 1.10 0.535 3.34 36.8 34.2 2.43 32.7 1.10 0.535 3.34 1126 36.8 34.1 2.42 \_\_\_\_\_\_

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

- E Exiting flow for slip lane traffic
  - D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

### **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Mov ID	Demand		Oppos	sing	Movement Adjust.			Prac. Spare		
	Flow (veh/h)	HV (웅)	Flow (veh/h)		Flow	(veh		Cap.	(%)	х
West: Ma	ayfield R	oad W								
5L L	105	1.9	310	6.5		190	0.85	54	100	0.553
		7.0	310	6.5		1791		54	100	0.553
2R R	65	15.4	275	6.3	280	1048	0.85	1270	100	0.062
South: N	Mississau	ga Roa	ad S							
3L L		2.6	1130	6.6	1152	88	0.85	-2	100	0.864*
8T T	465	14.0	1130	6.6	1152	539	0.85	-1	100	0.863
8R R	350	16.0	1130	6.6	1152	406	0.85	1	100	0.862
East: Ma	ayfield R	oad E								
1L L	106	10.4	645	10.7	687	135	0.85	8	100	0.785
6T T	855.	15.0	645	10.7	687	1091	0.85	8	100	0.784
6R R	50	2.0	645	10.7	. 687	64	0.85	9	100	0.781
North: N	ississau	ga Roa	id N							
7L L	35	8.6	1035	13.6	1126	141	0.85	242	100	0.248
4T T	170	4.1	1035	13.6	1126	683	0.85	242	100	0.249
4R R	. 55	1.8	1035	13.6	1126	221	0.85	242	100	0.249

\_\_\_\_\_\_

### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Intersection Level of Service = B
Worst movement Level of Service = C
Average intersection delay (s/pers) = 15.0
Largest average movement delay (s) = 28.4

```
Largest back of queue, 95% (m)
                                                 82
                                            81.03
Performance Index
Degree of saturation (highest)
                                            0.864
Practical Spare Capacity (lowest)
                                             3847
Effective intersection capacity, (veh/h) =
Total vehicle flow (veh/h)
                                              3322
Total person flow (pers/h)
Total vehicle delay (veh-h/h)
                                             13.87
Total person delay (pers-h/h)
                                           16.64
                                        =
                                            3225
3870
Total effective vehicle stops (veh/h)
Total effective person stops (pers/h)
Total vehicle travel (veh-km/h)
                                        =
                                            2102.3
                                            1066.94
Total cost ($/h)
Total fuel (L/h)
                                             333.0
Total CO2 (kg/h)
                                            836.28
```

#### **Table S.5 - Movement Performance**

Mov ID		Total Delav	Total Delay		-		_			Aver. Speed	
		(veh-h/h)				Rate		(m)		(km/h)	
West:	Ma	yfield Roa	d W								
5L	L	0.43	0.51	14.7	0.61	0.80	4.7	38	2.28	46.1	
2Т	T	2.15	2.58	7.8	0.61	0.65	4.7	38	18.09	51.2	
2R		0.14	0.16	7.6	0.37	0.55	0.3	3	1.06	52.3	
		ississauga	Road S								
3L	L	0.60	0.72	28.4	0.92	1.26	9.4	79	2.47	36.9	
8T	T	2.80	3.36	21.7	0.92	1.23	9.5	82	13.81	40.4	
8R	R	2.21	2.65	22.7	0.92	1.24	9.5	82	10.45	39.6	
Cast:	May	/field Roa	 d E								
1L	L	0.68	0.82	23.2	0.93	1.16	9.5	81	3.14	40.3	
6T	$\mathbf{T}$	3.86	4.64	16.3	0.93	1.14	9.5	81	22.96	44.7	
6R	R	0.24	0.28	17.0	0.93	1.15	9.5	81	1.35	43.6	
North:	. M	ississauga	Road N								
7L	L	0.16	0.19	16.7	0.75	0.93	1.5	12	0.84	45.1	
4 T	T	0.44	0.53	9.3	0.75	0.77	1.5	12	3.44	50.2	
4R	R	0.16	0.19	10.2	0.75	0.83	1.5	12	1.13	49.4	

## **Table S.6 - Intersection Performance**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout
Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Queued Stop Queue Index Speed
(veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m)
West: Mayfield Road W
1160 0.553 2.71
                      3.26
                             8.4 0.60 0.66 38 21.43 50.8
South: Mississauga Road S
 891 0.864 5.61 6.73 22.7 0.92 1.23
                                                 82 26.72
                                                              39.7
East: Mayfield Road E
1011 0 785 4.78 5.74 17.0 0.93 1.14 81 27.46
North: Mississauga Road N
 260 0.249 0.76 0.91
                             10.5 0.75 0.80
                                                 12
                                                       5.41
```

ALL VEHICLES:

3322 0.864 13.87 16.64 15.0 0.80 0.97 82 81.03 45.2

INTERSECTION (persons):

3986 0.864 16.64 15.0 0.80 0.97 81.03 45.2

Queue values in this table are 95% back of queue (metres).

### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Lane	Dem Flow	_	_	Aver.		Q u e 95% Ba		
No.	(veh /h)			_	_	(vehs)	(m)	Length (m)
West: 1 LT 2 T 3 R	546	993 988	0.553	7.8	0.65	4.7 4.7 0.3	38.0	
1 LT	: Mississa 439 452	509	0.862					
	Mayfield 502 509	641	0.784			9.5 9.5		
North 1 LT 2 TR		496	0.249	11.6 9.6		1.5 1.5	11.8 11.9	

## **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Lane No.								
					/h)			
West: M	ayfie	ld Ro	ad W					
1 LT	105	444	0	549	150	993	0.553	100
2 T	0	546	0	546	150	988	0.553	100
3 R	0	0	65	65	65	1048	0.062	100
South: 1 LT 2 TR	76	363	0	439				
East: M	ayfie	ld Roa	ad E					
1 LT	106	396	0	502	150	641	0.784	100
2 TR	0	459	50	509	150	649	0.784	. 100
North:	 Missi	ssauga	a Roa	 d N				
1 LT	35	88	0	123	123	496	0.249	100
2 TR	0	82	55	137	137	548	0.249	100

-----

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

## **Table S.10 - Movement Capacity and Performance Summary**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Mov ID	Mov Typ	Dem Flow (veh	Total Cap. (veh	Lane Util	Deg. Satn	Aver. Delay	_	95% Back of Queue	Perf. Index
		/h)	/h)	(%)	х	(sec)	Nate	(veh)	
West: M	ayfiel	d Road	W						
5L L		105	190	100	0.553			4.7	
2T T		990	1791	100		7.8		4.7	18.09
2R R	(Slp)	65	1048	100	0.062	7.6	0.55	0.3	1.06
South: I	Missis	sauga	 Road S						
3L L		76	88	100	0.864*	28.4	1.26	9.4	2.47
8T T		465	539	100	0.863	21.7	1.23	9.5	13.81
8R R		350	406	100	0.862	22.7	1.24	9.5	10.45
East: Ma	ayfielo	d Road	 Е						
1L L	-	106	135	100	0.785	23.2	1.16	9.5	3.14
6T T		855	1091	1,00	0.784	16.3	1.14	9.5	22.96
6R R		50	64	100	0.781	17.0	1.15	9.5	1.35
North: N	Mississ	auga i	 Road N						
7L L			141	100	0.248	16.7	0.93	1.5	0.84
4T T		170	683	100	0.249	9.3	0.77	1.5	3.44
4R R		55	221	100	0.249	10.2	0.83	1.5	1.13

<sup>\*</sup> Maximum degree of saturation

## **Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Mov	Fuel Total L/h	Cost Total \$/h	Total	CO Total kg/h		
West: Mayfiel	Ld Road W					
5L L	8.7	30.54	0.037	1.82	0.054	21.
2T T	84.0	271.47	0.322	17.09	0.541	210.
2R R	6.7	19.91	0.024	1.38	0.044	16.
	99.3	321.92	0.382	20.29	0.639	249.
outh: Missis	sauga Road					
3L L	6.9	25.86	0.030	1.45	0.042	17.
8T T	52.3	167.89	0.198	11.33	0.348	131.
8R R	41.4	130.98	0.156	9.15	0.279	104.
	100.7	324.73	0.384	21.92	0.669	253.

East:	Mayfield	Road E					
1L	L	11.5	38.32	0.046	2.50	0.074	28.
6Т	T	96.1	296.46	0.356	21.10	0.650	241.
6R	R	4.1	14.35	0.018	0.88	0.026	10.
		111.7	349.13	0.420	24.49	0.751	280.
North:	: Mississ	auga Roa	id N				
7L	L	3.4	11.34	0.014	0.74	0.022	8.
4 T	T	13.7	45.45	0.055	2.82	0.088	34.
4R	R	4.2	14.37			0.027	
		21 3	71.16				
		21.5					
		333.0	1066.94	1.273			
ARAME	ETERS USEI	333.0		1.273 			
PARAME	TTERS USEI	333.0 O IN COS	1066.94 T CALCULA	1.273 	71.15	0.900	836.
PARAME Pum Fue	ETERS USEI	333.0 O IN COS of fuel	T CALCULATOR (\$/L) factor	1.273 	71.15	0.900 0.70	836.
Pum Fue Rat	TERS USEI	333.0 O IN COS of fuel ce cost nning co	T CALCULAY  (\$/L) factor st to fuel	1.273 	71.15	2.196 0.900 0.70	836.
PARAME Pum Fue Rat Ave	eTERS USEI	333.0  O IN COS  of fuel ce cost ning co  ome (\$/h	T CALCULAY  (\$/L) factor st to fuel	1.273 	71.15	0.900 0.70 3.0 19.00	836.
PARAME Pum Fue Rat Ave	eTERS USEI  p price of el resourd io of run erage income	333.0  O IN COS  of fuel ce cost nning co  ome (\$/h	T CALCULA:  (\$/L) factor st to fue:	1.273 	71.15	0.900 0.70 3.0 19.00	836.
PARAME Pum Fue Rat Ave Tim Lig	mp price of the pr	333.0  O IN COS  of fuel ce cost mining co ome (\$/h factor	1066.94  T CALCULA:  (\$/L) factor st to fuel ) (1000 kg)	1.273	71.15	2.196 0.900 0.70 3.0 19.00 0.40	836.
PARAME Pum Fue Rat Ave Tim Lig	ETERS USEI  The price of rure  The prage income  The value for	333.0  O IN COS  of fuel ce cost ning co ome (\$/h  factor Le mass	T CALCULA:  (\$/L) factor st to fue:	1.273	71.15	0.900 0.70 3.0 19.00	836.

## Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Mov	Fuel	Cost	HC	CO	NOX	CO2
ID	Rate L/100km	Rate \$/km	Rate g/km	Rate g/km	Rate g/km	Rate g/km
		3/ KIII	97 KIII	9/KIII		9/KIII
West: Mayfield	Road W					
5L L	12.3	0.43	0.521	25.73	0.767	307.8
2T T	13.5	0.44	0.517	27.43	0.869	337.8
2R R	16.4	0.49	0.580	33.92	1.075	412.0
	13.5	0.44	0.521	27.62	0.870	339.0
South: Mississa	auga Poad					
3L L	13.5	0.50	0.589	28.18	0.823	337.6
8T T	17.9	0.57	0.676		1.190	449.6
8R R	19.0	0.60	0.717	41.94	1.276	477.7
	17.9	0.58	0.684	39.00	1.190	450.3
East: Mayfield	Road E					
1L L	16.1	0.54	0.640	34.97	1.040	403.5
6T T	17.9	0.55	0.663	39.22		449.0
6R R	13.2	0.46	0.562	28.27	0.842	329.2
	17.4	0.54	0.655	38.21	1.172	438.1
Jorth: Mississa	uga Road	N				
7L L	14.6	0.48	0.579	31.19	0.937	365.3
4T T	12.8	0.42	0.511	26.34	0.822	319.6
4R R	12.4	0.42	0.516	26.09	0.795	309.2
	12.9	0.43	0.522	26.98	0.833	324.0

Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Lane No.	Dema	nd Fl	ow (v	reh/h)		Adj. Basic				Longest Oueue	
	L	Т	R	Tot		Satf.			(sec)	(m)	(m)
West:	Mayfi	eld F	load W				 				
1 LT	105	444		549	6			0.553			500
2 T 3 R		546	65	546 65	7 15			0.553	7.8 7.6		500 75
3 K							 				
	105	990	65	1160	7			0.553	8.4	38	
South:	Miss	issau	iga Ro	ad S			 				
1 LT	76	363		439	12			0.862			500
2 TR		102	350	452	16			0.862	22.4	82	500
	76	465	350	891	14			0.862	22.7	82	
 East:	 Mavfi	eld R	 .oad E				 				
1 LT		396		502	14			0.784	17.8	81	500
2 TR		459	50	509	14			0.784	16.3	81	500
	106	855	50	1011	14		 	0.784	17.0	81	
North:	Miss	issau	ga Ro	ad N			 				
1 LT	35	88		123	5			0.249			500
2 TR		82	55	137	3		 	0.249	9.6	12	500
	35	170	55	260	4			0.249	10.5	12	
ALL VE	HICLE	===== S		Total	**************************************	======		====== Max	Aver.	Max	
				Flow				X	_	Queue	
				3322	11			0.864	15.0	82	

Peak flow period = 15 minutes.

East: Mayfield Road E

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

• Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Mov	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest 95% Ba (vehs)	~
West: N	avfield	Road W						
5L L	-	105	190	0.553	14.7	В	4.7	38
2T T		990	1791	0.553	7.8	A	4.7	38
2R R	(Slp)	65	1048	0.062	7.6	A	0.3	3
South:	Mississa	auga Roa	 d S					
3L L		76	88	0.864*	28.4	С	9.4	79
8T T		465	539	0.863	21.7	С	9.5	82
8R R		350	406	0.862	22.7	С	9.5	82

1L L 6T T 6R R	106 855 50	135 1091 64	0.785 0.784 0.781	23.2 16.3 17.0	C B B	9.5 9.5 9.5	81 81 81
North: Mississ 7L L 4T T 4R R	auga Road 35 170 55	1 N 141 683 221	0.248 0.249 0.249	16.7 9.3 10.2	B A B	1.5 1.5 1.5	12 12 12
ALL VEHICLES:	3322		0.864	15.0	В	9.5	82

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

- \* Maximum v/c ratio, or critical green periods
- " Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

## **Table D.0 - Geometric Delay Data**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

From T	'o		_	-	Negn		Downstream	n Distance
Approach A			Radius (m)	-		Dist. (m)	(m)	User Spec?
West: Mayfi	eld Road	W						
	South	Right	41.0	34.5	19.3	500	141	No
	East	Thru	57.3	39.1	47.1	500	136	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Miss	issauga	 Road S						
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: Mayfi	eld Road	E						
<del>-</del>	West	Thru	57.3	39.1	47.1	500	144	No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Miss	issauga 1	 Road N						
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

----- Delay (seconds/veh) -----

## Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

	Lane No.	Deg. Satn x	1st		Delay Total dSL	Dec.		qUvM	Stopd (Idle) di		Control dic	
٠	1 LT	Mayfield 0.553 0.553 0.062	2.0	0.3	2.3 2.3 1.0	4.0	0.0		0.0		7.8	
	1 LT	Mississ 0.862 0.862	6.3	9.7	16.1				5.2 5.1			
	1 LT	Mayfield 0.784 0.784	5.2	5.4					1.6 1.3			
	1 LT	Mississa 0.249 0.249	4.1	0.0	4.1			0.0	0.1			
	dn is	average	stop-	start	delay	for a	ll vehi	cles	queued	and u	inqueued	

## Table D.2 - Lane Stops

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

Lane No.	Deg. Satn x			_	Rate Overall h	-	-
1 LT 2 T	0.553	0.47	0.01	0.17	0.68 0.65 0.55	0.611	0.03
	0.862	0.92	0.27		1.23	0.921 0.920	
East: 1 1 LT ( 2 TR (	0.784	0.93	0.18		1.14		
	0.249	0.70	0.00	0.13	0.83 0.78	0.752 0.753	

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued

## **Table D.3A - Lane Queues (veh)**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1  $\,$ 

Roundabout

	Deg.	Ovrfl.	Avera	ge (veh)	)		Percen	tile (v	eh)		Queue
Lane	Satn	Queue -									Stor.
No.	x	No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio

West:	Mayfield	d Road V	I								
1 LT	0.553	0.1	1.4	0.1	1.5	2.7	3.3	3.8	4.7	5.5	0.08
2 T	0.553	0.1	1.4	0.1	1.5	2.7	3.3	3.8	4.7	5.5	0.08
3 R	0.062	0.0	0.1	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.04
South	: Mississ	sauga Ro	ad S								
1 LT	0.862	1.2	1.9	1.2	3.2	5.3	6.5	7.5	9.4	11.0	0.16
2 TR	0.862	1.2	1.9	1.3	3.2	5.3	6.6	7.6	9.5	11.1	0.16
East:	Mayfield	Road E	;								
1 LT	0.784	0.8	2.2	1.0	3.2	5.3	6.6	7.6	9.5	11.1	0.16
2 TR	0.784	0.8	2.2	1.0	3.2	5.4	6.7	7.6	9.5	11.2	0.16
North	: Mississ	auga Ro	ad N								
1 LT	0.249	0.0	0.5	0.0	0.5	0.9	1.1	1.2	1.5	1.7	0.02
2 TR	0.249	0.0	0.5	0.0	0.5	0.9	1.1	1.2	1.5	1.8	0.02

Values printed in this table are back of queue (vehicles).

### **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

T	Deg.	Ovrfl. Oueue -		-	res)						Queue
Lane No.	Satn x	-		Nb2	Nb		85%	90%	95%	98%	Stor. Ratio
West:	Mayfie	ld Road	w								
1 LT	0.553	0.5	11.5	0.8	12.2	21.8	26.7	30.3	37.7	43.8	0.08
2 T	0.553	0.5	11.6	0.8	12.3	21.9	26.9	30.6	38.0	44.1	0.08
3 R	0.062	0.0	0.9	0.0	0.9	1.7	2.0	2.3	2.8	3.3	0.04
South	 : Missi	 ssauga R	oad S								
1 LT	0.862	9.7	16.1	10.4	26.5	44.2	54.8	62.7	78.6	91.8	0.16
2 TR	0.862	10.1	16.7	10.8	27.5	45.9	56.9	65.1	81.6	95.3	0.16
East:	Mayfie	 ld Road	 E								
1 LT	0.784	6.9	18.5	8.7	27.2	45.4	56.3	64.4	80.8	94.4	0.16
		6.8						64.6	80.9	94.6	0.16
North	· Missi	 ssauga R	oad N								
1 LT		0.0		0.0	3.7	6 9	8 4	9 5	11.8	13.6	0.02
		0.0		0.0	3.8	7.0		9.7		13.8	0.02

Values printed in this table are back of queue (metres).

## Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Intersection ID: 1 Roundabout

	App. Speeds	Exit Speeds	Queue Move-up	Geom	
Mov ID	Cruise Nean	Negn Cruise	1st 2nd Grn Grn	Running Overall	Delay (sec)
10		Negh Cluise			
West: M	ayfield Road W				
5L L	65.0 25.7	25.7 65.0	25.5	46.1 46.1	12.4

		39.1 34.5			25.3	51.2 52.3	51.2 52.3	
South: Mis	ssissav	ıga Road	 d S					
3L L	65.0	25.7	25.7	65.0	16.8	40.9	36.9	12.4
8T T	65.0	39.1	39.1	65.0	16.3	44.2	40.4	5.7
8R R	65.0	32.5	32.5	65.0	16.6	43.6	39.6	7.1
East: May	field R	oad E						
1L L	65.0	25.7	25.7	65.0	19.8	42.3	40.3	12.6
6T T	65.0	39.1	39.1	65.0	19.5	45.8	44.7	5.7
6R R	65.0	32.5	32.5	65.0	20.3	45.2	43.6	6.6
North: Mis	sissau	ga Roac	 d N					
7L L	65.0	25.7	25.7	65.0		45.5	45.1	12.6
4T T	65.0	39.1	39.1	65.0		50.2	50.2	5.4
4R R	65.0	32.5	32.5	65.0		49.4	49.4	6.6

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mayfield 2031 PM TTMP

C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap Processed Jan 12, 2010 12:03:55PM

A1492, AECOM, Small Office

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# **Output Tables**

## Mississauga Road EA

## Mississauga Road and Sandalwood Parkway 2031 AM TTMP

### **Run Information**

\* Basic Parameters:

Intersection Type: Roundabout

Driving on the right-hand side of the road

Input data specified in Metric units

Model Defaults: US HCM (Metric)

Peak Flow Period (for performance): 15 minutes

Unit time (for volumes): 60 minutes.

Delay definition: Control delay

Geometric delay included

HCM Delay Model option selected

HCM Queue Model option selected

Level of Service based on: Delay (HCM method) Queue definition: Back of queue, 95th Percentile

## Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout.

	From Approach	To Approach	Mov ID					Peak Flow Factor		
-	West: San	dalwood Park	 way W							
		South	2R	Right	176	4	1.00	1.00		
		East	2T	Thru	98	2	1.00	1.00		
		North	5L	Left	5	0 -	1.00	1.00		
-	South: Mississauga Road S									
				Left	44	1	1.00	1.00		
		East	8R	Right	260	5	1.00	1.00		
		North	8T		274		1.00			
East: Sandalwood Parkway E										
		West	6T	Thru	78	2	1.00	1.00		
		South	1L	Left	176	4	1.00	1.00		
		North	6R	Right	240	5	1.00	1.00		
-	North: Mis	ssissauga Roa	 ad N							
		West	4R	Right	74	1	1.00	1.00		
		South	4T	Thru	1037	43	1.00	1.00		
		East	7L	Left	456	9	1.00	1.00		

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Mov ID	L	eft	Thr	ough	Right		
ID	LV	HV	LV	HV	LV	HV	
	lows in			sed by	the pro	gram	
West: Sa	andalwood	Parkway	W				
5L L	5	1	0	0	0	0	
2T T	0	0	98	2	0	0	
2R R	0	0	0	0	176	4	
South: M	ississau	ga Road :	<b>-</b> S				
3L L	44	1	0	0	0	0	
8T T	0	0	274	56	0	0	
8R R	0	0	0	0	260	5	
 East: Sa	ndalwood	Parkway	E				
1L L	176	4	0	0	0	0	
6T T	0	0	78	2	0	0	
6R R	0	0	0	0	240	5	
North: M	ississau	ga Road I	1				
7L L		9	0	0	0	0	
4T T	0	0 3	L037	43	0	0	
4R R	0	0	Ο	0	74	2	

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Mov		Left			ugh	Right	
ID		Total	%HV	Total	%HV	Total	%HV
				r as use	d by the	progra	ım
west: 5L			Parkway 16.7	y w 0	0.0	0	0.0
2T	_			100		0	0.0
	R		0.0	0	0.0	180	2.2
 South	: : Missi	ssaug	 a Road	s			
3L	L	45	2.2	0	0.0	0	0.0
8T	T	0	0.0	330	17.0	0	0.0
8R	R	0	0.0	0	0.0	265	1.9
 East:	Sandal	wood	Parkway	/ E			
1L	L	180	2.2	0	0.0	0	0.0
6Т	T	0	0.0	80	2.5	0	0.0
6R	R	0	0.0	0	0.0	245	2.0
North:	: Missi	ssaug	a Road	N			
7L	L	465	1.9	0	0.0	0	0.0
4 T	T	0	0.0	1080	4.0	0	0.0
4R	R	0	0.0	0	0.0	76	2.6

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout
                                    Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
             Lanes Lanes Width (veh/ Flow Incl. Constr. Factor
) (m) h) (pcu/h) Effect
Diam
 . (m)
           (m)
                                         (pcu/h) Effect
West: Sandalwood Parkway W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 1725 3.3 1726 0 N 0.652
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 570 2.0 570 0 N 0.892
East: Sandalwood Parkway E
 Environment Factor: 1.20
                       Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 380 15.0 420 0 N 0.924
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 305 2.0 305 0 N 0.963
```

#### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundahout
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
                 Flow Aver Aver In-Bnch Prop ----- Foll-up
                 Rate Speed Dist Headway Bunched Hdwy Dist (pcu/h) (km/h) (m) (s) (s) (m)
                                                             Dist Headway
_____
West: Sandalwood Parkway W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1726 34.1 19.8 1.14 0.725 3.81 36.1
                                                                      2.88
                                 19.8 1.14
Thru 1 Subdominant 1726
                          34.1
                                              0.725
                                                              32.4
                                                                      2.58
Right 2 Dominant 1726 34.1 19.8 1.14 0.725 2.91 27.5
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 570 28.1 49.3 2.00 0.505 4.02 31.4 Thru 1 Subdominant 570 28.1 49.3 2.00 0.505 4.51 35.2
                                                                      2.69
                                                              35.2
                                                                      3.01
2 Dominant 570 28.1 49.3 2.00 0.505 4.41 34.4 Right 2 Dominant 570 28.1 49.3 2.00 0.505 3.94 30.7
                                                                      2.95
                                                             30.7
                                                                      2.63
East: Sandalwood Parkway E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 420 37.3 89.0 1.43 0.305 4.13
Thru 1 Subdominant 420 37.3 89.0 1.43 0.305 4.13
                                                             42.9
                                                                      2.69D
                                                             42.9
                                                                      2.69D
                   420 37.3
420 37.3
                                89.0 1.43
89.0 1.43
                                            0.305
2 Dominant
Right 2 Dominant
                         37.3
                                                      4.13
                                                             42.9
                                                                     2.69
                                                      4.13
                                                             42.9
                                                                      2.69
```

North	: 1	Mississauga Ro	oad N							
Env:	iro	onment Factor:	1.20	Entry/	Circu.	lating	Flow Adjus	stment:	Medium	
Left	1	Subdominant	305	29.2	95.9	1.79	0.282	4.12	33.4	2.62
Thru	1	Subdominant	305	29.2	95.9	1.79	0.282	4.12	33.5	2.62
	2	Dominant	305	29.2	95.9	1.79	0.282	4.11	33.3	2.61
Right	2	Dominant	305	29.2	95.9	1.79	0.282	4.10	33.3	2.61

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

### **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Mov ID	Demand Flow (veh/h)	HV (용)	Oppos Flow (veh/h)	HV	ovement Adjust. Flow (pcu/h)	Total Cap. (veh /h)		Prac. Spare Cap.	Lane Util	Deg. Satn
West: S	andalwood									
5L L 2T T	6	16.7	1725	3.3	1726 1726	16 273	0.85	127 132	78 78	0.375 0.366
2R R	180	2.2	1725	3.3	1726	383	0.85	81	100	0.470
South: N 3L L 8T T 8R R		2.2	570 570 570	2.0 2.0 2.0	570 570 570	720 578	0.85 0.85 0.85	85 85 85	100 100 100	0.459 0.458 0.458
East: Sa	andalwood	Parkw	 ay E							
1L L 6T T 6R R	180 80 245	2.2 2.5 2.0		15.0 15.0 15.0	420 420 420	639 284 870	0.85 0.85 0.85	202 202 202	100 100 100	0.282 0.282 0.282
North: N	Mississau	ga Roa	d N							
7L L 4T T 4R R	465 1080 76	1.9 4.0 2.6	305 305 305	2.0 2.0 2.0	305 305 305	598 1389 98	0.85 0.85 0.85	9 9 10	100 100 100	0.778* 0.778* 0.776

#### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Intersection Level of Service = B
Worst movement Level of Service = C
Average intersection delay (s/pers) = 12.2
Largest average movement delay (s) = 22.5
Largest back of queue, 95% (m) = 90
Performance Index = 67.81
Degree of saturation (highest) = 0.778

```
Practical Spare Capacity (lowest)
Effective intersection capacity, (veh/h) =
                                             3925
Total vehicle flow (veh/h)
                                              3052
Total person flow (pers/h)
                                               3662
                                            10.31
Total vehicle delay (veh-h/h)
                                            12.37
Total person delay (pers-h/h)
Total effective vehicle stops (veh/h)
                                            3094
                                              2579
Total effective person stops (pers/h)
Total vehicle travel (veh-km/h)
                                       = 1947.8
                                            856.89
Total cost ($/h)
Total fuel (L/h)
                                            255.8
Total CO2 (kg/h)
                                            640.75
```

**Table S.5 - Movement Performance** 

Mov ID		Total Delay (veh-h/h)		Delay	Queued	Stop	95% Ba	ack.		
West:	Saı	ndalwood P	arkway W							
5L	L	0.04	0.04	22.5	0.86	0.99	2.2	17	0.17	40.
2T	T	0.43	0.52	15.5	0.86	0.95	2.2	17	2.60	45.
2R	R	0.80	0.95	15.9	0.88	1.00	3.4	2.6	4.60	44.
South	. Mi	ississauga	Road S							
3L	L	0.22	0.26	17.4	0.76	0.91	3.8	32	1.09	44.
8 T	T	0.97	1.17	10.6	0.76	0.86	3.9	31	7.06	50.
8R	R	0.80	0.96	10.8	0.75	0.85	3.9	31	5.57	49.
 East:	Sar	ndalwood Pa	arkwav E							
1L			0.85	14.2	0.55	0.79	1.8	14	3.78	46.
6T	T	0.16	0.19	7.2	0.55	0.60	1.8	14	1.39	51.
6R	R	0.57	0.69	8.4	0.55	0.68	1.8	14	4.41	50.
North:	Mi	ssissauga	Road N							
7L				17.4	0.82	0.89	11.4	89	11.61	44.
4 T	T	3.12	3.75	10.4	0.82	0.84	11.4	90	23.82	49.
4R	Ð	0.24	0 29	11 5	0.82	0.86	11.4	٩n	1.70	48.

#### **Table S.6 - Intersection Performance**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout
Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Delay Queued Stop Queue Index Speed
(veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m)
                                                     (km/h)
West: Sandalwood Parkway W
 286 0.470 1.26 1.52 15.9 0.87 0.98 26
                                                    7.37
South: Mississauga Road S
 640 0.459 1.98 2.38 11.2 0.75 0.86 32 13.72
East: Sandalwood Parkway E
 505 0.282 1.44 1.73
                            10.3 0.55 0.70
                                              14
                                                     9.57
                                                           49.1
North: Mississauga Road N
1621 0.778 5.61 6.74 12.5 0.82 0.86
                                              90 37.13
                                                           47.9
ALL VEHICLES:
3052 0.778
            10.31 12.37 12.2 0.77 0.84
                                              90 67.81
```

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

T	Dem Flow	-	_	Aver.		Q u e 95% Ba		
Lane No.	(veh /h)			_	-	(vehs)	(m)	Length (m)
West: S	andalwo	od Par	kway W					
1 LT	106	290	0.366	15.9	0.95	2.2	17.4	500.0
2 R	180	383	0.470	15.9	1.00	3.4	26.0	500.0
South:	Mississ	auga R	oad S					
1 LT	300	655	0.458	11.7	0.88	3.8	32.2	500.0
2 TR	340	742	0.458	10.6	0.85	3.9	30.8	500.0
East: S	andalwo	od Par	kway E					
1 LT	252	897	0.281	12.2	0.73	1.8	14.2	500.0
2 TR	253	897	0.281	8.4	0.67	1.8	14.2	500.0
North:	Mississ	auga R	 oad N					
	809			14.4	0.87	11.4	88.7	500.0
2 TR	812	1044	0.778	10.5	0.84	11.4	89.6	500.0

### **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

					Cap (veh	(veh	Deg. Satn x	Util
	6	100	0 180	106 180	150	383	0.366	100
	45	ssaug 255	a Roa	d S 300	150	655	0.458	100
East: 1 LT 2 TR	180	72	0	252			0.281 0.281	
North: 1 LT 2 TR	465	344	0	809				

P Lane under-utilisation found by the "Program". This includes cases where the value of lane under-utilisation due to downstream effects has been modified by the program during lane flow calculations (e.g. a de facto exclusive lane has been found).

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Mov ID	Mov Typ	Dem Flow (veh	Total Cap. (veh	Lane Util		Aver. Delay	Stop	95% Back of Oueue	Perf. Index
		/h)	/h)	(%)	х	(sec)		(veh)	
West: S	andalw	ood Pa	rkway W	,					
5L L		6	16	78	0.375	22.5	0.99	2.2	0.17
2T T		100	273	78	0.366	15.5	0.95	2.2	2.60
2R R		180	383	100	0.470	15.9	1.00	3.4	4.60
South:	Missis	sauga	Road S						
3L L		45	98	100	0.459	17.4	0.91	3.8	1.09
8T T		330	720	100	0.458	10.6	0.86	3.9	7.06
8R R		265	578	100	0.458	10.8	0.85	3.9	5.57
East: S	andalw	ood Pa	rkway E						
1L L		180	639	100	0.282	14.2	0.79	1.8	3.78
6T T		8.0	284	100	0.282	7.2	0.60	1.8	1.39
6R R		245	870	100	0.282	8.4	0.68	1.8	4.41
North:	Missis:	sauga	 Road N						
7L L		465	598	100	0.778*	17.4	0.89	11.4	11.61
4T T		1080	1389	100	0.778*	10.4	0.84	11.4	23.82
4R R		76	98	100	0.776	11.5	0.86		1.70

<sup>\*</sup> Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Mov ID		Cost Total \$/h	Total			
Vest: Sandalwood	l Parkwa	av W				
5L L		1.84	0.002	0.10	0.003	1.2
2T T	7.9	27.77	0.033	1.62	0.050	19.8
2R R	14.4	50.40	0.061	3.05	0.092	36.3
-	22.8	80.01	0.096	4.77	0.145	57.2
outh: Mississau	ıga Road	 IS				
3L L	3.8	13.46	0.016	0.80	0.024	9.5
8T T	36.2	107.71	0.129	7.72	0.243	91.0
8R R	20.4	69.24	0.085	4.31	0.131	51.3

East: Sandalwood Parkway E

1L L 6T T 6R R	5.9	52.11 19.99 62.40	0.024	1.16	0.037	14.7
	39.1	134.50	0.163	8.08	0.247	97.9
North: Mississa	auga Roac	 i N				
7L L						
4T T						
4R R	5.9	20.10	0.025	1.26	0.038	14.8
	133.4	451.97	0.548	28.01	0.855	334.0
INTERSECTION:	255.8				1.645	
PARAMETERS USEL	) IN COST	CALCULAT				
	) IN COST	CALCULAT		=		
PARAMETERS USED	O IN COST	CALCULAT	rions	=	0.900	
PARAMETERS USEL  Pump price of Fuel resource	O IN COST 	CALCULATOR (S/L) Factor	rions	= = = =	0.900 0.70	
PARAMETERS USER  Pump price of Fuel resource Ratio of run Average inco	of fuel (see cost funing cosme (\$/h)	\$ CALCULA! \$/L) Cactor to fuel	rions	= = = =	0.900 0.70 3.0 19.00 0.40	
PARAMETERS USER  Pump price of Fuel resource Ratio of run Average inco	of fuel (see cost funing cosme (\$/h) factor	\$/L) Sactor to fuel	rions	= = = = =	0.900 0.70 3.0 19.00 0.40 1.4	
PARAMETERS USER  Pump price of Fuel resource Ratio of run Average inco	of fuel (se cost fining cosme (\$/h) factor .e mass (e mass (	CALCULATOR (S/L) Sactor (t to fuell (1000 kg) (1000 kg)	rions 	= = = =	0.900 0.70 3.0 19.00 0.40	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Mov ID	Fuel Rate L/100km	Rate	HC Rate g/km	Rate		
 Vest: Sandal	wood Parkway	 z W				
5L L	12.2		0.538	25.05	.0.738	306.5
2T T	12.6		0.525			314.5
2R R	12.9	0.45			0.819	321.9
	12.7	0.45	0.538	26.62	0.809	318.9
South: Missi	ssauga Road	S				
3L L	12.5	0.44	0.535	26.40	0.782	313.9
8T T	17.4	0.52	0.619	37.16	1.168	438.1
8R R	12.4	0.42	0.516	26.10	0.795	309.3
	15.0	0.47	0.571	31.82	0.986	376.0
ast: Sandalı	wood Parkway	, E				
1L L	12.3	0.43	0.518	25.55	0.763	306.5
6T T	11.6	0.40	0.471	23.04	0.733	291.0
6R R	12.1	0.41	0.499	24.97	0.770	301.6
	12.1	0.41	0.502	24.89	0.762	301.8
orth: Missis	ssauga Road	N				
7L L	12.6	0.45	0.540	26.87	0.792	316.4
4T T	12.9	0.43	0.520	26.96	0.836	323.6
4R R	12.5	0.42	0.524	26.57	0.805	312.7
	12.8	0.43	0.526	26.91	0.821	320.9
INTERSECTION	 √: 13.1	0.44	0.532	27.56	0.844	329.0

Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Lane No.	Dema					Adj. Ef Basic (	(secs)	Sat	Delay		Lane
West:				-	_						
1 LT	6	100		106	3 2			0.366			
2 R			180	180	Z			0.4/0	15.9	26 	500
	6	100	180	286	2			0.470	15.9	26	
South:	Miss	issau	ga Ro	ad S							
1 LT	45	255	-	300	15			0.458	11.7	32	500
2 TR		75	265	340	5			0.458	10.6	31	500
	45	330	265	640	10			0.458	11.2	32	
 East:	 Sanda	lwood	 Dark								
1 LT	180			.way E 252	2			0.281	12.2	14	500
2 TR		8		253	2				8.4		500
	180	80	245	505	2			0.281	10.3	14	
North:	Miss	issau	ga Ro	ad N							
1 LT		344			, 3			0.778	14.4	89	500
2 TR		736	76	812	4			0.778	10.5	90	500
	465	1080	76	1621	3			0.778	12.5	90	
ALL VE	===== HICLE	===== S		Total	용	=======		====== Max	Aver.	Max	
				Flow	HV			X	Delay	Queue	
				3052	4			0.778	12.2	90	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Mov ID	Mov Typ	Flow		Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest 95% Ba (vehs)	ck
West: S	andalwo	od Parkw	ay W					
5L L		6	16	0.375	22.5	С	2.2	17
2T T		100	273	0.366	15.5	В	2.2	17
2R R		180	383	0.470	15.9	В	3.4	26
South:	Mississ	auga Roa	<b></b> d S					
3L L		45	98	0.459	17.4	В	3.8	32
8T T		330	720	0.458	10.6	В	3.9	31
8R R		265	578	0.458	10.8	В	3.9	31
East: S	andalwo	od Parkw	 ay E					
1L L		180	639	0.282	14.2	В	1.8	14

6T T 6R R	80 245	284 870	0.282 0.282	7.2 8.4	A A	1.8 1.8	14 14
North: Mississ	auga Roac	i N					
7L L	465	598	0.778*	17.4	В	11.4	89
4T T	1080	1389	0.778*	10.4	В	11.4	90
4R R	76	98	0.776	11.5	В	11.4	90
ALL VEHICLES:	3052		0.778	12.2	В	11.4	90

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

- \* Maximum v/c ratio, or critical green periods
- Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

#### Table D.0 - Geometric Delay Data

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

		-	Negn	_		Downstream	n Distance
From To Approach Approa			-		Dist. (m)	(m)	User Spec?
West: Sandalwood	l Parkway W						
Sout	h Right	35.0	32.5	19.4	500	126	No
Eas	t Thru	57.3	39.1	47.1	500	131	No
Nort	h Left	19.0	25.7	74.6	500	175	No
South: Mississau	ıga Road S						
Wes	t Left	19.0	25.7	74.6	500	176	No
Eas	t Right	35.0	32.5	19.4	500	126	No
Nort	h Thru	57.3	39.1	47.1	500	146	No
East: Sandalwood	l Parkway E						
Wes	t Thru	57.3	39.1	47.1	500	131	No
Sout	h Left	19.0	25.7	74.6	500	176	No
Nort	h Right	35.0	32.5	19.4	500	126	No
North: Mississau	ga Road N						
Wes	t Right	35.0	32.5	19.4	500	126	No
Sout	h Thru	57.3	39.1	47.1	500	133	No .
Eas	t Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

#### **Table D.1 - Lane Delays**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Lane No.	Satn x			Total dSL	dn	dq	dqm	(Idle) di	dig	
West:	 Sandalwo	ood Pai	ckway	W						
1 LT	0.366	8.7	1.4	10.1	5.6	4.6	0.6	4.0	5.8	15.9
2 R	0.470	7.1	2.3	9.3	5.1	4.2	1.1	3.2	6.6	15.9
South:	Mississ	sauga E	Road S	5						
1 LT	0.458	_			4.8	0.2	0.1	0.1	6.8	11.7
2 TR	0.458	3.8	0.5	4.3	4.5	0.0	0.0	0.0	6.4	10.6
East: S	 Sandalwo	od Pai	kwav	E						
	0.281		_		3.0	0.0	0.0	0.0	10.4	12.2
2 TR	0.281	1.8	0.0	1.8	3.2	0.0	0.0	0.0	6.5	8.4
North:	Mississ	auga E	Road N	 I						
1 LT	0.778	_			4.6	0.5	0.5	0.0	9.4	14.4
2 TR	0.778	2.8	2.2	5.0	5.4	0.0	0.0	0.0	5.5	10.5
dn is	average	stop-	 -start	delay	for a	ll veh	cles	queued	and u	inqueued

# **Table D.2 - Lane Stops**

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Lane Satn	Effectiv	Geom.	Overall	Queued	Rate
West: Sandal 1 LT 0.366 2 R 0.470	0.86 0.03	0.07			
South: Missi 1 LT 0.458 2 TR 0.458	0.73 0.03	0.12			
East: Sandalv 1 LT 0.281 2 TR 0.281	0.45 0.00	0.28	and the second second		
North: Missis 1 LT 0.778 2 TR 0.778	0.68 0.08	0.11			

hig is the average value for all movements in a shared lane

 $\ensuremath{\mathsf{hqm}}$  is average queue move-up rate for all vehicles queued and unqueued

### **Table D.3A - Lane Queues (veh)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Stor. Ratio
_

2 R	0.470	0.1	1.0	0.1	1.1	2.0	2.4	2.7	3.4	3.9	0.05
South	: Missis	sauga Ro	ad S								
1 LT	0.458	0.1	1.1	0.1	1.2	2.2	2.7	3.0	3.8	4.4	0.06
2 TR	0.458	0.1	1.2	0.1	1.3	2.3	2.8	3.1	3.9	4.5	0.06
East:	Sandalw	ood Park	way E								
1 LT	0.281	0.0	0.6	0.0	0.6	1.1	1.3	1.5	1.8	2.1	0.03
2 TR	0.281	0.0	0.6	0.0	0.6	1.1	1.3	1.5	1.8	2.1	0.03
North	: Missis	sauga Ro	ad N								
1 LT	0.778	0.5	2.9	1.0	3.9	6.3	7.9	9.1	11.4	13.4	0.18
2 TR	0.778	0.5	2.9	1.0	3.9	6.3	7.9	9.1	11.4	13.4	0.18

Values printed in this table are back of queue (vehicles).

### **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

Lane	Deg.	Ovrfl.									Queue
	Satn x	~	Nb1				85%				Stor. Ratio
West:	Sandal	wood Par	kway W								
1 LT 2 R		0.4			5.5 8.4	10.2 15.1	12.4 18.5		17.4 26.0	20.1	0.03 0.05
South	: Missi	ssauga R	oad S								
1 LT 2 TR		0.7 0.5				18.7 17.9					0.06 0.06
East:	Sandal	wood Pari	kway E								
		0.0			4.5 4.5	8.3				16.5 16.4	
North	: Missi	ssauga Ro	oad N								
1 LT	0.778	4.3 4.3	22.6	7.7	30.3 30.6	49.4	61.5 62.0	70.6 71.2	88.7 89.6	103.9 104.8	0.18

Values printed in this table are back of queue (metres).

### Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Intersection ID: 3 Roundabout

	App. Sp	eeds	Exit	Speeds	Queue M	Move-up	Av. Sect	ion Spd	Geom
Mov					1st	2nd			Delay
ID	Cruise	Negn	Negn	Cruise	Grn	Grn	Running	Overall	(sec)
West: Sa	andalwood	Parkwa	 ау ₩						
5L L	65.0	25.7	25.7	65.0	14.1		44.6	40.6	12.3
2T T	65.0	39.1	39.1	65.0	14.7		48.8	45.0	5.4
2R R	65.0	32.5	32.5	65.0	15.5		47.5	44.6	6.6
South: N	 Mississau	ga Road	 d S						
3L L	65.0	25.7	25.7	65.0	21.9		45.0	44.4	12.4

	8T T 8R R	65.0 65.0	39.1 32.5	39.1 32.5	65.0 65.0	20.8	50.2 49.4	50.2 49.4	5.8 6.6
E	ast: Sand	lalwood	Parkwa	ay E					
	1L L	65.0	25.7	25.7	65.0		46.3	46.3	12.4
	6T T	65.0	39.1	39.1	65.0		51.7	51.7	5.4
	6R R	65.0	32.5	32.5	65.0		50.7	50.7	6.6
No	orth: Mis	sissau	ga Roac	 l N					
	7L L	65.0	25.7	25.7	65.0	26.1	44.4	44.4	12.4
	4T T	65.0	39.1	39.1	65.0	26.2	49.7	49.7	5.4
	4R R	65.0	32.5	32.5	65.0	26.3	48.8	48.8	6.6
No	7L L 4T T	65.0 65.0	25.7 39.1	25.7 39.1	65.0	26.2	49.7	49.7	5.4

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Sandalwood 2031 AM TTMP G:\PROJECTS\105163 Mississauga Road Class EA\Sidra\Mississauga Rd EA Dec 9 Update.aap Processed Dec 10, 2009 11:46:00AM

A1492, AECOM, Small Office

Produced by SIDRA Intersection 3.2.2.1563

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# **Output Tables**

# Mississauga Road EA

### Mississauga Road and Sandalwood Parkway 2031 PM TTMP

#### **Run Information**

\* Basic Parameters:

Intersection Type: Roundabout

Driving on the right-hand side of the road

Input data specified in Metric units

Model Defaults: US HCM (Metric)

Peak Flow Period (for performance): 15 minutes

Unit time (for volumes): 60 minutes.

Delay definition: Control delay

Geometric delay included

HCM Delay Model option selected

HCM Queue Model option selected

Level of Service based on: Delay (HCM method) Queue definition: Back of queue, 95th Percentile

### **Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

From Approach	To Approach	Mov ID		Flow LV			Peak Flow Factor
West: San	dalwood Park	way W					
	South	2R	Right	123	2	1.00	1.00
	East	2T	Thru	123	2	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mi	ssissauga Ro	 ad S					
	West		Left	103	2	1.00	1.00
	East	8R	Right	642	13	1.00	1.00
	North	8T	Thru	681	139	1.00	1.00
East: San	dalwood Park	 way E					
	West	6T	Thru	103	2	1.00	1.00
	South	1L	Left	206	4	1.00	1.00
	North	6R	Right	412	8	1.00	1.00
North: Mi	ssissauga Ro	 ad N					
	West	4R	Right	25	0	1.00	1.00
	South	4T	Thru	442	18	1.00	1.00
	East	7L	Left	221	4	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Mov ID	L	eft	Thr	ough	Rig	ht
10	LV	HV	LV	HV	LV	HV
Demand flo				sed by	the pro	gram
West: Sand	alwood	Parkway	W			
5L L	5	1	0	0	0	0
2T T	0	0	123	2	0	0
2R R	0	0	0	0	123	2
South: Mis	sissau	ga Road S	 3			
3L L	103	2	0	. 0	0	0
8T T	Ó	0	681	139	0	0
8R R	0	0,	0	0	642	13
East: Sand	alwood	Parkway	E			
1L L	206	4	0	0	0	0
6T T	0	0	103	2	0	0
6R R	0	0	0	0	412	8
North: Mis:	sissau	ga Road N	1			
7L L		. 5	0	0	0	0
4T T	0	0	442	18	0	0
4R R	0	0	0	0	2.5	1

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Le	ft	Throu	ıgh	Righ	nt
Total	%HV	Total	%HV	Total	%HV
			l by the	progra	am
	-				
6	16.7	0	0.0		
				•	
0	0.0	0	0.0	125	1.6
sissauga	a Road	 S			
_			0.0	0	0.0
0	0.0	820	17.0	0	0.0
0	0.0	0	0.0	655	2.0
.lwood H	arkwav	 Е			
	-		0.0	0	0.0
0	0.0	105	1.9	0	0.0
					1.9
issauga	Road i				
			0.0	0	0.0
				0	
				26	
	Total  To	ws in veh/hour alwood Parkway 6 16.7 0 0.0 0.0 0.0 sissauga Road 105 1.9 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Total %HV Total ws in veh/hour as used alwood Parkway W 6 16.7 0 0 0.0 125 0 0.0 0 sissauga Road S 105 1.9 0 0 0.0 820 0 0.0 0 alwood Parkway E 210 1.9 0 0 0.0 105 0 0.0 105 0 0.0 0	Total %HV Total %HV  ws in veh/hour as used by the alwood Parkway W 6 16.7 0 0.0 0 0.0 125 1.6 0 0.0 0 0.0  sissauga Road S 105 1.9 0 0.0 0 0.0 820 17.0 0 0.0 820 17.0 0 0.0 0 0.0  alwood Parkway E 210 1.9 0 0.0 0 0.0 105 1.9 0 0.0 105 1.9 0 0.0 0 0.0  sissauga Road N 226 2.2 0 0.0 0 0.0 460 3.9	Total %HV Total %HV Total  ws in veh/hour as used by the program alwood Parkway W 6 16.7 0 0.0 0 0 0.0 125 1.6 0 0 0.0 0 0.0 125  sissauga Road S 105 1.9 0 0.0 0 0 0.0 820 17.0 0 0 0.0 820 17.0 0 0 0.0 0 0.0 655  alwood Parkway E 210 1.9 0 0.0 0 0 0.0 105 1.9 0 0 0.0 105 1.9 0 0 0.0 0 0.0 420  sissauga Road N 226 2.2 0 0.0 0 0 0.0 460 3.9

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout
                                 Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) h) (pcu/h) Effect
                                      (pcu/h) Effect
West: Sandalwood Parkway W
 Environment Factor: 1.20
                     Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 895 3.0 895 0 N
-----
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
    10 50 2 2 4.00 355 2.0 355 0 N
                                                       0.965
East: Sandalwood Parkway E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 930 15.2 1029 0 N
                                                      0.736
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 420 2.0 420 0 N 0.929
```

### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
______
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
No. Type Flow Aver Aver In-Bnch Prop ------ Foll-up
                  Rate Speed Dist Headway Bunched Hdwy Dist Headway (pcu/h) (km/h) (m) (s) (s) (m) (s)
West: Sandalwood Parkway W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 895 32.6 36.4 1.26 0.500 4.10 37.2
Thru 1 Subdominant 895 32.6
                                                                         2.59
                                                0.500
0.500
Thru 1 Subdominant 895 32.6 36.4 1.26 0.500 3.67 33.3 2 Dominant 895 32.6 36.4 1.26 0.500 3.56 32.3 Right 2 Dominant 895 32.6 36.4 1.26 0.500 3.56 32.3
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 355 30.4 85.7 1.89 0.335 4.19 35.4
Thru 1 Subdominant 355 30.4 85.7 1.89 0.335 4.67 39.5
                                                                          2.69
                                                                          3.00
2 Dominant 355 30.4 85.7 1.89 0.335 4.55
Right 2 Dominant 355 30.4 85.7 1.89 0.335 4.06
                                                                  38.5
                                                                         2.92
                                                                34.4
 -------
East: Sandalwood Parkway E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1029 37.5 36.5 1.43 0.602 3.72 38.8
                                                                          2.67
Thru 1 Subdominant 1029 37.5
Right 2 Dominant 1029 37.5
                                   36.5 1.43 0.602
                                                          3.72
                                                                  38.8
                                                                         2.67
                                 36.5 1.43 0.602 3.43
                                                                  35.8
```

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

#### **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Mov	Demand			-	lovement Adjust.	Cap.	Deg.	Prac. Spare		Deg. Satn
· .	Flow (veh/h)	HV (왕)	Flow (veh/h)	HV (%)	Flow (pcu/h)	(veh /h)	Satn xp	Cap. (%)	(%)	×
West:	Sandalwood	Parkv	ay W							
5L L	6	16.7	895	3.0	895	32	0.85		100	0.188
2T T		1.6	895	3.0	895	665	0.85	352	100	0.188
2R R	125	1.6	895	3.0	895	665	0.85	352	100	0.188
South:	Mississau	ga Roa	id S							
3L L		1.9	355	2.0	355	122	0.85	-1	100	0.861
8T T	820	17.0	355	2.0	355	951	0.85	-1	100	0.862*
8R R	655	2.0	355	2.0	355	760	0.85	-1	100	0.862*
 East: \$	Sandalwood	Parkw	av E							
1L L	210	1.9		15.2	1029	317	0.85	28	85	0.662
6T T	105	1.9	930	15.2	1029	159	0.85	29	85	0.660
6R R	420	1.9	930	15.2	1029	537	0.85	9	100	0.782
 North:	Mississau	a Roa	d N							
7L L	226	2.2	420	2.0	420	560	0.85	111	100	0.404
4T T	460	3.9	420	2.0	420	1139	0.85	110	100	0.404
4R R	26	3.8	420	2.0	420	64	0.85	109	100	0.406

#### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Intersection Level of Service = B
Worst movement Level of Service = C
Average intersection delay (s/pers) = 15.2
Largest average movement delay (s) = 22.8
Largest back of queue, 95% (m) = 134
Performance Index = 82.64
Degree of saturation (highest) = 0.862

```
Practical Spare Capacity (lowest)
                                                 -1 %
                                             3807
Effective intersection capacity, (veh/h) =
Total vehicle flow (veh/h)
                                              3283
Total person flow (pers/h)
                                               3940
                                             13.87
Total vehicle delay (veh-h/h)
Total person delay (pers-h/h)
                                             16.64
                                             3226
Total effective vehicle stops (veh/h)
Total effective person stops (pers/h)
                                               3872
Total vehicle travel (veh-km/h)
                                            2083.7
Total cost ($/h)
                                            993.28
Total fuel (L/h)
                                             298.5
Total CO2 (kg/h)
                                             748.48
```

#### **Table S.5 - Movement Performance**

Mov			Total		-		-			
ID		Delay (veh-h/h)	-	_		-				-
West:	 Sar	 ndalwood P	 arkway W							
5L	L	0.03	0.03	15.7	0.65	0.90	1.1	8	0.13	4
2 <b>T</b>	T	0.30	0.37	8.8	0.65	0.73	1.1	8	2.36	5
2R	R	0.34	0.41	9.8	0.65	0.79	1.1	8	2.41	5
South	 : Mi	ississauga	Road S							
3L	L	0.67	0.80	22.8	0.97	1.09	15.7	134	3.17	4
8T	T	3.63	4.36	15.9	0.97	1.10	16.1	128	22.53	4
8R	R	2.85	3.42	15.7	0.96	1.05	16.1	128	17.37	4
East:	Sar	ndalwood P	arkway E							
1L	L	1.32	1.58	22.6	0.91	1.08	6.0	47	6.09	4 (
6T	$\mathbf{T}$	0.45	0.55	15.6	0.91	1.06	6.0	47	2.75	4 !
6R	R	2.26	2.71	19.4	0.97	1.17	8.8	68	11.98	4
North	 : Мі	ssissauga	Road N							
7L	L	0.93	1.12	14.9	0.64	0.80	3.1	24	4.92	4 (
4T	T	1.01	1.22	7.9	0.64	0.65	3.1	24	8.43	5.
	R	0.07	0.08	9.0	0.64	0.73	3.1	24	0.49	5 (

#### **Table S.6 - Intersection Performance**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout
Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Queued Stop Queue Index Speed
(veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m) (km/h)
______
West: Sandalwood Parkway W
256 0.188 0.67 0.80
                       9.4 0.65 0.76
                                    8
                                        4.90
                                             50.4
 -----
South: Mississauga Road S
1580 0.862 7.15 8.58 16.3 0.97 1.08 134 43.07
East: Sandalwood Parkway E
735 0.782 4.03 4.84 19.8 0.94 1.13 68 20.82 41.8
North: Mississauga Road N
712 0.406 2.01 2.42 10.2 0.64 0.70
                                    24 13.85 49.2
ALL VEHICLES:
```

INTERSECTION (persons):
3940 0.862 16.64 15.2 0.87 0.98 82.64 45.2

Queue values in this table are 95% back of queue (metres).

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Lane No.	Dem Flow (veh /h)	(veh	Satn	_	Stop	Q u e 95% B  (vehs)	ack 	Length
West: S 1 LT 2 TR		663	0.188			1.1 1.1	8.2 8.3	
1 LT	Mississa 741 839	860	0.862			15.7 16.1		
1 LT	Sandalwoo 315 420	476	0.662	20.3				
1 LT	Mississa 356 356	882	0.404				24.2 24.4	

### **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Lane No.					Min Cap (veh /h)	Cap (veh	Satn	Util
1 LT	Sandal 6 0	119	0	125			0.188 0.188	
1 LT	: Missi 105 0	636	0	741				
1 LT	Sandal 210 0	105	0	315			0.662 0.782	
1 LT	: Missi 226 0	130	0	356		882 881	0.404	

P Lane under-utilisation found by the "Program". This includes cases where the value of lane under-utilisation due to downstream effects has been modified by the program during lane flow calculations (e.g. a de facto exclusive lane has been found).

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Mov	Mov Typ	Dem Flow (veh	Total Cap. (veh	Lane Util		Aver. Delay		95% Back of Oueue	Perf. Index
		/h)	/h)	(%)	х	(sec)		(veh)	
West: S	andalw	ood Pa	rkway W						
5L L		6	32	100	0.188	15.7	0.90	1.1	0.13
2T T		125	665	100	0.188	8.8	0.73	1.1	2.36
2R R		125	665	100	0.188	9.8	0.79	1.1	2.41
South:	 Missis	sauga	Road S						
3L L		105	122	100	0.861	22.8	1.09	15.7	3.17
8T T		820	951	100	0.862*	15.9	1.10	16.1	22.53
8R R		655	760	100	0.862*	15.7	1.05	16.1	17.37
East: S	andalw	ood Pa	rkway E						
1L L		210	317	85	0.662	22.6	1.08	6.0	6.09
6T T		105	159	85	0.660	15.6	1.06	6.0	2.75
6R R		420	537	100	0.782	19.4	1.17	8.8	11.98
North:	Missis	sauga	Road N						
7L L		226	560	100	0.404	14.9	0.80	3.1	4.92
4T T		460	1139	100	0.404	7.9	0.65	3.1	8.43
4R R		26	64	100	0.406	9.0	0.73	3.1	0.49

<sup>\*</sup> Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Mov	Fuel	Cost	HC	CO	NOX	CO2
ID	Total	Total	Total	Total	Total	Tota
	L/h	\$/h	kg/h	kg/h	kg/h	kg/h
est: Sandalwoo	d Parkwa	y W				
5L L	0.5	1.70	0.002	0.10	0.003	1.
2T T	9.3	31.74	0.038	1.87	0.059	23.
2R R	9.5	32.21	0.039	1.99	0.061	23.
	19.3	65.65	0.079	3.96	0.123	48.
outh: Mississa	uga Road	. S				
3L L	9.4	33.94	0.041	2.02	0.059	23.
8T T	97.3	294.31	0.358	21.82	0.669	245.
8R R	53.8	185.98	0.230	11.75	0.348	134.
	160.6					403.

East: Sandalwood Parkway E

		123.77		1.76	0.114 0.054 0.221	21.1
	61.7	220.12	0.264	13.05	0.389	154.4
North: Mississa	uga Road	l N				
7L L	18.8	65.90	0.080	3.94	0.117	47.0
4T T	36.2	120.69	0.144	7.33	0.231	90.7
4R R	2.0	6.69	0.008	0.41	0.013	4.9
	57.0	193.28	0.232		0.361	
INTERSECTION:	298.5	993.28	1.204			
			FIONS	=	0.900	
PARAMETERS USED  Pump price o Fuel resourc	 f fuel (	\$/L)	FIONS		0.900 0.70	
Pump price o Fuel resourc	f fuel (	\$/L) actor			0.70	
Pump price o Fuel resourc Ratio of run	f fuel ( e cost f ning cos	\$/L) actor t to fue		= =	0.70	
Pump price o Fuel resourc	f fuel ( e cost f ning cos me (\$/h)	\$/L) actor t to fue		= = =	0.70 3.0	
Pump price o Fuel resourc Ratio of run Average inco	f fuel ( e cost f ning cos me (\$/h) actor	\$/L) actor t to fuel	L cost	= = =	0.70 3.0 19.00 0.40	
Pump price o Fuel resourc Ratio of run Average inco	f fuel ( e cost f ning cos me (\$/h) actor e mass (	\$/L) actor t to fuel	L cost	= = = =	0.70 3.0 19.00 0.40	
Pump price o Fuel resourc Ratio of run Average inco Time value f Light vehicl	f fuel ( e cost f ning cos me (\$/h) actor e mass ( e mass (	\$/L) actor t to fuel 1000 kg) 1000 kg)	L cost	= = = =	0.70 3.0 19.00 0.40 1.4	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Mov	L	Fuel Rate /100km	Cost Rate \$/km	HC Rate g/km	CO Rate g/km	NOX Rate .g/km	CO2 Rate g/km
	Sandalwood	_					
5L		11.7	0.42	0.507	24.22	0.718	293.4
2 <b>T</b> 2R	-	11.8		0.482 0.507	23.82 25.49	0.750 0.781	295.9 305.1
ZR	K _	12.2			23.49	0.701	
		12.0	0.41	0.495	24.64	0.764	300.3
South	: Mississau	ga Road S	 S				
3L	L	13.3	0.48	0.576	28.54	0.827	332.0
8 T	T ·			0.693			474.7
8R	R	13.2	0.46	0.563	28.77	0.851	329.8
		16.1	0.52	0.631	35.76	1.081	405.1
East:	Sandalwood	Parkway	E				
1L				0.561	27.30		325.5
6Т		12.7		0.534	26.60		318.9
6R	R	13.3	0.47	0.571	28.37	0.846	333.1
		13.1	0.47	0.563	27.80	0.828	328.8
North:	Mississau	ga Road N	1				
7L	L			0.522	25.83	0.770	308.6
4 T	T	12.5	0.42	0.497	25.34	0.799	313.1
4R	R	12.2	0.41	0.506	25.44	0.780	305.1
	<del></del> .	12.4	0.42	0.506	25.50	0.789	311.3
TNTEF	RSECTION:	14.3	0.48	0.578	30.85	0.935	359.2

Table S.14 - Summary of Input and Output Data

Mississauga Road EA

Mississauga Road and Sandalwood Parkway 2031 PM TTMP

Intersection ID: 3

Roundabout

Lane									Longest Queue	
		Т		Tot					(m)	
West:				-		 	 			
1 LT 2 TR	-	119			2			9.1 9.7	8	500 500
	6	125	125	256	2		 0.188	9.4	8	
South:	Miss	issau	ga Ro	ad S		 	 			
1 LT 2 TR		636 184			15 -5		0.862 0.862		134 128	
	105	820	655	1580	10	 	 0.862	16.3	134	
East:	 Sanda	lwood	Park	wav E		 	 			
1 LT		105		315	2			20.3		
2 R			420	420	2		0.782	19.4	68	500
	210	105	420	735	2	 	 0.782	19.8	68	
North:	Miss	issau	ja Ro	ad N		 	 			
1 LT		130			3			12.3		
2 TR		330	26	356 	4	 	 0.404	8.0	24	500
	226	460	26	712	3		0.404	10.2	24	
ALL VE	HICLE	====== S		Total	%	 	Max	Aver.	Max	
				Flow 3283	HV 6			Delay 15.2	134	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID:  $3\,$ 

Roundabout

Mov ID	Mov Typ	Total Flow	Total Cap.	Deg. of	Aver. Delay		Longest 95% Ba	
		(veh /h)	(veh /h)	Satn (v/c)	(sec)		(vehs)	(m)
West: S	andalwo	od Parkw	ay W					
5L L		6	32	0.188	15.7	В	1.1	8
2T T		125	665	0.188	8.8	A	1.1	8
2R R		125	665	0.188	9.8	A	1.1	8
South: 1	Mississ	auga Roa	d S					
3L L		105	122	0.861	22.8	C	15.7	134
8T T		820	951	0.862*	15.9	В	16.1	128
8R R		655	760	0.862*	15.7	В	16.1	128
East: Sa	andalwo	od Parkw	 ay E					
1L L		210	317	0.662	22.6	С	6.0	47

6T T 6R R	105 420	159 537	0.660 0.782	15.6 19.4	ВВ	6.0 8.8	47 68
North: Mississ	auga Roac	l N					
7L L	226	560	0.404	14.9	В	3.1	24
4T T	460	1139	0.404	7.9	A	3.1	24
4R R	26	64	0.406	9.0	A	3.1	24
ALL VEHICLES:	3283		0.862	15.2	В	16.1	134

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

- \* Maximum v/c ratio, or critical green periods
- " Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

#### **Table D.0 - Geometric Delay Data**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

	m-		Negn	Negn	Negn	Appr.	Downstream	n Distance
From Approach	To Approach	Turn	Radius (m)	(km/h)		Dist. (m)	(m)	User Spec?
West: Sand	dalwood Pa	rkway W						
	South	Right	35.0	32.5	19.4	500	126	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	175	No
South: Mis	ssissauga	Road S						
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Sand	dalwood Pa	rkway E						
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mis	ssissauga	 Road N						
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

#### **Table D.1 - Lane Delays**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

----- Delay (seconds/veh) ------

Lane No.		1st d1		Total dSL	Dec. dn	Total dq	-	(Idle) di		Control dic
West:	Sandalw	ood Pai	rkway	w						
1 LT	0.188	3.4	0.0	3.4	4.2	0.0	0.0	0.0	5.7	9.1
2 TR	0.188	3.2	0.0	3.2	3.8	0.0	0.0	0.0	6.5	9.7
South:	Mississ	sauga E	Road S							
1 LT	0.862	4.4	6.0	10.5	6.2	4.3	3.4	0.9	6.7	17.2
2 TR	0.862	3.9	5.2	9.1	5.8	3.3	3.0	0.3	6.4	15.5
East:	Sandalwo	ood Par	kway	 Е						
1 LT	0.662	6.0	4.2	10.2	5.0	5.2	2.0	3.2	10.1	20.3
2 R	0.782	5.7	7.1	12.8	5.6	7.2	3.4	3.8	6.6	19.4
North:	Mississ	sauga F	Road N							
1 LT	0.404	2.5	0.0	2.5	3.5	0.0	0.0	0.0	9.9	12.3
2 TR	0.404	2.5	0.0	2.5	4.2	0.0	0.0	0.0	5.5	8.0
dn is	average	stop-	start	delay	for a	ll vehi	cles	queued	and u	inqueued

### **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Lane No.	Deg. Satn x			-	Rate Overall h	-	-
West: 1 LT 2 TR	Sandal 0.188 0.188	0.58	0.00	0.16	0.74 0.78	0.648	
1 LT	: Missi 0.862 0.862	0.89	0.20	0.01		0.973 0.962	
East: 1 LT 2 R	Sandal 0.662 0.782	0.91	0.11	0.06	1.08 1.17	0.909 0.967	
North 1 LT 2 TR	: Missi 0.404 0.404	0.53	0.00	N 0.22 0.16	0.75 0.66	0.640 0.640	0.00

hig is the average value for all movements in a shared lane

 $\ensuremath{\mathsf{hqm}}$  is average queue move-up rate for all vehicles queued and unqueued

### Table D.3A - Lane Queues (veh)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

T	_	Ovrfl.		ge (veh)			Percen-	tile (ve	eh)		Queue
Lane No.	Satn x	Queue	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Stor. Ratio
		wood Pari	kway W	0 0	0 2	0.6	n 0	0 0	1 1	1 0	0.00

2 TR	0.188	0.0	0.3	0.0	0.3	0.6	0.8	0.9	1.1	1.2	0.02
South	: Missis	sauga Ro	oad S								
1 LT	0.862	1.3	3.3	2.2	5.5	8.5	10.7	12.4	15.7	18.4	0.27
2 TR	0.862	1.3	3.5	2.2	5.7	8.8	11.0	12.7	16.1	19.0	0.26
East:	Sandalw	ood Parl	 kway E								
1 LT	0.662	0.4	1.6	0.4	2.0	3.5	4.3	4.9	6.0	7.0	0.09
2 R	0.782	0.8	2.1	0.9	3.0	5.0	6.2	7.1	8.8	10.3	0.14
North	: Missis	sauga Ro	 oad N								
1 LT	0.404	0.0	1.0	0.0	1.0	1.8	2.2	2.5	3.1	3.6	0.05
2 TR	0.404	0.0	1.0	0.0	1.0	1.8	2.2	2.5	3.1	3.6	0.05

Values printed in this table are back of queue (vehicles).

### **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

T	Deg.				res)						Queue
Lane No.	Satn x	No No	Nb1					90%			Stor. Ratio
West:	Sandal	wood Par	kway W								
1 LT	0.188	0.0	2.6	0.0	2.6	4.9	5.9	6.7	8.2	9.5	0.02
2 TR	0.188	0.0	2.6	0.0	2.6	4.9	6.0	6.7	8.3	9.6	0.02
South:	Missi	ssauga R	oad S								
1 LT	0.862	11.2	28.5	18.4	46.9	72.9	91.6	105.7	133.9	157.4	0.27
2 TR	0.862	10.1	27.7	17.3	45.1	69.6	87.6	101.1	128.1	150.7	0.26
East:	Sandal	wood Par	kway E								
1 LT	0.662	3.0	12.3	3.0	15.3	26.8	32.9	37.5	46.7	54.3	0.09
2 R	0.782	6.3	16.2	6.7	22.9	38.5	47.7	54.6	68.3	79.8	0.14
North:	Missi	 ssauga R	oad N								
	0.404	-	7.8	0.0	7.8	14.1	17.2	19.6	24.2	28.1	0.05
2 TR	0.404	0.0	7.8	0.0	7.8	14.3	17.4	19.7	24.4	28.4	0.05

Values printed in this table are back of queue (metres).

### Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Intersection ID: 3 Roundabout

Mov ID	App. Speeds  Cruise Negn	Exit Speeds Negn Cruise	Queue Move-up 	Av. Section Spd  Running Overall	Geom Delay (sec)
West: Sa 5L L 2T T 2R R		ay W 25.7 65.0 39.1 65.0 32.5 65.0		45.9 45.7 51.0 51.0 50.1 50.1	12.3 5.4 6.6
South: M	fississauga Roa 65.0 25.7		25.7	41.9 40.4	12.4

8T T 8R R	65.0 65.0	39.1 32.5	39.1 32.5	65.0 65.0	24.3 25.1	45.5 45.2	45.0 44.8	5.8 6.6
East: San	dalwood	Parkwa	 ay E					
1L L	65.0	25.7	25.7	65.0	16.9	43.2	40.5	12.4
6T T	65.0	39.1	39.1	65.0	16.9	47.0	45.0	5.4
6R R	65.0	32.5	32.5	65.0	17.4	44.9	41.7	6.6
North: Mis	ssissau	ga Road	l N					
7L L	65.0	25.7	25.7	65.0		46.0	46.0	12.4
4T T	65.0	39.1	39.1	65.0		51.0	51.0	5.4
4R R	65.0	32.5	32.5	65.0		50.2	50.2	6.6

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Sandalwood 2031 PM TTMP G:\PROJECTS\105163 Mississagua Road Class EA\Sidra\Mississauga Rd EA Dec 9 Update.aap Processed Dec 10, 2009 11:46:03AM

A1492, AECOM, Small Office

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# **Output Tables**

# Mississauga Road EA

### Mississauga Road and Wanless Road 2031 AM TTMP

#### **Run Information**

\* Basic Parameters:

Intersection Type: Roundabout

Driving on the right-hand side of the road

Input data specified in Metric units

Model Defaults: US HCM (Metric)

Peak Flow Period (for performance): 15 minutes

Unit time (for volumes): 60 minutes.

Delay definition: Control delay

Geometric delay included

HCM Delay Model option selected

 ${\tt HCM} \ {\tt Queue} \ {\tt Model} \ {\tt option} \ {\tt selected}$ 

Level of Service based on: Delay (HCM method) Queue definition: Back of queue, 95th Percentile

#### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

From Approach	To Approach	Mov					Peak Flow Factor
 West: Wan	less Road W						
	South	2R	Right	221	4	1.00	1.00
	East	2T	Thru	730	15	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mi	ssissauga R	oad S					
	West	3L	Left	25	0	1.00	1.00
	East	8R	Right	150	5	1.00	1.00
	North	8T	Thru	174	36	1.00	1.00
East: Wan	less Road E						
	West	6T	Thru	485	10	1.00	1.00
	South	1L	Left	392	8	1.00	1.00
	North	6R	Right	10	0	1.00	1.00
North: Mi	ssissauga R	oad N					
	West	4R	Right	59	1	1.00	1.00
	South	4 T	Thru	883	37	1.00	1.00
	East	7L	Left	403	12	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Mov ID		L	eft	Th	rough	Rig	jht
10		LV	HV	LV	HV	LV	HV
			veh/hour	as	used by	the pro	gram
West:	Wanles		ad W				
5L	L	5	1	0	0,	0	0
2T	T	0	0 -	730	15	0	0
2R	R	0	0	0	0	221	5
South:	Missi	ssaud	ga Road	 S			
3L	L	25	1	0	0	0	0
8T	T	. 0	0	174	36	0	0
8R	R	0	0	0	0	150	5
 East:	Wanles	s Roa	ad E				
1L	L 3	392	8	0	. 0	0	0
6Т	T	0	0	485	10	0	0
6R	R	0	0	0	0	10	1
North:	Missis	ssauc	ga Road I	л И			
7L	L 4	403	12	0	0	0	0
4 T	T	0	0	883	37	0	0
4R	R	0	0	0	0	59	1

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Mov ID	Lei	t	Thro	ugh	Righ	ıt.
10	Total	%HV	Total	%HV	Total	%HV
Demand flow			as use	d by th	e progra	ım
West: Wanle	ss Road	ł W				
	6	16.7	. 0	0.0	.0	
2T T	0	0.0	7.45		0	0.0
2R R	. 0	0.0	, 0	0.0	226	2.2
South: Miss	issauqa	Road	s			
	_		0	0.0	0	0.0
8T T	0	0.0	210	17.1	0	0.0
8R R	0	0.0	0	0.0	155	3.2
East: Wanle	ss Roac	 l E				
1L L	400	2.0	0	0.0	0	0.0
6T T	0	0.0	495	2.0	0	0.0
6R R	0	0.0	0	0.0	11	9.1
North: Miss	issauga	Road	n			
	415			0.0	0	0.0
	•	0 0	920	4 0	0	
	U	0.0	220		0	

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout
                                                     Circulating/Exiting Stream
 Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
 Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) h) (pcu/h) Effect
West: Wanless Road W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 1735 3.3 1736 0 N 0.630 Exclusive Slip lane (exiting flow): 1320 3.4 1321 0 N 0.720
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 1037 2.4 1037 0 Y Exclusive Slip lane (exiting flow): 1032 2.4 1033 0 Y
East: Wanless Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 239 15.2 264 0 Y 0.947
North: Mississauga Road N
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
  30 10 50 2 2 4.00 920 2.0 920 0 N 0.877 Exclusive Slip lane (exiting flow): 520 2.0 520 0 N 0.938
```

### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout
 Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
No. Type Flow Aver Aver In-Bnch Prop ------ Foll-up
                   Rate Speed Dist Headway Bunched Hdwy Dist Headway (pcu/h) (km/h) (m) (s) (s) (m) (s)
______
West: Wanless Road W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1736 32.8 18.9 1.24 0.768 3.62 33.0
                                                                              2.45
Thru 1 Subdominant 1736 32.8 18.9 1.24 0.768 3.24 2 Dominant 1736 32.8 18.9 1.24 0.768 2.90
                                                                       29.6
                                                                       26.5
Right 3 Excl. Slip 1321E 35.1 26.5 1.54 0.742 2.90 28.2 2.20
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1037 33.7 32.5 1.44 0.610 3.55 33.2 2.55
Thru 1 Subdominant 1037 33.7 32.5 1.44 0.610 3.98 37.2 2.85
2 Dominant 1037 33.7 32.5 1.44 0.610 3.98 37.2 2.85
Right 3 Excl. Slip 1033E 33.7 32.7 1.45 0.610 3.84 36.0 2.75
East: Wanless Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 264 37.5 141.7 1.03 0.153 4.26 44.4
```

Thru	1 Subdominan	t 264	37.5	141.7	1.03	0.153	4.26	44.4	2.69D
	2 Dominant	264	37.5	141.7	1.03	0.153	4.26	44.4	2.69
Righ	t 2 Dominant	264	37.5	141.7	1.03	0.153	4.44	46.2	2.80
Nort	h: Mississauga	Road N							
En	vironment Fact	or: 1.20	Ent	ry/Circu	lating	Flow Adj	ustment:	Medium	
Left	1 Subdominan	t 920	32.9	35.8	1.04	0.442	3.65	33.4	2.58
Thru	1 Subdominan	t 920	32.9	35.8	1.04	0.442	3.65	33.4	2.58
	2 Dominant	920	32.9	35.8	1.04	0.442	3.54	32.4	2.50
Righ	t 3 Excl. Slip	520E	38.5	73.9	1.59	0.396	3.54	37.8	2.50

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

- E Exiting flow for slip lane traffic
- D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

**Table S.2 - Movement Capacity Parameters** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP  $\,$ Intersection ID: 2 Roundabout

Mov ID		Demand			sing M	ovement Adjust.				Lane Util	
		Flow (veh/h)		Flow (veh/h)		Flow (pcu/h)			Cap. (%)	(%)	x ,
West:	: V	Vanless Ro	ad W								
5L 2T 2R	Т		16.7 2.0 2.2	1735	3.3 3.3 3.4	1736 1736 1321	5 618 472	0.85 0.85 0.85	-29 -29 78	100 100 100	1.200 1.206* 0.479
South	 n:	Mississau	ga Roa	ad S							
3L 8T		26 210	3.8 17.1	1037 1037	2.4	1037 1037	107 866	0.85 0.85	250 251	100 100	0.243 0.242
8R	R	155	3.2	1032	2.4	1033	493 	0.85	170 	100	0.314
East:	: V	anless Ro	ad E								
1L 6T 6R	Т		2.0 2.0 9.1		15.2 15.2 15.2	264 264 264		0.85 0.85 0.85	93 93 93	100 100 100	0.441 0.440 0.440
 North	 1:	Mississau	ra Roa								
7L	L T	415	2.9 4.0 1.7	920 920 520	2.0 2.0 2.0	920 920 520	431 955 951	0.85 0.85 0.85	-12 -12 1247	100 100 100	0.963 0.963 0.063

#### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Intersection Level of Service Worst movement Level of Service

F

```
Average intersection delay (s/pers)
                                                42.4
                                             139.3
Largest average movement delay (s)
Largest back of queue, 95% (m)
                                                269
Performance Index
                                             148.60
Degree of saturation (highest)
Practical Spare Capacity (lowest)
                                             1.206
                                                -29 %
Effective intersection capacity, (veh/h) =
                                                3044
Total vehicle flow (veh/h)
                                        =
                                               3669
Total person flow (pers/h)
                                        =
                                               4403
Total vehicle delay (veh-h/h)
                                              43.16
                                            51.80
Total person delay (pers-h/h)
Total effective vehicle stops (veh/h)
                                             4896
Total effective person stops (pers/h)
                                                5876
Total vehicle travel (veh-km/h)
                                            2345.3
Total cost ($/h)
                                         = 1406.89
Total fuel (L/h)
                                              354.7
Total CO2 (kg/h)
                                             888.01
```

#### **Table S.5 - Movement Performance**

Mov ID		Total Delay	Delay	Delay	Queued	Stop		ack	Index	Sp
		(veh-h/h)	(pers-h/l	n)(sec)		Rate	(vehs)	(m)		(km
West:	Wa	nless Road	W							
5L	L	0.23	0.28	139.3	1.00	2.11	30.2	234	0.56	1
2T	T	27.01	32.41	130.5	1.00	2.23	34.8	269	67.79	1
2R	R	1.00	1.19	15.8	0.92	1.03	4.2	32	5.80	4
South		ississauga	Road S							
3L	L	0.13	0.15	17.8	0.75	0.93	1.5	13	0.64	4
8T	$\mathbf{T}$	0.65	0.78	11.1	0.75	0.86	1.5	13	4.52	4
8R	R	0.51	0.61	11.8	0.77	0.89	2.0	16	3.40	4
East:	Wa:	nless Road	E							
1L	L	1.53	1.83	13.8	0.53	0.74	3.3	26	8.28	4
6T	T	0.93	1.11	6.8	0.53	0.56	3.3	26	8.43	5
6R	R	0.02	0.03	7.9	0.53	0.64	3.3	26	0.19	5
North	. М	ississauga	Road N							
7L		4.03		34.9	0.99	1.52	17.4	136	15.76	3
4 T	$\mathbf{T}$	7.00	8.40	27.4	0.99	1.52	17.8	140	32.21	3
4R	R	0.13	0.16	7.8	0.48	0 62	0.3	3	1 02	5

**Table S.6 - Intersection Performance** 

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout
Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Queued Stop Queue Index Speed
(veh/h) x (veh-h/h) (pers-h/h) (sec)
                            Rate (m)
                                              (km/h)
______
West: Wanless Road W
977 1.206 28.24 33.88 104.0 0.98 1.95 269 74.15 16.3
South: Mississauga Road S
391 0.314 1.28 1.54 11.8 0.76 0.88 16 8.56 48.9
 _____
East: Wanless Road E
East: Wanless Road E
906 0.441 2.48 2.98 9.9 0.53 0.64 26 16.90 49.2
North: Mississauga Road N
```

			13.39					48.99	36.0
ALL VE	HICLES:							148.60	
	ECTION (p	persons):	51.80	42.4	0.84	1.33		148.60	29.5
Queue v	values in	n this ta	 ble are 9	 5% back	of que	ue (me	tres).		

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Lane	Dem Flow	Cap (veh	_	Aver. Delay		Que 95%B		Lane Length
No.	/h)		X	_	-	(vehs)	(m)	(m)
West: Wa	nless 1	 Road W						
1 LT	341	283	1.206	132.5	2.15	30.2	233.8	500.0
2 T	410	340	1.206	129.0	2.30	34.8	269.0	500.0
3 R	226	472	0.479	15.8	1.03	4.2	32.2	75.0
South: M	ississ	auga R	oad S					
1 LT		482		12.6	0.88	1.5	12.6	500.0
2 T	119	491	0.242	11.1	0.86	1.5	13.0	500.0
3 R	155	493	0.314	11.8	0.89	2.0	15.6	75.0
East: War	nless I	Road E						
	453			12.9	0.72	3.3	25.7	500.0
2 TR	453	1028	0.440	6.8	0.56	3.3	25.7	500.0
North: M	ississa	auga R	oad N					
1 LT		677		32.4	1.52	17.4	136.0	500.0
2 T	683	709	0.963	27.2	1.52	17.8	139.6	500.0
3 R	60	951	0.063	7.8	0.62	0.3	2.6	75.0

### **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Lane No.					(veh	Cap	Satn	
West:	Wanles	s Roa	.d W					
1 LT	6	335	0	341	150	283	1.206	100
2 T	. 0	410	0	410	150	340	1.206	100
3 R	0	0	226	226	150	472	0.479	100
South:	: Missi	ssaug	a Roa	.d S				
1 LT	26	91	0	117	117	482	0.242	100
2 T	0	119	0	119	119	491	0.242	100
3 R	0	0	155	155	150	493	0.314	100
East:	Wanles	s Roa	d E					
1 LT	400	53	0	453	150	1029	0.440	100

2	TR	0	442	11	453	150	1028	0.440	100
No	orth:	Missi	ssauga	Roa	.d N				
1	LT	415	237	0	652	150	677	0.963	100
2	T	0	683	0	683	150	709	0.963	100
3	R	0	0	60	60	60	951	0.063	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Mov	Mov Typ	Dem Flow (veh /h)		Lane Util (%)	_	Delay	Stop Rate	95% Back of Queue (veh)	
West: 5L L 2T T 2R R		6 745	W 5 618 472	100 100 100	1.200 1.206* 0.479	130.5	2.23		67.79
3L L		26 210	Road S 107 866 493	100 100 100	0.243 0.242 0.314	11.1		1.5	0.64 4.52 3.40
East: 1L L 6T T 6R R	·	Road 400 495 11	E 908 1124 25	100	0.441 0.440 0.440		0.56	3.3 3.3 3.3	
North: 7L L 4T T 4R R		415 920	Road N 431 955 951	100- 100 100	0.963 0.963 0.063	34.9 27.4 7.8	1.52		15.76 32.21 1.02

<sup>\*</sup> Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Mov		Fuel Total L/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West:	Wanless	Road W					
5L	L	0.8	4.20	0.004	0.13	0.004	2.0
2T	T	97.4	500.12	0.470	16.22	0.478	243.7
2R	R	18.2	63.38	0.077	3.83	0.116	45.5
		116.4	567.70	0.551	20.18	0.597	291.2

South: Mississauga Road S

3L L 8T T 8R R	23.0	7.79 68.73 41.58	0.082	4.90	0.154	57.9
	37.5	118.11	0.142	7.94	0.247	94.3
 East: Wanle	ess Road E					
1L L		115.55				
	36.1					
6R R	0.8	2.79	0.003	0.17	0.005	2.1
	69.9	241.54	0.289	14.16	0.438	174.9
Jorth: Miss	sissauga Roa	 d N				
	40.6		0.178	8.57	0.248	101.7
4T T	85.8	310.48	0.363	18.28	0.544	214.9
4R R	4.4	15.02	0.018	0.90	0.028	11.1
	130.9	479.54	0.559	27.75	0.820	327.7
INTERSECTI	ON: 354.7	1406.89	1.541	70.03	2.102	888.0
AD AMERICA C	USED IN COS	D CALCULA	UTONG			
ARAMETERS	OSED IN COS.		TIONS			
Dumn nri	ce of fuel	(\$./T.)		-	0.900	
	source cost :			=	0.70	
	running co		l cost	=	3.0	
	income (\$/h)			=	19.00	
Time val	ue factor			=	0.40	
Light ve	hicle mass	(1000 kg)			1.4	
	hicle mass				11.0	
	hicle idle				1.350	
Heavy ve	hicle idle	tuel rate	(L/h)	= ,	2.000	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Mov	Fuel	Cost	HC ·	CO	NOX	CO2
ID	Rate	Rate	Rate	Rate	Rate	Rate
	L/100km	\$/km	g/km	g/km	g/km	g/km
West: Wanless	Road W					
5L L	19.5	1.04	0.969	31.51	0.909	490.2
2T T	20.8	1.07	1.003		1.019	519.9
2R R	12.9	0.45	0.544	27.14	0.821	322.0
	19.0	0.92	0.897	32.86	0.973	474.2
South: Mississa	auga Road	s				
3L L	12.5	0.44	0.534	26.21	0.779	313.7
8T T	17.4	0.52	0.620	37.09	1.167	438.3
8R R	12.7	0.43	0.523	26.67	0.818	318.4
	15.2	0.48	0.576	32.22	1.002	382.3
East: Wanless H	Road E					
1L L	12.2	0.43	0.517	25.47	0.762	305.9
6T T	11.6	0.40	0.468	22.84	0.728	289.6
6R R	12.0	0.41	0.497	24.82	0.766	301.4
	11.9	0.41	0.491	24.07	0.744	297.2
North: Mississa	uga Road	N				
7L L	14.5	0.55	0.636	30.61	0.884	363.3
	14.8		0.627		0.940	371.2
			0.483			295.2
4R R	11.8	0.40	0.463	23.91	0.740	293.2

INTERSECTION: 15.1 0.60 0.657 29.86 0.896 378.6

Table S.14 - Summary of Input and Output Data

Mississauga Road EA

Mississauga Road and Wanless Road 2031 AM TTMP

Intersection ID: 2

Roundabout

Lane No.	Dema	nd Fl	v) wo.	reh/h)		_	Eff Grn (secs)	_		Longest Queue	Shr
	L	T	R	Tot			1st 2nd	х	(sec)	(m)	(m)
West:	Wanle	ss Ro	ad W								
l LT	6	335		341	2			1.206	132.5	234	500
2 T		410		410	2			1.206	129.0		500
3 R			226	226	2			0.479	15.8	32	75
	6	745	226	977	2			1.206	104.0	269	
South:	Miss	issau	ga Ro	ad S							
l LT	26	91		117	14			0.242	12.6	13	500
2 T		119		119	17			0.242	11.1	13	500
3 R			155	155	3			0.314	11.8	16	75
	26	210	155	391	11			0.314	11.8	16	
East:	 Wanle	ss Ro	ad E								
l LT	400	53		453	2			0.440	12.9	26	500
2 TR		442	11	453	2			0.440	6.8	26	500
	400	495	11	906	2			0.440	9.9	26	
North:	Miss	 issau	ga Ro	 ad N							
LT	415	237		652	3			0.963	32.4	136	500
2 T		683		683	4			0.963	27.2	140	500
3 R			60	60	2			0.063	7.8	3	7.5
	415	920	60	1395	4			0.963	28.8	140	
ALL VE	HICLE:	==== S		Total	%				Aver.		
				Flow				X	Delay		
				3669	4			1.206	42.4	269	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

### **Table S.15 - Capacity and Level of Service**

Mississauga Road EA

Mississauga Road and Wanless Road 2031 AM TTMP

Intersection ID: 2

 ${\tt Roundabout}$ 

Mov	Mov	Total	Total	Deg.	Aver.	LOS	Longest Q	ueue
ID	Тур	Flow	Cap.	of	Delay		95% Bac	k
		(veh	(veh	Satn			(vehs)	(m)
		/h)	/h)	(v/c)	(sec)			

West: Wanless Road W

5L 2T 2R	T	6 745 226		1.206*	139.3 130.5 15.8	F	30.2 34.8 4.2	
South	n: Mississ	auga Road	l S					
3L	L	26	107	0.243	17.8	В	1.5	13
8T		210	866	0.242	11.1	В	1.5	. 13
8R	R (Slp)	155	493	0.314	11.8	В	2.0	16
East:	: Wanless							
1L		400	908				3.3	
6T	T	495	1124	0.440	6.8	A		
6R	R	11	25	0.440	7.9	A	3.3	26
North	n: Mississ	auga Road	. N					
7L	L	415	431	0.963	34.9	С	17.4	136
4T	T	920	955	0.963	27.4	C	17.8	140
4R	R (Slp)	60	951	0.063	7.8	A	0.3	3
ALL	VEHICLES:	3669		1.206	42.4	D	34.8	269

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

- \* Maximum v/c ratio, or critical green periods
- " Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

**Table D.O - Geometric Delay Data** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Electric Ele		_	Negn	-		Downstrea	m Distance
From To Approach Approach	Turn	Radius (m)	(km/h)		(m)	(m)	User Spec?
West: Wanless Road	W						
South	Right	41.0	34.5	19.3	500	127	No
East	Thru	57.3	39.1	47.1	500	131	No
North	Left	19.0	25.7	74.6	500	175	No
South: Mississauga	Road S						
West	Left	.19.0	25.7	74.6	500	176	No
East	Right	41.0	34.5	19.3	500	128	No
North	Thru	57.3	39.1	47.1	500	146	No
East: Wanless Road	E						
West	Thru	57.3	39.1	47.1	500	131	No
South	Left	19.0	25.7	74.6	500	176	No
North	Right	35.0	32.5	19.4	500	126	No .
North: Mississauga	Road N						
West	Right	41.0	34.5	19.3	500	127	No
South	Thru	57.3	39.1	47.1	500	133	No
East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Lane No.	Deg. Satn x	Stop 1st d1		Delay Total dSL	Acc.	(secon Queu Total dq	ing MvUp	Stopd (Idle)	Geom dig	Control dic
West: 1 1 LT 2 T 3 R		11.4	115.6 113.7	127.0 123.6 9.7		120.4 117.0 4.1	24.2		5.4	132.5 129.0 15.8
South: 1 LT 2 T 3 R	Mississ 0.242 0.242 0.314	5.4	0.0	5.4 5.3	4.9	0.7 0.3 0.9		0.3	5.8	12.6 11.1 11.8
East: V 1 LT 2 TR		Road 1.4 1.4	E 0.0 0.0	1.4 1.4	2.7		0.0	0.0	11.6	12.9
North: 1 LT 2 T 3 R		5.6 5.4	16.9 16.4	22.5	5.5 6.6 2.9					32.4 27.2 7.8
dn is	average	stop	-start	delay	for a	ill veh	icles	queued	and u	nqueued

**Table D.2 - Lane Stops** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Lane				_	Rate Overall h	_	_
	1.206	1.00	1.15 1.30	0.00	2.15 2.30 1.03	1.000	4.20
1 LT 2 T	0.242	0.75 0.75	0.00	0.13 0.11	0.88 0.86 0.89	0.749	0.00
		0.40	0.00	0.32	0.72 0.56		
1 LT 2 T	Missi 0.963 0.963 0.063	0.99 0.99	0.52 0.52	0.01 0.00	1.52 1.52 0.62		1.55

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued  $\frac{1}{2}$ 

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Deg.			Average (veh)				Percentile (veh)				
Lane Satn No. x	-		Nb2		70%			95%	98%	Stor. Ratio	
1 LT 2 T	1.206 1.206	8.7 10.3 0.2	3.0		11.3 13.2 1.3	15.5 17.6 2.4				35.8 41.4 4.8	0.47 0.54 0.43
1 LT 2 T	0.242	0.0	0.5 0.5	0.0 0.0 0.0		0.9 0.9 1.2	1.1 1.1 1.4	1.2 1.2 1.6	1.5 1.5 2.0	1.7 1.7 2.3	0.03 0.03 0.21
1 LT	Wanless 0.440 0.440		1.1	0.0	1.1	1.9					0.05
1 LT 2 T	0.963 0.963	3.0 3.1 0.0	2.6	3.6 3.7 0.0	6.2 6.3 0.1	9.4 9.6 0.2	11.9 12.1 0.2	13.7 14.0 0.3		20.5 20.9 0.4	0.27 0.28 0.04

Values printed in this table are back of queue (vehicles).

**Table D.3B - Lane Queues (metres)** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

Deg. Lane Satn		Queue	Average (metres)			Percentile (metres)					Queue
No. x	Nb1				70%	85%	90%	95%	98%	Stor. Ratio	
West: 1 LT 2 T 3 R	1.206 1.206	s Road W 67.1 79.5 1.4		66.3 79.1 1.1	102.1	120.0 136.2 18.6		181.3 207.7 25.9	233.8 269.0 32.2	277.6 320.0 37.4	0.47 0.54 0.43
1 LT 2 T	0.242	ssauga Rc 0.0 0.0 0.0	4.0			7.4 7.6 9.1		10.2 10.5 12.6	13.0	14.6 15.0 18.1	0.03 0.03 0.21
East: 1 LT 2 TR	Wanles 0.440 0.440		8.2 8.3	0.0	8.2 8.3	14.9 15.0					0.05
North 1 LT 2 T 3 R	0.963	ssauga Ro 23.5 24.0 0.0	20.3	27.9 28.8 0.0	48.2 49.5 0.8	73.4 75.2 1.6	92.7 95.0 1.9	107.1 109.9 2.1	136.0 139.6 2.6	160.1 164.4 3.1	0.27 0.28 0.04

Values printed in this table are back of queue  $(\mathsf{metres})$ .

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Intersection ID: 2 Roundabout

				Speeds		Move-up		ion Spd	Geom
Mov					1st Grn		Running	Overall	Dorag
West: Wa	anless Ro	ad W							
2T T 2R R	65.0 65.0 65.0	39.1 34.5	39.1 34.5	65.0 65.0	15.4			13.7 13.7 44.6	5.4
South: N 3L L 8T T	4ississau 65.0 65.0	ga Road 25.7 39.1	1 S 25.7 39.1	65.0 65.0	16.8			44.1 49.8 48.6	5.8
1L L 6T T	anless Ro 65.0 65.0 65.0	25.7 39.1 32.5	39.1 32.5	65.0			51.9	46.4 51.9 50.9	5.4
7L L 4T T	1ississau 65.0 65.0 65.0	25.7 39.1	N 25.7 39.1	65.0			37.9 40.3 51.6		5.4

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Wanless 2031 AM TTMP
C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap
Processed Jan 12, 2010 12:00:55PM

A1492, AECOM, Small Office
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# **Output Tables**

# Mississauga Road EA

# Mississauga Road and Wanless Road 2031 PM TTMP

#### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout
Driving on the right-hand side of the road
Input data specified in Metric units
Model Defaults: US HCM (Metric)
Peak Flow Period (for performance): 15 minutes
Unit time (for volumes): 60 minutes.
Delay definition: Control delay
Geometric delay included
HCM Delay Model option selected
HCM Queue Model option selected
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

#### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

From Approach	To Approach	Mov ID	Turn	Flow LV	Rate HV		Peak Flow Factor
West: Wan	less Road	w .					
	South	2R	Right	289	6	1.00	1.00
	East	2T	Thru	877	18	1.00	1.00
	North	5L	Left	10	0	1.00	1.00
South: Mi	ssissauga	Road S					
	West		Left	78	2	1.00	1.00
	East	8R	Right	466	14	1.00	1.00
	North .	81	Thru	552	113	1.00	1.00
East: Wan	less Road	 Е					
	West	6T	Thru	461	9	1.00	1.00
	South	1L	Left	382	8	1.00	1.00
	North	6R	Right	15	0	1.00	1.00
North: Mi	ssissauga :	 Road N					
	West	4R	Right	25	0	1.00	1.00
	South	4T	Thru	317	13	1.00	1.00
	East	7L	Left	63	2	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

Mov ID	I	Left	Th	rough	Rig	ht
ID	LV	HV	LV	HV	TA	HV
Demand flows			as	used by	the pro	gram
West: Wanles						
5L L			0	-	0	0
2T T			877	18	0	0
2R R	0	0	0	. 0	289	6
South: Missi	ssaı	ıga Road S	3			
3L L .	78	2	0	0	0	0
8T T	0	0	552	113	0	. 0
8R R	0	0	0	0	466	14
East: Wanles	s Ro	ad E				
1L L	382	8	0	0	0	0
6T T	0	0	461	9	0	0
6R R	0	0	0	0	15	1
North: Missi	ssau	iga Road 1	1			
7L L			0	0	0	0
4T T	0	0	317	13	0	0
4R R	0	0	0	0	25	1

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mov	Lef	it	Thro	ugh	Rigl	nt
ID	Total	%HV	Total	%HV	Total	%HV
Demand flow West: Wanle			r as use	d by th	e progra	am
5L L	11		0	0.0	0	0.0
2T T	0	0.0	895	2.0	0	0.0
2R R	0	0.0	0	0.0	295	2.0
South: Miss	issauga	Road	S			
3L L	80	2.5	. 0	0.0	0	0.0
8T T	0	0.0	665	17.0	0	0.0
8R R	0	0.0	0	0.0	480	2.9
 East: Wanle	ss Road	 ! Е				
1L L	390	2.1	0	0.0	0	0.0
6T T	0	0.0	470	1.9	0	0.0
6R R	0	0.0	0	0.0	16	6.2
North: Miss	issauga	Road	N			
7L L	65	3.1	0	0.0	0	0.0
4T T	0	0.0	330	3.9	0	0.0
4R R	0	0.0	0	0.0	26	3.8

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout
                                              Circulating/Exiting Stream
 Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) (m) (m) (m) (m) (m) Effect
West: Wanless Road W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 785 2.9 785 0 N 0.905 Exclusive Slip lane (exiting flow): 720 2.9 720 0 N 0.907
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 970 2.1 970 0 N Exclusive Slip lane (exiting flow): 960 2.1 960 0 N
East: Wanless Road E
 North: Mississauga Road N
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
```

#### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout
                      ---- Circulating/Exiting Stream --- Critical Gap
Flow Aver Aver In-Bnch Prop ----- Foll-up
Turn Lane Lane
       No.
               Type
                        Rate Speed Dist Headway Bunched Hdwy Dist Headway
                      (pcu/h) (km/h) (m) (s)
                                                                       (s)
                                                                               (m)
West: Wanless Road W
   Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 785 31.4 39.9 1.51 0.519 3.90 34.0
Thru 1 Subdominant 785 31.4 39.9 1.51 0.519 3.75 32.7 2 Dominant 785 31.4 39.9 1.51 0.519 3.68 32.1 Right 3 Excl. Slip 720E 31.9 44.2 1.62 0.513 3.68 32.6
                                                                                          2.60
                                                                                          2.55
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 970 38.1 39.2 1.08 0.474 3.59 38.0 2.55
Thru 1 Subdominant 970 38.1 39.2 1.08 0.474 4.02 42.5 2.86
2 Dominant 970 38.1 39.2 1.08 0.474 3.91 41.3 2.78
Right 3 Excl. Slip 960E 38.2 39.8 1.09 0.473 3.91 41.5 2.78
East: Wanless Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 835 37.5 44.9 1.03 0.407 3.71 38.7
```

```
Thru 1 Subdominant 835 37.5 44.9 1.03 0.407 3.71 38.7 2.59 2 Dominant 835 37.5 44.9 1.03 0.407 3.63 37.8 2.53 Right 2 Dominant 835 37.5 44.9 1.03 0.407 3.68 38.3 2.57
___________
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 940 32.4
Thru 1 Subdominant 940 32.4
                               34.5 1.09 0.466 3.64
34.5 1.09 0.466 3.64
                                                                 2.58
                                                          32.7
                                                          32.8
                                                                 2.58
    2 Dominant 940 32.4 34.5 1.09 0.466
                                                   3.52
                                                          31.7 2.49
Right 3 Excl. Slip 550E 37.2
                             67.6 1.67 0.429 3.52 36.3 2.49
_____
```

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

#### **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

Mov ID	Domona		Oppos	sing M	lovement				Lane	
10	Demand Flow (veh/h)				Adjust. Flow (pcu/h)	(veh	Satn			
West: Wa	nless Ro	ad W								
5L L		9.1		2.9		18	0.85		100	
	895 295		785 720	2.9	785 720			36 119	100	0.627 0.388
 South: M	ississau	ga Roa	 ad S							
3L L	80			2.1			0.85	21	100	0.702
	665			2.1	970	950	0.85	21	100	0.700
8R R	480	2.9	960	2.1	960	540	0.85	- 4	100	0.889
East: Wa	nless Ro	ad E								
1L L	390	2.1	755	15.2	835	599	0.85	31	100	0.651
	470			15.2		722	0.85	31	100	0.651
6R R	16	6.2	755	15.2	835	25	0.85	33	100	0.640
North: M	ississau	ga Roa	id N							
	65	_		2.0	940	208	0.85	172	100	0.312
4T T	330	3.9	940	2.0	940	1055	0.85	172	100	0.313
4R R	26	3.8	550	2.0	550	899	0.85	2839	100	0.029

#### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

Intersection Level of Service = B
Worst movement Level of Service = C
Average intersection delay (s/pers) = 14.3
Largest average movement delay (s) = 22.8

```
Largest back of queue, 95% (m)
                                                86
                                             89.24
Performance Index
Degree of saturation (highest)
                                             0.889
Practical Spare Capacity (lowest)
                                               -4 %
Effective intersection capacity, (veh/h)
                                               4188
Total vehicle flow (veh/h)
                                              3723
Total person flow (pers/h)
                                              4468
Total vehicle delay (veh-h/h)
Total person delay (pers-h/h)
                                            17.72
                                           3725
4470
Total effective vehicle stops (veh/h)
Total effective person stops (pers/h)
Total vehicle travel (veh-km/h)
                                            2363.9
Total cost ($/h)
                                        = 1083.40
Total fuel (L/h)
                                             322.5
Total CO2 (kg/h)
                                             808.12
```

## **Table S.5 - Movement Performance**

Mov ID	Delay		Delay	Queued	Stop	95% Ba	ack	Index	Speed	
	(veh-h/h)	(pers-h/h	1) (sec)			(vens)			(km/h)	
West: W	anless Road	W								
5L L	0.06	0.07	19.4	0.82	1.04	5.9	46	0.28	42.9	
2T T	3.05	3.66	12.3	0.82	0.99	6.0	46	20.50	48.1	
2R R	0.81	0.97	9.9	0.70	0.81	2.7	21	5.85	50.0	
South:	Mississauga	Road S								
3L L	0.47	0.57	21.2	0.86	1.08	6.0	51	2.21	41.5	
8T T	2.70	3.23	14.6	0.86	1.04	6.0	52	16.49	46.3	
8R R	3.04	3.64	22.8	0.95	1.27	11.1	86	14.79	39.3	
East: W	anless Road	 Е								
1L L	1.99	2.39	18.3	0.83	1.03	5.6	43	9.94	43.6	
6T T	1.45	1.75	11.1	0.83	0.99	5.7	44	10.55	49.3	
6R R	0.05	0.07	12.3	0.83	1.00	5.7	44	0.36	48.0	
North: I	Mississauga	Road N								
	0.29				0.92	1.9	15	1.49	45.7	
4T T	0.81	0.97	8.8	0.71	0.73	1.9	15	6.33	50.5	
4R R	0.06	0.07	7.9	0.52	0.60	0.2	1	0.45	51.3	

#### **Table S.6 - Intersection Performance**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout
______
Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Queued Stop Queue Index Speed
(veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m)
                                         (km/h)
_____
West: Wanless Road W
1201 0.627 3.92 4.70 11.7 0.79 0.95 46 26.63 48.5
_____
South: Mississauga Road S
1225 0.889 6.20 7.44 18.2 0.90 1.13 86 33.49 42.9
______
East: Wanless Road E
              4.20 14.4 0.83 1.01 44 20.85
 876 0.651 3.50
                                         46.5
_____
North: Mississauga Road N
 421 0.313 1.15 1.38 9.8 0.70 0.75 15
                                      8.27
                                         49.7
```

ALL VEHICLES:
3723 0.889 14.77 17.72 14.3 0.82 1.00 86 89.24 46.2

INTERSECTION (persons):
4468 0.889 17.72 14.3 0.82 1.00 89.24 46.2

Queue values in this table are 95% back of queue (metres).

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

Lane			_			Q u e 95% Ba		
No.	•					(vehs)	(m)	Length (m)
West:	Wanless F	Road W						
1 LT	447	712 (	0.627	12.5	0.99	5.9	45.8	500.0
2 T	459	732 (	0.627	12.2	0.99	6.0	46.1	500.0
3 R	295	761	387	9.9	0.81	2.7	21.0	75.0
South:	Mississa	auga Ro	ad S					
1 LT	371	530 0	700	16.1	1.05	6.0	50.8	500.0
2 T	374	535 0	700	14.5	1.04	6.0	52.2	500.0
3 R	480	540 0	.889	22.8	1.27	11.1	86.2	75.0
East:	Wanless F	Road E						
1 LT	431	662 0	.651	17.7	1.03	5.6	43.4	500.0
2 TR	445	684 0	651	11.2	0.99	5.7	43.9	500.0
North:	Mississa	uga Ro	ad N					
1 LT	193	616 0	.313	11.3	0.80	1.9	14.7	500.0
2 T	202	647 C	.313	8.7	0.72	1.9	15.0	500.0
3 R	26	899 C	.029	7.9	0.60	0.2	1.3	75.0

## Table S.8 - Lane Flow and Capacity Information

Lane No.				Tot	Min Cap (veh /h)	Cap (veh /h)	Satn	
West:	Wanles	s Roa	 d W					
1 LT	11	436	0	447	150	712	0.627	100
2 T	0	459	0	459	150	732	0.627	100
3 R	0	0	295	295	150	761	0.387	100
2 T	80	291 374	0	371 374		530 535 540	0.700	100
East: N	Wanles	s Roa	d E					
1 LT	390	41	0	431	150	662	0.651	100
2 TR	0	429	16	445	150	684	0.651	100

No	orth:	Missi	ssauga	Roa	d N				
1	LT	65	128	0	193	150	616	0.313	100
2	T	0	202	0	202	150	647	0.313	100
3	R	0	0	26	26	26	899	0.029	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Rounda	bout	ID: 2							
	Тур	Flow (veh		Util	Satn	Delay	Stop Rate	95% Back of Queue (veh)	In
5L L 2T T		11 895	18 1427	100	0.627	12.3	0.99	5.9 6.0 2.7	20.
3L L 8T T		80 665	114 950	100	0.700	14.6	1.04	6.0 6.0 11.1	16.
1L L 6T T		390 470	599	100	0.651	11.1	0.99	5.6 5.7 5.7	10.
7L L 4T T		65 330	208	100	0.313	8.8	0.73	1.9 1.9 0.2	

<sup>\*</sup> Maximum degree of saturation

# **Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)**

Mov ID	Fuel Total L/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Wanless	Road W					
5L L	0.9	3.38	0.004	0.20	0.006	2.4
2T T	69.6	239.18	0.289	14.46	0.445	174.3
2R R	22.4	76.19	0.093	4.67	0.144	56.2
	93.0	318.74	0.386	19.33	0.595	232.8
South: Mississ	auga Road	. S				
3L L	7.0	25.12	0.030	1.47	0.043	17.4
8T T	76.0	230.14	0.275	16.53	0.514	191.3

	41.0	149.62	0.177	8.84	0.264	104.5
	124.7	404.88	0.483	26.83	0.821	313.3
East: Wanless R	oad E					
		118.45				
		123.47				
6R R	1.3	4.28	0.005	0.27	0.008	3.1
		246.20				
North: Mississa						
	_	19.38	0.023	1.18	0.035	14.0
4T T	26.3	87.65	0.105	5.40	0.169	65.9
4R R		6.54				
		113.57			0.216	
INTERSECTION:		1083.40	1.303	67.98	2.081	808.1
DADAMEMEDO HOED	TN 000		n T O M G			
PARAMETERS USED	IN COS		rions	· •		
			FIONS	-	0 900	
Pump price of	f fuel	(\$/L)	FIONS	=	0.900 0.70	
Pump price of	f fuel	 (\$/L) factor			0.900 0.70 3.0	
Pump price of	f fuel e cost ning co	(\$/L) factor st to fuel		=	0.70 3.0	
Pump price of Fuel resource Ratio of runn	f fuel e cost ning co ne (\$/h	(\$/L) factor st to fuel		=	0.70 3.0 19.00 0.40	
Pump price of Fuel resource Ratio of runn Average incor	f fuel e cost ning co ne (\$/h actor	(\$/L) factor st to fue]		= =	0.70 3.0 19.00	
Pump price of Fuel resource Ratio of run Average incor Time value fa Light vehicle Heavy vehicle	f fuel e cost ning co ne (\$/h actor e mass e mass	(\$/L) factor st to fuel ) (1000 kg) (1000 kg)	L cost	= = = = =	0.70 3.0 19.00 0.40 1.4 11.0	
Pump price of Fuel resource Ratio of run Average incor Time value fa Light vehicle Heavy vehicle Light vehicle	f fuel e cost ning co ne (\$/h actor e mass e mass e idle	(\$/L) factor st to fuel ) (1000 kg) (1000 kg) fuel rate	cost	= = = = =	0.70 3.0 19.00 0.40 1.4 11.0	
Pump price of Fuel resource Ratio of run Average incor Time value fa Light vehicle Heavy vehicle	f fuel e cost ning co ne (\$/h actor e mass e mass e idle	(\$/L) factor st to fuel ) (1000 kg) (1000 kg) fuel rate	cost	= = = = =	0.70 3.0 19.00 0.40 1.4 11.0	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Roundabout						
Mov ID	Fuel Rate L/100km		HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Wanless : 5L L 2T T 2R R		0.42	0.547 0.513 0.505	26.90 25.68 25.33	0.790	320.0 309.4 304.8
	12.3	0.42	0.511	25.60	0.788	308.3
South: Mississon 3L L 8T T 8R R	12.9 18.2	0.47 0.55	0.556 0.658 0.592	39.49	0.800 1.228 0.882	
	16.2	0.52	0.625	34.75	1.064	405.6
East: Wanless I	 Road E					
1L L 6T T 6R R	12.7 12.2 12.6		0.543 0.506 0.529	25.39	0.792 0.785 0.810	317.6 306.4 315.3
	12.5	0.43	0.523	26.09	0.789	311.7
North: Mississa 7L L 4T T 4R R	auga Road 12.7 12.7 11.9	N 0.44 0.42 0.40	0.535 0.506 0.487	25.99	0.801 0.814 0.753	
	12.6	0.42	0.510	26.02	0.808	316.4
INTERSECTION:	13.6	0.46	0.551	28.76	0.880	341.9

## **Table S.14 - Summary of Input and Output Data**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

Lane No.	Dema	nd Fl		reh/h)		Adj. E Basic	(secs)	Sat	Delay	Queue	Lar
	L	Т	R	Tot		Satf. 1	st 2nd	X	(sec)	(m)	(m
West:	Wanle	ss Ro	ad W								
1 LT		436		447	2			0.627	12.5	46	50
2 T		459		459	2			0.627	12.2	46	50
3 R			295	295	2			0.387	9.9	21	7
	11	895	295	1201	2			0.627	11.7	46	
South:	Miss	issau	ıga Ro	ad S							
1 LT		291	-	371	14			0.700	16.1	51	50
2 T		374		374	17			0.700	14.5	52	50
3 R			480	480	3			0.889	22.8	86	7
	80	665	480	1225	11			0.889	18.2	86	
East:	Wanle	ss Ro	ad E								
1 LT	390	41		431	2			0.651	17.7	43	50
2 TR		429	16	445	2			0.651	11.2	44	50
	390	470	16	876	2			0.651	14.4	44	
North:	Miss	issau	ga Ro	ad N							
North:	Miss: 65			ad N 193	4			0.313	11.3	15	50
l LT					4				11.3 8.7		
LT T		128		193	_						50
LT T		128		193 202	4			0.313	8.7	15	50
1 LT 2 T	65  65	128 202  330	26	193 202 26	4			0.313 0.029	8.7 7.9	15 1	50
1 LT 2 T 3 R	65  65	128 202  330	26	193 202 26  421	4 4 4			0.313 0.029 0.313	8.7 7.9 9.8	15 1  15 	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

**Table S.15 - Capacity and Level of Service** 

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest 95% Ba (vehs)	_
West:	Wanless	Road W 11 895	18 1427	0.611 0.627	19.4 12.3	В В	5.9 6.0	46 46

							2.7	
South: M								
3L L		8.0	114	0.702	21.2	С	6.0	51
8T T		665	950	0.700	14.6	В	6.0	52
8R R				0.889*			11.1	
East: War								
1L L		390	599	0.651	18.3	В	5.6	43
6T T		470	722	0.651	11.1	В	5.7	44
6R R		16	25	0.640	12.3	В	5.7	44
North: M:	ississaı	ıga Road	N					
7L L		65	208	0.312	15.9	В	1.9	15
4T T		330	1055	0.313	8.8	A	1.9	15
4R R	-			0.029			0.2	
ALL VEH				0.889				

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

- \* Maximum v/c ratio, or critical green periods
- " Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

**Table D.O - Geometric Delay Data** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

D		Negn	Negn	Negn	Appr.	Downstream	Distance
From To Approach Approach		(m)	Speed (km/h)	Dist. (m)	Dist. (m)	(m)	User Spec?
West: Wanless Road	w						
South	Right	41.0	34.5	19.3	500	127	No
East	Thru	57.3	39.1	47.1	500	131	No
North	Left	19.0	25.7	74.6	500	176	No
 South: Mississauga	Road S						
West	Left	19.0	25.7	74.6	500	176	No
East	Right	41.0	34.5	19.3	500	128	No
North	Thru	57.3	39.1	47.1	500	146	No
East: Wanless Road	E						
West	Thru	57.3	39.1	47.1	500	131	No
South	Left	19.0	25.7	74.6	500	176	No
North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga	Road N						
West	Right	41.0	34.5	19.3	500	127	No
South	Thru	57.3	39.1	47.1	500	133	ЙО
East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout ----- Delay (seconds/veh) -----Deg. Stop-line Delay Acc. Queuing Stopd Satn 1st 2nd Total Dec. Total MvUp (Idle) Geom Control Lane No. x d1 d2 dSL dn dq dqm di West: Wanless Road W 
 1 LT
 0.627
 4.7
 2.3
 7.0
 5.4
 1.6
 1.6
 0.0
 5.6
 12.5

 2 T
 0.627
 4.5
 2.2
 6.8
 5.4
 1.4
 1.4
 0.0
 5.4
 12.2
 0.0 0.387 3.6 0.2 3.7 4.2 0.0 0.0 3 R 6.2 9.9 South: Mississauga Road S 1 LT 0.700 5.2 3.6 8.9 5.4 3.5 2.2 1.3 7.2 3.1 2 T 0.700 5.2 3.6 8.8 5.7 3.1 0.889 5.8 10.7 16.6 5.8 10.8 0.9 2.2 5.8 14.5 3 R 5.4 5.4 6.2 22.8 \_\_\_\_\_ East: Wanless Road E 1 LT 0.651 3.8 2.1 6.0 4.2 1.8 1.4 0.3 11.7 3.7 2.0 5.7 5.4 0.3 0.3 0.0 5.4 11.2 2 TR 0.651 North: Mississauga Road N 
 1 LT
 0.313
 3.5
 0.0
 3.5
 4.3
 0.0
 0.0
 0.0
 7.8
 11.3

 2 T
 0.313
 3.3
 0.0
 3.3
 4.7
 0.0
 0.0
 0.0
 5.4
 8.7

 3 R
 0.029
 1.7
 0.0
 1.7
 3.1
 0.0
 0.0
 0.0
 6.2
 7.9
 dn is average stop-start delay for all vehicles queued and unqueued

#### Table D.2 - Lane Stops

Mississauga Road EA

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

Lane	Deg. Satn x			ve Stop Geom. hig		-	_
West: 1 LT 2 T 3 R	Wanles 0.627 0.627 0.387		0.09	0.08	0.99	0.816 0.816 0.701	
South 1 LT 2 T 3 R	0.700	0.86 0.86	0.12 0.12	0.07	1.05 1.04 1.27	0.859	0.36 0.36 0.90
East: 1 LT 2 TR		s Road 0.83 0.83	0.08	0.12	1.03	0.828	0.25
1 LT	Missi 0.313 0.313 0.029	0.64 0.59	0.00	N 0.15 0.13 0.24	0.80 0.72 0.60	0.713 0.713 0.516	0.00 0.00 0.00

hqm is average queue move-up rate for all vehicles queued and unqueued

hig is the average value for all movements in a shared lane

#### Table D.3A - Lane Queues (veh)

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

Lane	Deg. Satn	Ovrfl. Queue -		ge (veh)			Percent	tile (v			Queue Stor.	
No.	х		Nb1	Nb2	Nb	70%		90%	95%	98%	Ratio	
		s Road W										
1 LT		0.4	1.5	0.4	1.9	3.4	4.2		5.9	6.9	0.09	
2 T		0.4		0.4		3.4					0.09	
3 R	0.387 	0.0	0.8	0.0	0.9	1.6	1.9	2.2	2.7	3.2	0.28	
South	: Missi	ssauga Ro	oad S									
1 LT	0.700	0.4	1.5	0.4	2.0	3.4	4.2	4.8	6.0	7.0	0.10	
		0.4		0.4	2.0	3.4			6.0		0.10	
3 R	0.889	1.4	2.2	1.6	3.8	6.2	7.7	8.8	11.1	13.0	1.15	
East:	Wanles	s Road E										
1 LT	0.651	0.3	1.5	0.3	1.8	3.2	4.0	4.5	5.6	6.5	0.09	
2 TR	0.651	0.3	1.5	0.3	1.9	3.3	4.0	4.6	5.7	6.6	0.09	
North:	: Missi	ssauga Ro	ad N									
		0.0		0.0	0.6	1.1	1.3	1.5	1.9	2.2	0.03	
2 T	0.313	0.0	0.6	0.0	0.6	1.1	1.4	1.5	1.9	2.2	0.03	
3 R	0.029	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.02	

Values printed in this table are back of queue (vehicles).

# **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

Lane	Deg. Satn	Ovrfl. Oueue									Queue Stor.
No.	х	No	Nb1	Nb2	Nb		85%	90%	95%	98%	Ratio
1 LT 1 2 T	Wanles	s Road W 2.7 2.7	11.8 11.9	3.2	15.0 15.1 6.7	26.3 26.4	32.3 32.5	36.8 37.0	45.8 46.1	53.3 53.7	0.09 0.09 0.28
1 LT 2 T	0.700	3.5 3.6 10.9	13.0 13.4	3.7 3.8 12.4	16.7 17.1 29.3	29.1 29.9 48.0	35.8 36.8 59.8	40.8 41.9 68.6	50.8 52.2 86.2	59.1 60.7 100.9	0.10 0.10 1.15
East: 1 LT 2 TR	0.651	s Road E 2.3 2.3				25.0 25.2				50.5 51.1	
North: 1 LT 2 T 3 R	0.313 0.313	0.0 0.0 0.0 0.0	4.7	0.0 0.0 0.0	4.7 4.7 0.4	8.6 8.8 0.8	10.5 10.7 0.9	11.9 12.1 1.1	14.7 15.0 1.3		0.03 0.03 0.02

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Intersection ID: 2 Roundabout

						Move-up			
	App. Sp	eeds		Speeds			Av. Sect	-	
Mov ID	Cruise	Negn			Ist Grn	2nd Grn			Delay (sec)
West: Wa	nless Ro	ad W							
5L L	65.0	25.7	25.7	65.0	18.3		43.8	42.9	12.4
2T T	65.0	39.1	39.1	65.0	18.6		48.1	48.1	5.4
2R R	65.0	34.5	34.5	65.0	19.4		50.0	50.0	6.2
South: M	ississau	ga Roac	l S						
3L L	65.0	25.7	25.7	65.0	17.7		43.3	41.5	12.4
8T T	65.0	39.1	39.1	65.0	17.2		47.2	46.3	5.8
8R R	65.0	34.5	34.5	65.0	16.5		43.4	39.3	6.2
East: War	nless Ro	ad E							
1L. L	65.0	25.7	25.7	65.0	17.5		43.9	43.6	12.4
6T T	65.0	39.1	39.1	65.0	17.7		49.3	49.3	5.4
6R R	65.0	32.5	32.5	65.0	17.6		48.0	48.0	6.6
North: M:	ississau	ga Road	l N						
7L L	65.0	25.7	25.7	65.0	17.1		45.7	45.7	12.4
4T T	65.0	39.1	39.1	65.0	17.3		50.5	50.5	5.4
4R R	65.0	34.5	34.5	65.0			51.3	51.3	6.2

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Wanless 2031 PM TTMP

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Processed Jan 12, 2010 12:04:37PM

A1492, AECOM, Small Office

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# **Output Tables**

# Mississauga Road EA

# Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S

#### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout
Driving on the right-hand side of the road
Input data specified in Metric units
Model Defaults: US HCM (Metric)
Peak Flow Period (for performance): 15 minutes
Unit time (for volumes): 60 minutes.
Delay definition: Control delay
Geometric delay included
HCM Delay Model option selected
HCM Queue Model option selected
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

#### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S Intersection ID: 1 Roundabout

From Approach	To Approach	Mov ID		Flow LV	Rate HV		Peak Flow Factor
West: May	field Road	W					
	South	2R	Right	76	14	1.00	1.00
	East	2T	Thru	1172	88	1.00	1.00
	North	5L	Left	64	1	1.00	1.00
South: Mi	ssissauga R	 .oad S					
	West	3L	Left	15	0	1.00	1.00
	East	8R	Right	38	7	1.00	1.00
	North	T8	Thru	52	8	1.00	1.00
East: May	field Road	E					
	West	6T	Thru	455	80	1.00	1.00
	South	1L	Left	153	17	1.00	1.00
	North	6R	Right	25	0	1.00	1.00
North: Mi	ssissauga R	oad N					
	West	4R	Right	74	1	1.00	1.00
	South	4T	Thru	389	16	1.00	1.00
	East	7L	Left	55	5	1.00	1.00

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/SIntersection ID: 1 Roundabout

Mov		1	Left	Th	rough	Ri	ght
ID		LV	HV	LV	HV	TA 	HV
			veh/hour	as	used by	the pr	ogram
	Mayfie						
	L		1	0	0	0	0
2T	T	0	0	1172	88	0	0
2R	R	0	0	0	0	76	14
South	: Missi	ssaı	iga Road	S			
3L		15	-	0	0	0	0
8T	T	0	0	52	8	0	0
8R	R	0	0	0	0	38	7
 East:	Mayfie	ld F	Road E				
1L	L	153	17	0	0	0	0
6T	T	0	0	455	80	0	0
6R	R	0	0	0	0	25	1
North:	: Missi	ssau	iga Road	N			
7L	L	55	5	0	0	0	0
4 T	T	0	0	389	16	0	0
4R	R	0	0	0	0	74	2

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mov ID	Le	ft	Thro	ugh	Rig	ht 
10	Total	%HV	Total	%HV	Total	%HV
Demand fl West: May			as use	d by th	e progr	am
5L L 2T T	65		0 1260	0.0		0.0
2R R		0.0		0.0	90	
 South: Mi	ssissaug	a Road	s ,			
3L L		6.2		0.0	-	0.0
8T T 8R R	-	0.0	60 0	0.0	45	0.0 15.6
 East: May	field Ro	ad E				
1L L	170			0.0	0	0.0
6T T	_	0.0		15.0		0.0
6R R	0	0.0	0	0.0	26 	3.8
North: Mi	ssissaug	a Road				
7L L		8.3	_	0.0	0	0.0
4T T	-		405		0	0.0
4R R	0	0.0	0	0.0	76	2.6

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout
                                        Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) h) (pcu/h) Effect
West: Mayfield Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 635 6.0 646 0 N Exclusive Slip lane (exiting flow): 575 5.8 584 0 N
                                                  646 0 N 0.925
584 0 N 0.936
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 1385 6.8 1413 0 N 0.645
East: Mayfield Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 140 7.1 145 0 N 0.982
_____
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 720 13.5 782 0 N 0.931
```

## **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout
Turn Lane Lane --- Circulating/Exiting Stream --- Critical Gap
                   Flow Aver Aver In-Bnch Prop
                                                             ----- Foll-up
      No. Type
                                    Dist Headway Bunched Hdwy Dist Headway (m) (s) (s) (m) (s)
                    Rate Speed
                   (pcu/h) (km/h) (m) (s)
_____
West: Mayfield Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 646 34.3 53.1 1.36 0.414 3.86 36.7
Thru 1 Subdominant 646 34.3 53.1 1.36 0.414 3.94 37.5
2 Dominant 646 34.3 53.1 1.36 0.414 3.92 37.3
                                                                              2.61
                                                                              2.67
                                                             3.92 37.3
                                                                            2.66
Right 3 Excl. Slip 584E 35.2 60.2 1.31 0.373 3.92 38.3
                                                                            2.66
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1413 37.9 26.8 1.05 0.605 3.38 35.6 Thru 1 Subdominant 1413 37.9 26.8 1.05 0.605 3.62 38.1
                                                                              2.69
      2 Dominant 1413 37.9 26.8 1.05 0.605
2 Dominant 1413 37.9 26.8 1.05 0.605
                                                             3.37
                                                                      35.5
                                                                   35.5
36.2
                                                                              2.51
Right 2 Dominant
                                                             3.44
                                                                              2.56
East: Mavfield Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Dominant 145 31.5 216.4 1.66 0.136 4.55 39.8
                                                                              2.80
      1 Dominant 145 31.5 216.4 1.66 0.136 2 Subdominant 145 31.5 216.4 1.66 0.136
                                                           4.74 41.5
4.74 41.5
                                                                              2.91
Thru 1 Dominant
                                                                            2.92D
```

Right 2 Subdominant					0.136	4.34	37.9	2.67D
North: Mississauga F								
Environment Factor	: 1.20	Entr	y/Circu	lating	Flow Adj	ustment:	Medium	
Left 1 Subdominant	782	35.7	45.6	1.05	0.393	3.89	38.5	2.69
Thru 1 Subdominant	782	35.7	45.6	1.05	0.393	3.76	37.3	2.61
2 Dominant	782	35.7	45.6	1.05	0.393	3.69	36.5	2.55
Right 2 Dominant	782	35.7	45.6	1.05	0.393	3.69	36.5	2.55

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

- E Exiting flow for slip lane traffic
- D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

# **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S Intersection ID: 1 Roundabout

Mov ID		Demand		Oppos	ing M	ovement Adjust.				Lane Util	Deg. Satn
		Flow (veh/h)				Flow (pcu/h)			_	(%)	x
 West:	May	field R	oad W								
5L 1	L	65	1.5	635	6.0	646	77	0.85	1	100	0.844*
2T :		1260		635		646			1	100	0.843
2R I	3	90	15.6	575	5.8	584	835	0.85	689	100	0.108
South	 : Mi	ssissau	 σa Roa	 id S							
3L I					6.8	1413	99	0.85	426	100	0.162
8T :	Г	60	13.3	1385	6.8	1413	369	0.85	423	100	0.163
8R I	3	45	15.6	1385	6.8	1413	277	0.85	423	100	0.162
 East:	May	field R	 oad E								
1L I	-		10.0	140	7.1	145	502	0.85	151	100	0.339
6T 1	Г	535	15.0	140	7.1	145	1578	0.85	151	100	0.339
6R I	3	26	3.8	140	7.1	145	77	0.85	152	100	0.338
North:	 : Mi	ssissau	ga Roa	.d N							
7L I		60	8.3		13.5	782	171	0.85	142	100	0.351
4T 7	ľ	405	4.0	720	13.5	782	1155	0.85	142	100	0.351
4R F	2	76	2.6	720	13.5	782	217	0.85	143	100	0.350

## **Table S.3 - Intersection Parameters**

Intersection Level of Service	=	В	
Worst movement Level of Service	=	C	
Average intersection delay (s/pers)	=	12.6	
Largest average movement delay (s)	=	23.1	

```
96
Largest back of queue, 95% (m)
Degree of saturation (highest)
Performance Index
                                                      63.03
                                                     0.844
Practical Spare Capacity (lowest)
                                                          1 %
                                                     3326
Effective intersection capacity, (veh/h) =
Total vehicle flow (veh/h)
                                                       2808
                                                       3370
9.81
Total person flow (pers/h)
Total vehicle delay (veh-h/h)
Total person delay (pers-h/h)
                                                     11.77
Total person delay (pers-n/n)

Total effective vehicle stops (veh/h) =

Total effective person stops (pers/h) =

Total vehicle travel (veh-km/h) =
                                                      2541
3049
                                                = 1780.0
                                                    841.23
Total cost ($/h)
                                                =
Total fuel (L/h)
                                                       260.0
Total CO2 (kg/h)
                                                      652.34
```

## **Table S.5 - Movement Performance**

Mov ID		Delay		Delay	Queued	Stop	95% Ba	ack	Index	Sp
		(veh-h/h)	(pers-h/h 	1) (sec)		Rate	(vehs)	(m)		(km
West:	May	yfield Road	w E							
5L	L	0.42	0.50	23.1	0.93	1.20	11.9	96	1.93	4
2T	T	5.66	6.80	16.2	0.93	1.18	12.0	96	33.93	4
2R	R	0.22	0.26	8.7	0.52	0.67	0.6	5	1.60	5
South	 : М:	ississauga	Road S							
3L	L	0.08	0.10	17.8	0.78	0.94	0.9	8	0.41	4
8 T	Τ	0.18	0.22	11.1	0.78	0.88	0.9	8	1.35	4
8R	R	0.15	0.18	12.2	0.78	0.90	0.9	8	1.02	4
East:	May	field Road	i E							
1L	L	0.64	0.76	13.5	0.36	0.68	2.3	20	3.38	4
6Т	T	0.98	1.17	6.6	0.36	0.51	2.3	20	8.77	5
6R	R	0.05	0.06	7.4	0.36	0.55	2.3	20	0.44	52
North:	 : Мі	.ssissauga	Road N							
. 7L	L	0.26	0.32	15.8	0.63	0.90	2.0	16	1.33	4
4T	T	0.96	1.15	8.6	0.63	0.71	2.0	16	7.44	5
4 R	R	0.20	0.24	9.6	0.63	0.78	2.0	16	1.44	51

#### **Table S.6 - Intersection Performance**

Total Flow (veh/h	Satn	Total Delay (veh-h/h)	Delay	Delay	Queued		Longest Queue (m)		
	Mayfield 0.844	Road W 6.30	7.56	16.0	0.90	1.15	96	37.46	44.7
		auga Road 0.42		12.4	0.78	0.89	8	2.78	48.4
731		1.67							
North:	Mississ	auga Road 1.43	N						

```
ALL VEHICLES:
2808 0.844 9.81 11.77 12.6 0.70 0.90 96 63.03 47.5

INTERSECTION (persons):
3370 0.844 11.77 12.6 0.70 0.90 63.03 47.5

Queue values in this table are 95% back of queue (metres).
```

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S Intersection ID: 1 Roundabout

Dem Queue	
Flow Cap Deg. Aver. Eff. 95% Back	Lane
Lane (veh (veh Satn Delay Stop No. /h) /h) x (sec) Rate (vehs) (m)	Length (m)
West: Mayfield Road W	
1 LT 662 784 0.843 16.9 1.19 11.9 95.7	
2 T 663 787 0.843 16.2 1.18 12.0 96.2	
3 R 90 835 0.108 8.7 0.67 0.6 4.9	75.0
South: Mississauga Road S	
1 LT 59 361 0.162 13.0 0.89 0.9 7.6	500.0
2 TR 62 385 0.162 11.9 0.89 0.9 8.0	500.0
East: Mayfield Road E	
1 LT 368 1086 0.339 9.8 0.59 2.3 19.8	500.0
2 TR 363 1071 0.339 6.7 0.51 2.3 19.9	
North: Mississauga Road N	
1 LT 265 756 0.351 10.3 0.76 2.0 15.8	
2 TR 276 787 0.351 8.8 0.72 2.0 15.7	500.0

## **Table S.8 - Lane Flow and Capacity Information**

Lane No.		Thru		Tot	Cap (veh	(veh /h)	Deg. Satn x	Util
West: N	 Mayfie							
1 LT	65	597	0	662	150	784	0.843	100
2 T	0	663	0	663	150	787	0.843	100
3 R	0	0	90	90	90	835	0.108	100
South: 1 LT 2 TR	16	43	0	59			0.162 0.162	
East: N	4avfie	eld Ro	ad E					
1 LT				368	150	1086	0.339	100
2 TR								
North:	Missi	ssaug	a Roa	d N				
1 LT	60	205	0	265	150	756	0.351	100
2 TR	0	200	76	276	150	787	0.351	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

# **Table S.10 - Movement Capacity and Performance Summary**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S Intersection ID: 1 Roundabout

Mov ID	Mov Typ	Dem Flow (veh	Total Cap. (veh	Lane Util	_	Aver. Delay	Eff. Stop Rate	95% Back of Queue	Perf. Index
		/h)	• .	(용)	x	(sec)		(veh)	
West: M	layfiel	d Road	w						
5L L	-	65	77		0.844*				
		1260			0.843				
2R R	(Slp)	90	835	100	0.108	8.7	0.67	0.6	1.60
south:	Missis	sauga :	Road S						
3L L		16	99	100	0.162	17.8	0.94	0.9	0.41
8T T		60	369	100	0.163	11.1	0.88	0.9	1.35
8R R		45	277	100	0.162	12.2	0.90	0.9	1.02
East: M	ayfiel	d Road	E						
1L L	-	170	502	100	0.339	13.5	0.68	2.3	3.38
6T T		535	1578	100	0.339	6.6	0.51		
6R R		26	77	100	0.338	7.4	0.55	2.3	0.44
North:	Missis	sauga 1	 Road N						
7L L		60	171	100	0.351	15.8	0.90	2.0	1.33
4T T		405	1155	100	0.351	8.6	0.71	2.0	7.44
4R R		7.6	217	100	0.350	9.6	0.78	2.0	1.44

<sup>\*</sup> Maximum degree of saturation

## **Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)**

Mov ID	Fuel Total			CO Total		CO2 Total
	L/h	\$/h	kg/h	kg/h	kg/h	kg/h
Jest: Mayfield	Road W					
5L L	5.8	20.98	0.025	1.23	0.036	14.5
2T T	118.0	389.69	0.470	25.53	0.777	295.9
2R R	9.4	28.20	0.034	1.99	0.063	23.
	133.2	438.86	0.529	28.75	0.875	334.0
outh: Mississa	auga Road					
3L L	1.4	4.80	0.006	0.28	0.008	3.4
8T T	6.2	18.88	0.023	1.32	0.041	15.6
8R R	4.9	14.80	0.018	1.08	0.033	12.4
		38.49	0.046	2.68	0.083	31.4

East: Mayfield	Road E					
1L L		54.57	0.065	3.58	0.109	42.
6T T	52.1	158.09	0.182	10.31	0.334	130.
6R R	1.9	6.46				
	70.9	219.12			0.455	
Jorth: Mississa	uga Road	i N				
7L L	5.8	19.19	0.023	1.24	0.037	14.
4T T		106.04				
4R R	5.8	19.54	0.024	1.20	0.037	14.
	43.4	144.76	0.173	8.88	0.277	108.
INTERSECTION:	260.0	841.23	1.004	54.58	1.690	652.
				54.58	1.690	652.
	IN COST	CALCULA!			0.900	
PARAMETERS USED	IN COST	CALCULA			0.900	
PARAMETERS USED	IN COST	CALCULA!	FIONS	=	0.900	
PARAMETERS USED  Pump price o Fuel resourc Ratio of run Average inco	IN COST	CALCULA! (\$/L) factor st to fuel	FIONS	= = =	0.900 0.70 3.0 19.00	
PARAMETERS USED  Pump price o Fuel resourc Ratio of run Average inco Time value f	f fuel (e cost fining cost me (\$/h) actor	CALCULA((\$/L))	FIONS	= = = = =	0.900 0.70 3.0 19.00 0.40	
PARAMETERS USED  Pump price o Fuel resourc Ratio of run Average inco Time value f Light vehicl	f fuel (e cost fining cosme (\$/h) actore mass (	CALCULAS  (\$/L)  Factor  t to fue:	FIONS	= = = = =	0.900 0.70 3.0 19.00 0.40 1.4	
PARAMETERS USED  Pump price o Fuel resourc Ratio of run Average inco Time value f	f fuel (e cost fining cosme (\$/h) actor e mass (e mass (e mass (fining cosme fining	CALCULA: (\$/L) Factor t to fue: (1000 kg) (1000 kg)	rions 	= = = =	0.900 0.70 3.0 19.00 0.40 1.4	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mov ID	Fuel Rate L/100km	Cost Rate \$/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Mayfiel 5L L 2T T 2R R	d Road W 13.2 14.9 16.8	0.48 0.49 0.50	0.572 0.593 0.599	28.08 32.19 35.38	0.818 0.979 1.112	330.0 373.1 421.6
	14.9	0.49	0.593	32.19	0.980	. 374.0
South: Missis: 3L L 8T T 8R R	sauga Road 12.6 16.4 17.6	S 0.45 0.50 0.53	0.535 0.599 0.643		0.781 1.095 1.188	314.5 412.6 442.2
	16.3	0.50	0.606	35.01	1.085	409.6
East: Mayfield 1L L 6T T 6R R	1 Road E 14.8 15.5 11.8	0.48 0.47 0.40	0.570 0.539 0.482	31.21 30.62 23.88	0.949 0.992 0.745	370.8 388.9 294.4
	15.2	0.47	0.545	30.53	0.973	381.2
North: Mississ 7L L 4T T 4R R	sauga Road 14.4 12.5 12.2	N 0.47 0.42 0.41 0.42	0.571 0.496 0.505	30.73 25.23 25.37 25.90	0.925 0.797 0.779	361.5 312.5 304.4 
INTERSECTION:	14.6	0.47	0.564	30.66	0.950	366.5

Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S Intersection ID: 1 Roundabout

Lane No.		and Fl			%HV	Basic	(se	ecs)	-	Delay	Longest Queue (m)	
West: 1 LT 2 T 3 R	65	1eld R 597 663			6 7 16				0.843 0.843 0.108		96	500 500 75
	 65	1260	90	1415	7				0.843	16.0	96	
South: 1 LT 2 TR		43		ad S 59 62	11 15				0.162 0.162			500 500
	16	60	45	121	13				0.162	12.4	8	
East:	Mavfi	eld Ro	oad E									
1 LT 2 TR		198 337		368 363	13 14					9.8 6.7		500 500
	170	535	26	731	13				0.339	8.2	20	
North:	Miss	issau	ga Ro	ad N								
1 LT 2 TR		205 200			5 4				0.351	10.3	16	500 500
	60	405	76	541	4				0.351	9.5	16	
ALL VE	HICLE	=== <del>=</del> =		Total Flow 2808	% HV 9	=======			Max X 0.844	Aver. Delay 12.6		
	=====	=====										

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mov ID	Mov Typ		Total Cap. (veh	of Satn	Aver. Delay (sec)	LOS	Longest 95% Ba (vehs)	ck
				(V/C)	(560)			
est: 1	Mayfield	Road W						
5L L		65	77	0.844*	23.1	С	11.9	96
2T T		1260	1494	0.843	16.2	В	12.0	96
2R R	(Slp)	90	835	0.108	8.7	A	0.6	5
 outh:	Mississ	auga Roa	d S					
3L L		16	99	0.162	17.8	В	0.9	8
a		60	369	0.163	11.1	В	0.9	8
8T T								8

1L 6T 6R	T	170 535 26	502 1578 77	0.339 0.339 0.338	13.5 6.6 7.4	B A A	2.3 2.3 2.3	20 20 20
Nortl	h: Mississau	ga Road	N					
7L	L	60	171	0.351	15.8	В	2.0	16
4T	T	405	1155	0.351	8.6	A	2.0	16
4R	R	76	217	0.350	9.6	Α	2.0	16
ALL	VEHICLES:	2808		0.844	12.6	В	12.0	9,6

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

- \* Maximum v/c ratio, or critical green periods
- " Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

#### **Table D.0 - Geometric Delay Data**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S Intersection ID: 1 Roundabout

From To		_	Negn Speed	Negn	Appr.	Downstream	n Distance
Approach Approach		(m)	(km/h)		(m)	(m)	User Spec?
West: Mayfield Road	w						
South	Right	41.0	34.5	19.3	500	141	No
East	Thru	57.3	39.1	47.1	500	136	No
North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga R	oad S						
West	Left	19.0	25.7	74.6	500	176	No
East	Right	35.0	32.5	19.4	500	140	No
North	Thru	57.3	39.1	47.1	500	143	No
East: Mayfield Road	 E						
West '	Thru	57.3	39.1	47.1	500	144	No
South	Left	19.0	25.7	74.6	500	184	No
North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Ro	oad N				7		
_	Right	35.0	32.5	19.4	500	126	No
South	Thru	57.3	39.1	47.1	500	133	No
East 1	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

# **Table D.1 - Lane Delays**

Lane No.		1st	2nd	Total	Dec.		MvUp	(Idle)		Control dic
1 LT 2 T	Mayfield 0.843 0.843 0.108	4.7 4.7	6.0 5.9	10.6	6.1	4.5	4.0	0.7 0.5 0.0	5.5	
1 LT	Mississa 0.162 0.162	5.5 5.2	0.0	5.5	4.7	0.5				
1 LT	Mayfield 0.339 0.339	Road 0.8	E 0.0	0.8	2.1	0.0		0.0		
1 LT	Mississa 0.351 0.351	3.1	0.1	3.2	3.9 4.0					10.3 8.8
dn is	average	stop-	start	delay	for a	ll vehi	cles	queued	and u	inqueued

## **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S Intersection ID: 1 Roundabout

Lane No.				Geom.	Rate Overall h	-	Rate
West:	Mayfie	ld Roa	d W				
1 LT	0.843	0.93	0.22	0.03	1.19	0.930	0.60
2 T	0.843	0.93	0.22	0.03	1.18	0.930	0.59
3 R	0.108	0.43	0.00	0.24	0.67	0.519	0.00
South:	: Missi	ssauga	Road	S			
1 LT		_			0.89	0.776	0.00
2 TR	0.162	0.78	0.00	0.11	0.89	0.778	0.00
 East:	Mayfie	ld Roa					
	_			0.36	0.59	0.361	0.00
				0.29			0.00
	Missi	_			0.76	0 600	0 00
1 LT				0.19 0.18			

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued

# Table D.3A - Lane Queues (veh)

	Deg.	Ovrfl.	Avera	ige (veh)	)		Percen	tile (v	eh)		Queue
Lane	Satn	Queue -									Stor.
No.	х	No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio

	Mayfield										
1 LT	0.843	1.2	2.5	1.6	4.1	6.6	8.3	9.5	11.9	14.0	0.19
2 T	0.843	1.2	2.5	1.6	4.1	6.6	8.3	9.5	12.0	14.0	0.19
3 R	0.108	0.0	0.2	0.0	0.2	0.3	0.4	0.5	0.6	0.7	0.07
South	: Mississ	auga Roa	d S								
1 LT	0.162	0.0	0.3	0.0	0.3	0.5	0.7	0.7	0.9	1.1	0.02
2 TR	0.162	0.0	0.3	0.0	0.3	0.6	0.7	0.8	0.9	1.1	0.02
 East:	Mayfield	Road E									
1 LT	0.339	0.0	0.7	0.0	0.7	1.4	1.7	1.9	2.3	2.7	0.04
2 TR	0.339	0.0	0.7	0.0	0.7	1.4	1.7	1.9	2.3	2.7	0.04
North	: Mississa	auga Roa	 d N								
1 LT	0.351	0.0	0.6	0.0	0.6	1.2	1.4	1.6	2.0	2.3	0.03
2 TR	0.351	0.0	0.6	0.0	0.6	1.2	1.4	1.6	2.0	2.3	0:03

Values printed in this table are back of queue (vehicles).

# Table D.3B - Lane Queues (metres)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S Intersection ID: 1 Roundabout

<b>T</b>	Deg.								Percentile (metres)					
	х	No Nk	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio			
		ld Road												
1 LT	0.843	9.4	19.8	13.0	32.8	53.1	66.2	76.0	95.7	112.0	0.1			
2 T	0.843	9.4	19.9	13.0	32.9	53.3	66.5	76.4	96.2	112.6	0.1			
		0.0												
2 TR	0.162	0.0	2.5	0.0	2.4 2.5		5.7		8.0	9.3	0.0:			
	<del>-</del>	ld Road		0 0	C 3	11 (	1 / 1	16.0	10.0	22.0	0.04			
		0.0			6.3						7,17			
Z TR	0.339	0.0	6.4	0.0	6.4	11.7	14.2	16.1	19.9	23.1	0.0			
North:	Missi	ssauga R	oad N											
		0.1		0.1	5.0	9.3	11.3	12.8	15.8	18.3	0.0			
		0.1		0.1	5.0	9.2	11.2	12.7	15.7	18.2	0.0			

Values printed in this table are back of queue (metres).

# Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mov ID	App. Speeds  Cruise Negn	Exit Speeds  Negn Cruise	Queue Move-up  1st 2nd Grn Grn	Av. Section Spd  Running Overall	Geom Delay (sec)
West: Ma	ayfield Road W 65.0 25.7	25.7 65.0	19.8	41.7 40.2	12.4

	65.0 65.0				19.7	45.1 51.3	44.6 51.3	5.5 6.7
South: Mi	ssissau	ga Road	d S					
3L L	65.0	25.7	25.7	65.0		45.4	44.0	12.4
8T T	65.0	39.1	39.1	65.0		50.0	49.7	5.7
8R R	65.0	32.5	32.5	65.0		49.3	48.6	7.1
East: May	field R	oad E						
1L L	65.0	25.7	25.7	65.0		47.2	47.2	12.6
6T T	65.0	39.1	39.1	65.0		53.2	53.2	5.7
6R R	65.0	32.5	32.5	65.0		52.0	52.0	6.6
North: Mi	ssissau	ga Road	 d N					
		-		65.0	17.9	45.9	45.9	12.6
4T T	65.0	39.1	39.1	65.0	18.1	51.1	51.1	5.4
4R R	65.0	32.5	32.5	65.0	18.2	50.3	50.3	6.6

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mayfield 2031 AM TTMP Red N/S C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap Processed Jan 12, 2010 12:01:46PM

A1492, AECOM, Small Office

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# **Output Tables**

# Mississauga Road EA

# Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S

#### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout
Driving on the right-hand side of the road
Input data specified in Metric units
Model Defaults: US HCM (Metric)
Peak Flow Period (for performance): 15 minutes
Unit time (for volumes): 60 minutes.
Delay definition: Control delay
Geometric delay included
HCM Delay Model option selected
HCM Queue Model option selected
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

#### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1

From Approach	To Approach	Mov ID	Turn				Peak Flow Factor
West: May	field Road	w					
_	South	2R	Right	63	12	1.00	1.00
	East	2T	Thru	1088	57	1.00	1.00
	North	5L	Left	118	2	1.00	1.00
South: Mi	ssissauga R	oad S					
	West	3L	Left	54	1.	1.00	1.00
	East	8R	Right	214	41	1.00	1.00
	North	8T	Thru	292	48	1.00	1.00
East: May	field Road	 Е					
-	West	6Т	Thru	633	112	1.00	1.00
	South	1L	Left	86	9	1.00	1.00
	North	6R	Right	44	1	1.00	1.00
North: Mi	ssissauga R	oad N					
	West	4R	Right	34	1	1.00	1.00
	South	4T	Thru	96	4	1.00	1.00
	East	7L	Left	18	2	1.00	1.00

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

Mov	Le	ft	Thr	ough	Right		
ID	TA	HV	TA	HV	ΓΛ	HV	
Demand fl	ows in v	eh/hoi	ır as u	sed by	the pro	gram	
West: May							
	118		0	0	0	0	
2T T	0		1088	. 57	0	0	
2R R	0	0	0	0	63	12	
South: Mi	ssissauq	a Roac	 1 S				
3L L	54		0	0	0	0	
8T T	0	0	292	48	0	0	
8R R	0	0	0	0	214	41	
 East: May	field Ro	 ad E					
1L L	86	10	0	0	0	0	
6T T	0	0	633	112	0	0	
6R R	0	0	0	0	44	1	
North: Mi	ssissaug	a Road	 l N				
7L L	18	2	0	0	0	0	
4T T	0	0	96	4	0	0	
4R R	0	0	0	0	34	1	

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mov	Le	ft	Thro	ough	Rig	ht
ID	Total	%HV	Total	%HV	Total	%HV
Demand flo			as use	d by th	e progr	am
West: Mayf						
	120	1.7	0		0	
2T T	-		1145		0	
2R R	0	0.0	0	0.0	75	16.0
South: Mis	sissaug	a Road	 S			
	55			0.0	0	0.0
8T T				14.1	. 0	0.0
8R R		0.0	0	0.0	255	16.1
 East: Mayf	ield Ro	 ad E				
_	96		0	0.0	0	0.0
6T T	0	0.0	745	15.0	0	0.0
6R R	0	0.0	0	0.0	45	2.2
 North: Mis	sissaug	 a Road	 N			
7L L	20			0.0	0	0.0
4T T			100		0	
4R R	-	0.0		0.0	35	
 Unit Time						

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout
                                       Circulating/Exiting Stream
 Cent Circ Insc No.of No.of Av.Ent ------
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
 Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) (m) (pcu/h) Effect
 _____
West: Mayfield Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 215 7.0 220 0 N 0.979 Exclusive Slip lane (exiting flow): 195 6.9 200 0 N 0.980
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 1285 4.8 1290 0 N 0.812
East: Mayfield Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 515 9.9 546 0 N 0.912
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 895 13.7 975 0 N 0.810
```

#### Table R.1 - Roundabout Gap Acceptance Parameters

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
                       Flow Aver Aver In-Bnch Prop ------ Foll-up
Rate Speed Dist Headway Bunched Hdwy Dist Headway
       No. Type
                       (pcu/h) (km/h) (m) (s)
                                                                        (s) (m)
                                                                                          . (s)
West: Mayfield Road W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 220 32.0 144.9 1.55 0.188 4.20 37.3

Thru 1 Subdominant 220 32.0 144.9 1.55 0.188 4.21 37.4
2 Dominant 220 32.0 144.9 1.55 0.188 4.21 37.4

Right 3 Excl. Slip 200E 32.6 163.1 1.53 0.170 4.21 38.1
                                                                                             2.62
                                                                                             2.63
                                                                                          2.63
                                                                                             2.63
_____
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1290 37.6 29.2 1.02 0.557 3.40 35.6
Thru 1 Subdominant 1290 37.6 29.2 1.02 0.557 3.71 38.8
2 Dominant 1290 37.6 29.2 1.02 0.557 3.50 36.6
Right 2 Dominant 1290 37.6 29.2 1.02 0.557 3.50 37.2
                                                                                          2.74
                                                                                             2.58
                                                                                          2.62
                                                                               37.2
East: Mayfield Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 546 34.6 63.3 1.55 0.403 4.18 40.2 2.78D
Thru 1 Subdominant 546 34.6 63.3 1.55 0.403 4.37 41.9 2 Dominant 546 34.6 63.3 1.55 0.403 4.37 41.9
                                                            0.403
                                                                                             2.91D
                                                                                          2.91
```

Right	2 Dominant	546	34.6	63.3	1.55	0.403	3.97	38.1	2.64
North	: Mississauga R	oad N							
Env	ironment Factor	: 1.20	Entry	/Circu	lating	Flow Adju	stment:	Medium	
Left	1 Subdominant	975	36.9	37.8	1.09	0.480	3.81	39.0	2.71
Thru	1 Subdominant	975	36.9	37.8	1.09	0.480	3.63	37.2	2.59
	2 Dominant	975	36.9	37.8	1.09	0.480	3.49	35.7	2.48
Right	2 Dominant	975	36.9	37.8	1.09	0.480	3.48	35.7	2.48

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

- E Exiting flow for slip lane traffic
- D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

#### **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

Mov		Demand		Oppos	ing N	Movement Adjust.	Total Cap.		Prac. Spare	Lane Util	
		Flow	HV	Flow	HV	Flow	(veh	Satn	Cap.		
		(veh/h)	(%)	(veh/h)	(%)			хр	(%)	(%)	x
West:	May	field R	load W								
5L I	L	120	1.7	215	7.0	220	213	0.85	51	100	0.563
2T 7	Γ	1145	5.0	215	7.0	220	2035	0.85	51	100	0.563
2R I	3	75	16.0	195	6.9	200	1143	0.85	1195	100	0.066
South:	 : Mi	ssissau	iga Roa	ad S							
3L I		5.5	1.8	1285	4.8	1290	83	0.85	28	100	0.663
8T 7	ľ	340	14.1	1285	4.8	1290	512	0.85	28	100	0.664*
8R F	ς .	255	16.1	1285	4.8	1290	384	0.85	28	100	0.664*
East:	May	field R	oad E								
1L I		96	10.4	515	9.9	546	159	0.85	41	100	0.604
6T 1	ľ	745	15.0	515	9.9	546	1237	0.85	41	100	0.602
6R F	₹	45	2.2	515	9.9	.546	75	0.85	42	100	0.600
North:	Mi	.ssissau	ga Roa	id N							
7L I	,	20	10.0	895	13.7	975	159	0.85	576	100	0.126
4T T	?	100	4.0	895	13.7	975	794	0.85	575	100	0.126
4R F		35	2.9	895	13.7	975	278	0.85	575	100	0.126

#### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

Intersection Level of Service = B
Worst movement Level of Service = C
Average intersection delay (s/pers) = 10.8
Largest average movement delay (s) = 22.3

```
Largest back of queue, 95% (m)
                                                 48
Performance Index
                                              62.59
Degree of saturation (highest)
                                              0.664
Practical Spare Capacity (lowest)
                                                28 %
Effective intersection capacity, (veh/h) =
                                               4564
Total vehicle flow (veh/h)
                                              3031
                                              3637
Total person flow (pers/h)
Total vehicle delay (veh-h/h)
                                               9.12
Total person delay (pers-h/h)
                                            10.95
Total effective vehicle stops (veh/h)
                                             2401
2881
                                        =
Total effective person stops (pers/h)
                                            1918.4
Total vehicle travel (veh-km/h)
Total cost ($/h)
                                        =
                                             901.19
Total fuel (L/h)
                                              283.1
Total CO2 (kg/h)
                                             710.79
```

#### **Table S.5 - Movement Performance**

Mov ID		Total Delay	Total Delay		Prop. Queued		Longest 95% Ba		Perf. Index	
		(veh-h/h)	(pers-h/l	n) (sec)			(vehs)			(km
West:	Ma	yfield Road	 d W							
5L	L	0.46	0.55	13.8	0.53	0.72	4.8	38	2.48	4
2 T	T	2.19	2.63	6.9	0.53	0.57	4.8	38	19.69	5.
2R	R	0.15	0.18	7.3	0.31	0.52	0.4	3	1.20	5
South	: M	ississauga	Road S							
3L	L	0.34	0.41	22.3	0.84	1.08	5.0	42	1.52	4 (
8T	T	1.47	1.76	15.6	0.84	1.03	5.1	44	8.44	4
8R	R	1.17	1.40	16.5	0.84	1.04	5.1	44	6.36	4
East:	Ma	yfield Road	i E						-	
1L	L	0.48	0.57	18.0	0.77	0.99	5.6	48	2.40	4
6T	T	2.29	2.75	11.1	0.77	0.94	5.6	48	16.47	4.9
6R	R	0.15	0.18	11.9	0.77	0.94	5.6	47	1.00	48
North	. M:	ississauga	Road N							
7L	L	0.09	0.11	15.9	0.66	0.90	0.7	6	0.45	45
4 T	T	0.24	0.29	8.6	0.66	0.71	0.7	6	1.89	5 (

#### **Table S.6 - Intersection Performance**

Mississauga Road EA

```
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout
Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Delay Queued Stop Queue Index Speed
(veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m)
                                      (km/h)
______
West: Mayfield Road W
1340 0.563 2.81 3.37 7.5 0.52 0.58 38 23.37 51.3
--------
South: Mississauga Road S
650 0.664 2.98 3.58 16.5 0.84 1.04 44 16.33 44.5
______
East: Mayfield Road E
886 0.604 2.92 3.50 11.8 0.77 0.94 48 19.87 49.0
North: Mississauga Road N
155 0.126 0.42 0.50 9.8 0.66 0.75 6 3.02 49.9
_____
```

```
ALL VEHICLES:
3031 0.664 9.12 10.95 10.8 0.67 0.79 48 62.59 49.0

INTERSECTION (persons):
3637 0.664 10.95 10.8 0.67 0.79 62.59 49.0

Queue values in this table are 95% back of queue (metres).
```

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

Lane No.	(veh	(veh	Satn	Delay	Stop	Q u e 95% Ba  (vehs)	ack	Length
1 LT 2 T	Mayfield 633 632 75	1124 1124	0.563 0.563	6.9	0.57	4.8	37.8	500.0
	Mississ 317 333	477	0.664			5.0 5.1		
1 LT	Mayfield 443 443	735	0.602			5.6 5.6		
	Mississ 74 81	590	0.126	10.7			5.5 5.6	

## Table S.8 - Lane Flow and Capacity Information

	Lane No.					Cap (veh	(veh	Deg. Satn x	
•	West: Ma 1 LT 2 T 3 R	120	513 632	0 0	632			0.563	100
	South: 1 1 LT 2 TR	55	262	0	317		477 502		
-	East: Ma 1 LT 2 TR	96	347	0					
•	North: N 1 LT 2 TR		54		74	74 81			

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

# **Table S.10 - Movement Capacity and Performance Summary**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

Mov	Mov Typ	Dem Flow (veh /h)	Cap. (veh	Util	Satn	Delay	Stop Rate	95% Back of Queue (veh)	Perf. Index
West: M 5L L	ayrrer		w 213	100	0 563	12 0	0 72	4.8	2 40
								4.8	
			2035						
ZR R	(Slp)	/5	1143	100	0.066	1.3	0.52	0.4	1.20
South:	Missis:	sauga	Road S						
3L L		_	83	100	0.663	22.3	1.08	5.0	1.52
8T T			512					5.1	
8R R			384					5.1	
East: M	ayfield	d Road	E						
1L L		96	159	100	0.604	18.0	0.99	5.6	2.40
6T T		745	1237	100	0.602	11.1	0.94	5.6	16.47
6R R		45	75	100	0.600	11.9	0.94	5.6	1.00
North: 1	Mississ	sauga :	Road N						
7L L		20	159	100	0.126	15.9	0.90	0.7	0.45
4T T		100	794	100	0.126	8.6	0.71	0.7	1.89
4R R		35	278	100	0.126	9 6	0.77	0.7	0.68

<sup>\*</sup> Maximum degree of saturation

# Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mov ID	Fuel Total L/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Mayfield	Road W					
5L L	9.9	34.66	0.042	2.06	0.062	24.8
2T T	90.7	299.74	0.354	18.10	0.577	227.3
2R R	7.6	22.77	0.027	1.56	0.050	19.1
	108.2	357.17	0.422	21.72	0.689	271.2
outh: Mississa	uga Road	. s				
3L L	4.8	17.45	0.021	1.01	0.030	12.0
8T T	36.5	113.70	0.135	7.82	0.243	91.7
8R R	28.9	88.63	0.107	6.35	0.195	72.7
	70.2	219.78	0.263	15.18	0.468	176.4

		200 45			0.023	
	92.2	282.45	0.339	19.71	0.614	231.8
North: Mississau	ıga Road	d N				
7L L						
		26.34				
4R R	2.7	9.04			0.017	
	12.5	41.79				
INTERSECTION:	283.1	901.19	1.074	59 19	1.851	710.8
PARAMETERS USED	IN COST	CALCULAT	TIONS			
Pump price of	fuel (	\$/L)		=	0.900	
Fuel resource				=	0.70	
Ratio of runn	_		cost		3.0	
Average incom Time value fa				. =	19.00	
Light vehicle		1000 kg)		=		
Heavy vehicle					11.0	
Light vehicle			(L/h)		1.350	
Heavy vehicle	idle f	uel rate	(T./h)	=	2.000	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Fuel Rate L/100km	Cost Rate \$/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
Road W 12.2 12.6 16.2	0.43 0.42 0.49	0.517 0.491 0.572	25.47 25.11 33.33	0.762 0.801 1.060	305.9 315.5 408.3
12.8	0.42	0.498	25.60	0.812	319.7
13.0 17.0	0.47 0.53	0.558 0.632 0.673	27.10 36.56 39.94	0.799 1.136 1.225	324.0 428.6 457.0
17.1	0.54	0.641	37.02	1.140	430.1
Road E 15.5 16.8 12.5	0.50 0.51 0.43	0.607 0.607 0.524	33.48 35.82 26.52	1.004 1.123 0.804	388.2 422.1 312.8
16.4	0.50	0.603	35.08	1.093	412.8
uga Road 14.4 12.6 12.2	N 0.47 0.42 0.41	0.573 0.500 0.508	30.83 25.54 25.57	0.928 0.804 0.783	362.5 314.5 305.8 319.2
14.8	0.47	0.560	30.85	0.965	370.5
	Rate L/100km  Road W 12.2 12.6 16.2  12.8  uga Road 13.0 17.0 18.2  17.1  Road E 15.5 16.8 12.5  16.4  uga Road 14.4 12.6 12.2	Rate L/100km \$/km  Road W 12.2 0.43 12.6 0.42 16.2 0.49  12.8 0.42  uga Road S 13.0 0.47 17.0 0.53 18.2 0.56  17.1 0.54  Road E 15.5 0.50 16.8 0.51 12.5 0.43  16.4 0.50  uga Road N 14.4 0.47 12.6 0.42 12.2 0.41  12.7 0.43	Rate L/100km \$/km g/km  Road W 12.2 0.43 0.517 12.6 0.42 0.491 16.2 0.49 0.572  12.8 0.42 0.498  uga Road S 13.0 0.47 0.558 17.0 0.53 0.632 18.2 0.56 0.673  17.1 0.54 0.641  Road E 15.5 0.50 0.607 16.8 0.51 0.607 12.5 0.43 0.524  16.4 0.50 0.603  uga Road N 14.4 0.47 0.573 12.6 0.42 0.500 12.2 0.41 0.508	Rate L/100km \$/km g/km g/km g/km  Road W  12.2 0.43 0.517 25.47 12.6 0.42 0.491 25.11 16.2 0.49 0.572 33.33  12.8 0.42 0.498 25.60  uga Road S  13.0 0.47 0.558 27.10 17.0 0.53 0.632 36.56 18.2 0.56 0.673 39.94  17.1 0.54 0.641 37.02  Road E  15.5 0.50 0.607 33.48 16.8 0.51 0.607 35.82 12.5 0.43 0.524 26.52  16.4 0.50 0.603 35.08  uga Road N  14.4 0.47 0.573 30.83 12.6 0.42 0.500 25.54 12.2 0.41 0.508 25.57	Rate L/100km \$/km g/km g/km g/km g/km g/km g/km g/km g

Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

Lane	Dema	and Fl				_	Eff Grn	_		-	
	L	Т	R				1st 2nd		-		(m)
West:	Mayfi	eld R	load W	'							
1 LT		513			4			0.563			500
2 T		632		632	5				6.9		500
3 R			75	75	16			0.066	7.3	, 3 	75
	120	1145	75	1340	5			0.563	7.5	38	
South:	Miss	issau	ga Ro	ad S							
1 LT		262	_		12			0.664	16.8	42	500
2 TR		78	255	333	16			0.664	16.2	44	500
	55	340	255	650	14			0.664	16.5	44	
East:	Mavfi	eld R	oad E								
	96			443	14			0.602	12.6	48	500
2 TR		398	45	443	14			0.602	11.1	47	500
	96	745	45	886	14			0.602	11.8	48	
North:	Miss	issau	ga Ro	ad N							
1 LT	20		_		6			0.126	10.7	6	500
2 TR		46		81	4			0.126	8.9	6	500
	20	100	35		-			0.126	9.8	6	
ALL VE	HICLE	===== S		Total	===== %			Max	Aver.	Max	
				Flow	HV			X	Delay	Queue	
				3031	10			0.664	10.8	48	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mov ID	Mov Typ	Total Flow	Total Cap.	Deg. of	Aver. Delay	LOS	Longest 95% Ba	
		(veh /h)	(veh /h)	Satn (v/c)	(sec)		(vehs)	(m)
West: N	Mayfield	Road W						
5L L	_	120	213	0.563	13.8	В	4.8	38
2T T		1145	2035	0.563	6.9	A	4.8	38
2R R	(Slp)	75	1143	0.066	7.3	A	0.4	3
South:	Mississ	auga Roa	d S					
3L L		55	83	0.663	22.3	С	5.0	42
8T T		340	512	0.664*	15.6	В	5.1	44
8R R		255	384	0.664*	16.5	В	5.1	44

1L L	96	159	0.604	18.0	В	5.6	48
6T T	745	1237	0.602	11.1	В	5.6	48
6R R	45	75	0.600	11.9	В	5.6	47
North: Missis	sauga Road	N					
7L L	20	159	0.126	15.9	В	0.7	6
4T T	100	794	0.126	8.6	A	0.7	6
4R R	35	278	0.126	9.6	A	0.7	6
ALL VEHICLES	: 3031		0.664	10.8	В	5.6	48

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

- \* Maximum v/c ratio, or critical green periods
- " Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

## **Table D.O - Geometric Delay Data**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

From	То		Negn	Negn	Negn	Appr.	Downstream	n Distance
Approach		Turn		Speed (km/h)	(m)	Dist. (m)	(m)	User Spec?
West: Mayf	ield Road	. w						
_	South	Right	41.0	34.5	19.3	500	141	No
	East	Thru	57.3	39.1	47.1	500	134	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mis	sissauga	Road S						
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: Mayf	ield Road	E						
· ·	West	Thru	57.3	39.1	47.1	500	144	No No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mis	sissauga	 Road N						
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru		39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

----- Delay (seconds/veh) -----

## Table D.1 - Lane Delays

Mississauga Mississauga Intersection Roundabout	Road	and	Mayfield	Road	2031	PM	TTMP	Reduced	N/S
Roundabout									

Lane No.	Deg. Satn x	1st d1	2nd d2	Total dSL	Dec. dn		MvUp dqm	di		Control dic
1 LT 2 T	Mayfield 0.563 0.563 0.066	Road 1.4 1.4	W 0.0 0.0	1.4 1.4	3.3 3.5	0.0	0.0	0.0		8.2 6.9 7.3
1 LT	Mississ 0.664 0.664	6.2	3.7	10.0						
1 LT	Mayfield 0.602 0.602	3.8	1.6							
1 LT	Mississ 0.126 0.126	3.3	0.0	3.3						10.7
dn is	average	stop-	start	delay	for a	ll vehi	icles	queued	and u	ınqueued

### Table D.2 - Lane Stops

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

Lane No.	Satn			Geom.	Rate Overall h	Queued	Rate
West:	Mayfie	ld Roa	d W				
1 LT	0.563	0.36	0.00	0.23	0.60	0.530	0.00
2 T	0.563	0.36	0.00	0.21	0.57	0.530	0.00
3 R	0.066	0.18	0.00	0.35	0.52	0.311	0.00
South:	: Missi	ssauga	Road	S			
1 LT	0.664	0.84	0.12	0.08	1.04	0.843	0.38
2 TR	0.664	0.84	0.12	0.08	1.04	0.838	0.37
East:	Mavfie	ld Road	 d E				
	_			0.11	0.95	0.771	0.17
2 TR	0.602	0.77	0.07	0.10	0.94	0.771	0.17
North:	Missi	ssauga	Road	n			
1 LT	0.126	0.60	0.00	0.17	0.77	0.664	0.00
2 TR	0.126	0.57	0.00	0.16	0.73	0.662	0.00

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued

### **Table D.3A - Lane Queues (veh)**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

		Ovrfl.						ntile (v	,		Queue
Lane	Satn	Queue -									Stor.
No.	×	No	Nb1	Nh2	Nb	70%	8.5%	90%	95%	98%	Ratio

West:	Mayfield	Road W									
1 LT	0.563	0.0	1.6	0.0	1.6	2.8	3.4	3.8	4.8	5.6	0.0
2 T	0.563	0.0	1.6	0.0	1.6	2.8	3.4	3.8	4.8	5.6	0.0
3 R	0.066	0.0	0.1	0.0	0.1	0.2	0.3	0.3	0.4	0.4	0.0
South	: Mississ	auga Roa	d S								
1 LT	0.664	0.4	1.3	0.3	1.6	2.9	3.5	4.0	5.0	5.8	0.08
2 TR	0.664	0.4	1.3	0.3	1.7	2.9	3.6	4.1	5.1	5.9	0.0
East:	Mayfield	Road E									
1 LT	0.602	0.2	1.5	0.3	1.8	3.2	3.9	4.5	5.6	6.5	0.10
2 TR	0.602	0.2	1.5	0.3	1.8	3.2	3.9	4.5	5.6	6.5	0.09
North:	: Mississa	auga Roa	 d N								
1 LT		0.0	0.2	0.0	0.2	0.4	0.5	0.6	0.7	0.8	0.0
			0.2		0.2		0.5				0.0

Values printed in this table are back of queue (vehicles).

## **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

T	Deg.			Average (metres)				Percentile (metres)			
Lane No.	Satn x	No	Nb1	Nb2	Nb	70%	85%	90%		98%	Stor. Ratio
West:	Mayfie	ld Road	₩								
1 LT	0.563	0.0	12.2	0.0	12.2 12.3	21.7 21.8	26.6 26.8	30.3	37.6 37.8	43.8 44.0	0.08
		0.0				1.8					0.08
South	 : Missi	 ssauga R	oad S				,				
1 LT	0.664	3.0	10.8	2.8	13.6					48.7	0.08
2 TR		3.1			14.3		31.0		43.8	50.9	0.09
		ld Road									
1 LT		2.1			15.6		33.6				0.10
2 TR	0.602	2.1	12.9	2.7	15.5	27.3	33.5	38.1	47.4	55.2	0.09
North	: Missi	ssauga R	oad N				_				
1 LT	0.126		1.7	0.0	1.7		4.0				0.01
2 TR	0.126	0.0	1.7	0.0	1.7	3.3	4.0	4.5	5.6	6.4	0.01

Values printed in this table are back of queue (metres).

## Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S Intersection ID: 1 Roundabout

Mov ID	App. Speeds 	Exit Speeds  Negn Cruise	Queue Mo	 Av. Section Spd	Geom Delay (sec)
	Mayfield Road W	25 7 65 0		 46.4.46.4	12 4

	65.0 65.0					51.9 52.8		5.5 6.7
South: Mi	ssissau	ga Roa	d S					
3L L	65.0	25.7	25.7	65.0	16.3	43.3	40.7	12.4
8T T	65.0	39.1	39.1	65.0	15.9	47.3	45.3	5.7
8R R	65.0	32.5	32.5	65.0	16.2	46.7	44.5	7.1
East: May	rfield R	oad E						
1L L	65.0	25.7	25.7	65.0	21.3	44.4	44.2	12.6
6T T	65.0	39.1	39.1	65.0	20.9	49.8	49.8	5.7
6R R	65.0	32.5	32.5	65.0	21.7	48.4	48.4	6.6
North: Mi	ssissau	ga Road	 d N					
	65.0			65.0		45.9	45.8	12.6
4T T	65.0	39.1	39.1	65.0		50.8	50.8	5.4
4R R	65.0	32.5	32.5	65.0		50.0	50.0	6.6

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mayfield 2031 PM TTMP Red N/S C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap Processed Jan 12, 2010 12:05:14PM

A1492, AECOM, Small Office

Produced by SIDRA Intersection 3.2.2.1563

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# **Output Tables**

# Mississauga Road EA

## Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S

#### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout
Driving on the right-hand side of the road
Input data specified in Metric units
Model Defaults: US HCM (Metric)
Peak Flow Period (for performance): 15 minutes
Unit time (for volumes): 60 minutes.
Delay definition: Control delay
Geometric delay included
HCM Delay Model option selected
HCM Queue Model option selected
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

#### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3  $\,$ 

From Approach	To Approach	Mov ID	Turn		Rate HV		Peak Flow Factor
West: San	dalwood Par	kway W					
	South	2R	Right	255	5	1.00	1.00
	East	21	Thru	142	3	1.00	1.00
	North	5L	Left	10	0	1.00	1.00
South: Mi	ssissauga R	oad S					
	West	3L	Left	34	1	1.00	1.00
	East	8R	Right	172	3	1.00	1.00
	North	8T	Thru	183	37	1.00	1.00
East: San	dalwood Par	kway E					
	West	6T	Thru	78	2	1.00	1.00
	South	1L	Left	176	4	1.00	1.00
	North	6R	Right	240	5	1.00	1.00
North: Mi	ssissauga R	oad N					
	West	4R	Right	44	1	1.00	1.00
	South	4T	Thru	600		1.00	1.00
	East	7L	Left	270	5	1.00	1.00

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Mov ID		I	eft	Th	rough	Right		
10		ΓΛ	HV	LV	HV	LV	HV	
Demand	lflows	in	veh/hour	as	used by	the pro	gram	
West:	Sandal	wood	Parkway	W				
5L	L	10	1	0	0	0	0	
2 T	T	0	0	142	3	0	0	
2R	R	0	0	0	0	255	5	
south:	Missi	ssau	ga Road S	3				
3L	L	34	1	0	0	0	0	
8T	T	0	0	183	37	0	0	
8R	R	0	0	0	0	172	3	
 East:	Sandalı	wood	Parkway	E				
1L	L :	176	4	0	0	0	0	
6T	T	0	0	78	2	0	0	
6R	R	0	0	0	0	240	5	
North:	Missis	ssau	ga Road N	1				
7L	L 2	270	6	0	0	0	0	
4 T	T	0	0	600	25	0	0	
4R	R	0	0	0	0	44	1	

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Mov ID	Lei	ft	Thro	ugh	Righ	nt
10	Total	%HV	Total	%HV	Total	%HV
Demand flo West: Sand				d by th	e progra	ım
5L L		9.1		0.0	0	0.0
2T T	0	0.0	145	2.1	0	0.0
2R R	0	0.0	0	0.0	260	1.9
South: Mis	sissauga	Road	s			
3L L	_		0	0.0	0	0.0
8T T	0	0.0	220	16.8	0	0.0
8R R	0	0.0	0	0.0	175	1.7
 East: Sand	alwood E	arkway	E			
1L L		2.2	0	0.0	0	0.0
6T T	0	0.0	80	2.5	0	0.0
6R R	0	0.0	0	0.0	245	2.0
 North: Mis	 sissauga	Road I	 N			
7L L	_	2.2		0.0	0	0.0
4T T	0	0.0	625	4.0	0	0.0
4R R	0	0.0	0	0.0	4.5	2.2

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout
                              Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
West: Sandalwood Parkway W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 1080 3.2 1081 0 N 0.859
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 430 2.0 430 0 N 0.963
East: Sandalwood Parkway E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 265 14.5 291 0 N 0.959
______
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 295 2.0 295 0 N 0.970
```

#### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout .
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
                     Flow Aver Aver In-Bnch Prop ----- Foll-up
Rate Speed Dist Headway Bunched Hdwy Dist Headway
(pcu/h) (km/h) (m) (s) (s) (m) (s)
       No.
              Type
West: Sandalwood Parkway W
  Environment Factor: 1.20
                                  Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1081 33.5 31.0 1.20 0.553 4.02 37.3
                                                                                       2.90
Thru 1 Subdominant 1081 33.5 31.0 1.20 0.553 Right 2 Dominant 1081 33.5 31.0 1.20 0.553
                                                                    3.86
                                                                              35.9
                                                                                       2.78
                                                                             31.5
                                                                    3.38
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 430 30.2 70.3 2.00 0.409 4.15 34.9
Thru 1 Subdominant 430 30.2 70.3 2.00 0.409 4.64 39.0
2 Dominant 430 30.2 70.3 2.00 0.409 4.61 38.7
Right 2 Dominant 430 30.2 70.3 2.00 0.409 4.12 34.6
                                                                                       3.03
                                                                                       3.00
East: Sandalwood Parkway E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 291 36.8 126.4 1.44 0.226 4.32 44.2 Thru 1 Subdominant 291 36.8 126.4 1.44 0.226 4.32 44.2
                                                                                       2.74D
                                                                                       2.74D
       2 Dominant
                         291 36.8 126.4 1.44 0.226
                                                                                     2.74
                                                                    4.32 44.2
Right 2 Dominant 291 36.8 126.4 1.44 0.226 4.32 44.2
                                                                                     2.74
```

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

## **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Mov ID	Demand		Oppos	-	lovement Adjust.			Prac. Spare	Lane Util	Deg. Satn
	Flow (veh/h)	HV (%)	Flow (veh/h)			(veh /h)	Satn xp	L	(%)	×
West: Sa	ndalwood	Parkw	 way W							
5L L	11	9.1	1080	3.2	1081	37	0.85	186	74	0.297
2T T	145	2.1	1080	3.2		487	0.85	185		0.298
2R R	260	1.9	1080	3.2	1081	644	0.85	111	100	0.404
South: M	lississau	ga Roa	ıd S				•			
3L L	35	2.9	430	2.0	430	136	0.85	230	100	0.257
8T T	220	16.8	430	2.0	430	856	0.85	231	100	0.257
8R R	175	1.7	430	2.0	430	681	0.85	231	100	0.257
East: Sa	ındalwood	Parkw	 ay E							
1L L	180	2.2	265	14.5	291	711	0.85	236	100	0.253
6T T	8.0	2.5	265	14.5	291	316	0.85	236	100	0.253
6R R	245	2.0	265	14.5	291	968	0.85	236	100	0.253
North: M	ississau	ga Roa	.d N							
7L L	276	2.2	295	2.0	295	596	0.85	84	100	0.463
4T T	625	4.0	295	2.0	295	1350	0.85	84	100	0.463
4R R	45	2.2	295	2.0	295	97	0.85	83	100	0.464

### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Intersection Level of Service = A
Worst movement Level of Service = B
Average intersection delay (s/pers) = 9.7
Largest average movement delay (s) = 17.4
Largest back of queue, 95% (m) = 28
Performance Index = 43.29
Degree of saturation (highest) = 0.464

```
Practical Spare Capacity (lowest)
                                                 83 %
Effective intersection capacity, (veh/h) =
                                               4951
Total vehicle flow (veh/h)
                                              2297
Total person flow (pers/h)
                                              2756
Total vehicle delay (veh-h/h)
                                               6.19
Total person delay (pers-h/h)
                                              7.43
                                              1599
Total effective vehicle stops (veh/h)
Total effective person stops (pers/h)
                                               1919
Total vehicle travel (veh-km/h)
                                           1464.1
                                            618.45
Total cost ($/h)
Total fuel (L/h)
                                             184.4
Total CO2 (kg/h)
                                             461.76
```

#### **Table S.5 - Movement Performance**

Mov		Total	Total	Aver.	Prop.	Eff.	Longest	Queue	Perf.	Aver.	
ID		Delay								Speed	
		(veh-h/h)	(pers-h/h	n)(sec)		Rate	(vehs)	(m)		(km/h)	
West:	Saı	ndalwood P	arkway W								
5L	L	0.05	0.06	17.4	0.71	0.92	1.7	13	0.26	44.4	
		0.42					1.7		3.00	50.1	
2R	R	0.82	0.99	11.4	0.74	0.91	2.7	21	5.48	49.0	
South:	M	ississauga	Road S								
3L	L	0.15	0.18	15.0	0.55	0.78	1.6	14	0.75	46.3	
8T	T	0.51	0.61	8.4	0.55	0.66	1.7	13	3.99	51.7	
8R	R	0.43	0.52	8.9	0.55	0.69	1.7	13	3.19	50.8	
Cast:	Sar	ndalwood P	arkway E								
1L	L.	0.68	0.82	13.7	0.45	0.73	1.6	12	3.64	46.8	
6Т	Ť	0.15	0.18	6.7	0.45	0.56	1.6	12	1.33	52.5	
6R	R	0.54					1.6	12	4.23	51.4	
Vorth:	Mi	ssissauga									
7L	L	1.08	1.30	14.1	0.55	0.75	3.5	27	5.76	46.4	
4 T	Т	1.25	1.50	7.2	0.55	0.59	3.5	27	10.85	51.7	
4R	R	0.10	0.12	8.3	0.55	0.67	3.5	28	0.81	50.8	

#### **Table S.6 - Intersection Performance**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout
Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Delay Queued Stop Queue Index Speed
(veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m)
                                       (km/h)
______
West: Sandalwood Parkway W
416 0.404 1.30 1.56 11.2 0.73 0.89 21
                                   8.73 49.2
______
South: Mississauga Road S
 430 0.257 1.09 1.31 9.1 0.55 0.68 14
                                   7.93 50.8
East: Sandalwood Parkway E
 505 0.253 1.37 1.64 9.8 0.45 0.65 12
                                    9.20
                                        49.7
______
North: Mississauga Road N
946 0.464 2.44 2.92 9.3 0.55 0.64 28 17.43
                                        49.9
ALL VEHICLES:
2297 0.464
         6.19 7.43 9.7 0.56 0.70 28 43.29
                                        49.9
```

INTERSECTION (persons):
2756 0.464 7.43 9.7 0.56 0.70 43.29 49.9

Queue values in this table are 95% back of queue (metres).

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Lane	Dem Flow (veh	_	Deg. Satn			Que 95% Ba	ck	Lane Length
No.	/h)	/h)	Х	(sec)	Rate	(vehs)	(m)	(m)
West: S	Sandalwo	od Par	kway W	· <del></del>				
1 LT			_		0.85	1.7	13.0	500.0
2 R	260	644	0.403	11.4	0.91	2.7	20.5	500.0
South:	Mississa	auga R	oad S					
1 LT				9.6	0.68	1.6	13.9	500.0
2 TR	225	878	0.257	8.7	0.68	1.7	13.2	500.0
East: S	Sandalwoo	od Par	 kway E					
					0.68	1.6	12.3	500.0
2 TR	253	998	0.253	7.8	0.63	1.6	12.3	500.0
North:	Mississa	auga R	oad N					
				11.2	0.69	3.5	27.4	500.0
2 TR	473	1021	0.463	7.3	0.60	3.5	27.6	500.0

## **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

No.	Dem  Lef				Cap (veh	(veh	Deg. Satn	Util
1 LT	Sandal 11 0	145	0	156	150			
1 LT	Missi 35 0	170	. 0	205				
1 LT	Sandal 180 0	72	0	252	150			
1 LT	Missi 276 0	197	0	473				

P Lane under-utilisation found by the "Program". This includes cases where the value of lane under-utilisation due to downstream effects has been modified by the program during lane flow calculations (e.g. a de facto exclusive lane has been found).

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Mov	Mov Typ	Dem Flow (veh /h)	(veh	Lane Util	_	Delay	Stop Rate	95% Back of Queue (veh)	Perf. Index
			, II) 	(%)	^	(560)		( veii)	
West:	Sandalw	ood Pa	rkway W						
5L L		11	37	74	0.297	17.4	0.92	1.7	0.26
2T T		145	487	74	0.298	10.4	0.84	1.7	3.00
2R R		260	644	100	0.404	11.4	0.91	2.7	5.48
South:	Missis	 sauga	Road S						
3L L		35	136	100	0.257	15.0	0.78	1.6	0.75
8T T		220		100		8.4		1.7	
8R R		175	681	100	0.257	8.9	0.69	1.7	3.19
East:	Sandalw	ood Pa	rkway E						
1L L			711	100	0.253	13.7	0.73	1.6	3.64
6T T		8.0	316	100	0.253	6.7	0.56	1.6	1.33
6R R		245	968	100	0.253	7.9	0.63	1.6	4.23
North:	Missis	sauga	Road N						
7L L		_	596	100	0.463	14.1	0.75	3.5	5.76
4T T		625	1350	100	0.463	7.2	0.59	3.5	10.85
4R R		45	97	100	0.464*	8.3	0.67	3.5	0.81

<sup>\*</sup> Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Mov	Fuel Total L/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Sandalwoo	d Parkwa	 .y W				
5L L	0.9	3.28	0.004	0.19	0.006	2.3
2T T	10.9	37.37	0.045	2.22	0.070	27.4
2R R	20.1	68.38	0.084	4.24	0.129	50.3
	32.0	109.04	0.133	6.66	0.204	80.0
South: Mississa	uga Road	 l S				
3L L	2.9	10.13	0.012	0.60	0.018	7.2
8T T	23.2	69.24	0.081	4.78	0.152	58.3
8R R	13.1	44.52	0.054	2.72	0.084	32.9
	39.2	123.89	0.148	8.10	0.254	98.4

East: Sandalwood Parkway E

1L L 6T T 6R R	5.7	19.65	0.023	1.12	0.092 0.036 0.116	14.4
	38.7	132.89	0.160	7.91	0.243	96.8
North: Mississa	uga Road	 d N				
7L L	22.8	79.83	0.096	4.75	0.142	57.0
4T T	48.3	161.35	0.191	9.63	0.307	121.0
4R R	3.4				0.022	
			0.301	15.09	0.470	
INTERSECTION:						461.8
PARAMETERS USED Pump price o		CALCULAT	PIONS			
Fuel resourc	t fuel (	(\$/T.)		=	0.900	
ruer resourc				=	0.900	
Ratio of run	e cost f	actor	cost		0.70	
	e cost f	factor st to fuel	l cost	=	0.70	
Ratio of run	e cost f ning cos me (\$/h)	factor st to fuel	l cost	= = =	0.70 3.0 19.00 0.40	
Ratio of run Average inco Time value f Light vehicl	e cost f ning cos me (\$/h) actor e mass (	actor t to fuel	L cost	= = = = =	0.70 3.0 19.00 0.40 1.4	
Ratio of run Average inco Time value f Light vehicl Heavy vehicl	e cost f ning cos me (\$/h) actor e mass ( e mass (	actor t to fuel 1000 kg) 1000 kg)		= = = = =	0.70 3.0 19.00 0.40 1.4 11.0	
Ratio of run Average inco Time value f Light vehicl Heavy vehicl Light vehicl	e cost fining cosme (\$/h) actor e mass (e mass (e idle f	actor t to fuel 1000 kg) 1000 kg) uel rate	(L/h)	= = = = = =	0.70 3.0 19.00 0.40 1.4 11.0	
Ratio of run Average inco Time value f Light vehicl Heavy vehicl	e cost fining cosme (\$/h) actor e mass (e mass (e idle f	actor t to fuel 1000 kg) 1000 kg) uel rate	(L/h)	= = = = =	0.70 3.0 19.00 0.40 1.4 11.0	
Ratio of run Average inco Time value f Light vehicl Heavy vehicl Light vehicl	e cost fining cosme (\$/h) actor e mass (e mass (e idle f	actor t to fuel 1000 kg) 1000 kg) uel rate	(L/h)	= = = = = =	0.70 3.0 19.00 0.40 1.4 11.0	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate \$/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Sandalwoo 5L L 2T T 2R R	d Parkway 12.5 12.0 12.4	0.44 0.41 0.42	0.531 0.491 0.518	26.09 24.37 26.17	0.776 0.762 0.796	313.3 299.9 310.3
	12.3	0.42	0.509	25.54	0.784	306.7
South: Mississa 3L L 8T T 8R R	uga Road 12.2 16.7 12.0	S 0.43 0.50 0.41	0.518 0.585 0.498	25.55 34.51 24.92	0.763 1.101 0.768	306.6 421.3 301.2
	14.5	0.46	0.544	29.87	0.938	363.0
Cast: Sandalwoo 1L L 6T T 6R R	d Parkway 12.2 11.4 11.9	0.43 0.39 0.40	0.512 0.459 0.490	25.23 22.21 24.40	0.756 0.714 0.757	304.2 285.6 297.7
			0.494	24.37		298.2
Jorth: Mississa 7L L 4T T 4R R	uga Road 12.2 12.3 12.0	0.43 0.41 0.41	0.517 0.485 0.498	25.52 24.49 24.91	0.763 0.780 0.768	306.3 307.7 301.2
	12.3	0.42	0.496	24.83	0.774	307.0
INTERSECTION:	12.6	0.42	0.507	25.79	0.801	315.4

Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

No.	Dema	nd Fl	v) wo.			_	n Deg ) Sat		_	
	L	T	R				d x		(m)	(m)
West:	Sanda	lwood	l Park	way W			 			
1 LT	11	145		156	3		0.298			500
2 R			260	260	2		 0.403	11.4	21	500 
	11	145	260	416	2		0.403	11.2	21	
South:	Miss	issau	ga Ro	ad S			 			
1 LT	35	170		205	14		0.257	9.6		500
2 TR		50	175	225	5		 0.257	8.7	13	500
	35	220	175	430	10		0.257	9.1	14	
East:	Sanda	lwood	Park	way E						
East: 1 LT		lwood 72		way E 252	2		0.253	11.7	12	500
		72		252	2 2		0.253	11.7		500 500
1 LT		72	245	252						
1 LT	180  180	72 8  80	245  245 	252 253  505	2		 0.253	7.8	12	
1 LT 2 TR	180  180  Miss	72 8  80  issau 197	245  245  ga Ro	252 253  505  ad N 473	2		 0.253	7.8	12 12	500
1 LT 2 TR  North:	180  180  Miss	72 8  80  issau 197	245  245  ga Ro	252 253  505 	2 2		 0.253	7.8  9.8	12 12 27	500
1 LT 2 TR  North: 1 LT	180  180  Miss 276	72 8  80  issau 197	245  245  ga Ro 45	252 253  505  ad N 473	2 2 2 3		 0.253 0.253 0.463 0.463 0.463	7.8 9.8  11.2 7.3 9.3	12 12 	500
1 LT 2 TR  North: 1 LT	180  180  Miss 276  276	72 8  80  issau 197 428  625	245  245  ga Ro 45	252 253  505  ad N 473 473	2 2 2 3 4		 0.253 0.253 0.463 0.463	7.8 9.8  11.2 7.3 9.3	12 12 27 28	500
1 LT 2 TR  North: 1 LT 2 TR	180  180  Miss 276  276	72 8  80  issau 197 428  625	245  245  ga Ro 45	252 253  505  ad N 473 473  946	2 2 3 4 3		 0.253 0.253 0.463 0.463 0.463	7.8 9.8 	12 12 27 28 28	500

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Mov ID	Mov Typ	Total Flow	Total Cap.		Aver. Delay	LOS	Longest 95% Ba	-
		•	(veh		()		(vehs)	(m)
		/h)	/h)	(v/c)	(sec)			
lest: S	andalwo	od Parkw	ay W					
5L L		11	37	0.297	17.4	В	1.7	13
2T T		145	487	0.298	10.4	В	1.7	13
2R R		260	644	0.404	11.4	В	2.7	21
outh:	 Mississ	auga Roa	d S					
3L L		35	136	0.257	15.0	В	1.6	14
8T T		220	856	0.257	8.4	A	1.7	13
8R R		175	681	0.257	8.9	A	1.7	13
ast: S	 andalwo	 od Parkw	 av E					
1L L		180	711	0.253	13.7	В	1.6	12

6T T 6R R	80 245	316 968	0.253 0.253	6.7 7.9	A A	1.6 1.6	12 12
North: Mississ	auga Road	i N					
7L L	276	596	0.463	14.1	В	3.5	27
4T T	625	1350	0.463	7.2	A	3.5	27
4R R	45	97	0.464*	8.3	A	3.5	28
ALL VEHICLES:	2297		0.464	9.7	Α	3.5	28

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

\* Maximum v/c ratio, or critical green periods

### Table D.0 - Geometric Delay Data

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

From	То		Negn	-	_	Appr. Dist.	Downstream	n Distance
	Approach					(m)	(m)	User Spec?
West: San	dalwood Pa	rkway W						
	South	Right	35.0	32.5	19.4	500	126	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mi	 ssissauga	Road S						
	_	Left	19.0	25.7	74.6	500	176	No
		Right	35.0	32.5	19.4	500	126	No
		Thru			47.1		146	No
East: San	 dalwood Pa	rkwav E						
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left					176	No
		Right					126	No
North: Mi	 ssissauga	Road N						
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru		39.1				No
		Left		25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

#### **Table D.1 - Lane Delays**

Deg. Stop-line Delay Acc. Queuing Stopd

Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

No.	Satn x	d1	d2	dSL	dn	dq	dqm	di	dig	dic
West: 1 LT	Sandalwo 0.298 0.403	od Pai 5.0	kway 1	W 5.0	4.6	0.4	0.1	0.4		10.9
1 LT	: Mississ 0.257 0.257	2.6	0.0						6.9 6.4	
1 LT	Sandalwo 0.253 0.253	1.3	0.0	1.3						
1 LT	: Mississ 0.463 0.463	1.7	0.0				0.0			11.2
dn i:	s average	stop-	-start	delay	for al	l vehi	cles	queued	and u	inqueued

# **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Lane No.	Satn			Geom.	Rate Overall h	Queued	Rate
	Sandal						
					0.85 0.91		
South:	: Missi	ssauga	Road	s			
					0.68 0.68		
East:	Sandal	wood Pa	arkway	E			
					0.68 0.63		
North:	Missi	ssauga	Road	л И			
					0.69 0.60		

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued

## **Table D.3A - Lane Queues (veh)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Lane	Deg. Satn	Ovrfl.	Avera	ge (veh)			Percent	tile (ve	eh)		Queue Stor.
No.	X	No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio
		wood Parl	-								
1 LT	0.298	0.0	0.5	0.0	0.5	1.0	1.2	1.4	1.7	1.9	0.03

2 R	0.403	0.1	0.8	0.1	0.8	1.6	1.9	2.1	2.7	3.1	0.04
South	n: Missis	sauga Ro	ad S								
1 LT	0.257	0.0	0.5	0.0	0.5	1.0	1.2	1.3	1.6	1.9	0.03
2 TR	0.257	0.0	0.5	0.0	0.5	1.0	1.2	1.3	1.7	1.9	0.03
East:	Sandalw	ood Park	way E								
1 LT	0.253	0.0	0.5	0.0	0.5	0.9	1.1	1.3	1.6	1.8	0.02
2 TR	0.253	0.0	0.5	0.0	0.5	0.9	1.1	1.3	1.6	1.8	0.02
North	: Missis	sauga Ro	ad N								
1 LT	0.463	0.0	1.1	0.0	1.1	2.0	2.5	2.8	3.5	4.1	0.05
2 TR	0.463	0.0	1.1	0.0	1.1	2.0	2.5	2.8	3.5	4.1	0.06

Values printed in this table are back of queue (vehicles).

## **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Tano	Deg.			ge (metre			Percentile (metres)				
Lane No.	Satn x	-		Nb2				90%			Stor. Ratio
West:	Sandal	wood Par	kway W								
1 LT	0.298	0.0	4.1	0.0	4.1	7.6	9.3	10.5	13.0	15.0	0.03
2 R	0.403	0.5	6.1	0.4	6.6	12.0	14.6	16.6	20.5	23.8	0.04
South	 : Missi	ssauga R	oad S								
1 LT	0.257	0.0	4.4	0.0	4.4	8.1	9.9	11.2	13.9	16.0	0.03
2 TR	0.257	0.0	4.2	0.0		7.8		10.7	13.2	15.3	0.03
East:	Sandal	wood Par	 kway E								
1 LT	0.253	0.0	3.9	0.0	3.9	7.2	8.8	9.9	12.3	14.2	0.02
2 TR	0.253	0.0	3.9	0.0	3.9	7.2	8.8	9.9	12.3	14.2	0.02
North	 : Missi	ssauga R	oad N								
		0.0		0.0	8.8	15.9	19.5	22.1	27.4	31.8	0.05
2 TR	0.463	0.0	8.9	0.0	8.9	16.1	19.6	22.3	27.6		0.06

Values printed in this table are back of queue (metres).

## Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S Intersection ID: 3 Roundabout

Mov ID	App. Spee		t Speeds	Queue N  1st Grn	Move-up  2nd Grn	Av. Sect		Geom Delay (sec)
West: S	andalwood P	arkway W						
5L L	65.0 2	5.7 25.	7 65.0	15.8		45.6	44.4	12.4
2T T	65.0 3	9.1 39.	1 65.0	16.1		50.4	50.1	5.4
2R R	65.0 3	2.5 32.	5 65.0	16.9		49.0	49.0	6.6
South:	Mississauga	Road S						
3L L	65.0 2	5.7 25.	7 65.0			46.3	46.3	12.4

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Sandalwood 2031 AM TTMP Red N/S G:\PROJECTS\105163 Mississagua Road Class EA\Sidra\Mississauga Rd EA Dec 9 Update.aap Processed Dec 10, 2009 11:46:01AM

A1492, AECOM, Small Office

Produced by SIDRA Intersection 3.2.2.1563

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# **Output Tables**

# Mississauga Road EA

## Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S

#### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout
Driving on the right-hand side of the road
Input data specified in Metric units
Model Defaults: US HCM (Metric)
Peak Flow Period (for performance): 15 minutes
Unit time (for volumes): 60 minutes.
Delay definition: Control delay
Geometric delay included
HCM Delay Model option selected
HCM Queue Model option selected
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

#### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

From Approach	To Approach	Mov ID	Turn	Flow LV		Flow Scale	Peak Flow Factor
West: San	dalwood Par	kway W					
	South	2R	Right	162	3	1.00	1.00
	East	2T	Thru	162	3	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mis	 ssissauga R	oad S					
	West	3L	Left	64	1	1.00	. 1.00
	East	8R	Right	382	8	1.00	1.00
	North	81	Thru	403	82	1.00	1.00
East: Sand	dalwood Par	 kwav E					
	West	6T	Thru	108	2	1.00	1.00
	South	1L	Left	216	4	1.00	1.00
	North	6R	Right	426	9	1.00	1.00
North: Mis	ssissauga R	oad N					
	West	4R	Right	20	0	1.00	1.00
	South	4T	Thru		11		
	East	7L	Left	132	3	1.00	1.00

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

Mov ID		L	eft	Th	rough	Rig	ght
10		LV	HV	LV	HV	ΓΛ	HV
			veh/hour		used by	the pro	ogram
			Parkway	_			
5L		5	1	0	•	0	0
2T		0		162		0	0
2R	R	0	0	0	0	162	3
South:	Missi	ssau	ga Road S	 S			
3L	L	64	1	. 0	0	0	0
8T	T	0	0	403	82	0	0
8R	R	0	0	0	0	382	8
 East:	Sandalı	wood	Parkway	E			
1L	L :	216	4	0	0	0	0
6T	T	0	0	108	2	0	0
6R	R	0	0	0	0	426	9
 North:	Missis	ssauc	ga Road 1	N			
7 <sub>.</sub> L		132	3	0	0	0	0
4 T	T	0	0	254	11	0	0

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

Mov ID	Lef	t	Thro	ugh	Righ	Right		
ID	Total	%HV	Total	%HV	Total	%HV		
Demand flow West: Sanda				d by th	e progra	ım		
	6	_		0.0	0	0.0		
2T T	0	0.0	165	1.8	0	0.0		
2R R	0	0.0	0	0.0	165	1.8		
South: Miss	sissauga	Road	s					
3L L				0.0	0	0.0		
8T T	0	0.0	485	16.9	0	0.0		
8R R	0	0.0	0	0.0	390	2.1		
East: Sanda	alwood E	arkway	E					
1L L	220	1.8	0	0.0	0	0.0		
6T T	0	0.0	110	1.8	0	0.0		
6R R	0	0.0	0	0.0	435	2.1		
North: Miss	issauga	. Road 1	n					
7L L				0.0	0	0.0		
4 m m	0	0.0	265	4.2	0	0.0		
4T T			0	0.0		4.8		

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout
                                   Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent ------
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) h) (pcu/h) Effect
West: Sandalwood Parkway W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 620 2.9 620 0 N 0.945
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 305 2.0 305 0 N 0.976
East: Sandalwood Parkway E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 555 15.1 613 0 N 0.916
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 395 2.0 395 0 N 0.945
```

## Table R.1 - Roundabout Gap Acceptance Parameters

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
No. Type Flow Aver Aver In-Bnch Prop ------
                     Rate Speed Dist Headway Bunched Hdwy Dist Headway
                    (pcu/h) (km/h) (m) (s)
                                                      (s) (m)
West: Sandalwood Parkway W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 620 31.5 50.7 1.38 0.407 4.34 37.9
                                                                                   2.93
                                                    0.407
Thru 1 Subdominant 620 31.5 50.7 1.38 0.407 3.89 34.0 2 Dominant 620 31.5 50.7 1.38 0.407 3.87 33.8 Right 2 Dominant 620 31.5 50.7 1.38 0.407 3.87 33.8
                                                                                   2.62
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 305 33.0 108.1 1.88 0.294 4.27 39.1 Thru 1 Subdominant 305 33.0 108.1 1.88 0.294 4.77 43.6 2 Dominant 305 33.0 108.1 1.88 0.294 4.72 43.3 Right 2 Dominant 305 33.0 108.1 1.88 0.294 4.72 38.7
                                                                                   2.71
                                                                                   3.03
                                                                                   3.00
                                                                                 2.68
  _____
East: Sandalwood Parkway E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium

    Left
    1 Subdominant
    613
    37.4
    61.0
    1.44
    0.418
    4.11
    42.7

    Thru
    1 Subdominant
    613
    37.4
    61.0
    1.44
    0.418
    4.11
    42.7

                                                                                  2.77
                                                                                 2.77
Right 2 Dominant 613 37.4
                                     61.0 1.44 0.418 3.88 40.3
                                                                                 2.62
```

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.O) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

## **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

Mov	Demand Flow (veh/h)		Flow	HV	Movement Adjust. Flow (pcu/h)	Cap. (veh	Deg. Satn	Spare Cap.	Util	Deg. Satn x
	andalwood		-							
5L L	6	16.7	620	2.9	620		0.85	325	100	0.200
		1.8	620	2.9	620	815	0.85	320	100	0.202
2R R	165	1.8	620	2.9	620	815	0.85	320	100	0.202
 South: N	lississau	ga Roa	 ad S							
3L L	65	1.5	305	2.0	305	131	0.85	71	100	0.496
8T T	485			2.0	305	974	0.85	71	100	0.498
8R R		2.1	305	2.0	305	783	0.85	71	100	0.498
 East: Sa	ndalwood	Parkw	av E							
1L L	220		-	15.1	613	499	0.85	93	82	0.441
				15.1	613		0.85		82	0.442
				15.1	613		0.85			0.538
North: M	lississau	ga Roa	d N							
7L L	135	2.2	395	2.0	395	584	0.85	268	100	0.231
4T T	265	4.2	395	2.0	395	1146	0.85	268	100	0.231
4R R	21	4.8	395	2.0	395	91	0.85	268	100	0.231

#### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

Intersection Level of Service = A
Worst movement Level of Service = B
Average intersection delay (s/pers) = 9.9
Largest average movement delay (s) = 16.1
Largest back of queue, 95% (m) = 35
Performance Index = 47.59
Degree of saturation (highest) = 0.538

```
Practical Spare Capacity (lowest)
                                                          58 %
                                                      4579
Effective intersection capacity, (veh/h) =
                                                       2462
Total vehicle flow (veh/h)
Total person flow (pers/h)
                                                       2954
Total vehicle delay (veh-h/h)
Total person delay (pers-h/h)
                                                        6.78
                                                       8.14
Total person delay (pers-n/n)
Total effective vehicle stops (veh/h) =
Total effective person stops (pers/h) =
                                                       1822
                                                         2186
Total vehicle travel (veh-km/h)
                                                     1562.8
Total cost ($/h)
                                                    675.46
Total fuel (L/h)
                                                       204.3
Total CO2 (kg/h)
                                                      512.02
```

#### **Table S.5 - Movement Performance**

Mov			Total Delay (pers-h/h	Delay	Queued	Stop Rate	95% B	ack (m)	Index	Aver. Speed (km/h)	
West:	San	dalwood F	arkway W								
5L		0.02	0.03	14.8				9	0.13	46.3	
2T				7.8		0.65		9		51.6	
2R	R 	0.41	0.49	9.0	0.56	0.72	1.1	9	3.01	50.7	
South:	Mi	ssissauga	Road S								
3L	L	0.27	0.32	14.8	0.58	0.77	3.8	33	1.40	46.2	
8T		1.09		8.1		0.64		31		51.5	
		0.93			0.57	0.68	3.8	31	7.13	50.6	
		dalwood P									
1L	_	0.98	1.18	16.1	0.68	0.92	3.2	24		45.5	
6Т		0.28			0.68	0.78		24		50.7	
6R	R	1.30	1.56	10.8	0.73	0.91	4.5	35	9.13	49.6	
North:	Mi	ssissauga	Road N								
7L	L	0.54	0.65	14.4	0.54	0.76	1.5	12	2.82	46.4	
4 T		0.55			0.54	0.61		12	4.63	51.8	
4R	R	0.05	0.06	8.5	0.54	0.67	1.5	12	0.38	50.9	

## **Table S.6 - Intersection Performance**

	ction I	ad and Sar D: 3	ndalwood	Parkway	y 2031 F	M TTM	P Red N/	S	
Flow	Satn	Total Delay (veh-h/h)	Delay	Delay	Queued	Stop	Queue	Index	Spee
		od Parkway		8.5	0.56	0.69	9	6.05	51.
		auga Road 2.29		8.8	0.57	0.67	33	17.35	50.
		od Parkway		12.1	0.71	0.90	35	16.36	48.4
		auga Road 1.13		9.7	0.54	0.66	12	7.83	49.8
ATT VED	ICLES:								

INTERSECTION (persons):
2954 0.538 8.14 9.9 0.61 0.74 47.59 49.9

Queue values in this table are 95% back of queue (metres).

#### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

_		-	_			Que 95% Ba	ck	
Lane No.				-	-	(vehs)		Length (m)
West: S	andalwo	od Par	 kway W					
1 LT	167	825	0.202	8.1	0.66	1.1	8.8	500.0
2 TR	169	835	0.202	9.0	0.72	1.1	8.8	500.0
South:	Mississa	auga R	 oad S					
		_		9.1	0.67	3.8	32.6	500.0
2 TR	493	991	0.498	8.4	0.67	3.8	30.5	500.0
East: S	andalwoo	od Par	 kwav E					
			_		0.88	3.2	24.4	500.0
2 R	435	809	0.538	10.8	0.91	4.5	34.8	500.0
North: I	Mississa	auga R	oad N					
1 LT	211	911	0.231	11.9	0.71	1.5	12.0	500.0
2 TR	210	910	0.231	7.5	0.62	1.5	12.2	500.0

### **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

Lane					Min Cap (veh /h)	Cap (veh	Satn	Util
1 LT	Sandal 6 0	161	0	167				
1 LT	: Missi 65 0	382	0	447				
1 LT	Sandal 220 0	110	0	330			0.441 0.538	
1 LT	: Missi 135 0	76	0	211		911 910		

P Lane under-utilisation found by the "Program". This includes cases where the value of lane under-utilisation due to downstream effects has been modified by the program during lane flow calculations (e.g. a de facto exclusive lane has been found).

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

Mov	Mov Typ	Dem Flow (veh	Total Cap. (veh	Lane Util	_	Aver. Delay		95% Back of Queue	Perf. Index
		/h)		(%)	x	(sec)		(veh)	
West: S	Sandalw	ood Pa	rkway W						
5L L		6	30	100	0.200			1.1	0.13
2T T			815			7.8			2.91
2R R		165	815	100	0.202	9.0	0.72	1.1	3.01
South:	Missis	sauga	Road S						
3T T		65	131	100	0.496	14.8	0.77	3.8	1.40
8T T			974	100		8.1			8.83
8R R		390	783	100	0.498	8.6	0.68	3.8	7.13
East: S	Sandalw	ood Pa	rkway E						
1L L		220	499	82	0.441	16.1	0.92	3.2	5.07
6T T		110	249	82	0.442	9.1	0.78	3.2	2.16
6R R		435	809	100	0.538*	10.8	0.91	4.5	9.13
North:	Missis	sauga	Road N						
7L L		~	584	100	0.231	14.4	0.76	1.5	2.82
4T T		265	1146	100	0.231	7.4	0.61	1.5	4.63
4R R		21	91	100	0.231	8.5	0.67	1.5	0.38

<sup>\*</sup> Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

NOX ÇO2 al Total Tota h kg/h kg/h
10 0.003 1.
39 0.076 30.
57 0.079 31.
06 0.158 62.
12 0.034 13.
64 0.339 129.
09 0.188 73.
85 0.560 216.

East: Sandalwood Parkway E

1L L 6T T 6R R	8.2	64.72 28.10 113.28	0.034	1.67	0.052	20.6
	60.1	206.09	0.251	12.58	0.382	150.3
North: Mississ	auga Roac	i N				
7L L						
		68.31				
4R R	1.6	5.34			0.010	
	33.2	112.67				
INTERSECTION:	204.3	675.46	0.812	42.21	1.309	512.0
PARAMETERS USER			rions	_	0.900	
Fuel resource		,		_	0.300	
Ratio of rur			Lcost	==	3.0	
Average inco				==	19.00	
Time value f					10.00	
Time value i	actor				0.40	
Light vehicl	e mass (			=	0.40	
Light vehicl Heavy vehicl	e mass (	1000 kg)		=	0.40 1.4 11.0	
Light vehicl	e mass ( e mass ( e idle f	1000 kg) uel rate	(L/h)	=	0.40 1.4 11.0 1.350	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Koundabi	buc						
Mov	т	Fuel Rate //100km	Cost Rate \$/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate
	andalwood	_					
5L L 2T T			0.42	0.502	23.95	0.712	291.3
			0.40	0.471	23.05	0.732	290.8
2R R	_	12.1	0.41	0.499	24.99	0.770	301.
		11.8	0.40	0.486	24.01	0.750	296.1
South: 1	ississau	ga Road S	 S				
3L L		12.3	0.43	0.519	25.64	0.765	307.1
8T T		16.8	0.50	0.590	34.86	1.109	423.5
8R R		12.1	0.41	0.500	25.05	0.771	302.3
	<del>.</del>	14.5	0.46	0.548	30.15	0.945	365.1
 East: Sa	andalwood	 Parkwav	 Е				
1L L			0.44	0.527	26.08	0.775	310.6
6T T		11.9	0.41	0.487	24.12	0.756	297.9
6R R		12.3	0.42	0.514	25.95	0.792	308.3
	_	12.3	0.42	0.514	25.73	0.782	307.5
Iorth. N	 Mississau	as Posd N					
7L L	iississau	12.2	0.43	0.517	25.49	0.762	306.1
4T T		12.3	0.41	0.484	24.41	0.778	307.2
4R R			0.41	0.497	24.86	0.767	301.2
22. 1.	_						
		12.2	0.42	0.496	24.80	0.772	306.6
TNTERSE	CTION:	13.1	0.43	0.520	27.01	0.838	327.6

Table S.14 - Summary of Input and Output Data

Mississauga Road EA

Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S

Intersection ID: 3

Roundabout

Lane No.	Dema	nd Fl	,	reh/h)		-	rn Deg s) Sat		_	
	L	Т	R	Tot			nd x	-		(m)
West:	Sanda	lwood	Park	way W			 			
1 LT 2 TR	6	161 4	165	167 169	2		0.202		-	500 500
	6	165	165	336	2		 0.202	8.5	9	
South:	Miss	issau	ga Ro	ad S			 			
1 LT 2 TR	65	382 103		447 493	15 5		0.498	9.1 8 8.4		500 500
	65	485	3,90	940	10		 0.498	8.8	33	
East:	 Sanda	lwood	 Park	 wav E			 			
1 LT	220			330	2		0.441	13.8	24	500
2 R			435	435	2		 0.538	10.8	35	500
	220	110	435	765	2		0.538	12.1	35	
North:	Miss	issau	ga Ro	 ad N			 			
1 LT	135	76		211	3			11.9		
2 TR		189	21	210	4		 0.231	7.5	12	500
	135	265	21	421	4		0.231	9.7	12	
ALL VE	HICLE	===== S		Total	응		 Max	Aver.	Max	
				Flow	HV		X	2	Queue	
				2462	5		0.538	9.9	35	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

**Table S.15 - Capacity and Level of Service** 

Mississauga Road EA

Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S  $\overline{\phantom{a}}$ 

Intersection ID: 3

Roundabout

Mov	Mov Typ		(veh	Deg. of Satn (v/c)	-		Longest 95% Ba (vehs)	ck
 West: S	andalwo	 od Parkw	ay W					
5L L		6	30	0.200	14.8	В	1.1	9
2T T		165	815	0.202	7.8	A	1.1	9
2R R		165	815	0.202	9.0	A	1.1	9
South:	Mississ	auga Roa	 d S					
3L L		65	131	0.496	14.8	В	3.8	33
8T T		485	974	0.498	8.1	A	3.8	31
8R R		390	783	0.498	8.6	A	3.8	31
East: S	andalwo	od Parkw	 ay E					
1L L		220	499	0.441	16.1	В	3.2	24

6T T 6R R	110 435	249 809	0.442 0.538*	9.1 10.8	A B	3.2 4.5	24 35
North: Missis	ssauga Road	l N					
7L L	135	584	0.231	14.4	В	1.5	12
4T T	265	1146	0.231	7.4	A	1.5	12
4R R	21	91	0.231	8.5	A	1.5	12
ALL VEHICLES	S: 2462		0.538	9.9	A	4.5	35

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used.

For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

 $^{\star}$  Maximum v/c ratio, or critical green periods

## **Table D.0 - Geometric Delay Data**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

From	To		Negn	Negn Speed	-		Downstream	Distance
	Approach	Turn		(km/h)		(m)	(m)	User Spec?
West: Sar	ndalwood Pa	arkway W						
	South	Right	35.0	32.5	19.4	500	126	No
	East	Thru	57.3	39.1	47.1	500	129	No
	North	Left	19.0	25.7	74.6	500	175	No
South: Mi	.ssissauga	Road S						
	West	Left ·	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: San	dalwood Pa	rkway E						
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mi	ssissauga	Road N						
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

#### Table D.1 - Lane Delays

<sup>&</sup>quot; Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

	Satn x		2nd d2		Dec. dn		-	(Idle) di		Control dic
West:	Sandalwo	od Par	kway 1	w						
	0.202		_		3.7	0.0	0.0	0.0	5.6	8.1
2 TR	0.202	2.4	0.0	2.4	3.3	0.0	0.0	0.0	6.5	9.0
South:	Mississ	auga F	Road S							
	0.498	_		2.4	3.7	0.0	0.0	0.0	6.8	9.1
2 TR	0.498	2.0	0.0	2.0	3.4	0.0	0.0	0.0	6.4	8.4
East: :	Sandalwo	od Par	kwav 1	 E						
	0.441		_		3.7	0.2	0.2	0.0	10.1	13.8
2 R	0.538	3.3	0.9	4.2	4.2	0.0	0.0	0.0	6.6	10.8
North:	Mississa	auga F	oad N							
	0.231	_		2.0	3.0	0.0	0.0	0.0	9.9	11.9
2 TR	0.231	2.0	0.0	2.0	3.5	0.0	0.0	0.0	5.6	7.5
dn is	average	stop-	start	delay	for al	l vehi	cles	queued	and u	inqueued

## **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

	Satn			Geom.	Rate Overall h	Queued	Rate
1 LT		0.46	0.00	0.20	0.66 0.72		
1 LT		0.46	0.00		0.67 0.67	0.582 0.569	
		0.66	0.02		0.88 0.91		
1 LT		0.42	0.00		0.71 0.62	0.536	

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued

## Table D.3A - Lane Queues (veh)

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

Tana	-	Ovrfl. Oueue -	Avera	-			Percent	ile (ve	eh)		Queue Stor.
Lane No.	Satn x	No No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Ratio
		wood Parl	-	0 0	0 4	0.7	0.8	0 0	1 1	1 2	0 02

2 TR	0.202	0.0	0.4	0.0	0.4	0.7	0.8	0.9	1.1	1.3	0.02
South	: Missis	sauga Ro	oad S								
1 LT	0.498	0.0	1.2	0.0	1.2	2.2	2.7	3.1	3.8	4.4	0.07
2 TR	0.498	0.0	1.2	0.0	1.2	2.2	2.7	3.1	3.8	4.5	0.06
East:	Sandalw	ood Parl	 way E								
1 LT	0.441	0.1	0.9	0.1	1.0	1.8	2.2	2.6	3.2	3.7	0.05
2 R	0.538	0.2	1.3	0.2	1.5	2.6	3.2	3.6	4.5	5.2	0.07
North	: Missis	sauga Ro	ad N								
1 LT	0.231	0.0	0.5	0.0	0.5	0.9	1.1	1.3	1.5	1.8	0.02
2 TR	0.231	0.0	0.5	0.0	0.5	0.9	1.1	1.3	1.5	1.8	0.02

Values printed in this table are back of queue (vehicles).

## **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

T	Deg.			_	res)		Percen	,			Queue
Lane No.	Satn x	Queue - No	Nb1	Nb2	Nb	70%					Stor. Ratio
West:	Sandál	wood Par	kway W								
1 LT	0.202	0.0	2.8	0.0	2.8	5.2	6.3	7.2	8.8	10.2	0.02
2 TR	0.202	0.0	2.8	0.0	2.8	5.2	6.3	7.2	8.8	10.2	0.02
South	 : Missi	ssauga R	oad S								
1 LT		0.1		0.2	10.5	18.9	23.2	26.3	32.6	37.9	0.07
2 TR	0.498	0.0	9.8	0.0	9.8	17.7	21.6	24.6	30.5	35.4	0.06
East:	Sandal	wood Par	kway E								
1 LT		0.5	-	0.5	7.8	14.2	17.3	19.7	24.4	28.3	0.05
		1.2		1.5	11.3	20.1	24.6	28.0	34.8	40.4	0.07
		 ssauga R								· .	
	0.231	_	3.8	0.0	3.8	7.1	8.6	9.7	12.0	13.9	0.02
2 TR	0.231	0.0	3.8	0.0	3.8	7.2	8.7	9.8	12.2	14.1	0.02

Values printed in this table are back of queue (metres).

## Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S Intersection ID: 3 Roundabout

Mov ID	App. Sp  Cruise			Speeds  Cruise	Queue M	Move-up 2nd Grn	Av. Sect		Geom Delay (sec)
	andalwood		4	65.0			46.2	46.2	10.0
5L L 2T T	65.0 65.0	25.7 39.1	25.7 39.1	65.0 65.0			46.3 51.6	46.3 51.6	12.3 5.4
2R R	65.0	32.5	32.5	65.0			50.7	50.7	6.6
South: N	Mississau 65.0	ga Road 25.7	is 25.7	65.0	27.0		46.2	46.2	12.4

65.0 39.1	39.1	65.0	25.5	51.5	51.5	5.8
65.0 32.5	32.5	65.0		50.6	50.6	6.6
dalwood Parkw	ay E					
65.0 25.7	25.7	65.0	19.4	45.5	45.5	12.4
65.0 39.1	39.1	65.0	19.4	50.7	50.7	5.4
65.0 32.5	32.5	65.0	19.9	49.6	49.6	6.6
 ssissauga Roa	d N					
65.0 25.7	25.7	65.0		46.4	46.4	12.4
65.0 39.1	39.1	65.0		51.8	51.8	5.4
65.0 32.5	32.5	65.0		50.9	50.9	6.6
	65.0 32.5  dalwood Parkw 65.0 25.7 65.0 39.1 65.0 32.5  ssissauga Roa 65.0 25.7 65.0 39.1	65.0 32.5 32.5  dalwood Parkway E 65.0 25.7 25.7 65.0 39.1 39.1 65.0 32.5 32.5  ssissauga Road N 65.0 25.7 25.7 65.0 39.1 39.1	65.0 32.5 32.5 65.0  dalwood Parkway E 65.0 25.7 25.7 65.0 65.0 39.1 39.1 65.0 65.0 32.5 32.5 65.0  ssissauga Road N 65.0 25.7 25.7 65.0 65.0 39.1 39.1 65.0	65.0 32.5 32.5 65.0  dalwood Parkway E 65.0 25.7 25.7 65.0 19.4 65.0 39.1 39.1 65.0 19.4 65.0 32.5 32.5 65.0 19.9  ssissauga Road N 65.0 25.7 25.7 65.0 65.0 39.1 39.1 65.0	65.0 32.5 32.5 65.0 50.6  dalwood Parkway E 65.0 25.7 25.7 65.0 19.4 45.5 65.0 39.1 39.1 65.0 19.4 50.7 65.0 32.5 32.5 65.0 19.9 49.6  ssissauga Road N 65.0 25.7 25.7 65.0 46.4 65.0 39.1 39.1 65.0 51.8	65.0 32.5 32.5 65.0 50.6 50.6  dalwood Parkway E 65.0 25.7 25.7 65.0 19.4 45.5 45.5 65.0 39.1 39.1 65.0 19.4 50.7 50.7 65.0 32.5 32.5 65.0 19.9 49.6 49.6  ssissauga Road N 65.0 25.7 25.7 65.0 46.4 46.4 65.0 39.1 39.1 65.0 51.8 51.8

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Mississauga and Sandalwood 2031 PM TTMP Red N/S G:\PROJECTS\105163 Mississagua Road Class EA\Sidra\Mississauga Rd EA Dec 9 Update.aap Processed Dec 10, 2009 11:46:05AM

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# **Output Tables**

# Mississauga Road EA

## Mississauga Road and Wanless Road 2031 AM TTMP Red N/S

#### **Run Information**

#### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

From Approach	To Approach	Mov ID		Flow LV		Flow Scale	Peak Flow Factor
West: Wan	less Road W						
	South	2R	Right	221	4	1.00	1.00
	East	2T				1.00	
	North	5L	Left	5	0	1.00	1.00
South: Mi	ssissauga R	oad S					
	West	3L	Left	20	0	1.00	1.00
	East	8R	Right	92	3	1.00	1.00
	North	· 8T	Thru	104	21	1.00	1,00
East: Wan	less Road E						
	West	6T	Thru	456	9	1.00	1.00
	South	1L	Left	377	. 8	1.00	1.00
	North	6R	Right	10	0	1.00	1.00
North: Mi	ssissauga R	oad N					
	West	4R	Right	34	1	1.00	1.00
	South	4T	Thru	514	21	1.00	1.00
	East	7L	Left	233	7	1.00	1.00

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Mov		Lef	t	Throu	gh	Righ	.t
ID	-	ΓΛ	HV	TA.	HV	TA	HV
Demand	l flows	in ve	h/hour	as use	d by	the prog	ram
West:	Wanless	s Road	W				
5L	L	5	1	0	0	0	0
2T	T	0	0	730	15	0	0
2R	R	0	0	0	0	221	5
 South:	Missis	sauga	Road	3			
3L		20	1	0	0	0	0
8T	Т	0	0	104	21	0	0
8R	R	0	0	. 0	0	92	3
 East:	Wanless	Road	E				
1L	L 3	3.7.7	8	0	0	0	0
6Т	Т	0	0	456	9	0	0
6R	R	0	0	0	0	10	1
North:	Missis	sauga	Road 1	1			
7L	L 2	33	7	0	0	0	0
4Т	Т	0	0	514	21	0	0

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Mov	Lef	t		Thro	ugh	Righ	ıt .
ID	Total	%HV		Total	%HV	Total	/H%
Demand flo	ws in ve	h/hou	 r a	s use	d by the	progra	ım
West: Wanl	ess Road	L W					
5L L	6	16.7		0	0.0	0	0.0
2T T	0	0.0		745	2.0	0	0.0
2R R	0	0.0		0	0.0	226	2.2
South: Mis	sissauga	Road					
	21			0	0.0	0	0.0
8T T	0	0.0		125	16.8	0	0.0
8R R	0	0.0		0	0.0	95	3.2
 East: Wanl	ess Road	 . Е					
1L L	385	2.1		0	0.0	0	0.0
6T T	0	0.0		465	1.9	0	0.0
6R R	0	0.0		0	0.0	11	9.1
North: Mis	sissauga	Road	 N				
	240			0	0.0	0	0.0
4T T	0	0.0		535	3.9	0	0.0
4R R					0.0	35	2.9

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout
                                           Circulating/Exiting Stream
Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
 Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) h) (pcu/h) Effect
------
West: Wanless Road W
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 1160 3.1 1161 0 N 0.827 Exclusive Slip lane (exiting flow): 920 3.2 921 0 N 0.883
South: Mississauga Road S
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 2 4.00 990 2.2 990 0 N Exclusive Slip lane (exiting flow): 985 2.2 985 0 N
                                                     990 0 N 0.808
985 0 N 0.809
East: Wanless Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 150 14.5 165 0 N 0.966
North: Mississauga Road N
```

#### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout
Turn Lane Lane ---- Circulating/Exiting Stream --- Critical Gap
      No. Type Flow Aver Aver In-Bnch Prop
                   Rate Speed Dist Headway Bunched Hdwy Dist Headway (pcu/h) (km/h) (m) (s) (s) (m) (s)
______
West: Wanless Road W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1161 31.9 27.5 1.34 0.627 3.91 34.6
Thru 1 Subdominant 1161 31.9 27.5 1.34 0.627 2 Dominant 1161 31.9 27.5 1.34 0.627
                                                               3.50
                                                                        31.0
                                                                                 2.55
                                                               3.31
                                                                       29.3
                                                                                 2 41
Right 3 Excl. Slip 921E 33.5 36.4 1.62 0.608 3.31 30.8 2.41
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 990 35.8 36.1 1.27 0.541 3.58 35.6 2.55
Thru 1 Subdominant 990 35.8 36.1 1.27 0.541 3.99 39.7 2.85
2 Dominant 990 35.8 36.1 1.27 0.541 3.88 38.6 2.77
Right 3 Excl. Slip 985E 35.8 36.4 1.27 0.541 3.88 38.6 2.77
East: Wanless Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 165 36.9 223.4 1.04 0.099 4.30 44.0
```

Thru	1 Subdominant	165	36.9	223.4	1.04	0.099	4.30	44.0	2.65D
	2 Dominant	165	36.9	223.4	1.04	0.099	4.30	44.0	2.65
Right	2 Dominant	165	36.9	223.4	1.04	0.099	4.47	45.8	2.76
North	: Mississauga R	oad N							
	ironment Factor		Enter	. / 0	1 4 4 4 4 4	Dlass Addi		Manaldana	
EIIV	ronment factor	: 1.20	Entr	y/Circu	lating	Flow Adj	ustment:	Mealum	
Left	1 Subdominant	870	32.9	37.8	1.03	0.423	3.69	33.7	2.59
Thru	1 Subdominant	870	32.9	37.8	1.03	0.423	3.69	33.7	2.59
	2 Dominant	870	32.9	37.8	1.03	0.423	3.59	32.8	2.52
Right	3 Excl. Slip	485E	38.6	79.5	1.60	0.378	3.59	38.5	2.52

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

- E Exiting flow for slip lane traffic
- D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

### **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Mov		Demand		Oppos	sing M	ovement Adjust.				Lane Util	-
ID		Flow	HV			Flow (pcu/h)	(veh	Satn	Cap.		
West:	. Wa	nless Ro	 ad W								
5L	L	6	16.7	1160	3.1	1161	9	0.85	28	100	0.667
2 <b>T</b>	T	745	2.0	1160	3.1	1161	1102	0.85	26	100	0.676
2R	R	226	2.2	920	3.2	921	698	0.85	163	100	0.324
 South	1: M	lississau	ga Roa	ad S							
3L		21			2.2	990	151	0.85	511	100	0.139
81	T	125	16.8	990	2.2	990	897	0.85	510	100	0.139
8R	R	95	3.2	985	2.2	985	526	0.85	371	100	0.181
 East:	Wa	nless Roa	ad E								
1L	L	385	2.1	150	14.5	165 .	1025	0.85	126	100	0.376
6 <b>T</b>	Т	465	1.9	150	14.5	165	1238	0.85	126	100	0.376
6R	R	11	9.1	150	14.5	165	29	0.85	124	100	0.379
North	1: M	ississau	ga Roa	ıd N							
7ь	L	. 240	2.9	870	2.0	870	455	0.85	61	100	0.527
4T	Т	535	3.9	870	2.0	870	1014	0.85	61	100	0.528
4 R	R	35	2.9	485	2.0	485	980	0.85	2280	100	0.036

#### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Intersection Level of Service = B

```
Average intersection delay (s/pers)
                                              12.1
Largest average movement delay (s)
                                              23.3
Largest back of queue, 95% (m)
                                               49
Performance Index
                                        =
                                             61.57
Degree of saturation (highest)
                                             0.676
Practical Spare Capacity (lowest)
                                              26 %
Effective intersection capacity, (veh/h) =
                                              4273
Total vehicle flow (veh/h)
                                              2889
Total person flow (pers/h)
                                             3467
Total vehicle delay (veh-h/h)
                                              9.68
Total person delay (pers-h/h)
                                            11.61
                                            2438
Total effective vehicle stops (veh/h)
Total effective person stops (pers/h)
                                              2925
Total vehicle travel (veh-km/h)
                                            1846.0
Total cost ($/h)
                                            791.60
Total fuel (L/h)
                                       =
                                             231.8
Total CO2 (kg/h)
                                             580.32
```

#### **Table S.5 - Movement Performance**

	Total Delay (veh-h/h)		Delay	Queued	Stop Rate	95% Ba (vehs)	ck (m)	Index	Speed	
West: Wa	anless Road	 . W								
5L L	0.04	0.05	23.3	0.88	1.10	6.2	48	0.17	40.1	
2T T	3.29	3.95	15.9	0.88	1.07	6.4	49	19.02	44.7	
2R R	0.66	0.79	10.5	0.73	0.85	2.2	17	4.60	49.8	
South: N	Mississauga	Road S								
3L L	0.10	0.12	16.5	0.69	0.90	0.8	7	0.49	45.1	
8T T	0.35									
	0.28									
East: Wa	nless Road	 _ E			,					
1L L	1.41	1.69	13.2	0.41	0.68	2.8	22	7.68	47.0	
6T T	0.80	0.96	6.2	0.41	0.51	2.8	22	7.61	52.8	
6R R	. 0.02									
North: N	ississauga	Road N								
7L L	1.15	1.38	17.3	0.72	0.98	3.8	29	5.71	44.5	
4T T	1.51	1.81	10.2	0.72	0.89	3.8	30	11.02	50.4	
	0.07							0.58	51.8	

#### **Table S.6 - Intersection Performance**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout
Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Delay Queued Stop Queue Index Speed
(veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m)
                                                      (km/h)
West: Wanless Road W
 977 0.676 3.99
                  4.79 14.7 0.85 1.02 49 23.79 45.7
South: Mississauga Road S
241 0.181 0.72 0.86 10.7 0.70 0.82 8
                                                4.99
East: Wanless Road E
 861 0.379 2.23 2.68 9.3 0.41 0.59 22 15.48 49.9
North: Mississauga Road N
```

810	0.528	2.74	3.28	12.2	0.71	0.90	30	17.31	48.4
ALL VE		9.68	11.61	12.1	0.67	0.84	49	61.57	48.0
	ECTION (po 0.676	ersons):	11.61	12.1	0.67	0.84		61.57	48.0
Queue v	alues in	this tak	ole are 9	5% back	of que	ue (met	res).		

### **Table S.7 - Lane Performance**

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

T.ane	Dem Flow (veh	_	_			Q u e 95% Ba	Lane Length				
				_	_	(vehs)		_			
West: Wanless Road W											
1 LT	359	532	0.676			6.2					
						6.4					
3 R	226	698	0.324	10.5	0.85	2.2	17.0	75.0			
South:	South: Mississauga Road S										
		_		11.8	0.82	0.8	6.7	500.0			
2 T	73	524	0.139	9.9	0.79	0.8	6.9	500.0			
3 R	95	526	0.181	10.5	0.85	1.0	8.1	75.0			
East: W	Janless H	Road E									
1 LT	431	1147	0.376	12.5	0.67	2.8	21.9	500.0			
2 TR	430	1145	0.376	6.2	0.52	2.8	21.9	500.0			
North: Mississauga Road N											
	380	-		14.7	0.95	3.8	29.4	500.0			
2 T	395	749	0.527	10.1	0.89	3.8	29.8	500.0			
3 R	35	980	0.036	7.6	0.59	0.2	1.4	75.0			

# **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Lane No.		n Flow Thru			(veh	Cap (veh	Satn	Lane Util
West:	 Wanles	s Road						
1 LT	6			359	150	532	0.676	100
2 T	0		-	392		579		
3 R	0	0	226	226	150			
South:	Missi	ssauq	a Roa	.d S				
1 LT	21	52	0	73	73	524	0.139	100
2 T	0	73	0	73	73	524	0.139	100
3 R	0	0	95	95	95	526	0.181	100
East:	Wanles	s Road	 d E					
1 LT	385	46	0	431	150	1147	0.376	100

2	TR	0	419	11	430	150	1145	0.376	100
No	Jorth: Mississauga				id N				
1	LT ·	240	140	0	380	150	721	0.527	100
2	T	0	395	0	395	150	749	0.527	100
3	R	0	0	35	35	35	980	0.036	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Mov	Mov Typ	Dem Flow (veh	_	Lane Util	_	Aver. Delay	Eff. Stop Rate	95% Back of Oueue	Perf. Index
		/h)	/h)	(%)	x	(sec)		(veh)	
West:	Wanless	Road	w						
5L L		6	9	100	0.667				0.17
2T T 2R R	(glp)	745	1102 698	100 100	0.676* 0.324				19.02 4.60
	(DIP)								
	Missis				1 322				
3L L 8T T		125	151 897	100	0.139	16.5		0.8 0.8	0.49
8R R				100	0.133			1.0	1.97
Fagt: 1	Wanless	Pood							
1L L		385	1025	100	0.376	13.2	0.68	2.8	7.68
6T T		465	1238	100	0.376	6.2	0.51	2.8	7.61
6R R		11	29	100	0.379	7.4	0.58	2.8	0.19
North:	Mississ	sauga	Road N						
7L L		240	455	100	0.527	17.3		3.8	5.71
4T T	(03)	535	1014	100	0.528	10.2			11.02
4R R	(Slp)	35 	980 	100	0.036	7.6	0.59	0.2	0.58

 $<sup>\</sup>star$  Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Mov ID		Fuel Total L/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West:	Wanless	Road W					
5L	L	0.5	1.87	0.002	0.10	0.003	1.3
2T	T	59.7	209.49	0.250	12.42	0.379	149.5
2R	R	17.3	58.63	0.072	3.60	0.111	43.2
		77.5	269.98	0.324	16.13	0.493	193.9

South: Mississauga Road S

3L	T.	1.8	6.20	0.007	0.37	0.011	4.
	T	13 5	40.34	0.048	2 86	0.090	34
	R	7 4	24.97	0.010	1 55	0.030	18.
OIX	IX						
		22.7	71.51	0.086	4.78	0.149	57.
East:	Wanless R	oad E					
1L	L	31.5	110.07	0.132	6.52	0.196	78.
6Т	T	33.1	113.36	0.133	6.39	0.207	82.
	R	0.8	2.75	0.003	0.17	0.005	2.
		65.4	226.18	0.269	13.07	0.407	163.
	Mississa						
			72.86				
$4\mathrm{T}$	T	42.7	142.35	0.171	8.78	0.275	107.
4R	R		8.72				6.
		66.2	223.92	0.269	13.70	0.422	165.
INTER	RSECTION:						
		231.8	791.60	0.948			
PARAME	RSECTION:	231.8 IN COST	791.60	0.948	47.68		580.
PARAME	RSECTION:	231.8 IN COST	791.60 	0.948	47.68	1.471	580.
PARAME  Pum Fue	RSECTION: TERS USED	IN COST	791.60  CALCULAT  \$/L) actor	0.948 	47.68	0.900	580.
PARAME  Pum Fue Rat	RECTION: TERS USED  p price of	IN COST	791.60  CALCULAT  \$/L) actor	0.948 	47.68	0.900 0.70	580.
PARAME  Pum Fue Rat Ave	RECTION: TERS USED  p price of resource	IN COST f fuel (e cost fining cost (\$/h))	791.60  CALCULAT  \$/L) actor	0.948 	47.68	0.900 0.70 3.0	580.
PARAME Pum Fue Rat Ave	RSECTION:  TERS USED  p price of resource io of rungerage income	IN COST  f fuel ( e cost f hing cos ne (\$/h) actor	791.60  CALCULAT  \$/L) actor t to fuel	0.948 	47.68 = = = = = =	0.900 0.70 3.0 19.00 0.40	580.
PARAME Pum Fue Rat Ave Tim Lig	ETERS USED  TERS USED  To price of the resource of rungering income value father the results of	IN COST  f fuel ( e cost f ning cos ne (\$/h) actor e mass (	791.60  CALCULAT  \$/L) actor t to fuel	0.948 	47.68 = = = = = =	0.900 0.70 3.0 19.00 0.40	580.
PARAME Pum Fue Rat Ave Tim Lig	TERS USED  price of resource io of rungrage income value fa	IN COST  f fuel ( c cost fining cost me (\$/h) actor e mass ( e mass (	791.60  CALCULAT  \$/L) actor t to fuel  1000 kg) 1000 kg)	0.948	47.68 = = = = = = =	0.900 0.700 0.70 3.0 19.00 0.40	580.

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Mov	Fuel Rate L/100km	Cost Rate \$/km		CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Wanles	s Road W					
5L L			0.546		0.747	
2T T	12.7		0.534			
2R R	12.2	0.42	0.508	25.54	0.785	306.2
	12.6	0.44	0.528	26.27	0.803	315.8
South: Missi	ssauga Road	s				
3L L	12.4	0.44	0.528	26.01	0.774	311.1
8T T	17.2					
8R R	12.5	0.42	0.513	26.18	0.807	313.9
	14.9	0.47	0.564	31.41	0.980	375.1
East: Wanles:	Road E					
1L L	12.1	0.42	0.510	25.09	0.753	303.1
6T T	11.3		0.454		0.706	
6R R	11.8	0.40	0.486	24.14	0.751	296.7
	11.7	0.40	0.480	23.38	0.728	292.6
North: Missis	ssauga Road	 N				
7L L	12.9		0.543	27.21	0.808	322.6
4T T	12.7	0.42	0.508	26.07	0.816	
4R R	11.7	0.40	0.480	23.68	0.743	293.8
	12.7	0.43	0.517	26.32	0.810	318.3

INTERSECTION: 12.6 0.43 0.514 25.83 0.797 314.4

Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Lane						7 -1-	nee	 D	7	T +	
No.				reh/h)		Adj. Basic		Deg Sat		Longest Oueue	Lane
	L	T	R	Tot		Satf.			(sec)		(m)
West: N	Wanle	ss Ro	ad W					 			
1 LT	6	353		359	2			0.676			500
2 T		392		392	2			0.676			500
3 R			226	226	2			 0.324	10.5	17	75 
	6	745	226	977	2			 0.676	14.7	49	
South:	Miss	issau	ga Ro	ad S				 			
1 LT	21	52		73	13			0.139	11.8	7	500
2 T		73		73	17			0.139	9.9		500
3 R			95	95	3			 0.181	10.5		75
	21	125	95	241	10			0.181	10.7	8	
East: V	vanle	ss Ro	ad E					 			
1 LT	385	46		431	2			0.376	12.5	22	500
2 TR		419	11	430	2			0.376	6.2	22	500
	385	465	11	861	2			 0.376	9.3	22	
North:	Miss	 issau	ga Ro	ad N				 	7777		
1 LT	240		-	380	3			0.527	14.7	29	500
2 T		395		395	4			0.527	10.1	30	500
3 R			35	35	3			 0.036	7.6	1	75
	240	535	35	810	4			0.527	12.2	30	
ALL VEH	HICLE	===== S		Total	%			 Max	Aver.	Max	
				Flow	HV			X	Delay	Queue	
				2889	3			0.676	12.1	49	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID:  $2\,$ 

Roundabout

Mov	Mov	Total	Total	Deg.	Aver.	LOS	Longest Queue
ID	Тур	Flow	Cap.	of	Delay		95% Back
		(veh	(veh	Satn			(vehs) (m)
		/h)	/h)	(v/c)	(sec)		

West: Wanless Road W

5L 2T 2R				0.667 0.676* 0.324	15.9	В		49
South	: Mississa	uga Road	 d S					
3L		_		0.139	16.5	В	0.8	7
8T	T	125	897	0.139	9.9	A	0.8	7
8R	R (Slp)	95	526	0.181	10.5	В	1.0	8
1L : 6T : 6R :	Г	385 465	1238		6.2	A	2.8 2.8 2.8	22
North	: Mississa	ıga Road	d N					
7L :	L	240	455	0.527	17.3	В	3.8	29
	Г							
4R 1	R (Slp)	35	980	0.036	7.6	A	0.2	1
ALL '	VEHICLES:	2889		0.676	12.1	В	6.4	49

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used.

For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

\* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

E	m -		_	_	_		Downstrea	m Distance
From Approach	To Approach	Turn	Radius (m)	-			(m)	User Spec?
West: Wan	less Road	w						
	South	Right	41.0	34.5	19.3	500	127	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	175	No
South: Mi:	ssissauga	Road S						
	West	Left	.19.0	25.7	74.6	500	176	No
	East	Right	41.0	34.5	19.3	500	128	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Wan	less Road	E						
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mis	ssissauga	Road N						
	West	Right	41.0	34.5	19.3	500	127	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Lane No.	Deg. Satn x	1st	2nd d2	Total dSL	Acc. Dec. dn	dq	ing MvUp dqm	Stopd (Idle) di	dig	
West: 1 LT 2 T 3 R	0.676	6.5 6.0	4.4 4.2	10.9	5.8 5.8	5.2 4.3	2.5	2.6 1.8 0.0	5.5 5.4	16.4 15.5
1 LT 2 T	Mississ 0.139 0.139 0.181	4.1 4.1	0.0	4.1 4.1	4.2 4.6 4.3		0.0 0.0 0.0			11.8 9.9 10.5
1 LT	Wanless 0.376 0.376	0.8	0.0			0.0				12.5
1 LT 2 T	Mississ 0.527 0.527 0.036	3.8 3.6	1.1 1.0	4.9	4.8	0.0	0.7 0.0 0.0	0.0	5.4	14.7 10.1 7.6

**Table D.2 - Lane Stops** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Lane No.	Deg. Satn x			Geom.	Rate Overall	Queued	_
West: 1 LT 2 T 3 R	0.676 0.676	0.88	0.14	0.05	1.07 1.07 0.85	0.884	0.41
1 LT 2 T	0.139	0.66	0.00	0.16 0.14	0.82 0.79 0.85	0.692	
1 LT	Wanles 0.376 0.376	0.26	0.00		0.67 0.52	0.409	0.00
1 LT	Missi 0.527 0.527 0.036	0.72 0.71	0.06 0.05	N 0.17 0.12 0.28	0.95 0.89 0.59	0.722 0.720 0.444	

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued

Tana	Deg.			ge (veh)			Percent	ile (ve	eh)		Queue Stor.
Lane No.	Satn	Queue No	Nb1			70%	85%	90%	95%	98%	Ratio
1 LT 2 T	Wanles: 0.676 0.676 0.324		1.5 1.6 0.7	0.5 0.5 0.0		3.5 3.6 1.3				7.2 7.4 2.5	0.10 0.10 0.23
1 LT 2 T	0.139 0.139		0.2	0.0 0.0 0.0	0.2 0.2 0.3	0.5 0.5 0.6	0.6 0.6 0.7			0.9 0.9 1.2	0.01 0.01 0.11
East: 1 LT 2 TR	0.376	s Road E 0.0 0.0	0.9 0.9	0.0		1.7 1.7					
1 LT 2 T	0.527	0.2 0.2 0.2 0.0	0ad N 1.0 1.1 0.1	0.2 0.2 0.0	1.2 1.2 0.1	2.2 2.2 0.1	2.7 2.7 0.1	3.0 3.1 0.1	3.8 3.8 0.2	4.4 4.4 0.2	0.06 0.06 0.02

Values printed in this table are back of queue (vehicles).

**Table D.3B - Lane Queues (metres)** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 AM TTMP Red N/S Intersection ID: 2 Roundabout

Ton	Deg.	Ovrfl.		ge (metr			Percen	tile (me	etres)		Queue - Stor.
Lane No.	e Satn x	No		Nb2		70%	85%	90%	95%	98%	Ratio
West 1 L: 2 T 3 R	0.676 0.676	s Road W 3.8 3.8 0.0	11.9 12.3 5.4	3.7 3.9 0.0	15.6 16.2 5.4	27.3 28.2 10.0	33.5 34.6 12.1		47.6 49.2 17.0		0.10 0.10 0.23
1 L7 2 T		0.0	2.1	0.0 0.0 0.0	2.1 2.2 2.6	4.0 4.1 4.8		5.4 5.6 6.6		7.7 7.9 9.4	0.01 0.01 0.11
East 1 LT 2 TF		0.0	7.0 7.0	0.0	7.0 7.0	12.8 12.8	15.6 15.6	17.7 17.7	21.9 21.9	25.4 25.4	
Nort 1 L1 2 T 3 R		ssauga Ro 1.3 1.2 0.0	8.2	1.3 1.3 0.0	9.5 9.6 0.4	17.1 17.3 0.9	20.9 21.2 1.0	23.7 24.0 1.2	29.4 29.8 1.4	34.1 34.6 1.7	0.06 0.06 0.02

Values printed in this table are back of queue (metres).

				Speeds		 Av. Sect		Geom
Mov ID	Cruise				1st Grn			Delay (sec)
West: Wa	nless Ro	ad W				 		
5L L	65.0	25.7	25.7	65.0	15.9	43.0	40.1	12.3
2T T	65.0	39.1	39.1	65.0	16.7	46.7	44.7	5.4
2R R	65.0	34.5	34.5	65.0		49.8	49.8	6.2
South: M	 ississau	ga Roac	 l S			 		
	65.0	_		65.0			45.1	12.4
8T T	65.0	39.1	39.1	65.0		50.6	50.6	5.8
8R R	65.0	34.5	34.5	65.0		50.0	50.0	6.2
 East: Wa	nless Ro	ad E				 		
1L L	65.0	25.7	25.7	65.0		47.0	47.0	12.4
6T T	65.0	39.1	39.1	65.0		52.8	52.8	5.4
6R R	65.0	32.5	32.5	65.0		51.7	51.7	6.6
North: M	ississau	ga Roac	 l N			 		
				65.0	17.4	44.8	44.5	12.4
4T T	65.0	39.1	39.1	65.0	17.6	50.4	50.4	5.4
4R R	65.0	34.5	34.5	65.0		51.8	51.8	6.2

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Wanless 2031 AM TTMP Red N/S C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap Processed Jan 12, 2010 12:03:04PM

A1492, AECOM, Small Office

Produced by SIDRA Intersection 3.2.2.1563

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# **Output Tables**

# Mississauga Road EA

# Mississauga Road and Wanless Road 2031 PM TTMP Red N/S

#### **Run Information**

\* Basic Parameters:
Intersection Type: Roundabout
Driving on the right-hand side of the road
Input data specified in Metric units
Model Defaults: US HCM (Metric)
Peak Flow Period (for performance): 15 minutes
Unit time (for volumes): 60 minutes.
Delay definition: Control delay
Geometric delay included
HCM Delay Model option selected
HCM Queue Model option selected
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

#### Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

From Approach	To Approach	Mov ID	Turn		Rate HV		
West: Wan	less Road	 W					
	South	2R	Right	397	8	1.00	1.00
	East	2T	Thru	1201	24	1.00	1.00
	North	5L	Left	15	0	1.00	1.00
South: Mi	ssissauga	 Road S					
	West	3L	Left	49	1	1.00	1.00
	East	8R	Right	272	8	1.00	1.00
	North	8T	Thru	324	. 66	1.00	1.00
East: Wan	less Road	 Е					
	West	6T	Thru	412	8	1.00	1.00
	South	1L	Left	348	7	1.00	1.00
	North	6R	Right	15	0	1.00	1.00
North: Mi	ssissauga :	 Road N					
	West	4R	Right	20	0	1.00	1.00
	South	4T	Thru	182	8	1.00	1.00
	East	7L	Left	39	1	1.00	1.00

Unit Time for Volumes = 60 minutes Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mov ID	Le	ft	Thro	ugh	Rig	ht
ID	LV HV		LV	HV	LV	HV
Demand flo			ır as us	ed by	the pro	gram
West: Wani	less Roa	d W				
5L L	15	1	.0	0	0	0
2T T	0	0	1201	24	0	0
2R R	0	0	0	0	397	8
South: Mis	sissauq	a Road	 l S			
3L L	49	1	0	0	0	0
8T T	0	0	324	66	0	0
8R R	0	0	0	0	272	8
East: Wanl	Less Roa	 d E				
1L L	348	7	0	0	0	0
6T T	0	0	412	8	0	0
6R R	0	0	0	0	15	1
North: Mis	sissaug	a Road	. N			
7L L	39	1	0	0	0	0
4T T	0	0	182	8	0	0
4R R	0	0	0	0	20	1

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes

Flow Rates include effects of Flow Scale and Peak Flow Factor

**Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

Mov	Lef	t	Thro	ugh	Righ	nt
ID	Total	%HV	Total	%HV	Total	%HV
Demand flow	s in ve	h/hour	as use	d by th	e progra	ım
West: Wanle	ss Road	W				
5L L				0.0	0	0.0
2T T	0	0.0	1225	2.0	. 0	0.0
2R R		0.0			405	2.0
 South: Miss	issauga	Road	s			
3L L				0.0	. 0	0.0
			390		0	0.0
8R R	0	0.0	0	0.0	280	2.9
 East: Wanle	ss Road	 Е				
1L L	355	2.0	0	0.0	0	0.0
6T T	0	0.0	420	1.9	0	0.0
		0.0	420 0	1.9 0.0	0 16	0.0 6.2
6T T 6R R	0	0.0	0		=	
6T T 6R R 	0	0.0  Road	N 0	0.0	=	
6T T 6R R 	0  issauga 40	0.0 Road 2.5	N 0	0.0	16	6.2

#### **Table R.O - Roundabout Basic Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout
                                          Circulating/Exiting Stream
 Cent Circ Insc No.of No.of Av.Ent -----
Island Width Diam. Circ. Entry Lane Flow %HV Adjust. %Exit Cap. O-D
 Diam Lanes Lanes Width (veh/ Flow Incl. Constr. Factor (m) (m) (m) (m) h) (pcu/h) Effect
 _____
West: Wanless Road W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium 30 10 50 2 3 4.00 585 2.7 585 0 N 0.938 Shared Slip lane (exiting flow): 545 2.7 545 0 N 0.939
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
  30 10 50 2 2 4.00 1280 2.0 1280 0 N Exclusive Slip lane (exiting flow): 1265 2.0 1265 0 N
East: Wanless Road E
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
  30 10 50 2 2 4.00 455 14.9 502 0 N 0.905
North: Mississauga Road N
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
 30 10 50 2 2 4.00 825 2.0 825 0 N
Exclusive Slip lane (exiting flow): 470 2.0 470 0 N
```

#### **Table R.1 - Roundabout Gap Acceptance Parameters**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout
Turn Lane Lane --- Circulating/Exiting Stream --- Critical Gap
     No. Type
                   Flow Aver Aver In-Bnch Prop
                                                            ----- Foll-up
                     Rate Speed Dist Headway Bunched Hdwy Dist Headway
                   (pcu/h) (km/h) (m) (s)
                                                             (s)
West: Wanless Road W
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 585 30.1 51.4 1.61 0.439 3.68 30.7
Thru 1 Subdominant 585 30.1 51.4 1.61 0.439 2 Dominant 585 30.1 51.4 1.61 0.439
                                                                           2.43
                                                            3.63
3.25
                                                                     30.3
                                                                     27.2
Right 3 Shared Slip 545E 30.4 55.8 1.71 0.435 3.86 32.6 2.57
South: Mississauga Road S
  Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 1280 38.5 30.1 1.09 0.580 3.41 36.5 2.51
Thru 1 Subdominant 1280 38.5 30.1 1.09 0.580 3.82 40.8 2.81
2 Dominant 1280 38.5 30.1 1.09 0.580 3.59 38.5 2.65
Right 3 Excl. Slip 1265E 38.7 30.6 1.10 0.579 3.59 38.6 2.65
East: Wanless Road E
 Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium
Left 1 Subdominant 502 37.2 74.1 1.06 0.277 4.02 41.6
                                                                             2.66D
```

Thru	1 Subdominant 2 Dominant	502 502	37.2 37.2	74.1 74.1	1.06 1.06	0.277 0.277	4.02 4.02	41.6 41.6	2.66D 2.66
Right	2 Dominant	502	37.2	74.1	1.06	0.277	4.08	42.1	2.69
	: Mississauga R ironment Factor		Entry	/Circu	lating	Flow Adi	ustment:	Medium	
Left	1 Subdominant	825	32.5	39.4	1.08	0.419	3.72	33.6	2.59
Thru	1 Subdominant	825	32.5	39.4	1.08	0.419	3.72	33.6	2.59
	2 Dominant	825	32.5	39.4	1.08	0.419	3.64	32.9	2.54
Right	3 Excl. Slip	470E	37.7	80.2	1.63	0.374	3.64	38.1	2.54

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

- E Exiting flow for slip lane traffic
- D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

## **Table S.2 - Movement Capacity Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

Mov ID	Demand		Oppos	sing M	Movement Adjust.				Lane Util	Deg. Satn
	Flow (veh/h)				Flow (pcu/h)			Cap.	(%)	×
West: W	anless Ro	 ad W								
5L L	16	6.2	585	2.7	585	25	0.85	33	100	0.640*
2T T	1225	2.0	585	2.7	585	1950	0.85	35	74	0.628
2R R	405	2.0	545	2.7	545	874	0.85	83	74	0.463
South:	Mississau	ga Roa	ad S							
	50			2.0	1280	97	0.85	65	100	0.515
	390			2.0	1280	759	0.85	65	100	0.514
8R R	280			2.0	1265	446	0.85	35	100	0.628
 East: W	anless Ro	 ad E								
		2.0	455	14.9	502	764	0.85	83	100	0.465
	420	1.9	455	14.9	502	904	0.85	83	100	0.465
6R R	16	6.2	455	14.9	502	34	0.85	81	100	0.471
North:	 Mississau	ga Roa	id N							
7L L		2.5	825	2.0	825	248	0.85	427	100	0.161
4T T	190	4.2		2.0	825		0.85	426	100	0.162
41 1										

В

С

#### **Table S.3 - Intersection Parameters**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

```
Average intersection delay (s/pers)
                                              11.2
Largest average movement delay (s)
                                             20.5
Largest back of queue, 95% (m)
                                               51
Performance Index
                                       ==
                                             72.08
Degree of saturation (highest)
                                             0.640
Practical Spare Capacity (lowest)
                                             33 %
Effective intersection capacity, (veh/h) =
                                              5325
Total vehicle flow (veh/h)
                                              3408
Total person flow (pers/h)
                                             4090
                                            10.59
Total vehicle delay (veh-h/h)
Total person delay (pers-h/h)
                                             12.70
                                            2922
Total effective vehicle stops (veh/h)
Total effective person stops (pers/h)
                                              3507
Total vehicle travel (veh-km/h)
                                           2161.9
Total cost ($/h)
                                           934.95
Total fuel (L/h)
                                       =
                                            278.5
Total CO2 (kg/h)
                                            697.40
```

#### **Table S.5 - Movement Performance**

Mov			Total		_					
ID		Delay (veh-h/h)				Rate		(m)		Speed (km/h)
West:	War	nless Road	w							
5L			0.09							
		3.35								
2R	R	1.10	1.32	9.8	0.68	0.81	3.6	28	7.97	50.0
South	 : Mi	ssissauga	Road S							
3L	L	0.28	0.34	20.5	0.82	1.01	3.4	2.9	1.34	42.1
8T	$^{1}$ T	1.47	1.77	13.6	0.82	0.96	3.5	30	9.31	47.2
8R	R	1.20	1.44	15.5	0.86	1.02	4.7	37	7.02	45.0
East:	War	less Road	E							
1L	L.	1.48	1.78	15.0	0.66	0.88	3.4	26	7.89	45.9
6T	$\mathbf{T}$	0.94	1.12	8.0	0.66	0.68	3.4	26	7.76	50.9
6R	R	0.04	0.05	9.2	0.66	0.76	3.4	26	0.31	. 50.1
North:	. Mi	ssissauga.	Road N							
7L	L	0.17	0.20	15.2	0.62	0.87	0.9	7	0.88	46.1
4 T	T	0.43	0.52	8.1	0.62	0.67	0.9			
ΔÞ	R	0.04	0.05	7.6	0.46	0.57	0.1	1	0.35	51.7

#### **Table S.6 - Intersection Performance**

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout
______
Total Deg. Total Total Aver. Prop. Eff. Longest Perf. Aver. Flow Satn Delay Delay Delay Queued Stop Queue Index Speed
(veh/h) x (veh-h/h) (pers-h/h) (sec) Rate (m)
West: Wanless Road W
1646 0.640 4.52
                5.43 9.9 0.74 0.86 51 33.78 50.0
South: Mississauga Road S
720 0.628 2.96 3.55 14.8 0.83 0.99 37 17.67 45.9
East: Wanless Road E
791 0.471 2.46 2.95 11.2 0.66 0.77 26 15.96 48.4
North: Mississauga Road N
```

251	0.162	0.64	0.77	9.2	0.60	0.70	7	4.66	50.3
ALL VEH		10.59	12.70	11.2	0.73	0.86	51	72.08	48.7
	ECTION (1 0.640	persons):	12.70	11.2	0.73	0.86		72.08	48.7
Queue v	alues in	n this tal	ble are 9	5% back	of que	ue (met	res).		

#### **Table S.7 - Lane Performance**

North: Mississauga Road N

Mississauga Road EA

Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout Dem Queue
Flow Cap Deg. Aver. Eff. 95% Back
(veh (veh Satn Delay Stop ------Lane Lane Length /h) /h) x (sec) Rate (vehs) (m) (m) West: Wanless Road W 500.0 1 LT 576 917 0.628 10.4 0.91 6.4 49.3 665 1058 0.628 9.5 0.86 6.6 51.0 405 874 0.463 9.8 0.81 3.6 27.9 500.0 75.0 2 T 3 R \_\_\_\_\_\_\_ South: Mississauga Road S 1 LT 214 416 0.514 15.4 0.97 3.4 29.1 500.0 226 441 0.514 13.4 0.96 3.5 30.4 500.0 280 446 0.627 15.5 1.02 4.7 36.8 75.0 2 T 3 R East: Wanless Road E 1 LT 396 851 0.465 14.3 0.86 3.4 26.4 2 TR 395 851 0.465 8.1 0.69 3.4 26.4 500.0

### **Table S.8 - Lane Flow and Capacity Information**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

1 LT 113 701 0.162 10.7 0.75 0.9 6.9 2 T 117 723 0.162 8.1 0.67 0.9 7.0 3 R 21 957 0.022 7.6 0.57 0.1 0.9

500.0 500.0 75.0

	1.5	e e						
Lane No.					Cap (veh	(veh	Deg. Satn x	Util
West:	Wanles	s Roa	d W					
1 LT	16	560	0	576	150	917	0.628	100
2 T	0	665	0	665	150	1058	0.628	100
3 R	0	0	405	405	150	874	0.463	74P
South:	Missi	ssaug	a Roa	.d S				
1 LT	50	164	0	214	150	416	0.514	100
2 T	0	226	0	226	150	441	0.514	100
3 R	0	0	280	280	150	446	0.627	100
East: N	anles	 s Roa						
1 LT		41		396	150	851	0.465	100

2	TR	0	379	16	395	150	851	0.465	100
			ssauga						
1	LT	40	73	0	113	113	701	0.162	100
2	T	0	117	0	117	117	723	0.162	100
3	R	0	0	21	21	21	957	0.022	100

P Lane under-utilisation found by the "Program". This includes cases where the value of lane under-utilisation due to downstream effects has been modified by the program during lane flow calculations (e.g. a de facto exclusive lane has been found).

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

**Table S.10 - Movement Capacity and Performance Summary** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

Mov	Mov Typ	Dem Flow (veh /h)	Cap.	Util	Satn	Aver. Delay (sec)	Stop Rate	95% Back of Queue (veh)	
5L L 2T T		16 1225	W 25 1950 874		0.640* 0.628 0.463	9.8	0.88	6.4 6.6 3.6	
South: 3L L 8T T 8R R		50 390	Road S 97 759 446	100 100 100	0.515 0.514 0.628	13.6	0.96	3.4 3.5 4.7	1.34 9.31 7.02
East: N 1L L 6T T 6R R		355	E 764 904 34	100 100 100	0.465 0.465 0.471	8.0		3.4 3.4 3.4	7.89 7.76 0.31
		40 190	Road N 248 1176 957	100 100 100	0.161 0.162 0.022			0.9 0.9 0.1	0.88 3.44 0.35

<sup>\*</sup> Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

Mov ID	Fuel Total L/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Wanless	Road W					
5L L	1.4	4.79	0.006	0.29	0.008	3.4
2T T	93.1	316.94	0.382	19.09	0.594	232.9
2R R	30.9	104.67	0.128	6.46	0.198	77.2

	125.3	426.40	0.517	25.84	0.801	313.5
 South: Mississa						
			0 019	0.90	0.027	10 8
8T T	43 9	132 48	0.015	9.45	0.295	110.5
8R R					0.147	
OIC IC						
	71.2	227.25	0.272	15.20	0.469	178.8
East: Wanless F						
1L L	29.6	103.66	0.125	6.20	0.185 0.199	74.0
6T T	31.3	106.79	0.128	6.32	0.199	78.3
6R R	1.2	4.13	0.005	0.25	0.008	3.1
	62.1	214.59	0.258	12.77	0.391	155.4
North: Mississa	uga Roa	 d N				
7L L	3.4	11.83	0.014	0.72	0.021	8.5
4T T	14.9	49.65	0.059	3.00	0.095	37.3
4R R	1.5	5.24	0.006	0.31	0.021 0.095 0.010	3.9
	19.8		0.080		0.126	49.7
INTERSECTION:	278.5	934.95	1.127	57.84	1.787	697.4
INTERSECTION:	278.5	934.95	1.127			
Pump price o	e enal	(¢ / T )		=	0.900	
Fuel resource				=	0.900	
				===		
Ratio of run			L COST		3.0	
Average inco				==	19.00	
Time value f		(1000 1- )		=	0.40	
Light vehicl					1.4	
Heavy vehicl			(= 42 ·	=	1.4 11.0 1.350	
Light vehicl				=		
Heavy vehicl	e idle i	ueı rate	(L/N)	=	2.000	

# Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

Mov	Fuel		HC	CO	NOX	CO2
ID	Rate L/100km		Rate g/km	Rate g/km		
West: Wanle	ess Road W					
5L L	12.6	0.44	0.537	26.61	0.786	315.3
2T T		0.41	0.496	24.76	0.771	302.0
2R R	12.2	0.41	0.508	25.57	0.783	305.8
	12.1	0.41	0.499	24.98	0.774	303.1
South: Miss	sissauga Road	S				
3L L	12.8	0.46	0.549	26.77	0.791	319.9
8T T	17.9	0.54	0.644	38.52	1.203	450.0
8R R	13.1	0.45	0.547	27.71	0.842	329.1
	15.7	0.50	0.600	33.48	1.034	393.8
East: Wanle	ess Road E					
1L L	12.3	0.43	0.523	25.88	0.771	308.9
6T T	11.8	0.40	0.483	23.89	0.752	296.4
6R R	12.2	0.41	0.508	25.54	0.782	306.0
	12.1	0.42	0.503	24.85	0.761	302.4
North: Miss	sissauga Road	N				
7L L	12.7	0.44	0.529	26.57	0.794	316.7

4T T 4R R	12.5 11.8			25.12 23.78		311.8
	12.4	0.42	0.499	25.26	0.790	311.2
INTERSECTION:	12.9	0.43	0.521	26.76	0.827	322.6

## Table S.14 - Summary of Input and Output Data

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

Lane No.	Dem	and F	r) wol	zeh/h)		Eff Grn			Longest Oueue	
	L	Т	R	Tot		1st 2nd		(sec)	(m)	(m)
West:	Wanl	ess Ro	ad W			 				
1 LT		560		576	2		0.628			500
2 T 3 R		665	405	665 405	2 2		0.628 0.463	9.5 9.8		500 75
2 K				403		 		J. 0		
	16	1225	405	1646	2		0.628	9.9	51	
South	: Mis		ıga Ro	ad S		 				
1 LT	50	164			13		0.514			500
2 T		226		226	17		0.514			
3 R			280	280	3	 	0.627	15.5	37 	75
	. 50	390	280	720	10		0.627	14.8	37	
East:	Wanle	ess Ro	ad E			 				
1 LT	355	41		396	2		0.465	14.3	26	500
2 TR		379	16	395	2	 	0.465	8.1	26	500
	355	420	16	791	2		0.465	11.2	26	
North	: Miss	sissau	iga Ro	ad N		 				
1 LT	40			113	4		0.162			500
2 T		11,7		117	4			8.1		500
3 R			21	21	5 		0.022	7.6	. 1	75
	40	190	21	251	4	 	0.162	9.2	7	
ALL V	EHICLE	ES		Total	 %		Max	Aver.	Max	
				Flow	HV				Queue	
				3408	4		0.640	11.2	, 51	*

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

## Table S.15 - Capacity and Level of Service

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

Mov	Mov	Total	Total	Deg.	Aver.	LOS	Longest Queue
ID	qvT	Flow	Cap.	of	Delay		95% Back

West: Wanless Road W  5L L 16 25 0.640* 17.2 B 6.4 2T T 1225 1950 0.628 9.8 A 6.6 2R R (Slp) 405 874 0.463 9.8 A 3.6  South: Mississauga Road S  3L L 50 97 0.515 20.5 C 3.4 8T T 390 759 0.514 13.6 B 3.5 8R R (Slp) 280 446 0.628 15.5 B 4.7  East: Wanless Road E  1L 355 764 0.465 15.0 B 3.4 6T T 420 904 0.465 8.0 A 3.4 6R R 16 34 0.471 9.2 A 3.4  North: Mississauga Road N  7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1  ALL VEHICLES: 3408 0.640 11.2 B 6.6					Satn (v/c)			(vehs)	(m)
2T T 1225 1950 0.628 9.8 A 6.6 2R R (Slp) 405 874 0.463 9.8 A 3.6  South: Mississauga Road S  3L 50 97 0.515 20.5 C 3.4 8T T 390 759 0.514 13.6 B 3.5 8R R (Slp) 280 446 0.628 15.5 B 4.7  East: Wanless Road E  1L L 355 764 0.465 15.0 B 3.4 6T T 420 904 0.465 8.0 A 3.4 6R R 16 34 0.471 9.2 A 3.4  North: Mississauga Road N  7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1	West	: Wanles	s Road W						
2T T 1225 1950 0.628 9.8 A 6.6 2R R (Slp) 405 874 0.463 9.8 A 3.6  South: Mississauga Road S  3L 50 97 0.515 20.5 C 3.4 8T T 390 759 0.514 13.6 B 3.5 8R R (Slp) 280 446 0.628 15.5 B 4.7  East: Wanless Road E  1L L 355 764 0.465 15.0 B 3.4 6T T 420 904 0.465 8.0 A 3.4 6R R 16 34 0.471 9.2 A 3.4  North: Mississauga Road N  7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1	5L	L	16	25	0.640*	17.2	В	6.4	49
South: Mississauga Road S  3L L 50 97 0.515 20.5 C 3.4  8T T 390 759 0.514 13.6 B 3.5  8R R (Slp) 280 446 0.628 15.5 B 4.7  East: Wanless Road E  1L L 355 764 0.465 15.0 B 3.4  6T T 420 904 0.465 8.0 A 3.4  6R R 16 34 0.471 9.2 A 3.4  North: Mississauga Road N  7L L 40 248 0.161 15.2 B 0.9  4T T 190 1176 0.162 8.1 A 0.9  4R R (Slp) 21 957 0.022 7.6 A 0.1	2T								
3L L 50 97 0.515 20.5 C 3.4 8T T 390 759 0.514 13.6 B 3.5 8R R (Slp) 280 446 0.628 15.5 B 4.7  East: Wanless Road E 1L L 355 764 0.465 15.0 B 3.4 6T T 420 904 0.465 8.0 A 3.4 6R R 16 34 0.471 9.2 A 3.4  North: Mississauga Road N 7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1	2R	R (Slp	) 405	874	0.463	9.8	А	3.6	28
8T T 390 759 0.514 13.6 B 3.5 8R R (Slp) 280 446 0.628 15.5 B 4.7  East: Wanless Road E 1L L 355 764 0.465 15.0 B 3.4 6T T 420 904 0.465 8.0 A 3.4 6R R 16 34 0.471 9.2 A 3.4  North: Mississauga Road N 7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1	Sout	h: Missi	ssauga Roa	ad S					
8R R (Slp) 280 446 0.628 15.5 B 4.7	3L	L	50	97	0.515	20.5	C	3.4	29
East: Wanless Road E  1L L	8T	T	390	759	0.514	13.6	В	3.5	30
1L L     355     764     0.465     15.0     B     3.4       6T T     420     904     0.465     8.0     A     3.4       6R R     16     34     0.471     9.2     A     3.4       North: Mississauga Road N       7L L     40     248     0.161     15.2     B     0.9       4T T     190     1176     0.162     8.1     A     0.9       4R R (Slp)     21     957     0.022     7.6     A     0.1	8R	R (Slp	) 280	446	0.628	15.5	В	4.7	37
6T T 420 904 0.465 8.0 A 3.4 6R R 16 34 0.471 9.2 A 3.4  North: Mississauga Road N 7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1	East	: Wanles	s Road E						
6R R 16 34 0.471 9.2 A 3.4  North: Mississauga Road N 7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1	1L	L	355	764	0.465	15.0	В	3.4	26
6R R 16 34 0.471 9.2 A 3.4  North: Mississauga Road N 7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1	6Т	Т	420	904	0.465	8.0	А	3.4	26
7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1	6R	R	16	34	0.471	9.2	A	3.4	26
7L L 40 248 0.161 15.2 B 0.9 4T T 190 1176 0.162 8.1 A 0.9 4R R (Slp) 21 957 0.022 7.6 A 0.1	North	h: Missi	ssauga Roa	 ad N					
4T T       190       1176       0.162       8.1       A       0.9         4R R (Slp)       21       957       0.022       7.6       A       0.1					0.161	15.2	В	0.9	7
4R R (Slp) 21 957 0.022 7.6 A 0.1	4T								
ALL VEHICLES: 3408 0.640 11.2 B 6.6									
	ALL	VEHICLE	S: 3408		0.640	11.2	В	6.6	51

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

**Table D.O - Geometric Delay Data** 

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red  $\ensuremath{\text{N/S}}$ Intersection ID: 2 Roundabout

<u>.</u>	<b></b>						Downstream	
From Approach	To Approach	Turn		-			(m)	
 West: Wan	less Road	 W						
	South	Right	36.0	32.8	19.4	500	126	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mi	ssissauga	Road S						
	_	Left	19.0	25.7	74.6	500	176	No
	East	Right	41.0	34.5	19.3	500	128	No
÷	North	Thru	57.3	39.1	47.1	500	146	No
East: Wan	less Road	E						
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mi:	ssissauga	Road N						
			41.0	34.5	19.3	500	127	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

<sup>\*</sup> Maximum v/c ratio, or critical green periods
" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.1 - Lane Delays

Lane	Deg. Satn x	1st	2nd	Total	Acc. Dec.		ing MvUp	Stopd	Geom	Control dic
1 LT 2 T	Wanless 0.628 0.628 0.463	3.3 2.9 3.0	1.5 1.2	4.1	5.0	0.0	0.0	0.0 0.0 0.0	5.4	9.5
South: 1 LT 2 T 3 R	0.514	6.0 5.7	2.0 1.9	8.1 7.6	5.4	2.2	1.2		5.8	13.4
1 LT	Wanless 0.465 0.465	2.3	0.3							
1 LT 2 T	Mississ 0.162 0.162 0.022	2.8 2.7	0.0	2.8	4.1				5.4	10.7 8.1 7.6

dn is average stop-start delay for all vehicles queued and unqueued

## **Table D.2 - Lane Stops**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2 Roundabout

Lane No.	Deg. Satn x			_	Rate Overal·l h	_	_
West: 1 LT 2 T 3 R	0.628 0.628	0.68	0.07 0.06		0.86	0.768 0.757 0.675	0.16
1 LT 2 T	: Missi 0.514 0.514 0.627	0.82 0.82	0.06	0.09	0.96	0.820 0.822 0.855	0.20
East: 1 LT 2 TR		s Road 0.61 0.52	0.02		0.86 0.69	0.657 0.657	
North 1 LT 2 T 3 R	: Missi 0.162 0.162 0.022	0.54 0.50	Road 0.00 0.00 0.00	0.21 0.17	0.75 0.67 0.57	0.617 0.615 0.460	0.00 0.00 0.00

hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Lane	Deg.			ge (veh)				tile (v	,		Queue
	Satn x	_		Nb2					95%		Stor. Ratio
West:	Wanles	s Road W									
1 LT	0.628		1.7	0.4	2.1	3.6	4.5	5.1	6.4	7.4	0.10
2 T				0.4				5.3		7.7	
3 R	0.463	0.1	1.1	0.1	1.2	2.1	2.6	2.9	3.6	4.2	0.37
South	: Missi	ssauga Ro	oad S								
1 LT	0.514	0.1	1.0	0.1	1.1	2.0	2.4	2.8	3.4	4.0	0.06
2 T	0.514	0.1	1.0	0.1	1.1	2.0	2.5	2.8	3.5	4.1	0.06
3 R	0.627	0.3	1.3	0.3	1.5	2.7	3.3	3.8	4.7	5.5	0.49
East:	Wanles	s Road E									
1 LT	0.465	0.1	1.0	0.1	1.1	2.0	2.4	2.8	3.4	4.0	0.05
2 TR	0.465	0.1	1.0	0.1	1.1	2.0	2.4	2.8	3.4	4.0	0.05
North:	: Missi	ssauga Ro	oad N								
1 LT	0.162	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.9	1.0	0.01
2 T	0.162	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.9	1.0	0.01
3 R	0.022	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.01

Values printed in this table are back of queue (vehicles).

# **Table D.3B - Lane Queues (metres)**

Mississauga Road EA Mississauga Road and Wanless Road 2031 PM TTMP Red N/S Intersection ID: 2  $\,$ 

T	Deg.		Avera	ge (met	res)		Percen	tile (m	etres)		Queue
Lane No.	Satn x	Queue - No	Nb1	Nb2	Nb	70%	85%	90%	95%	98%	Stor. Ratio
West:	Wanles	s Road W	. — — — — — . I								
1 LT	0.628	2.4	13.0	3.2	16.2	28.2	34.7	39.6	49.3	57.4	0.10
2 T	0.628	2.2	13.6	3.2	16.8	29.1	35.9	40.9	51.0	59.4	0.10
3. R	0.463	0.4	8.5	0.5	9.0	16.2	19.8	22.5	27.9	32.4	0.37
South	: Missi	ssauga R	oad S								
1 LT	0.514	1.3	8.3	1.0	9.4	16.9	20.7	23.5	29.1	33.8	0.06
2 Т	0.514	1.3	8.7	1.0	9.8	17.7	21.6	24.5	30.4	35.3	0.06
3 R	0.627	2.2	10.0	2.0	12.0	21.3	26.1	29.7	36.8	42.8	0.49
East:	Wanles:	s Road E									
1 LT	0.465	0.4	8.0	0.5	8.5	15.3	18.7	21.3	26.4	30.6	0.05
2 TR	0.465	0.4	8.0	0.5	8.5	15.4	18.7	21.3	26.4	30.6	0.05
North	: : Missis	ssauga R	oad N								
1 LT	0.162	0.0	2.2	0.0	2.2	4.1	4.9	5.6	6.9	8.0	0.01
2 T	0.162	0.0	2.2	0.0	2.2	4.1	5.0	5.7	7.0	8.1	0.01
3 R	0.022	0.0	0.3	0.0	0.3	0.6	0.7	0.8	0.9	1.1	0.01

Values printed in this table are back of queue  $(\mbox{metres})\:.$ 

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mov ID	App. Speeds				Queue Move-up		Av. Section Spd Geom		
							TILL WOOD CHOIL DECK		Delay
					Grn Grn				Deray
West: Wa:	nless Ro	ad W							
5L L	65.0	25.7	25.7	65.0	21.0		44.5	44.5	12.4
2T T	65.0	39.1	39.1	65.0	21.7		50.1	50.1	5.4
2R R	65.0	32.8	32.8	65.0	21.2		50.0	50.0	6.5
South: M	ississau	ga Roac	l S						
3L L	65.0	25.7	25.7	65.0	16.5		44.2	42.1	12.4
8T T	65.0	39.1	39.1	65.0	16.1		48.4	47.2	5.8
8R R	65.0	34.5	34.5	650	15.6		47.2	45.0	6.2
East: War	nless Ro	 ad E							
1L L	65.0	25.7	25.7	65.0	20.7		45.9	45.9	12.4
6T T	65.0	39.1	39.1	65.0	20.7		50.9	50.9	5.4
6R R	65.0	32.5	32.5	65.0	20.6		50.1	50.1	6.6
North: M	ississau	ga Road	. – – – – – – – – – – – – – – – – – – –						
	65.0	_		65.0			46.1	46.1	12.4
4T T	65.0	39.1	39.1	65.0				51.2	
4R R	65.0	34.5	34.5	65.0			51.7	51.7	6.2

<sup>&</sup>quot;Running Speed" is the average speed excluding stopped periods.



Site: Wanless 2031 PM TTMP Red N/S C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap Processed Jan 12, 2010 12:05:54PM

A1492, AECOM, Small Office

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