



**600 March Road**

Transportation Impact Assessment  
Report

July 18, 2022

Prepared for:

Nokia Canada Inc.

Prepared by:

Stantec Consulting Ltd.

## Sign-off Sheet

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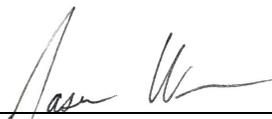
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## 1.0 SCREENING

### 1.1 SUMMARY OF DEVELOPMENT

Municipal Address	600 March Road
Description of Location	Southeast quadrant of the March Road at Terry Fox Drive intersection
Land Use Classification	Mixed-Use Development (Residential High-Rise, Retail, Office)
Development Size (units)	Residential units = 1,900
Development Size (m <sup>2</sup> )	Office/Lab: 46,000 m <sup>2</sup> Retail: 11,350 m <sup>2</sup>
Number of Accesses and Locations	Four (4) accesses from March Road, One (1) access from Terry Fox Drive, Three (3) accesses from Legget Drive.
Phase of Development	Nokia Campus: 2026 Residential: 1 tower (250 units/year) after 2026
Buildout Year	2032 (10 year build out)

If available, please attach a sketch of the development or site plan to this form.

### 1.2 TRIP GENERATION TRIGGER

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size	Triggered
Single-family homes	40 units	✘
Townhomes or apartments	90 units	✓
Office	3,500 m <sup>2</sup>	✓
Industrial	5,000 m <sup>2</sup>	✘
Fast-food restaurant or coffee shop	100 m <sup>2</sup>	✘
Destination retail	1,000 m <sup>2</sup>	✓
Gas station or convenience market	75 m <sup>2</sup>	✘

*\* If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

**If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.**



### 1.3 LOCATION TRIGGERS

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

\*DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

### 1.4 SAFETY TRIGGERS

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

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

### 1.5 SUMMARY

	Yes	No
Does the development satisfy the Trip Generation Trigger?	✓	
Does the development satisfy the Location Trigger?	✓	
Does the development satisfy the Safety Trigger?	✓	

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).



## 2.0 SCOPING

### 2.1 EXISTING AND PLANNED CONDITIONS

#### 2.1.1 Proposed Development

Nokia Canada Inc. is proceeding with a Zoning By-Law Amendment application for a proposed mixed-use development. The proposed development is located at 600 March Road (southeast quadrant of the March Road at Terry Fox Drive intersection) in the Brookside-Briarbrook-Morgan's Grant community in Kanata, Ontario. The current development concept consists of eleven residential buildings, six of which have a commercial component, as well as two office buildings, which both have a commercial component. It should be noted that this concept plan is subject to change as the development proceeds through the approvals process. The site is bound by an existing office building to the south, March Road to the west, Legget Drive to the east, and Terry Fox Drive to the north.

**Figure 1** illustrates the site location. The subject site currently carries two different zoning designations. The northern portion of the proposed site is zoned IP6 H (44) and as outlined in the City of Ottawa's Zoning By-Law, the purpose of the IP- Business Park Industrial Zone is to:

- accommodate mixed office, office-type uses and low impact, light industrial uses in a business park setting, in accordance with the Enterprise Area designations of the Official Plan or, the Employment Area or the General Urban Area designation where applicable;
- allow in certain Enterprise or General Urban Areas, a variety of complementary uses such as recreational, health and fitness uses and service commercial (e.g., convenience store, personal service business, restaurant, automobile service station and gas bar), occupying small sites as individual occupancies or in groupings as part of a small plaza, to serve the employees of the Enterprise, Employment or General Urban Area, the general public in the immediate vicinity, and passing traffic;
- prohibit retail uses in areas designated as Enterprise Area but allow limited sample and showroom space that is secondary and subordinate to the primary use of buildings for the manufacturing or warehousing of the product;
- prohibit uses which are likely to generate noise, fumes, odors, or other similar obnoxious impacts, or are hazardous; and
- provide development standards that would ensure compatibility between uses and would minimize the negative impact of the uses on adjacent non-industrial areas.

The southern portion of the proposed site is zoned IG6 and as outlined in the City of Ottawa's Zoning By-Law, the purpose of the IG- General Industrial Zone is to:

- permit a wide range of low to moderate impact, light industrial uses in accordance with the Employment Area designation of the Official Plan or, the General Urban Area designation where applicable;
- allow in certain Employment Areas or General Urban Areas, a variety of complementary uses such as recreational, health and fitness uses and service commercial (e.g. convenience store, personal service



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business, restaurant, automobile service station and gas bar), occupying small sites as individual occupancies or in groupings as part of a small plaza, to serve the employees of the Employment or General Urban Area, the general public in the immediate vicinity, and passing traffic;

- prohibit retail uses in areas designated as Employment Area but allow limited sample and showroom space that is secondary and subordinate to the primary use of buildings for the manufacturing or warehousing of the product; and
- provide development standards that would ensure that the industrial uses would not impact on the adjacent non-industrial areas

A full build-out and occupancy of the proposed development is anticipated to occur by 2032, with an unknown number of phases. There are four proposed site accesses to March Road, one proposed site access to Terry Fox Road, and three proposed site accesses to Legget Drive. The number and location of proposed site accesses is subject to change as the development proceeds through the approvals process. Underground vehicle parking spaces will be provided on-site as part of the development; however, the exact layout of the proposed parking garages is not yet known.

As the subject application is for Zoning By-Law Amendment, detailed information regarding the current concept is not yet known. The current concept includes 1,900 residential units 46,000 m<sup>2</sup> of office space, and 11,350 m<sup>2</sup> of retail space.

**Figure 2** illustrates the current development concept plan.



Figure 1 - Site Location



Figure 2 - Proposed Development Concept Plan



## 2.1.2 Existing Conditions

### 2.1.2.1 Roads and Traffic Control

The roadways and intersections under consideration in the study area are described as follows:

March Road	March Road is a four-lane arterial roadway with a posted speed limit of 80 km/h. Across the frontage of the subject site, there are buffered on-street cycle lanes in both directions. In addition, sidewalks are provided along both sides of March Road. The roadway is designated as a Spine route as per the City of Ottawa's Ultimate Cycling Plan and is also designated as a truck route. On-street parking on March Road in the vicinity of the subject site is prohibited at all times. The intersection with Terry Fox Drive is signalized with dual left turn lanes in the northbound, westbound, and eastbound directions. In addition, there are channelized right turn lanes in all directions. The intersection with Solandt Road is signalized with dual left turn lanes in the westbound direction. In addition, the March Road at Solandt Road intersection has channelized right turn lanes in all directions.
Terry Fox Drive	Across the frontage of the subject development, Terry Fox Drive is a two-lane major collector roadway with a posted speed limit of 60 km/h. This portion of Terry Fox Drive has on-street cycling lanes. Continuous sidewalks are provided along the south side of Terry Fox Drive. A sidewalk is provided along the north side of Terry Fox Drive between March Road and McKinnley Drive. West of March Road, Terry Fox Drive is designated as a truck route, Cross Town Bikeway, and a cycling spine route. East of March Road, Terry Fox Drive is designated as cycling spine route. On-street parking along Terry Fox Drive in the vicinity of the study area is prohibited at all times. The intersection with Legget Drive is a full movements intersection that is stop-controlled along Legget Drive.
Legget Drive	Across the frontage of the subject site, Legget Drive is a two-lane collector roadway with a posted speed limit of 50 km/h. There is an existing sidewalk along the east side of Legget Drive and an on-street cycle lane along the west side. The roadway is designated as a Local Route per the City of Ottawa's Ultimate Cycling Plan. On-street parking on Legget Drive in the vicinity of the subject site is prohibited at all times. The intersection with Solandt Road is signalized with auxiliary left turn lanes in all directions.
Solandt Road	Solandt Road is a two-lane collector road with a default speed limit of 50 km/h. West of Legget Drive, there are sidewalks along both sides of Solandt Road. Currently, the roadway is classified as a suggested cycling route per the City's Existing Cycling Network. The roadway is also designated as a Local Route and Major Pathway per the City of Ottawa's Ultimate Cycling Plan. On-street parking on Solandt Road in the vicinity of the subject site is prohibited at all times.
Morgan's Grant Way / Shirley's Brook Drive	Morgan's Grant Way is a two-lane collector roadway with a posted speed limit of 40 km/h. Sidewalks are provided along the south of Morgan's Grant Way / Shirley's Brook Drive. On-street cycle lanes are provided on both sides of the roadway. Currently, Morgan's Grant Way / Shirley's Brook Drive are designed as suggested cycling routes per the City of Ottawa's Existing Cycling Network. They are both designated as local routes per the City's Ultimate Cycling Network. The intersection with March Road is signalized with channelized right turn lanes in all directions.



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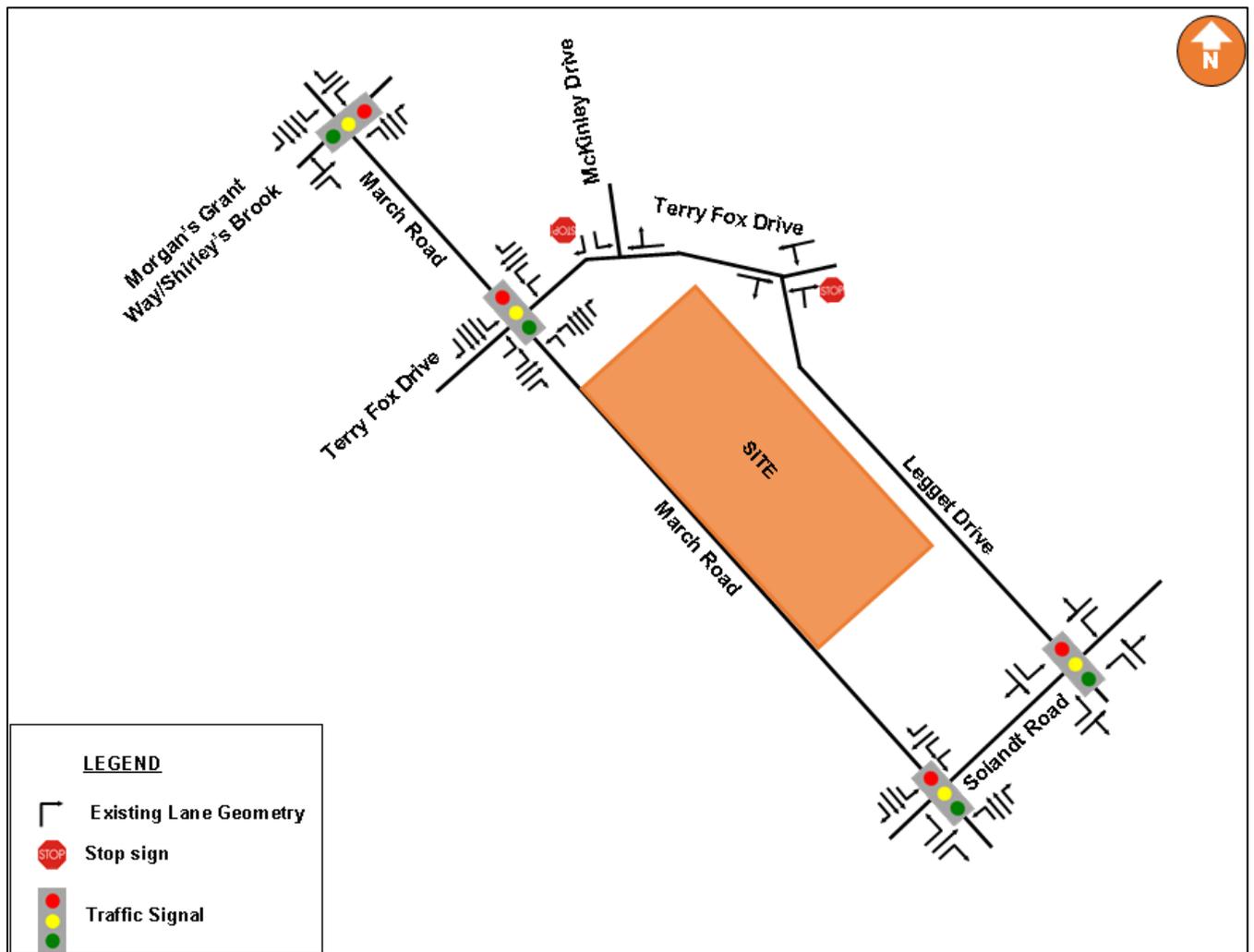
## McKinley Drive

McKinley Drive is a two-lane collector road with a speed limit of 40 km/h. There are sidewalks along both sides of McKinley Drive within the vicinity of the development. On-street parking on McKinley Drive in the vicinity of the subject site is prohibited at all times.

Figure 3 illustrates the existing lane configuration and traffic control.

Currently, there are several driveways along March Road, within the vicinity of the subject development. There is also one commercial access along the north side of Terry Fox Drive, just east of March Road. Along Legget Drive, there are also several driveways that access the existing office buildings in the Kanata North Business Park.

Figure 3 - Existing Lane Configuration and Traffic Control



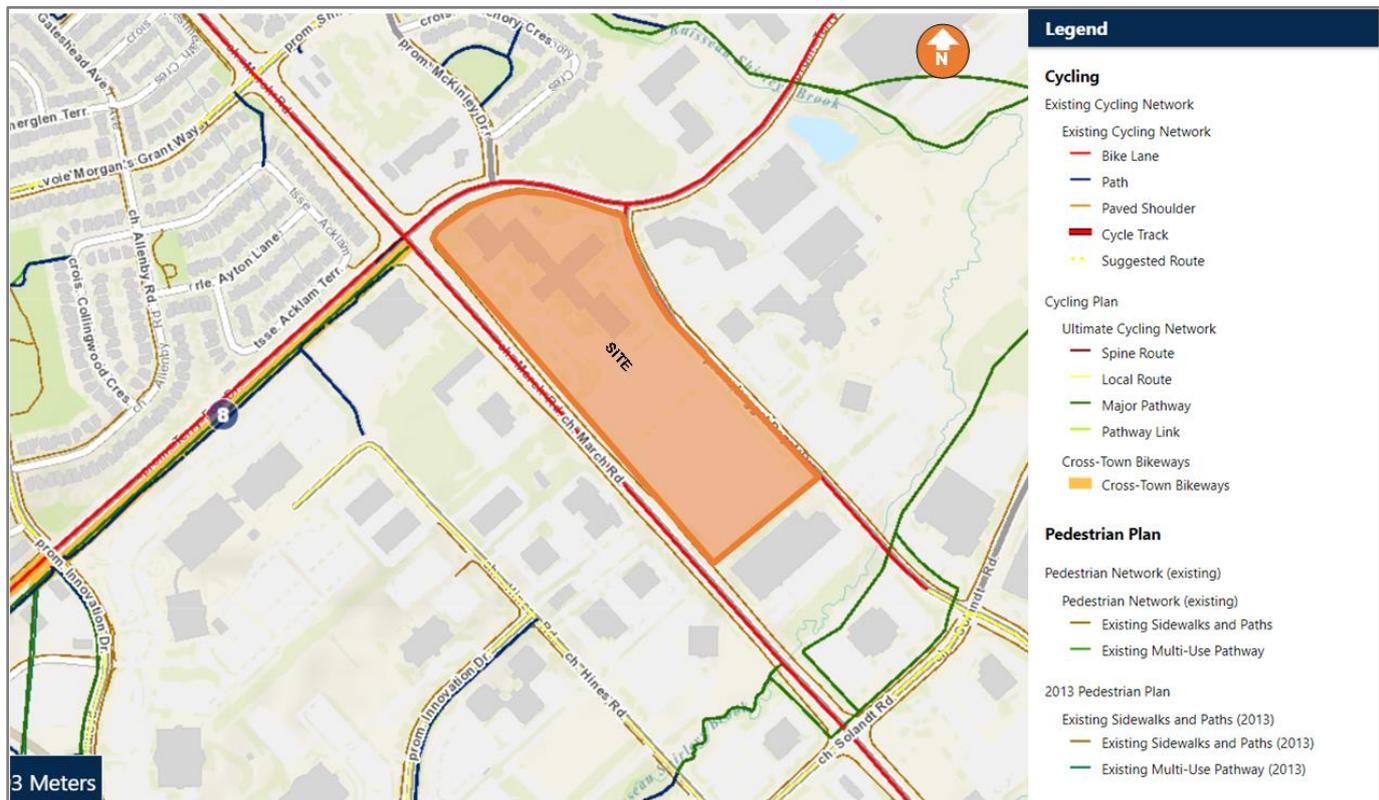
### 2.1.2.2 Walking and Cycling

The study area is currently well-served by pedestrian facilities with sidewalks along all study area roadways.

Currently, March Road and Terry Fox Drive are designated as Spine Routes as outlined in the City of Ottawa's Ultimate Cycling Plan. Terry Fox Drive is also designated as a Cross-Town Bikeway west of March Road. The City's Ultimate Cycling Plan also identifies Legget Drive, Solandt Road, and Morgan's Grant Way / Shirley's Brook Drive as Local Cycling Routes. The Ultimate Cycling Network also includes a Major Pathway link along Solandt Road, that connects the Kanata North Business Park to the South March Highlands Conservation Forest.

Figure 4 illustrates the existing pedestrian and cycling facilities within the vicinity of the subject site.

**Figure 4 - Existing Pedestrian and Cycling Network**



Source: geoOttawa, accessed January 2022



### 2.1.2.3 Transit

OC Transpo service is currently provided in the vicinity of the subject site via routes 63, 64, 66, 110, and 166.

Route 63 is a Rapid Route that runs 7 days per week between Innovation Station and Tunney's Pasture. It runs with 20-minute headways during the weekday peak periods and 30-minute headways during the weekend peak periods.

Route 64 is a Local Route that runs Monday to Friday between Morgan's Grant Via Innovation and Tunney's Pasture via Morgan's Grant. It runs with 15-minute headways in the peak periods.

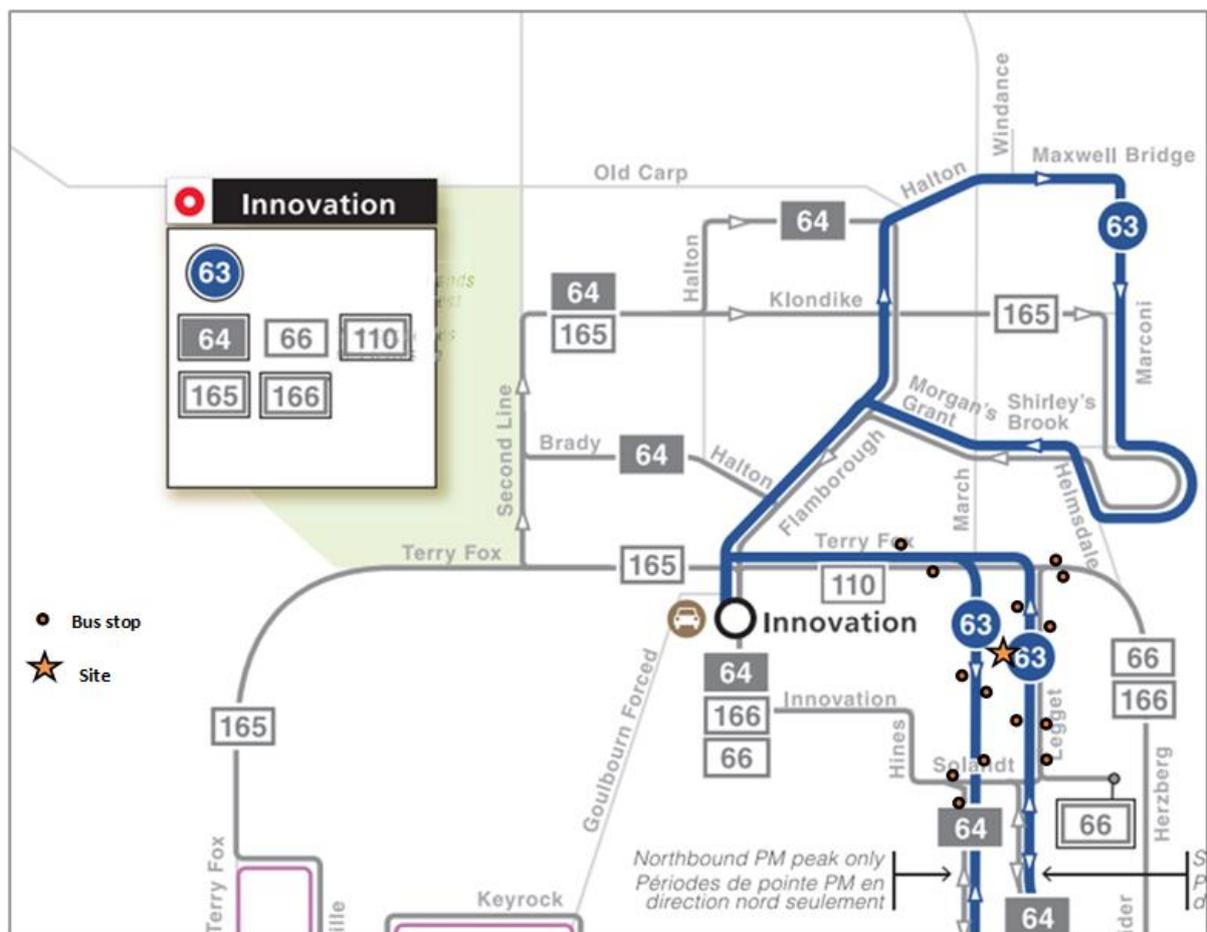
Route 66 is a Local Route that runs Monday to Friday between Kanata and Gatineau. It runs with 30-minute headways during both peak periods.

Route 110 is a Local Route that runs Monday to Friday between Innovation and Fallowfield. It runs with 30-minute headways during both peak periods.

Route 166 is a Local Route that runs Monday to Friday between Innovation and Eagleson. It runs only one trip northbound in the AM peak and one trip southbound in the PM peak.

Figure 5 illustrates the transit routes and stops.

Figure 5 - Study Area Transit Routes and Stops



Source: OC Transpo System Map [Accessed on January 18<sup>th</sup>, 2022]



#### **2.1.2.4 Traffic Management Measures**

There are currently no traffic management measures in the vicinity of the subject development.

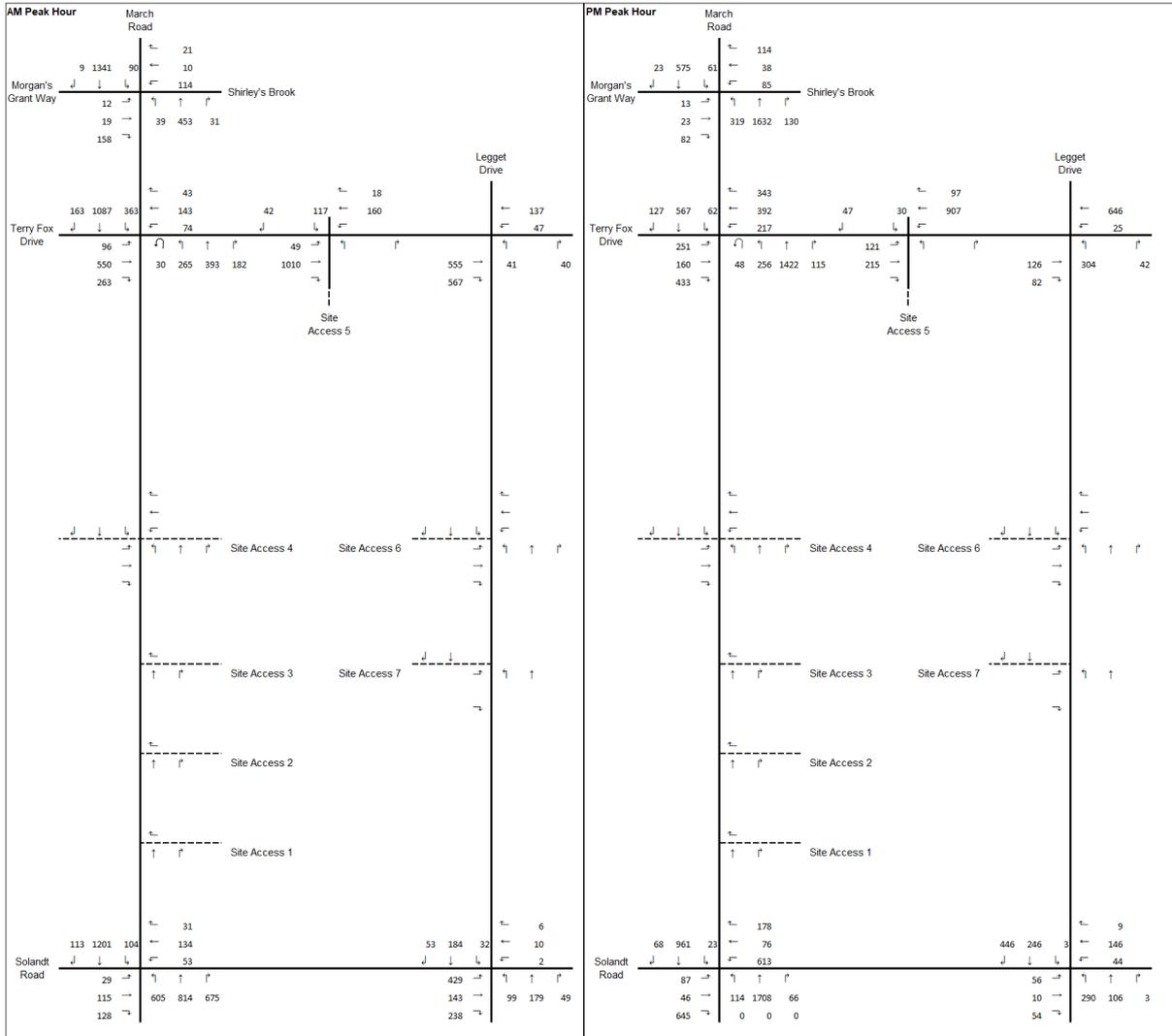
#### **2.1.2.5 Traffic Volumes**

Traffic volumes at the study area intersections were collected in the fall of 2016-2019, besides McKinley Drive and Terry Fox whose volumes were from 2013. Updated counts were obtained from the City for 2022, but with the recent shift in volumes from the recent COVID pandemic due to telecommuting, the traffic volumes were significantly lower for 2022 compared to the other intersections. Therefore, the 2013 counts were more applicable as the worst-case scenario. Using the City of Ottawa's long-range model (exhibit 2.11 of the 2013 TMP), the weighted forecasted trip growth was calculated to / from the inner area (from 2011 to 2031), and it was found that the growth rate is approximately 1.9% per year. This annual growth rate was applied to the traffic counts to represent the 2022 existing traffic volumes.

The 2022 existing traffic volumes can be seen in **Figure 6** for the AM and PM peak hours.



Figure 6 - 2022 Existing Traffic Volumes



### 2.1.2.6 Collision History

Collision data was provided by the City of Ottawa and included collisions from 2015 to 2019 in the vicinity of the subject site.

Overall, there were a total 186 reported collisions between 2015 to 2019. It was found that 144 collisions (77%) resulted in property damage only, suggesting that they occurred at low speeds, thereby circumventing bodily harm. The analysis also found that 42 collisions (23%) resulted in non-fatal injuries, and 0 collision (0%) resulted in a fatal injury. The collision statistics are shown in **Table 1** below.

At the intersection of Terry Fox Drive at March Road, a total of 56 collisions were reported, which accounts for 30% of the total collisions in the identified intersections and segments. Of these 56 collisions, 43 of them (77%) resulted in property damage only and 13 of them (23%) resulted in non-fatal injuries. Of these 56 collisions, the vast majority of them were rear end collisions (64%). These rear end collisions were analyzed further to determine if there are any significant patterns in the rear end collisions at this intersection, which can be seen in **Table 2** below. It was found that 50% of the rear end collisions occurred between vehicles traveling in the northbound direction. As there does not appear to be any geometric issues that could explain the frequency of the northbound rear end collisions at this location, the combination of the high volume of vehicles coupled with the high posted speed limit could have been factors.

At the intersection of March Road at Solandt Road, a total of 53 collisions were reported, accounting for 29% of the total collisions. Of the 53 collisions, 47 collisions (89%) resulted in property damage only and 6 collisions (11%) resulted in non-fatal injuries. Of these 53 collisions, a significant portion of them were rear end collisions (45%) and angle / turning collisions (45%). These collisions were reviewed further to determine if there are any significant patterns, which can be seen in **Table 3** below.

The rear end collision analysis at this intersection found that 9 collisions (25%) occurred along the southbound approach and 7 collisions (19%) occurred along the northbound approach. The angle / turning movement analysis at this intersection found that 11 collisions (31%) occurred in the southbound approach and 10 collisions (28%) occurred in the northbound approach. Similar to the findings of the Terry Fox Drive at March Road intersection, as there are no geometric issues that could contribute to these rear end and angle collisions, they are likely due to the combination of the high volume of traffic with the high posted speed limit.



**Table 1 - Collision Statistics**

		Terry Fox @ March	March @ Morgan Grant	March @ Solandt	Solandt @ Legget	Terry Fox @ Legget	Terry Fox between March & Legget	March between Terry Fox & Solandt	Legget between Solandt & Terry Fox	Solandt between March and Legget	Terry Fox Drive & McKinley Drive
<b>Classification</b>	Property Damage Only	43	27	47	4	6	1	13	1	1	1
	Non-Fatal Injury	13	10	6	--	1	2	7	2	--	1
	Fatal Injury	--	--	--	--	--	--	--	--	--	--
<b>Collision Type</b>	Sideswipe	7	2	4	--	--	--	3	--	--	
	Angle / Turning	6	20	24	1	4	--	1	2	1	2
	Rear End	36	13	24	2	3	1	7	--	--	--
	Single Motor Vehicle	5	2	1	1	--	2	9	1	--	--
	Other	2	--	--	--	--	--	--	--	--	--
<b>Environmental Condition</b>	Clear	41	31	39	2	3	3	16	3	--	2
	Rain	10	2	6	1	2	--	2	--	1	--
	Snow	4	4	7	1	2	--	2	--	--	--
	Freezing Rain	1	--	1	--	--	--	--	--	--	--

**Table 2 - Terry Fox at March Rear-End Collisions**

Vehicle Direction	Number of Collisions
<b>North</b>	18
<b>South</b>	8
<b>East</b>	5
<b>West</b>	5

**Table 3 - March at Solandt Rear-End and Angle/Turning movement and Sideswipe Collisions**

March at Solandt Rear-End and Angle/Turning movement Collisions			
<b>Rear End Collision Statistics</b>	Vehicle 1 Direction	North	7
		South	9
		East	4
		West	4
<b>Angle/Turning movements Collision Statistics</b>	Vehicle 1 Direction	North	10
		South	11
		East	2
		West	1



## 2.1.3 Planned Conditions

### 2.1.3.1 Road Network Modifications

**Table 4** identifies the City of Ottawa’s Transportation Master Plan (TMP) projects located in the vicinity of the subject site, as well as projects that are anticipated to influence modal share characteristics in the future.

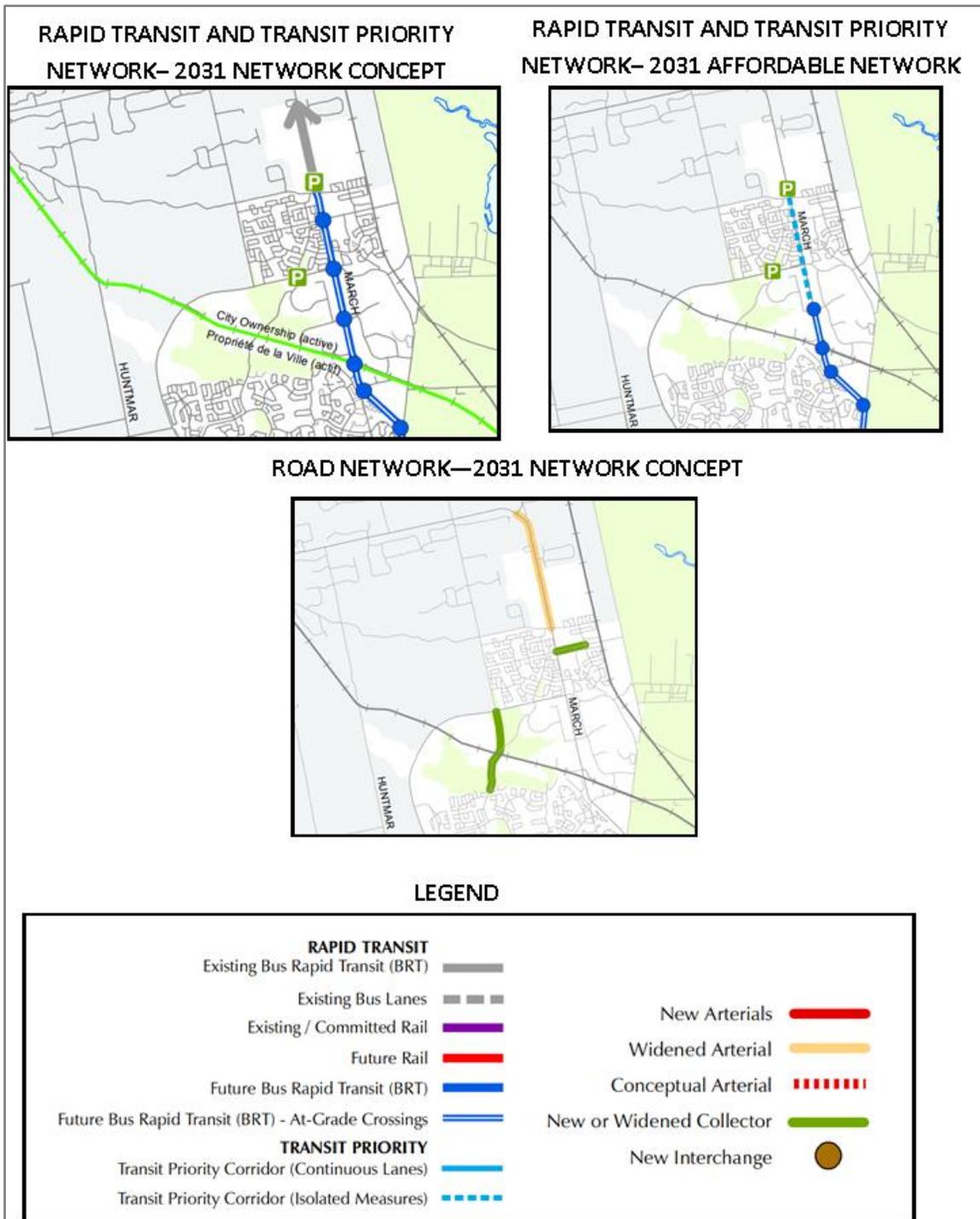
**Figure 7** illustrates planned network modifications near the proposed development.

**Table 4 - City of Ottawa Transportation Master Plan Projects**

Project	Description	TMP Phase
Kanata North Transitway	Affordable: At-grade BRT between Solandt Road and Hwy. 417	Affordable Network
	Concept: At-grade BRT between Maxwell Bridge Road and Highway 417	Network Concept
March Road	Transit signal priority and queue jump lanes between Maxwell Bridge Road and Carling Avenue. Allows for future conversion to BRT at a later time to connect with planned BRT south of Carling Avenue	Affordable Network
March Road	Widen from two to four lanes between Old Carp Road and Dunrobin Road	Network Concept
Klondike Road	Urbanize existing two-lane rural cross section between March Road and Sandhill Road	Affordable Network and Network Concept
Goulbourn Forced Road Realignment	Re-aligned and new two-lane road between Terry Fox Drive and Kanata Avenue	Network Concept



Figure 7 - Planned Network Modifications



Source: City of Ottawa TMP, accessed January 2022





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**Table 5 - Background Developments**

Key Plan Reference	Development	Location	Description
<b>A</b>	359 Terry Fox Drive & 525 Legget Drive	Southeast corner of the Terry Fox Drive and Legget Drive	30-storey high-rise residential building with 256 rental dwellings and approx. 3,850 ft <sup>2</sup> GFA of rooftop restaurant space
<b>B</b>	2707 Solandt Road	At the eastern limits of Solandt Road	8-storey, 198,615ft <sup>2</sup> office building
<b>C</b>	3026 Solandt Road	Southeast corner of the March Road and Solandt Road intersection	5 storey building, 100,000ft <sup>2</sup> office building
<b>D</b>	415 Legget Drive & 2700 Solandt Road	Northeast corner of Legget Drive and Solandt Road intersection	2-storey warehousing, GFA 14,350m <sup>2</sup> and 2 warehouse buildings, GFA 18,580m <sup>2</sup>
<b>E</b>	706,710, and 714 March Road	Bound by Shirley's Brook Drive to the north, McKinley Drive to the east, March Road to the west, and Terry Fox Drive to the south	4,165 m <sup>2</sup> supermarket, 350m <sup>2</sup> fast-food restaurant with drive-through, and multi-unit commercial space 1500m <sup>2</sup> , 237 parking stalls
<b>F</b>	788 March Road	Southeast corner of the Klondike and March Road	111 residential units
<b>G</b>	1055 Klondike Road	Northeast corner of the Klondike Road and March Road intersection	12 Semi-detached & 46 townhomes dwellings, 56 apartment dwellings
<b>H</b>	1050 Klondike Road**	Southwest corner of the Klondike Road and Sandhill Road	Seven 3- storey townhomes and a 2-storey stacked dwelling with 9 dwellings
<b>I</b>	100 Attwell Private**	Southwest corner of the Sandhill Road and Attwell Private	14 blocks of townhomes, 60 units on private street.
<b>J</b>	1104 Halton Terrace	Northeast corner of the Halton Terrace and Flamborough Way intersection	86 apartment dwellings
<b>K</b>	910 March Road	Northeast corner of the March Road and Maxwell Bridge Road intersection	1,835m <sup>2</sup> hardware store, 234m <sup>2</sup> restaurant with drive-through, 191m <sup>2</sup> coffee shop with drive-through, 416m <sup>2</sup> retail store, and 249m <sup>2</sup> gas bar.
<b>L</b>	KNUEA***	North of the established urban area of Kanata	960 single-detached homes, 1282 townhomes, 2,170 multi-unit residential units, and 145,600 ft <sup>2</sup> GFA of commercial space

\*\*TIA not yet submitted and thus traffic for these developments have not been explicitly added

\*\*\*This KNUEA (Kanata North Urban Expansion Area\_ development includes 927 March Road, 936 March Road, 1020 and 1070 March Road, 1053,1075 and 1145 March Road



## 2.2 STUDY AREA AND TIME PERIODS

### 2.2.1 Study Area

The study area was limited to the following intersections:

1. Terry Fox Drive at March Road;
2. Terry Fox Drive at Legget Drive;
3. March Road at Solandt Road;
4. March Road at Morgan's Grant Way / Shirley's Brook Drive;
5. Solandt Road at Legget Drive;
6. Terry Fox Drive at McKinley Drive
7. All site access intersections (as shown on the Concept Plan in **Figure 2**)

### 2.2.2 Time Periods

The scope of the transportation assessment includes the following analysis time periods:

- Weekday AM peak hour of roadway; and
- Weekday PM peak hour of roadway.

### 2.2.3 Horizon Years

The scope of the transportation assessment includes the following horizon years:

- 2022 existing conditions;
- 2032 future background conditions;
- 2032 total future conditions (site build-out); and
- 2037 total future conditions (5 years beyond build-out).



## 2.3 EXEMPTIONS REVIEW

**Table 6** summarizes the Exemptions Review table from the City of Ottawa’s *2017 Transportation Impact Assessment Guidelines*.

As the subject TIA is in support of a Zoning By-Law Amendment application, Modules 4.1 to 4.4 have been omitted from the study.

**Table 6 - Exemptions Review**

Module	Element	Exemption Considerations	Exempted?
<b>Design Review Component</b>			
<b>4.1 Development Design</b>	4.1.2 Circulation and Access	Only required for site plans	Yes
	4.1.3 New Street Networks	Only required for plans of subdivision	Yes
<b>4.2 Parking</b>	4.2.1 Parking Supply	Only required for site plans	Yes
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Yes
<b>Network Impact Component</b>			
<b>4.5 Transportation Demand Management</b>	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	No
<b>4.6 Neighbourhood Traffic Management</b>	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Yes
<b>4.8 Network Concept</b>		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	Yes
<b>4.9 Intersection Design</b>	All Elements	Not required if site generation trigger is not met	No



## 3.0 FORECASTING

### 3.1 DEVELOPMENT GENERATED TRAVEL DEMAND

#### 3.1.1 Existing Trip Generation

As the subject site currently includes office space, the trip generation for the existing office building was calculated and subsequently removed from the transportation network. This is to avoid double counting the future trips associated with this development parcel.

The *Institute of Transportation (ITE) Trip Generation Manual (11<sup>th</sup> Edition)* was used to forecast the auto trip generation for the existing office land use. Land use 710 – General Office Building was thought to be the most representative of the existing land use. The size of the future campus is smaller in terms of overall gross floor area as compared to the existing campus while the number of employees will be higher for the future campus. Therefore, if the GFA is used as the independent variable, it will incorrectly show a decrease in site trips for the future campus as compared to the existing campus. As such, the number of employees was used as the independent variable which more accurately represents the increase in employees between the existing and future Nokia campus.

**Table 7** outlines the assumed land uses and the trip generation rates for each land use.

**Table 7 – Existing Trip Generation Rates**

LUC	Land Use	Employees	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
710	General Office Building	2,000	88%	12%	0.42	17%	83%	0.34

**Table 8** outlines development-generated person trips for each land use.

**Table 8 – Existing Person Trips Generated**

LUC	Land Use	Trip Conversion	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
710	General Office Building	Auto Trips	743	101	844	115	560	675
		Person Trip Factor	1.28					
		Person Trips	951	129	1080	147	717	864

To reflect local travel characteristics, the person trips were assigned to the four primary modal shares (i.e., auto, passenger, transit, and active moves). The modal shares were obtained from the TRANS Committee's 2011 Origin-Destination (O-D) Survey for the Kanata / Stittsville District. **Table 9** below outlines the existing trips generated by modal share. These trips were removed from the transportation network.

**Table 9 – Existing Trip Generation by Travel Mode**

LUC	Land Use	Trip Conversion	Weekday AM Peak Hour	Weekday PM Peak Hour
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LUC	Land Use	Mode	%	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
710	General Office Building	Auto Driver	48%	694	94	788	107	523	631
		Auto Passenger	23%	209	28	238	32	158	190
		Transit	25%	10	1	11	1	7	9
		Cycling	0%	0	0	0	0	0	0
		Walking	5%	38	5	43	6	29	35

Comparing the vehicle trips associated with the existing Nokia campus, as outlined in **Table 9** above, to the existing traffic volumes along Legget Drive, it is clear that the volumes outlined in **Table 9** are an overestimation of the actual volumes the existing Nokia campus is generating. As the main entrances to the existing Nokia campus are on Legget Drive, the vehicle trips outlined in **Table 9** above are not realistic and thus were decreased to more accurately match the existing volumes along Legget Drive. This reduction was done in conjunction with assessing the existing volumes on Legget Drive along with the surrounding land uses. **Table 10** below outlines the existing Nokia volumes after the reductions were applied, which are more in line with the turning movement counts collected in the area.

**Table 10 – Adjusted Existing Trips**

LUC	Land Use	Trip Conversion	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
710	General Office Building	Reduction 30%	486	66	552	75	366	442

### 3.1.2 Future Trip Generation and Mode Shares

The *Institute of Transportation (ITE) Trip Generation Manual (11<sup>th</sup> Edition)* was used to forecast the auto trip generation for the retail and office land uses and the *Trans Trip Generation Study* was used to forecast the auto trip generation for the residential land use. Land use codes 222 – Multi-Unit High Rise Building, 821 – Shopping Plaza, and 710 – General Office Building were thought to be the most representative of the proposed land uses.

**Table 11** outlines the assumed land uses and the trip generation rates for each land use.

**Table 11 – Future Land Uses and Trip Generation Rates**

LUC	Land Use	Units/Employees/ GFA (1000's SF)	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
222	Multi - Unit (High-Rise)	1900 Units	31%	69%	0.80	58%	42%	0.90
710	General Office Building	2400	88%	12%	0.42	17%	83%	0.32
821	Shopping Plaza	122 GFA	62%	38%	1.73	48%	52%	5.19

It is noted that as per direction from Nokia, the office land use is anticipated to generate an additional 25 inbound and 25 outbound delivery trips during each of the AM and PM peak hours. Of the net 25 deliveries, 3 are anticipated to be tractor trailers (entering the site from Legget Drive), and 22 are anticipated to be box trucks / vans (entering the site from March Road). The delivery trips are not included in the trip generation tables and were accounted for as part of the total office land use trips shown in **Figure 12**.

**Table 12** outlines development-generated person trips for each land use.



**Table 12 – Future Person Trips Generated by Land Use**

LUC	Land Use	Trip Conversion	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
222	Multi - Unit (High-Rise)	Person Trips (Peak Period	471	1049	1520	992	718	1710
		Person Trips (Peak Hour) 0.50 for AM & 0.40 for PM	236	525	761	436	316	752
710	General Office	Auto Trips	880	120	1000	131	641	772
		Person Trip Factor	1.28					
		Person Trips	1126	154	1280	168	820	988
821	Shopping Plaza	Auto Trips	131	80	211	304	330	634
		Person Trip Factor	1.28					
		Person Trips	168	102	270	389	422	812
<b>Total Development</b>		<b>Total Person Trips</b>	<b>1530</b>	<b>781</b>	<b>2311</b>	<b>993</b>	<b>1558</b>	<b>2552</b>

To reflect local travel characteristics, the person trips were assigned to the four primary modal shares (i.e., auto, passenger, transit, and active moves). As per the City of Ottawa’s TMP, the March Road Bus Rapid Transit (BRT) is scheduled to be implemented by 2031, between Solandt Road and Highway 417. The subject development is planned to be built and occupied by 2032. The office portion of the subject development is anticipated to be within 400m of the planned BRT station at Solandt Road. Per direction from the City of Ottawa, the March Road BRT, north of Solandt Road, is scheduled to occur beyond the horizons of this subject study (i.e., post 2037). The residential / retail portion of the subject development (north half) are not anticipated to be within 400m of a rapid transit station during the study horizons. As such, the modal shares for the northern and southern portions of the subject development will differ as a direct result of the implementation plan of the March Road BRT.

**Residential Trips – Mode Shares**

Section 4.2 (Table 8) of the *TRANS Trip Generation Summary Report* was utilized to determine the residential mode share for high rise multi-family housing for the Kanata / Stittsville district. The average mode shares for the district include a 49% auto mode share and a 25% transit mode share. As the existing transit mode share is notably high for the general area, it is not anticipated to see increase as a result of the planned March Road BRT (between Highway 417 and Solandt Road) as the distance between the transit station and the residential component of the proposed development is anticipated to be greater than 400m.

**Office Trips – Mode Shares**

Section 6.2 (Table 12) of the *TRANS Trip Generation Summary Report* was utilized to determine the employment generator mode share by district. The report exclusively cites AM mode shares, however, it is expected that the PM mode shares would be identical as the commute from employment generators during the PM peak hour is very unlikely to differ from the commute to employment generators during the AM peak hour. For the Kanata / Stittsville district, the aforementioned report cites an 8% transit mode share and an 84% auto mode share.

**Commercial Trips – Mode Shares**

Section 6.3 (Table 13) of the *TRANS Trip Generation Summary Report* was utilized to determine the commercial generator mode share for the Kanata / Stittsville district. The report exclusively cites that the sample size for shopping trips during the AM peak tends to be low. As such, more emphasis was placed on the mode shares during the PM peak period to better represent the activity in the district. During the PM peak, the mode shares for the district include a 73%



auto mode share and a 1% transit mode share. To account for the enhanced overall transit service as a result of the planned March Road BRT (between Highway 417 and Solandt Road), the transit mode share for the commercial land use was increased from 1% to 10% (a 9% net increase) while subsequently reducing the 73% auto mode share by 9% for a total of 64%.

Table 13 outlines the modal shares that were used for the proposed development.

**Table 13 – Future Trip Generation by Travel Mode**

LUC	Land Use	Trip Conversion	Weekday AM Peak Hour			Weekday PM Peak Hour			
			In	Out	Total	In	Out	Total	
222	Multi - Unit (High-Rise)	Auto Driver	49%	116	257	373	214	155	369
		Auto Passenger	22%	52	116	168	96	70	166
		Transit	25%	58	129	187	107	77	184
		Cycling	0%	0	0	0	0	0	0
		Walking	4%	9	21	30	17	13	30
710	General Office Building	Auto Driver	84%	946	129	1075	141	689	832
		Auto Passenger	4%	45	6	51	7	33	39
		Transit	8%	90	12	102	13	66	79
		Cycling	1%	11	2	12	2	8	11
		Walking	3%	34	5	37	5	25	31
821	Shopping Plaza	Auto Driver	64%	108	65	173	249	270	51
		Auto Passenger	22%	37	22	59	86	93	179
		Transit	10%	17	10	27	39	42	81
		Cycling	0%	0	0	0	0	0	0
		Walking	4%	7	4	11	16	17	33
Total Development		<b>Auto Driver</b>		<b>1170</b>	<b>451</b>	<b>1621</b>	<b>604</b>	<b>1114</b>	<b>1719</b>
		<b>Auto Passenger</b>		<b>139</b>	<b>144</b>	<b>278</b>	<b>189</b>	<b>196</b>	<b>384</b>
		<b>Transit</b>		<b>165</b>	<b>151</b>	<b>316</b>	<b>159</b>	<b>185</b>	<b>344</b>
		<b>Cycling</b>		<b>11</b>	<b>2</b>	<b>12</b>	<b>2</b>	<b>8</b>	<b>11</b>
		<b>Walking</b>		<b>50</b>	<b>30</b>	<b>78</b>	<b>38</b>	<b>55</b>	<b>94</b>

### 3.1.3 Internal Capture and Pass-By

When predicting trips that are associated with different land use types the interaction between those land use types must be accounted for by applying the principals of internal capture adjustments. Internal capture trips are trips which are shared between two or more uses on the same site. A portion of the generated trips for each individual land use is therefore drawn from the adjacent land uses. Internal capture adjustments were made to account for vehicles that visit more than one land use within the subject development. Since these trips are contained within the subject site, accounting for each trip separately on the roadway network would result in “double-counting”. For this reason, land uses that may have associated internal capture trips between one another ultimately had their net new trips adjusted consistent with typical industry standards. In the subject development, the land uses that are subject to internal capture reductions are the retail and office land uses.

In addition, a portion of the auto trips generated by the proposed retail land uses will be ‘pass-by’ in nature. Pass-by trips are considered intermediate stops between an origin and a destination. They are site trips that are drawn from existing traffic volumes on the road network that are “passing-by” the site. While the total number of trips generated by a given development remains the same, the turning movements at study area intersections and site accesses require



adjustments to reflect pass-by traffic. The rate of pass-by traffic is based on the specific land use which was obtained from the *ITE Trip Generation Manual*. A pass-by rate of 34% was used for the retail land use.

**Table 14** outlines the pass-by, internal capture, and net new trips anticipated for the proposed development.

**Table 14 – Future Pass-By and Internal Capture Trips**

LUC	Land Use	Trip Conversion			Weekday AM Peak Hour			Weekday PM Peak Hour		
					In	Out	Total	In	Out	Total
710	General Office Building	Auto Trips			946	129	1075	141	690	831
		Internal Capture	AM	PM						
		Inbound	4%	10%	-38	-36	-74	-14	-34	-48
		Outbound	28%	5%						
		Net New Auto Trips			908	93	1001	127	655	783
821	Shopping Plaza	Auto Trips			108	65	173	249	270	519
		Internal Capture	AM	PM						
		Inbound	24%	16%	-26	-21	-47	-40	-76	-116
		Outbound	33%	28%						
		Net New Auto Trips			82	44	126	209	194	403
821 – Shopping Plaza	Auto Trips			82	44	126	209	194	403	
	Pass-By						71	66	137	
	Net Auto Trips			82	44	126	138	128	266	
<b>Net New Auto Trips</b>										
222 – Multi Unit (High Rise)				116	257	373	214	155	369	
710 – Office Building/ Lab				908	93	1001	127	655	783	
821 – Shopping Plaza				82	44	126	138	128	266	
<b>Total Development</b>										
Net New Auto Trips				1106	394	1500	479	938	1418	

### 3.1.4 Trip Distribution

The distribution of traffic to / from the proposed development was developed using the relative traffic flows and volumes at the study area inlets / outlets. To account for the significant Kanata North Urban Expansion Area (KNUEA) development north of the study area (anticipated to be fully built by the 2032 horizon year and is projected to add 800 vehicles to / from the north during the peak hours), the 2032 future background horizon volumes were utilized for this exercise.

Overall, for the office land use, the following trip distribution is anticipated:

- 35% to / from the North (via March Road)
- 50% to / from the South (via March Road)
- 15% to / from the West (via Terry Fox Drive)
- Note: Terry Fox Road (E) and Legget Drive (S) are anticipated to carry negligible development traffic due to the limited connectivity to the adjacent transportation network. Traffic to / from the south of the proposed development is projected to be predominantly on March Road due to the higher speeds and superior connectivity to Highway 417 and the district to the south.



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For the commercial and residential components, the anticipated trips to / from the north were reduced to better reflect the area characteristics, resulting in the following trip distribution:

- 20% to / from the North (via March Road)
- 60% to / from the South (via March Road)
- 20% to / from the West (via Terry Fox Drive)

The trip distribution was done separately for each land use to account for the specific access arrangements.

**Figure 9** through **Figure 11** illustrates the site traffic distribution for the proposed land uses.



Figure 9 - Trip Distribution – Office Land Use (excluding truck deliveries)

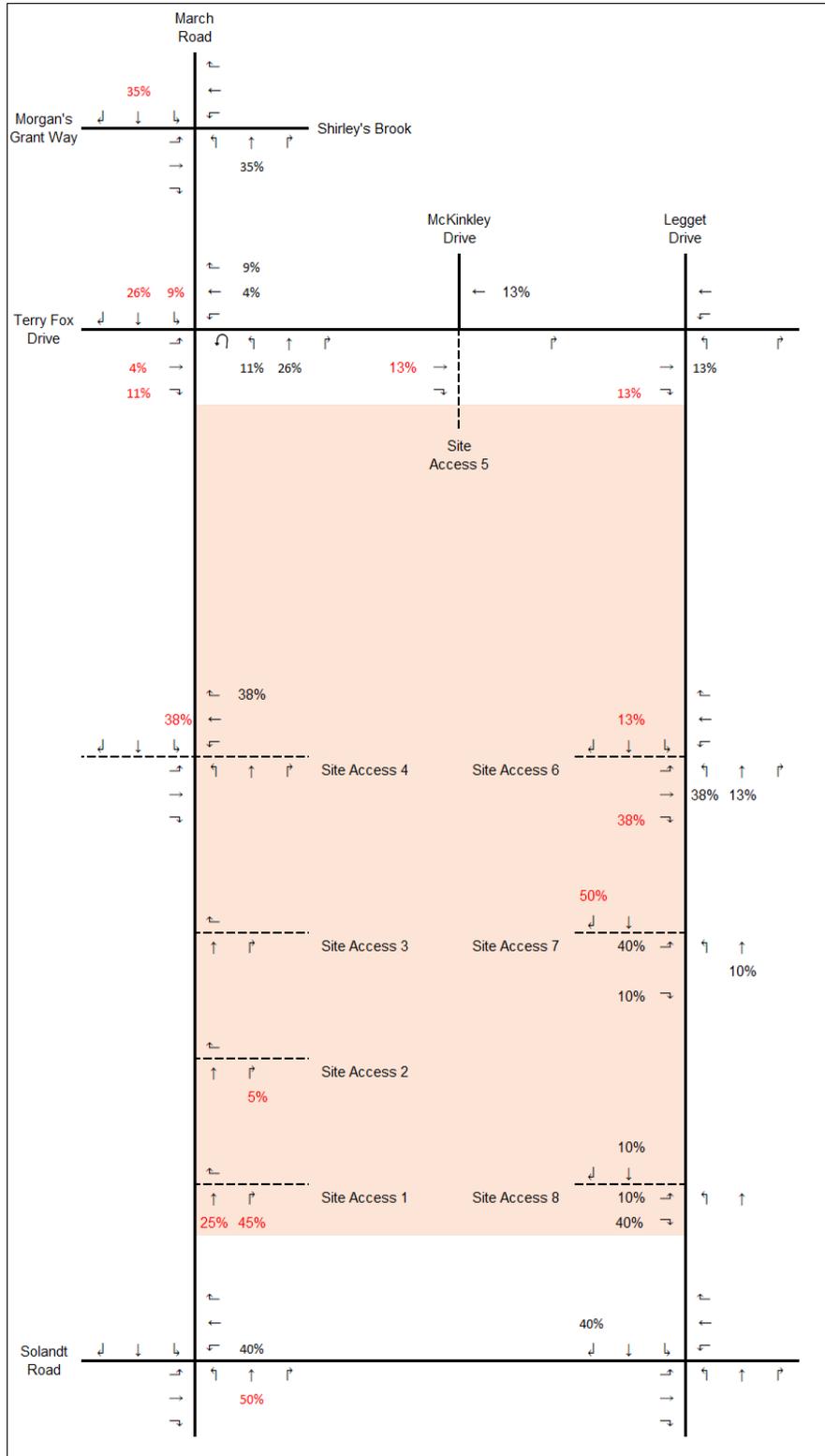


Figure 10 - Trip Distribution - Residential Land Use

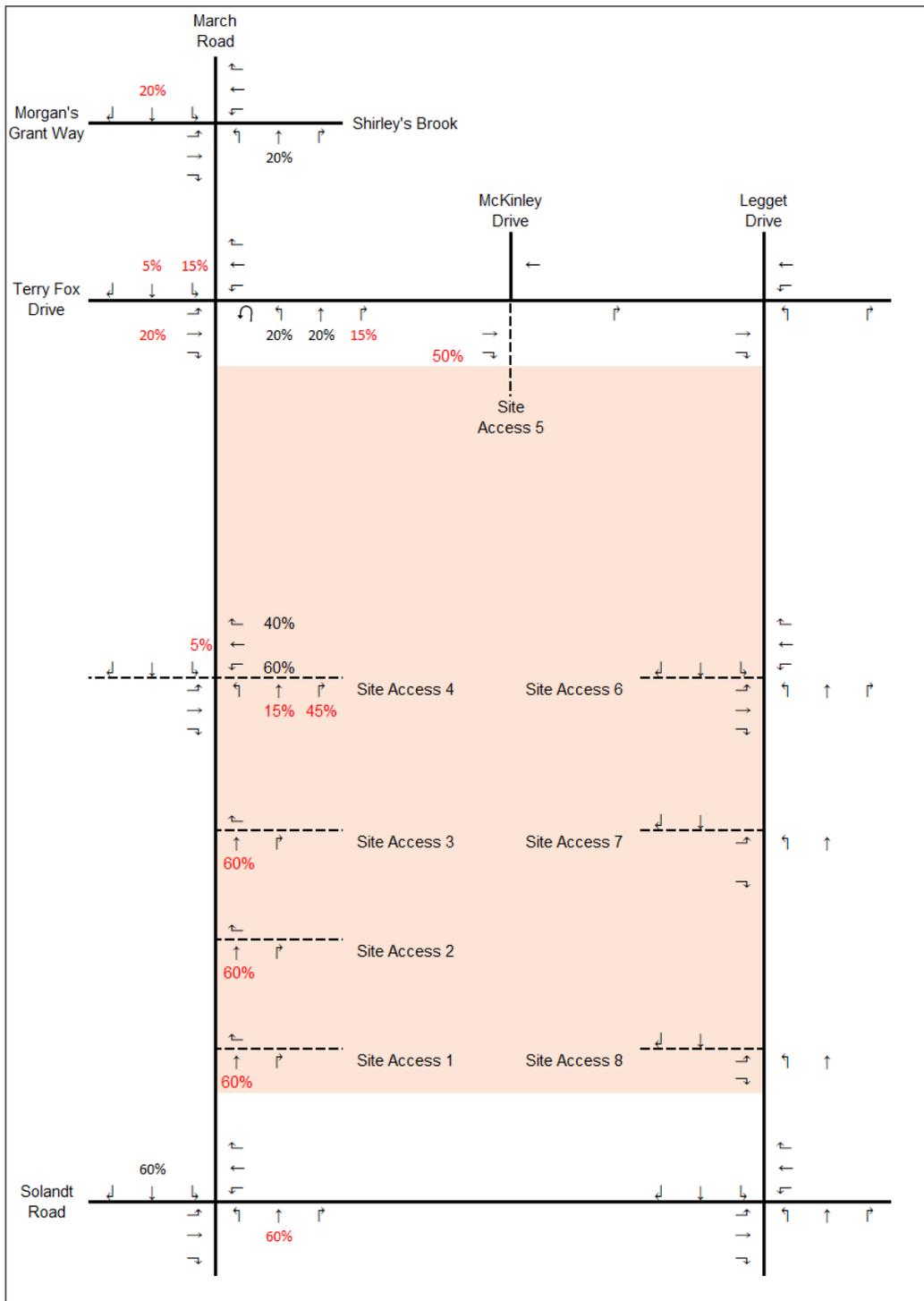
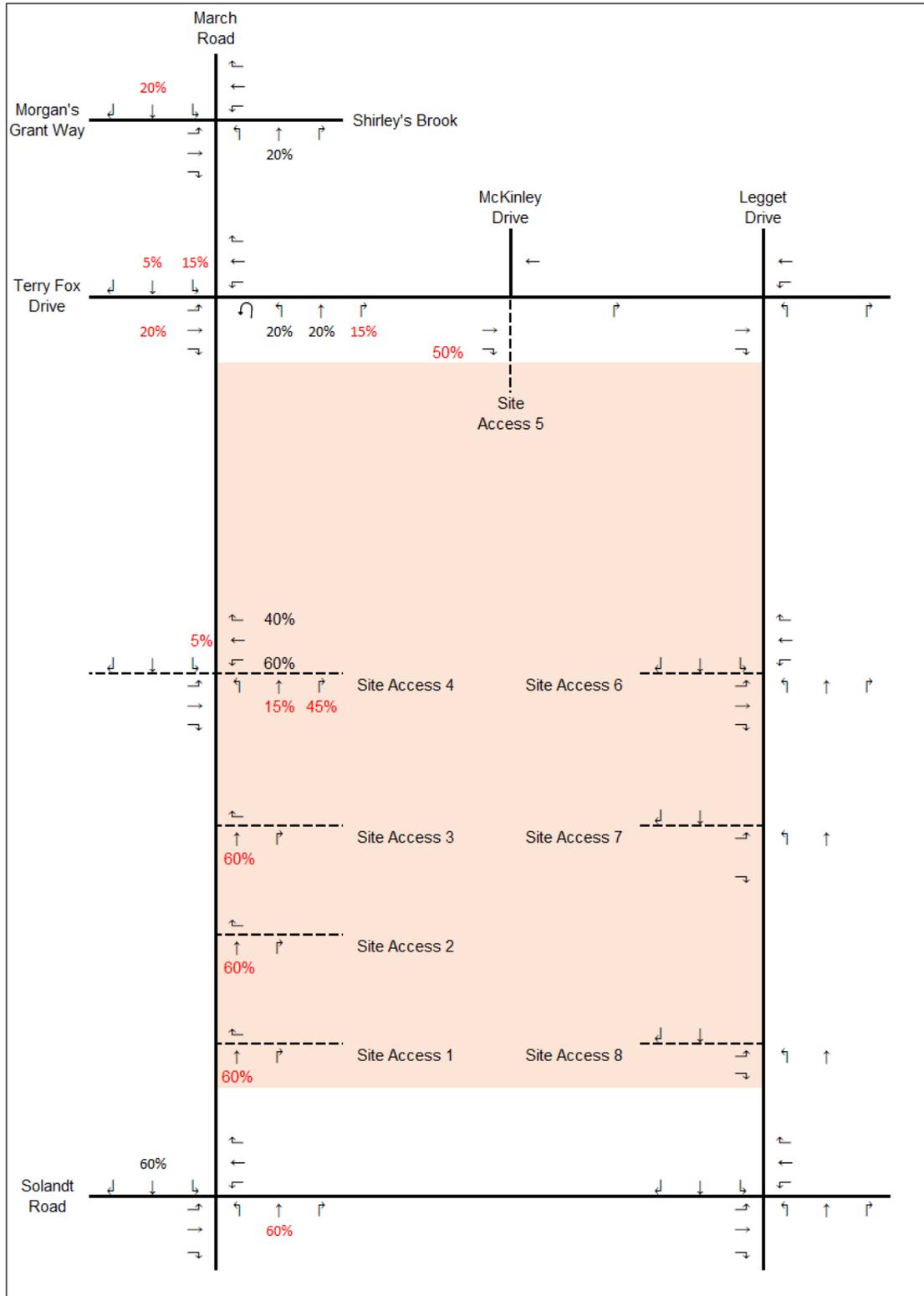


Figure 11 - Trip Distribution - Commercial Land Use



### 3.1.5 Trip Assignment

Site generated trips were assigned to the study area road network based on the trip distribution assumptions outlined above in **Section 3.1.4**. **Figure 12** through **Figure 15** illustrates the new site generated trips.

**Figure 12 - Site Generated Traffic Volumes – Office Land Use (including truck deliveries)**

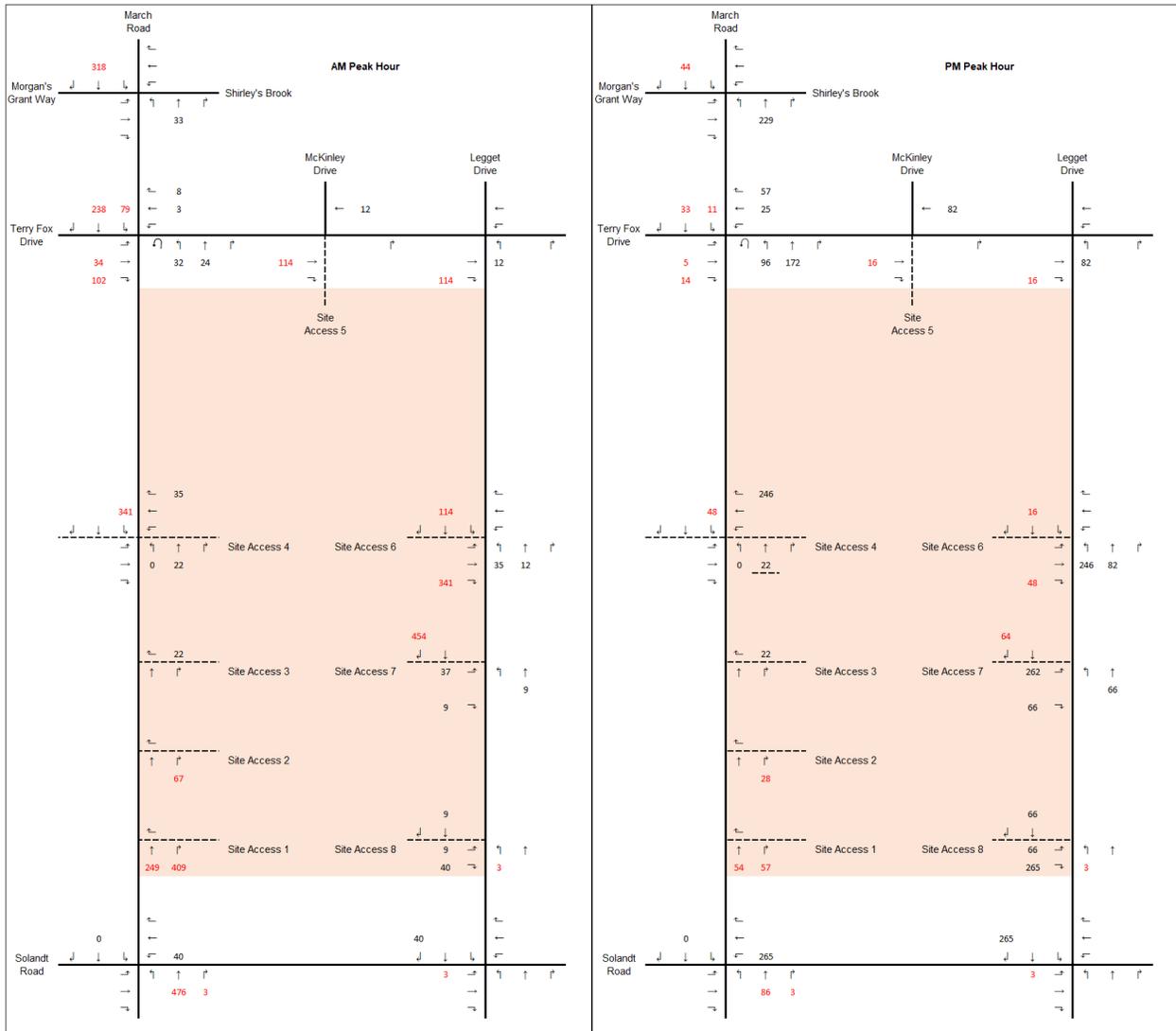


Figure 13 - Site Generated Traffic Volumes – Residential Land Use

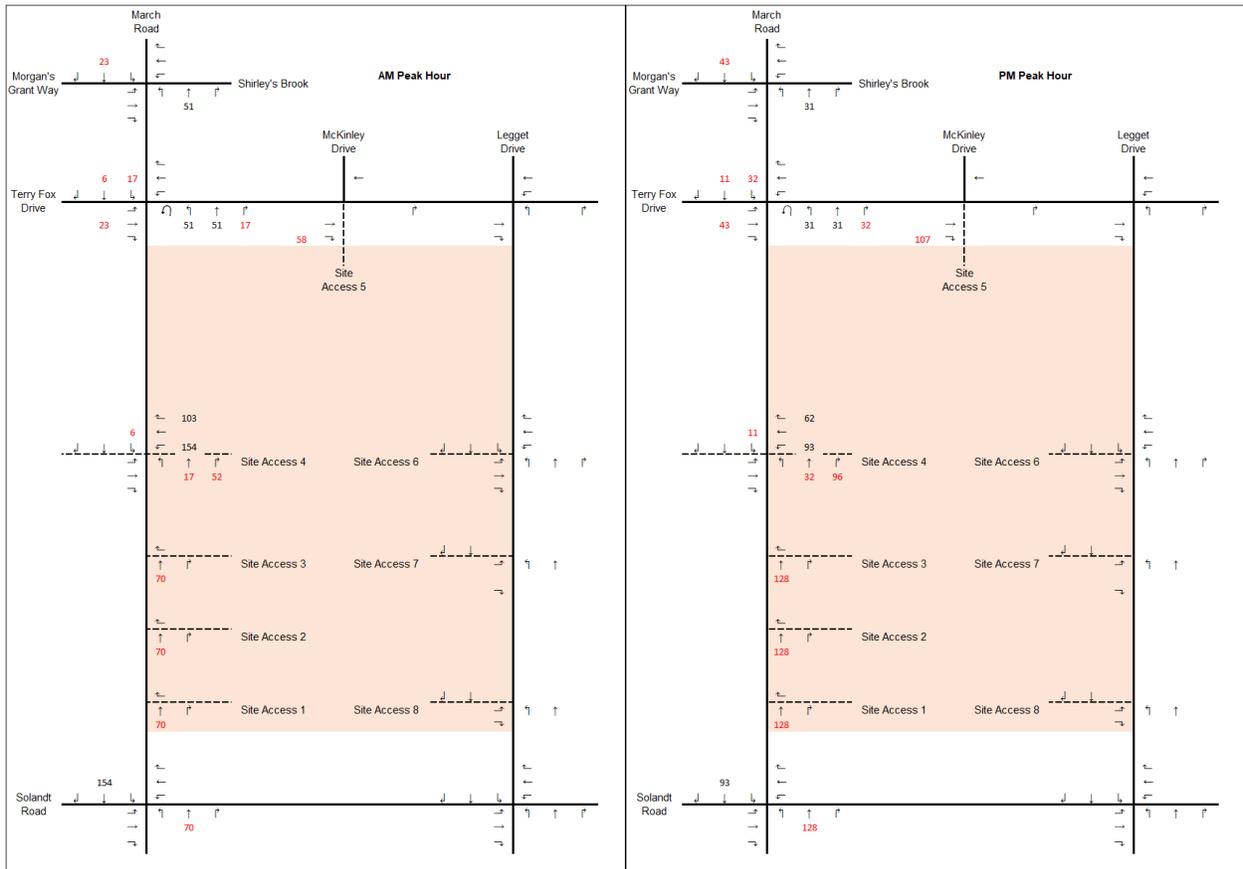


Figure 14 - Site Generated Traffic Volumes – Commercial Land Use

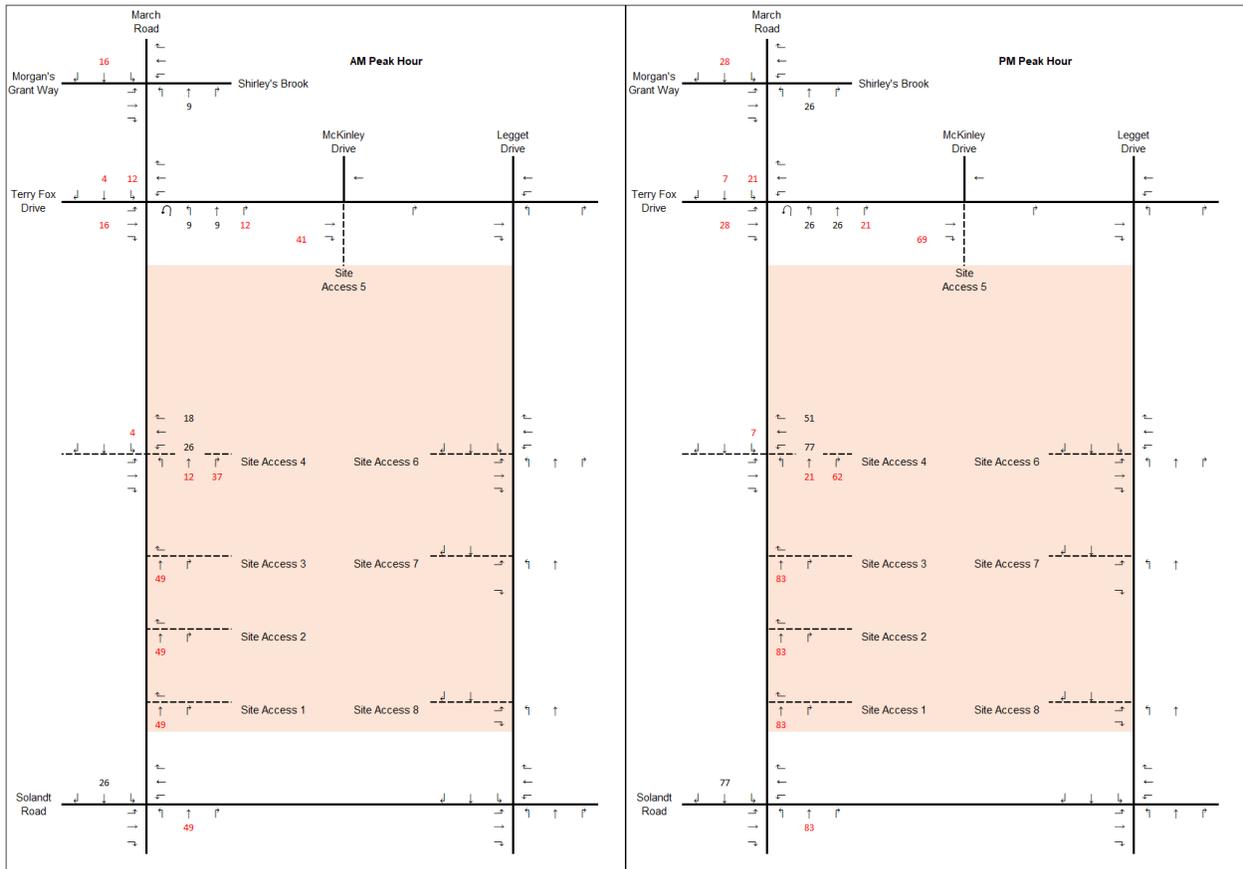
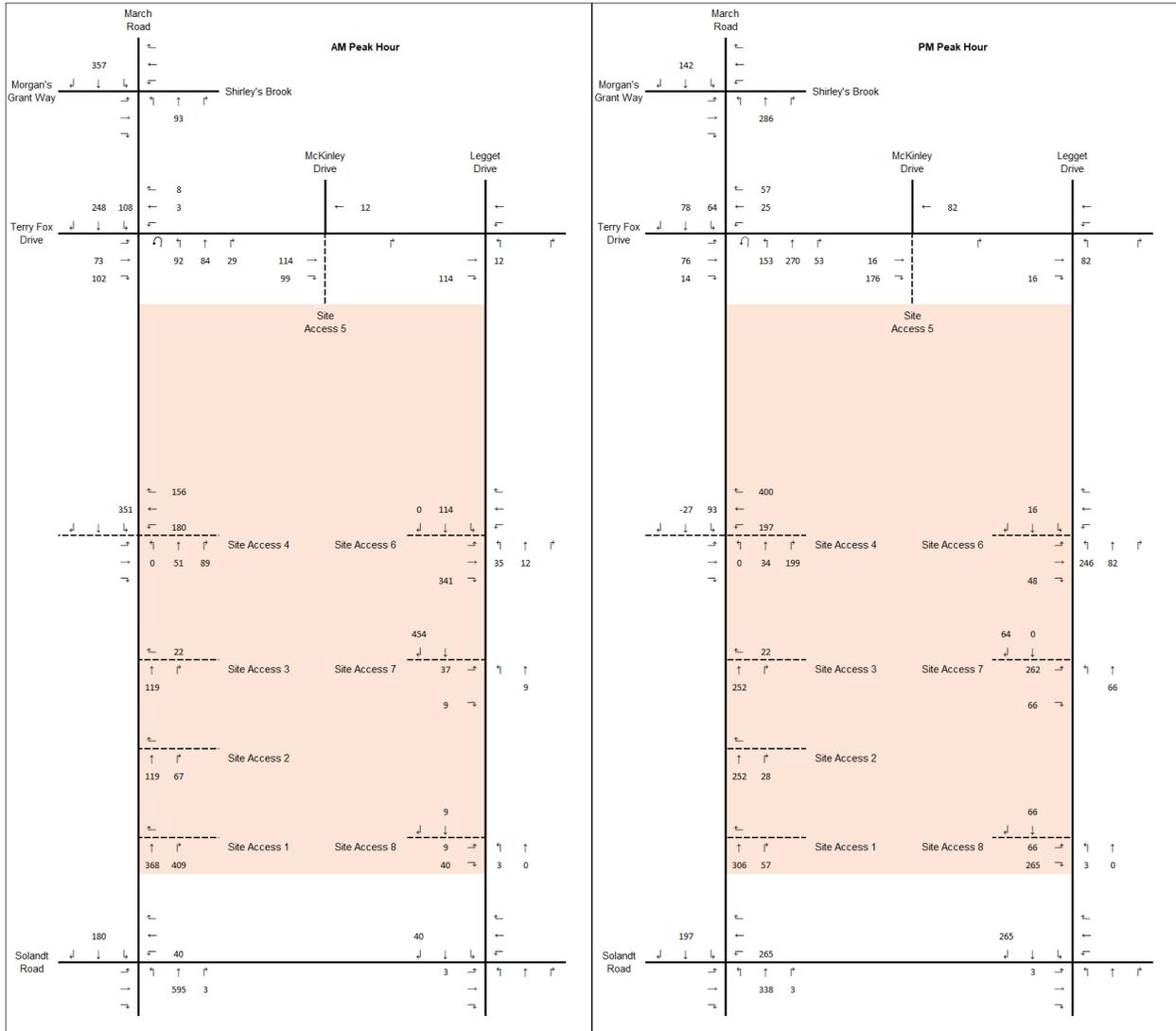


Figure 15 - Site Generated Traffic Volumes - All Land Uses & Pass-by Trips



## 3.2 BACKGROUND NETWORK TRAVEL DEMAND

### 3.2.1 Transportation Network Plans

**Table 4** includes the transportation network plans in the vicinity of the subject site.

### 3.2.2 Background Growth

As outlined in **Section 2.1.2.5**, a 1.9% per annum growth rate was applied to the traffic volumes at the study area intersections to represent 2022 existing traffic volumes. This growth rate was calculated based on the long-range model in the City of Ottawa's 2013 TMP.

Due to the limited connections from Solandt Road, Legget Drive, and Terry Fox Drive (E), the established land uses in the vicinity of the proposed development, as well as the consideration of future planned background developments in the area, the calculated annual growth rate was not applied beyond existing conditions to represent future volumes. Any growth to the turning movements at the study area intersections is anticipated to be directly correlated with planned background developments as opposed to natural traffic growth when considering the factors above. Furthermore, analysis of existing conditions found that several study area intersections currently operate above their theoretical capacities, indicating that March Road (just south of Terry Fox) does not have the capacity to grow unconstrained.

### 3.2.3 Other Developments

As outlined in **Table 5** in **Section 2.1.3.2**, there are numerous developments in the study area that are scheduled to be constructed within the horizons of the subject study. The traffic volumes from these developments were obtained from their respective traffic studies, where available, and added to the transportation network as background traffic.

## 3.3 DEMAND RATIONALIZATION

Recognizing that the future traffic volumes in the study area are projected to be extremely high, particularly along March Road, it is feasible to assume some demand rationalization will inevitably occur. The two-way peak hour traffic volumes along March Road are projected to be in the range of 3,300 – 4,300 during the 2032 future background horizon. A large portion of these traffic volumes are attributed to the Kanata North Urban Expansion Area.

While a portion of the forecasted future volume is envisioned to be accommodated by the planned March Road BRT (between Highway 417 and Solandt Road), the overall future volumes are still anticipated to drive March Road, Terry Fox Drive, Solandt Road, and Legget Drive beyond their respective theoretical capacities, effectively placing a limitation on background traffic growth in the area.

In light of the projected future congestion in the area, motorists may begin to alter their travel times to travel outside of the peak period, thereby reducing demand on the network during the peak hour and subsequently increasing demand on the network just before and just after the peak hour, which is referred to as peak spreading. This is often realized with flexible work schedules, a now common arrangement borne of the COVID-19 pandemic.



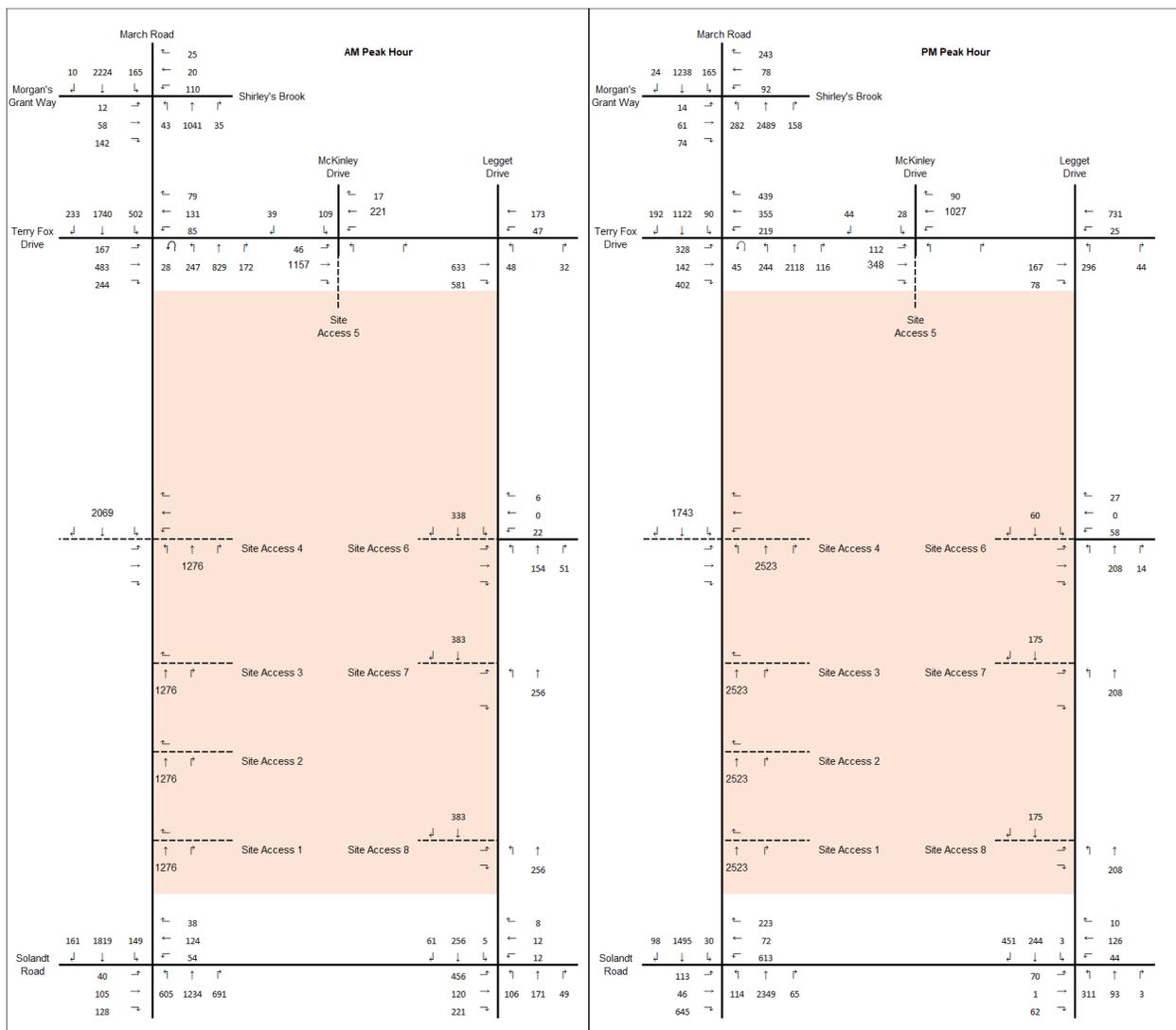
As a high-level observation, it is also noted that a significant proportion of the existing land uses in the vicinity of the proposed development are Information Technology (IT) based companies. As such, it is also expected that a portion of the employees would elect to “work-from-home” or telecommute to eliminate all travel during the peak hours.

Overall, it was assumed that peak hour traffic in the study area would be reduced by 15% due to the combination of peak spreading (flexible work schedules) and telecommuting. This reduction may need to be adjusted as part of the Step 4 – Forecasting Report once the intersection operations are analyzed and the capacities at each intersection are determined.

### 3.3.1 2032 Future Background Traffic Volumes

Figure 16 illustrates the 2032 future background traffic volumes at the study area intersections.

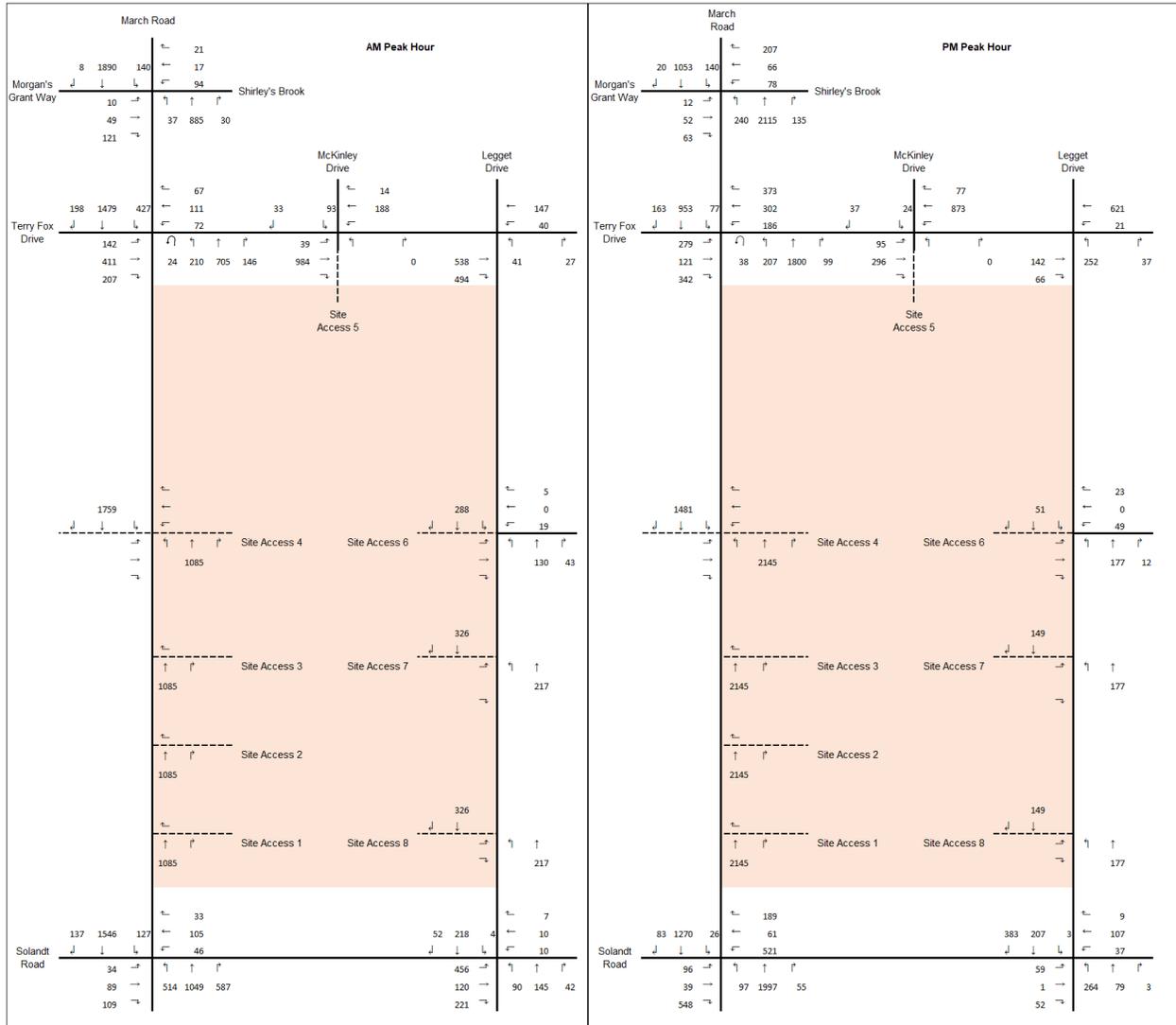
**Figure 16 - 2032 Future Background Traffic Volumes**



### 3.3.2 2032 Future Background Traffic Volumes - Rationalized

Figure 17 illustrates the 2032 rationalized future background traffic volumes at the study area intersections.

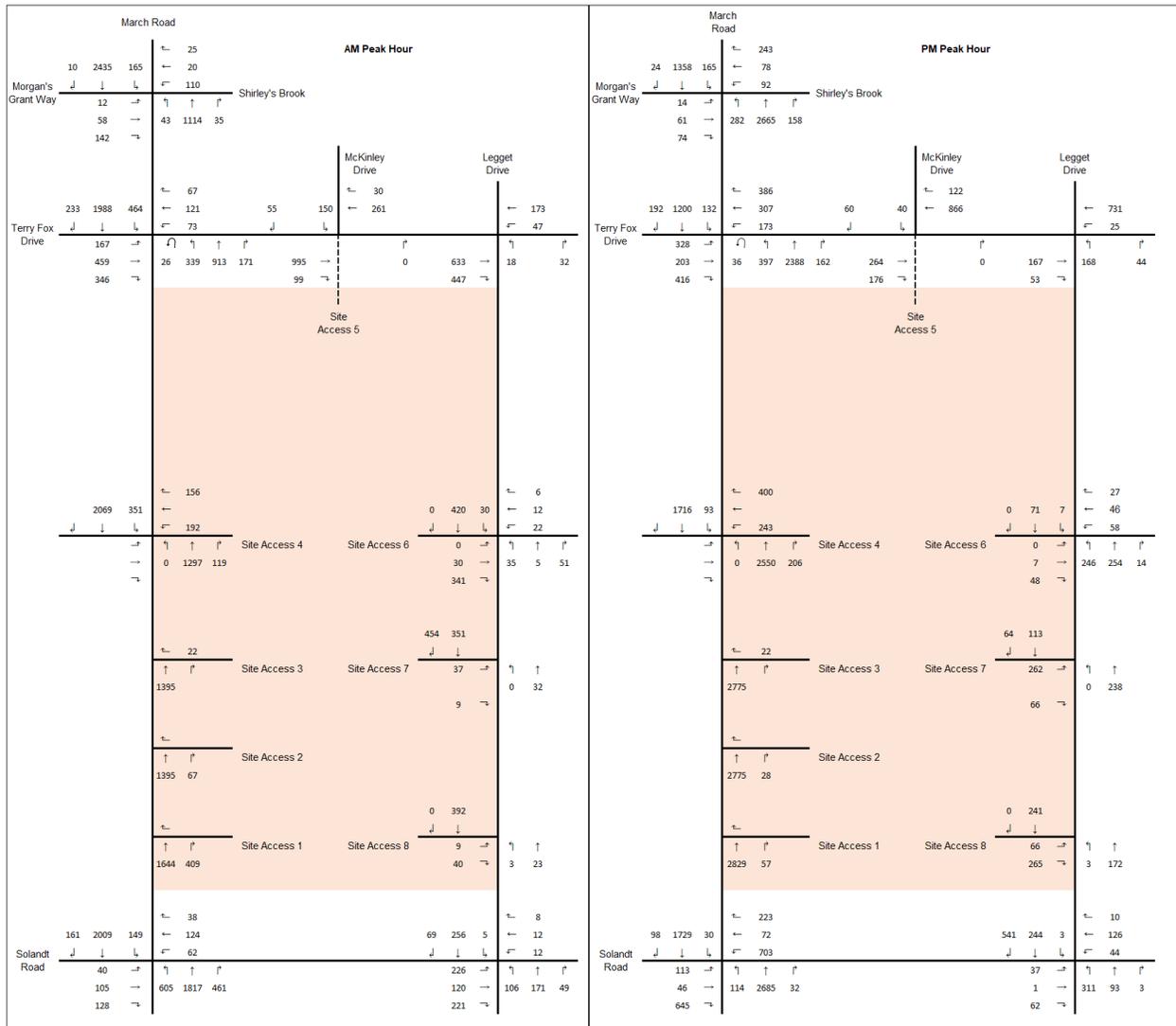
Figure 17 - 2032 Future Background Traffic Volumes - Rationalized



### 3.3.3 2032 Total Future Traffic Volumes

Figure 18 illustrates the 2032 total future traffic volumes at the study area intersections.

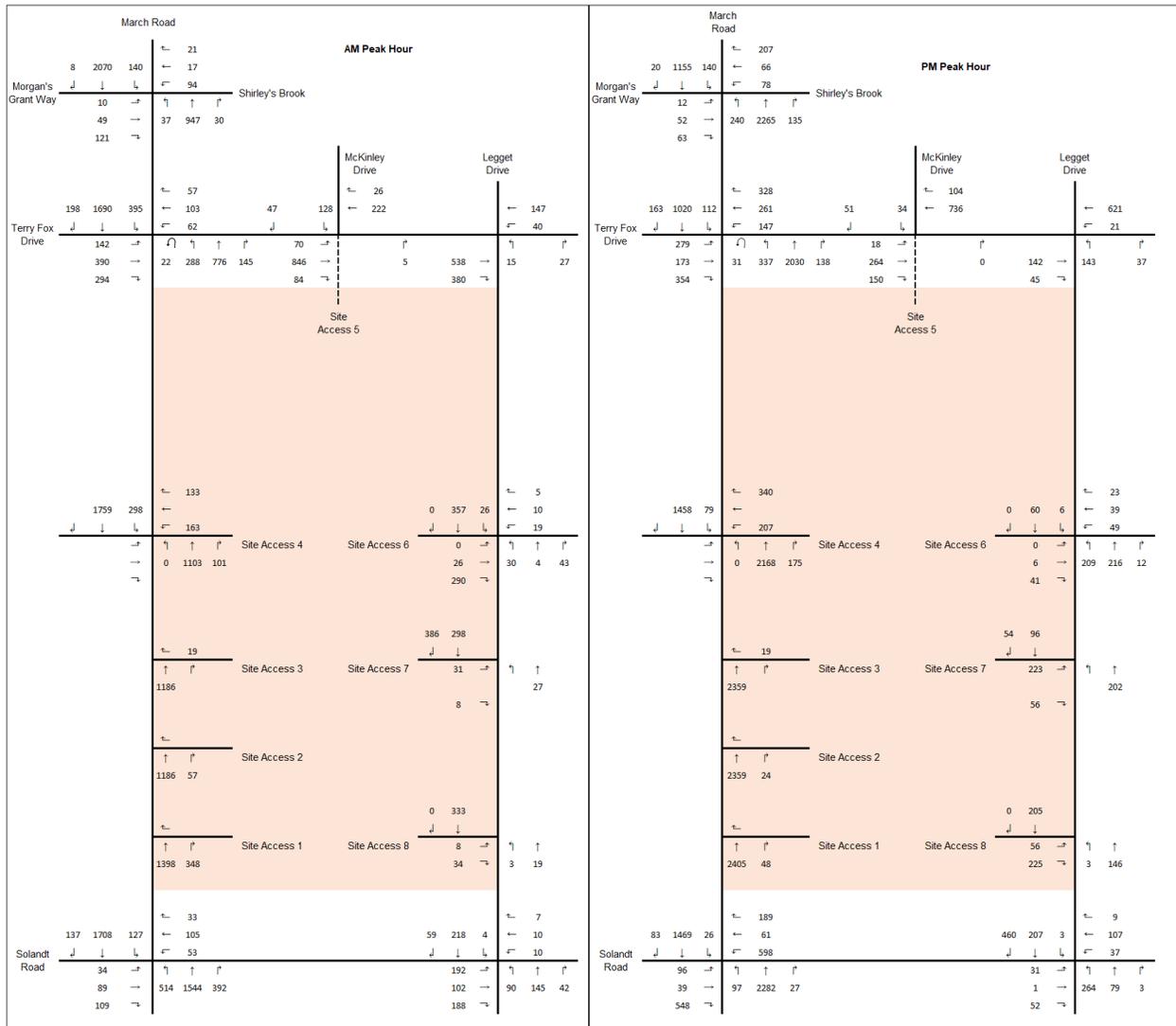
Figure 18 - 2032 Total Future Traffic Volumes



### 3.3.4 2032 Total Future Traffic Volumes - Rationalized

Figure 19 illustrates the 2032 rationalized total future traffic volumes at the study area intersections.

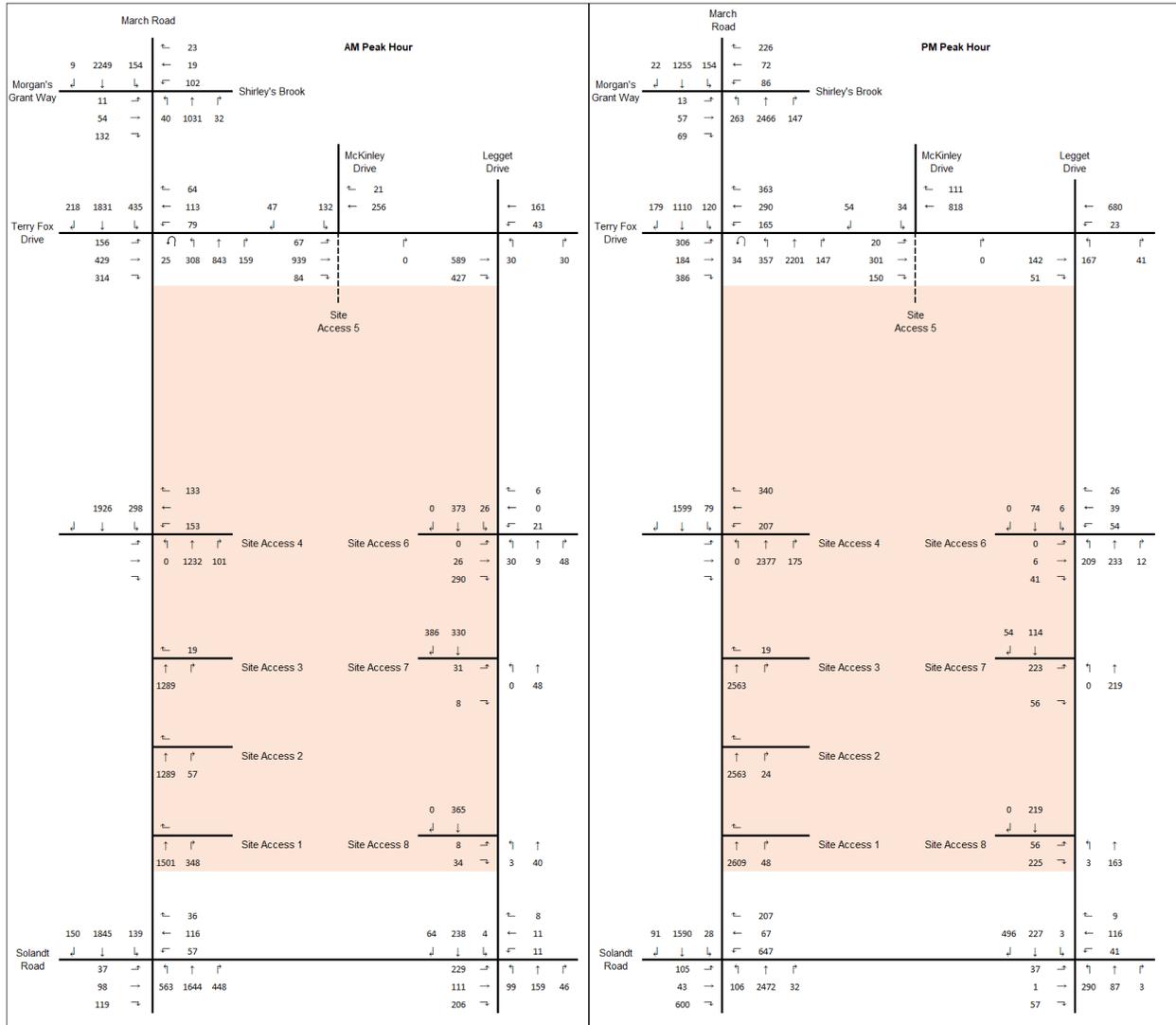
Figure 19 - 2032 Total Future Traffic Volumes - Rationalized



### 3.3.5 2037 Ultimate Volumes - Rationalized

Figure 20 illustrates the 2037 rationalized total future traffic volumes at the study area intersections.

Figure 20 - 2037 Total Future Traffic Volumes - Rationalized



## **4.0 STRATEGY REPORT**

### **4.1 DEVELOPMENT DESIGN**

#### **4.1.1 Design for Sustainable Modes**

Not applicable; exempted during screening and scoping.

#### **4.1.2 Circulation and Access**

Not applicable; exempted during screening and scoping.

#### **4.1.3 New Street Networks**

Not applicable; exempted during screening and scoping.

### **4.2 PARKING**

#### **4.2.1 Parking Supply**

Not applicable; exempted during screening and scoping.

#### **4.2.2 Spillover Parking**

Not applicable; exempted during screening and scoping.

### **4.3 BOUNDARY STREET DESIGN**

#### **4.3.1 Multi Modal Level of Service**

Not applicable; exempted during screening and scoping.

### **4.4 ACCESS INTERSECTION DESIGN**

#### **4.4.1 Access Location**

Not applicable; exempted during screening and scoping.

#### **4.4.2 Intersection Control**

Not applicable; exempted during screening and scoping.



## 4.5 TRANSPORTATION DEMAND MANAGEMENT

### 4.5.1 Context for TDM Measures

The proposed development includes 1,900 residential units, 495,000ft<sup>2</sup> of office space, and 122,000 ft<sup>2</sup> of retail space. As the current development application is for Zoning, the exact unit breakdown of the residential buildings (i.e., studios, one-bedroom, two-bedrooms, etc.) is not known at this time.

The majority of the proposed development is located within 600m of a future Bus Rapid Transit station (stations at March Road and Solandt Road). However, per direction from the City of Ottawa, the March Road BRT is currently planned to terminate at Solandt Road by the horizons of the subject study. As such, only the southern portion of the subject site (i.e., the office component and the southern retail component) will be within 600m of a Bus Rapid Transit station at Solandt Road for the subject horizons. Due to the proximity of the proposed land uses to the future BRT station at Solandt, and the nature of the land uses themselves, the Transportation Demand Management (TDM) measures are different for the various proposed land uses.

### 4.5.2 Need and Opportunity

The mode shares for the residential portion of the proposed development were taken from the *TRANS Trip Generation Summary Report*, which states that the transit modal share for this district is 25%. As this transit mode share is notably high for the general area, it is not anticipated to see increase as a result of the planned March Road BRT (between Highway 417 and Solandt Road) as the distance between the transit station and the residential component of the proposed development is anticipated to be greater than 400m.

The modal shares for the office portion of the proposed development were also taken from the *TRANS Trip Generation Summary Report*, which states that the transit modal share for this district is 8%. To account for the planned March Road BRT (between Highway 417 and Solandt Road) after completion, the transit mode share for the office land use would increase from 8% to 20% (a 12% net increase) while subsequently reducing the auto mode share by 12% to a total of 72%.

The modal shares for the commercial portion of the proposed development were also taken from the *TRANS Trip Generation Summary Report*, which states that the transit modal share for this district is 1%. To account for the enhanced overall transit service as a result of the planned March Road BRT (between Highway 417 and Solandt Road), the transit mode share for the commercial land use was increased from 1% to 10% (a 9% net increase) while subsequently reducing the 73% auto mode share by 9% for a total of 64%.

Should the aforementioned transit modal share targets not be fully realized at the buildout of the subject development for the office and commercial land uses, the increase in two-way traffic volumes would equate to:

- AM Peak Hour: an additional 177 number of vehicle trips (increasing from 1,095 to 1,272)
- PM Peak Hour: an additional 192 number of vehicle trips (increasing from 1,231 to 1,423)

This represents roughly an 11% increase in vehicle trips should the desired transit modal share targets not be realized for the office and commercial land uses. As outlined in Section 4.9, there are existing congestion issues at the majority of the study area intersections, which will be exacerbated by the future growth, particularly in relation to the Kanata



North Urban Expansion Area. Should the development not reach their transit modal share targets for the office and commercial land uses, it is not expected to substantially impact the future operations at the study area intersections as it is a relatively small increase to future traffic. However, given the low assumed transit modal share targets for these two land uses, it is anticipated that these targets will be able to be met, particularly with the TDM measures, as described in the following subsection. According to the *March BRT Environmental Project Report (Final)* states that; to reflect Ottawa's growth transportation vision, the TMP aims for the highest level of future transit usage that can reasonably be achieved during commuter peak hours. The set target is 30% which means that 30% of all person-trips made using motorized modes (transit/auto) during peak hours would be by transit and 70% by automobile.

The TMP notes that while a 30% peak hour transit modal split represents a real challenge, it can be achieved if the required service strategies, transit priority measure and a variety of essential supporting actions are implemented in a coordinated and comprehensive fashion. One of the four TMP recommendations of response to this major transportation challenge, both in terms of encouraging desirable shifts in travel and in serving the resulting transit and traffic volumes in Transportation Demand Management discussed below for this development.

### **4.5.3 TDM Program**

The City of Ottawa's TDM-supportive design and infrastructure elements checklist was consulted to identify and incorporate TDM supportive measures into the design stage. The various land uses within the proposed development are planned to include specific TDM measures, as described below.

#### **RESIDENTIAL**

The following is a list of the TDM measures that apply to the residential land uses within the proposed development:

##### **Walking and Cycling routes**

- Locate building close to the street, and do not locate parking areas between the street and building entrances
- Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations
- Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort
- Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort
- Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances
- Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks
- Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps



- Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation.
- Provide safe, direct and attractive walking routes from building entrances to nearby transit stops
- Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible
- Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility
- Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails
- Provide wayfinding signage for site access (where required,

#### **Walking and cycling: end-of-trip facilities**

- Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible
- Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas
- Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored
- Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists
- Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers

#### **Transit**

- Provide shelters, lighting and benches at any on-site transit stops
- Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter

#### **Ridesharing**

- Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones

#### **Parking**

- Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for



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- Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking
- Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly

### **TDM Program Management**

- Designate an internal coordinator, or contract with an external coordinator

### **Walking and Cycling**

- Display local area maps with walking/cycling access routes and key destinations at major entrances;

### **Transit**

- Display relevant transit schedules and route maps at entrances;
- Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit

### **Parking**

- Unbundle parking cost from the purchase/lease price; and

### **TDM Marketing and Communications**

- Provide a multimodal travel option information package to new residents. The package would be redistributed to residents once transit projects in the vicinity of the area are completed, i.e., post the year 2026.

### **OFFICE**

In addition to the TDM measures listed above, the following is a list of the TDM measures that apply to the office and retail land uses within the proposed development.

#### **Walking and cycling: end-of-trip facilities**

- Provide shower and change facilities for the use of active commuters

### **Transit**

- Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools
- Provide online links to OC Transpo and STO information

### **Ride sharing**

- Provide a dedicated ride matching portal at [OttawaRideMatch.com](http://OttawaRideMatch.com)



### **Parking**

- Charge for long-term parking (daily, weekly, monthly)
- Unbundle parking cost from lease rates at multi-tenant sites

### **TDM Marketing & Communications**

- Provide a multimodal travel option information package to new/relocating employees and students

### **Other incentives & amenities**

- Encourage flexible work hours
- Provide local business travel options that minimize the need for employees to bring a personal car to work

The TDM checklists are contained in **Appendix B**.

## **4.6 NEIGHBOURHOOD TRAFFIC MANAGEMENT**

Not applicable; exempted during screening and scoping.

## **4.7 TRANSIT**

### **4.7.1 Route Capacity**

Due to the limits of the future March Road BRT (i.e., terminating at Solandt Road), the transit users for the specific proposed land uses will utilize different transit facilities based on their proximity (i.e., office employees will be within 400m of the BRT station at Solandt, whereas the residents of the residential buildings and the users of the retail components will not).

The March Road BRT will support growth along March Road, by providing fast, reliable, comfortable service which is an attractive alternative to the automobile; and supplying increased transportation network capacity necessary to support increased development densities in designated areas including this proposed development. It provides reliable and high-quality transit service and provides the best multimodal and TOD opportunities.

### **Residential and Commercial**

Per the distribution of the future residential and commercial trips as outlined in **Section 3.1.4**, 20% of the trips associated with the residential and commercial components will be destined to / from the north (via March Road north), 20% will be destined to / from the west (via Terry Fox Drive west), and 60% will be destined to / from the south (via March Road south). The residential and commercial components of the proposed development is anticipated to generate the following transit trips:

- 214 transit trips during the AM peak hour (75 inbound and 139 outbound); and
- 265 transit trips during the PM peak hour (146 inbound and 119 outbound).



Those traveling to / from the north equates to roughly 43 and 53 transit trips during the AM and PM peak hours, respectively. Based on the current transit schedule, there is only one transit route (Route 63- Innovation Station and Tunney's Pasture) that these transit users can take that head north, which operates with three buses per hour during the peak hours. This provides a total transit capacity of 204 based on a total individual bus capacity of 68 people (the average between standard bus – 45 people, articulated bus- 70 people and double-decker bus – 90 people). As such, the transit users destined to / from the north are anticipated to occupy roughly 21%-26% of transit capacity, based on the current transit schedules.

Those traveling to / from the west equates to roughly 43 and 53 transit trips during the AM and PM peak hours, respectively. Based on the current transit schedule, there are three transit routes (Routes 66,110,166 - refer to **Section 2.1.2.3**) that these transit users can take that head west, which operate with five buses per hour during the peak hours. This provides a total transit capacity of 340 based on a total individual bus capacity of 68 people (the average between standard and articulated buses). As such, the transit users destined to / from the west are anticipated to occupy roughly 13%-16% of transit capacity, based on the current transit schedules.

Those traveling to / from the south equates to roughly 128 and 159 transit trips during the AM and PM peak hours, respectively. Based on the current transit schedule, there are four transit routes (Routes, 63,64, 66,110 and 166- refer to **Section 2.1.2.3**) that these transit users can take that head south, which operate with 12 buses per hour during the peak hours. This provides a total transit capacity of 816 based on a total individual bus capacity of 68 people (the average between standard and articulated uses). As such, the transit users destined to / from the south are anticipated to occupy roughly 5%-6% of transit capacity, based on the current transit schedules.

The area to the east is all an employment area of offices, considering this, we do not anticipate trips being generated.

### **Office**

Per the distribution of the future office trips as outlined in **Section 3.1.4**, 50% of the office employees will be coming from the north and west (i.e., March Road north and Terry Fox Drive west) and 50% will be coming from the south (i.e., March Road south). The office component of the proposed development is anticipated to generate the following transit trips:

- 102 transit trips during the AM peak hour (90 inbound and 12 outbound); and
- 79 transit trips during the PM peak hour (13 inbound and 66 outbound).

The employees that are arriving to the proposed site via transit from the west and north are all assumed to take local transit routes. This equates to approximately 51 and 40 two-way transit trips during the AM and PM peak hours, respectively. Based on the current transit schedule, there are four transit routes (Routes, 63, 64, 110,166) that these transit users can take that head north and west, which operate with ten buses per hour during the peak hours. This provides a total transit capacity of 680 based on a total individual bus capacity of 68 people. As such, the office transit users destined to / from the north and west are anticipated to occupy roughly 6%-8% of transit capacity, based on the current transit schedules.

The employees that will be arriving to the proposed site via transit from the south are all assumed to take the future March Road BRT. This equates to approximately 128 and 99 two-way transit trips during the AM and PM peak hours, respectively. Per the *West Transitway Connection – Highway 417 / Eagleson Road to North of Maxwell Bridge Road*



*Environmental Project Report (Final)* (Delcan 2013), the future March Road BRT is anticipated to operate with 25 buses during the peak hours in the peak directions. As no indication was given as to how many buses will operate in the off-peak directions, it was assumed that 15 buses will do so, for a total of 40 two-way buses during the peak hours. OC Transpo buses have total capacities of approximately 68 (the average between standard bus – 45 people, articulated bus- 70 people and double-decker bus – 90 people), which equates to a total two-way March Road BRT capacity of 2,720 people during the peak hours. As such, the future office component of the proposed development is projected to occupy approximately 8% of the future March Road BRT.

The area to the east is all an employment area of offices, considering this, we do not anticipate trips being generated

## **4.8 REVIEW OF NETWORK CONCEPT**

The current zoning permits a total GFA of appx 2,275,000 ft<sup>2</sup>. As there are numerous land uses permitted under the existing zoning, it was assumed that the worst-case scenario in terms of traffic generation would be to construct an office of this size. This would result in appx 4,426 and 4,193 person trips during the AM and PM peak hours, respectively.

The proposed concept plan is reflection of the maximum allowable GFA of the proposed zoning. Therefore, the person trips associated with the proposed zoning is outlined in **Table 12**, which outlines there are 2311 and 2552 projected person trips during the AM and PM peak hours, respectively.

As such, the proposed zoning is not anticipated to generate more than 200 peak hour person-trips over the existing zoning, and thus, **Section 4.8** is exempt from the subject TIA.

## **4.9 INTERSECTION DESIGN**

### **4.9.1 Intersection Control**

The concept plan is proposing to include a total of eight site accesses to the subject development, seven of which will be stop controlled at the accesses and one signalized intersection at the proposed 'lifestyle' street. Access to Terry Fox Drive will be a right-in / right-out on the south side of Terry Fox Drive opposite the existing unsignalized intersection of Terry Fox Drive and McKinley Drive. This site access will be reinforced with a right-in/right-out island that will prevent motorists from turning left onto Terry Fox Drive as well as vehicles turning left from Terry Fox into the site.

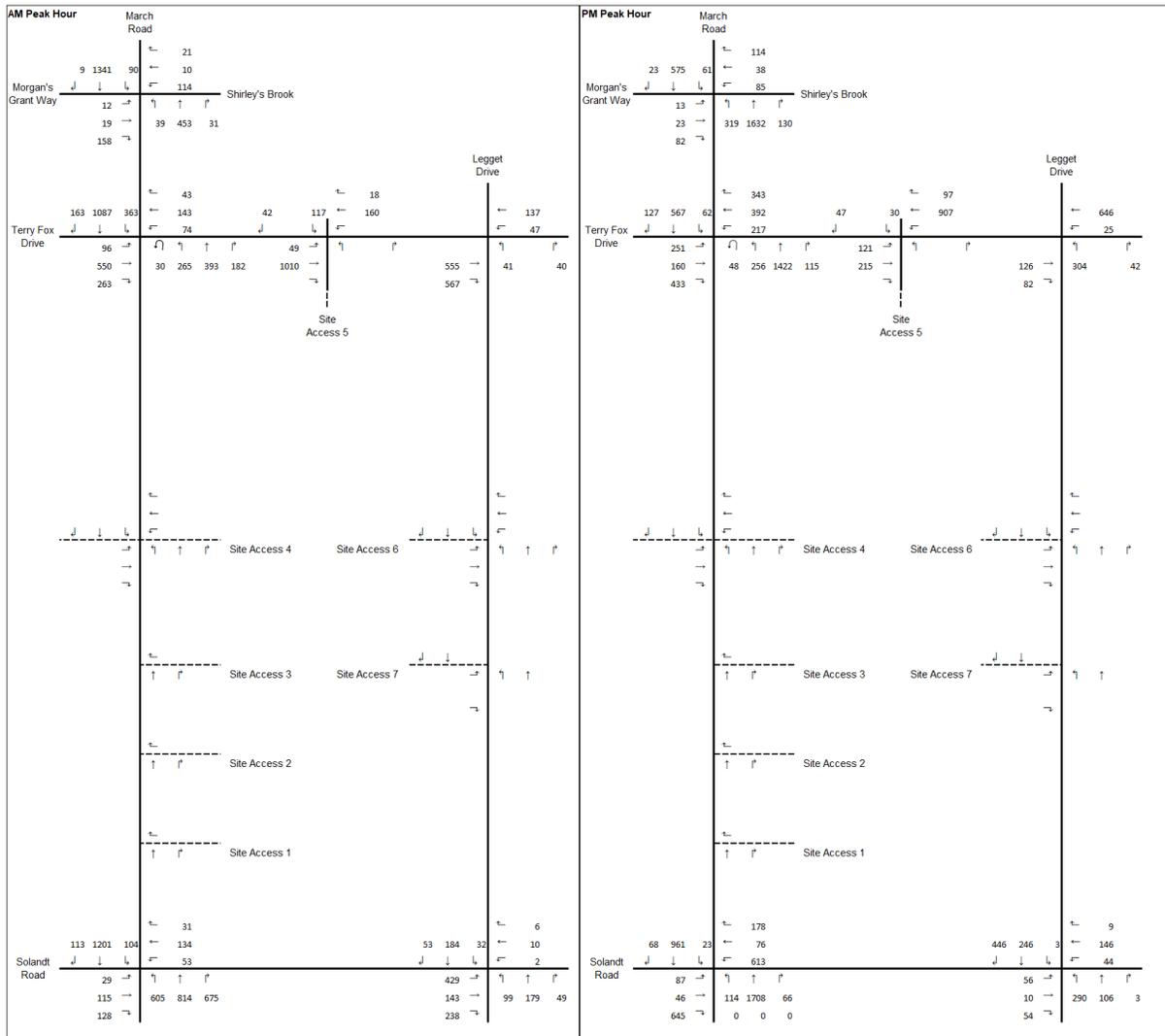
There are three accesses proposed on Legget Drive, which will all be stop-controlled at the entrances to Legget Drive. Legget Drive users will be free flowing.

Four accesses to the site are proposed on March Road, three are stop controlled, right-in right-out due to a median island along March Road, and one signalized all movement intersection. This signalized intersection is proposed to be located approximately 350m south of Terry Fox Drive and will not have a significant impact on the March Road BRT as signal coordination will be used along the corridor.

It should be noted that the exact location of this intersection may change slightly as the development proceeds through the approvals process.

**Figure 6 - 2022 Existing Traffic Volumes**

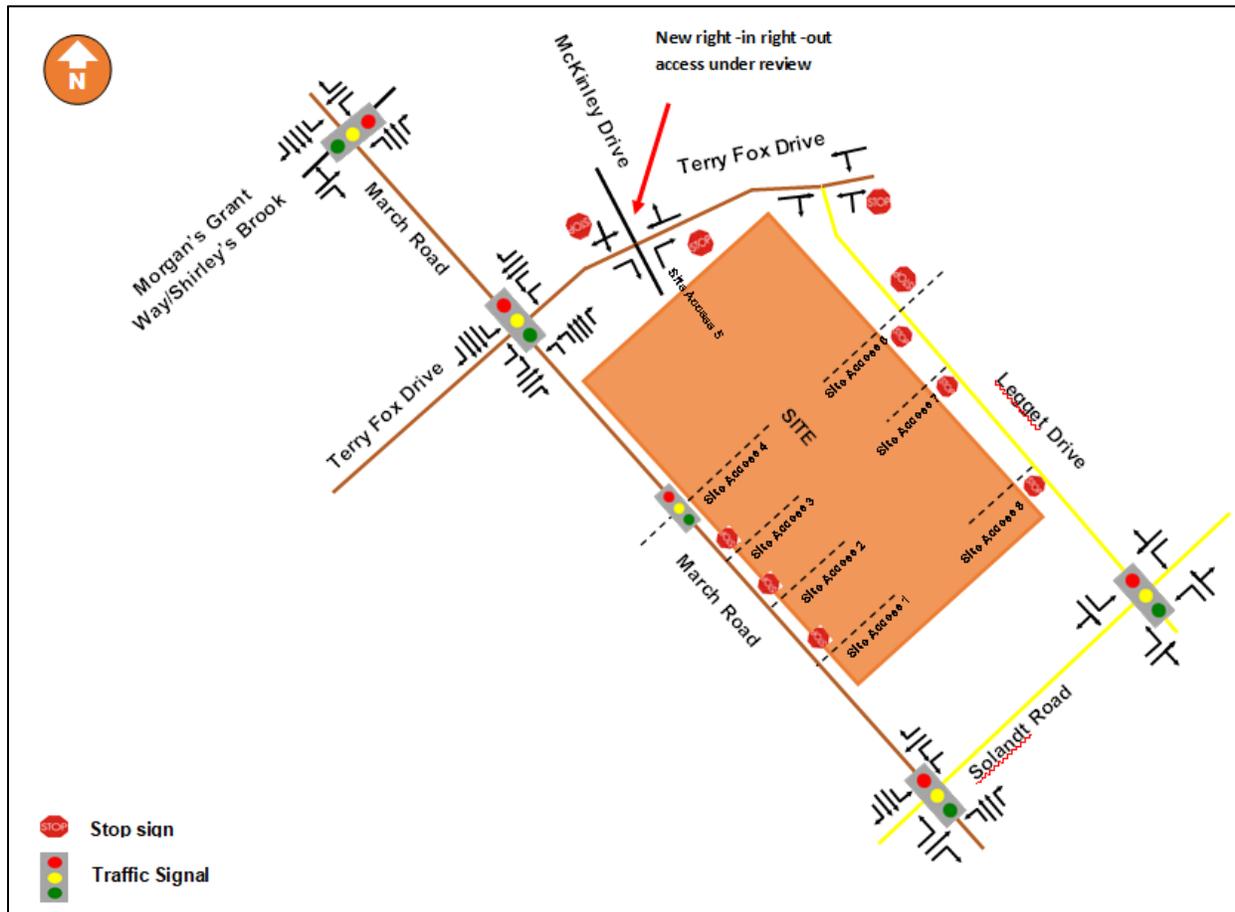




summarizes the accesses and traffic control proposed for the subject site.

Figure 6 - Future Intersection Control





### 4.9.2 Intersection Design

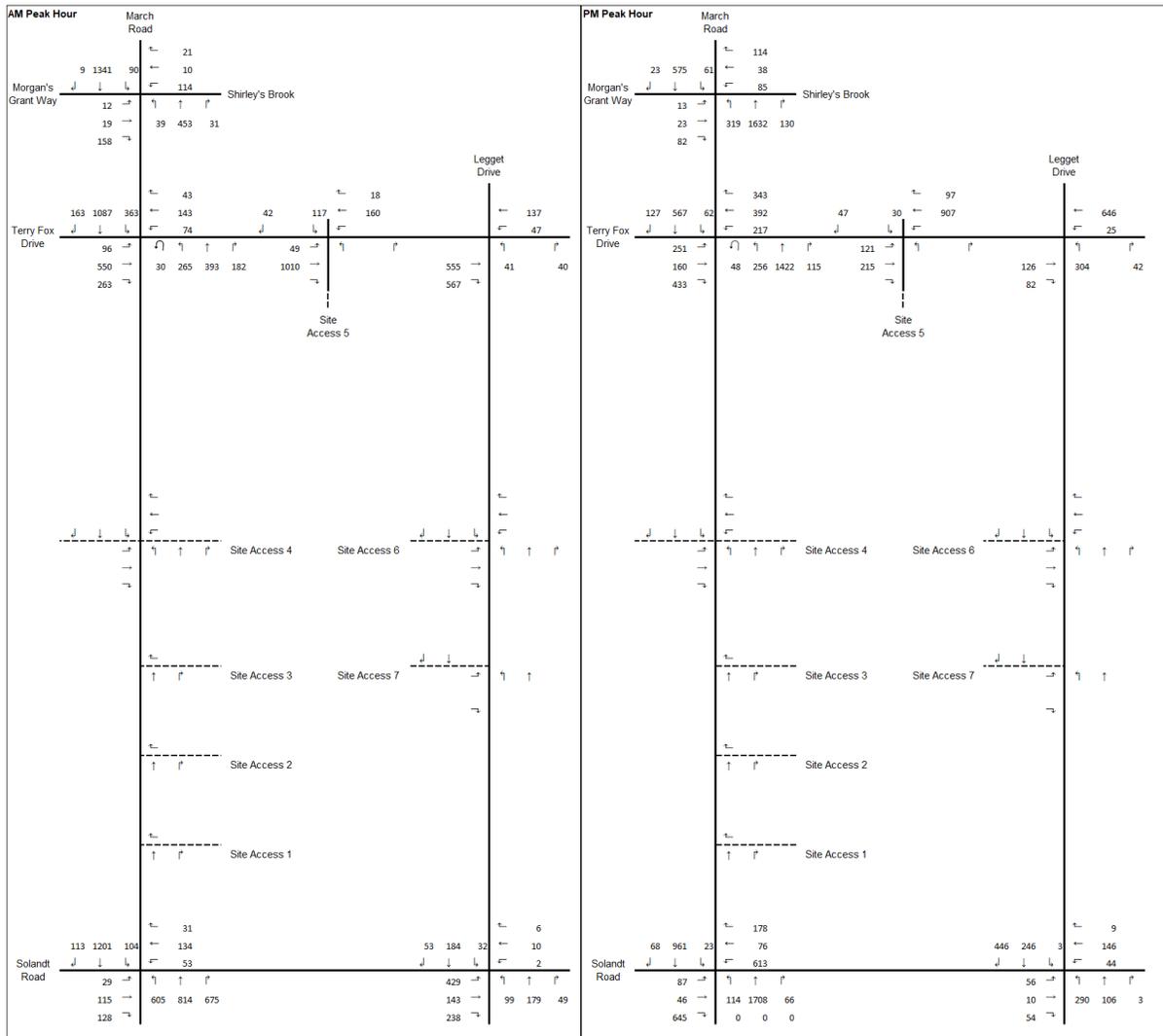
An assessment of the study area intersections was undertaken to determine the operational characteristics under the various horizons identified in the Screening and Scoping report. Intersection operational analysis was performed with Synchro 10.0™ software package and the MMLOS analysis was completed for all modes and compared against the City of Ottawa’s MMLOS targets.

#### 4.9.2.1 2022 Existing Conditions

Existing traffic volumes were used to determine the base year 2022 for analysis at the study area intersections. Using the City of Ottawa’s long-range model (exhibit 2.11 of the 2013 TMP), the weighted forecasted trip growth was calculated to / from the inner area (from 2011 to 2031), and it was found that the growth rate is approximately 1.9% per year. This annual growth rate was applied to the traffic counts to represent the 2022 existing traffic volumes.

Figure 6 - 2022 Existing Traffic Volumes





illustrates 2022 existing traffic volumes at the study area intersection during the AM and PM peak hours, respectively.

### Intersection Capacity Analysis

Table 15 summarizes the results of the Synchro analysis for the 2022 existing intersection operations.

#### March Road at Morgan’s Grant

During the 2022 horizon year, the intersection of March Road and Morgan’s Grant will operate at very good levels of service of A and B during the AM and PM peak hours, respectively.

The March Road BRT will support growth along March Road, by providing fast, reliable, comfortable service which is an attractive alternative to the automobile; and supplying increased transportation network capacity necessary to support increased development densities in designated areas including this proposed development.

#### March Road at Terry Fox Drive



The intersection of March Road at Terry Fox Drive currently has several individual movements operating with delays exceeding 50 seconds. In addition, the southbound left turn movement is operating at the theoretical capacity during the AM peak hour. This suggests there is little residual capacity for any future growth at this intersection. This signal timing plan at this intersection will be optimized in subsequent horizons to determine if the operations can be improved.

The March Road BRT will support growth along March Road, by providing fast, reliable, comfortable service which is an attractive alternative to the automobile; and supplying increased transportation network capacity necessary to support increased development densities in designated areas including this proposed development.

#### **March Road at Solandt Road**

The intersection of March Road at Solandt Road currently has several individual movements operating at or above theoretical capacity with excessive delays during both the AM and PM peak hours. Of particular note are the eastbound right turn movement during the PM peak hour (9 minutes of delay), the northbound through movement during the PM peak hour (2.5 minutes of delay), and the northbound left turn movement during the AM peak hour (4 minutes of delay). Overall, this intersection is exceeding capacity and motorists are currently having to wait for several cycles to clear the intersection. The signal timing plan of this intersection will be optimized in subsequent horizons to determine if the operations can be improved.

The March Road BRT will support growth along March Road, by providing fast, reliable, comfortable service which is an attractive alternative to the automobile; and supplying increased transportation network capacity necessary to support increased development densities in designated areas including this proposed development.

#### **Solandt Road at Legget Drive**

The southbound through/ right movement at the intersection of Solandt Road at Legget Drive currently operates at or above theoretical capacity during the PM peak hour with delays exceeding 1.5 minutes. The signal timing plan will be optimized in subsequent horizons to determine if the operations can be improved.

#### **Terry Fox Drive at Legget Drive**

The intersection of Terry Fox Drive at Legget Drive currently operates at or above theoretical capacity with delays exceeding two minutes in the northbound direction during the PM peak hour. This intersection will be further reviewed in subsequent horizons to determine if geometric changes or traffic control upgrades are required to improve the operations of this intersection.

#### **Terry Fox Drive and McKinley Drive**

The intersection of Terry Fox Drive and McKinley Drive will operate at satisfactory levels of service of C and D during both the AM and PM peak hours, respectively, in 2022.

All other study area intersections were found to operate acceptably.

Synchro analysis results can be found in **Appendix C**.



Table 15 - 2022 Existing Conditions - Intersection Operations

Intersection	Intersection Control	Approach / Movement	LOS	V/C	Delay (s)	Queue 95th (m)	
March Road and Morgan's Grant Way	Signalized	EB	Through	A (A)	0.15 (0.24)	49.8 (52.9)	17 (20)
			Right	A (A)	0.12 (0.06)	49.5 (51.3)	19 (15)
		WB	Left	C (B)	0.71 (0.61)	65.5 (61.8)	50 (39)
			Through	A (A)	0.05 (0.20)	48.8 (52.5)	8 (20)
		NB	Right	A (A)	0.02 (0.08)	48.6 (51.5)	0 (17)
			Left	A (D)	0.44 (0.86)	56.2 (81.4)	25 (m#136)
			Through	A (A)	0.18 (0.56)	11.2 (3.4)	16 (25)
		SB	Right	A (A)	0.02 (0.11)	10.0 (0.4)	m0 (m0)
			Left	A (A)	0.59 (0.56)	61.2 (63.9)	42 (31)
			Through	A (A)	0.46 (0.27)	11.8 (19.6)	97 (43)
				Right	A (A)	0.01 (0.02)	8.0 (17.0)
		<b>Overall Intersection</b>	<b>A (B)</b>	<b>0.53 (0.66)</b>	<b>20.6 (21.4)</b>	<b>-- (--)</b>	
March Road and Terry Fox Drive	Signalized	EB	Left	A (C)	0.49 (0.71)	60.4 (60.9)	23 (50)
			Through	C (A)	0.77 (0.19)	51.3 (36.4)	94 (28)
			Right	A (E)	0.25 (0.93)	41.3 (73.2)	28 (#158)
		WB	Left	A (B)	0.40 (0.65)	59.7 (59.6)	19 (44)
			Through	A (A)	0.21 (0.48)	40.7 (40.5)	26 (65)
		NB	Right	A (A)	0.03 (0.46)	39.0 (40.8)	0 (57)
			Left	C (D)	0.72 (0.85)	56.1 (64.7)	55 (m33)
			Through	A (E)	0.30 (0.95)	47.1 (23.4)	52 (m133)
		SB	Right	A (A)	0.16 (0.09)	113.8 (26.3)	41 (m4)
			Left	F (A)	1.26 (0.57)	192.2 (68.9)	#209 (34)
			Through	B (A)	0.67 (0.45)	28.9 (31.9)	124 (43)
		Right	A (A)	0.13 (0.10)	18.6 (21.3)	13 (9)	
		<b>Overall Intersection</b>	<b>D (E)</b>	<b>0.84 (0.94)</b>	<b>59.4 (40.1)</b>	<b>-- (--)</b>	
March Road and Solandt Road	Signalized	EB	Left	A (A)	0.60 (0.59)	79.9 (61.5)	19 (41)
			Through	A (A)	0.49 (0.15)	52.4 (43.3)	48 (23)
			Right	A (F)	0.10 (2.08)	48.2 (548.3)	17 (#324)
		WB	Left	A (E)	0.41 (0.95)	62.4 (71.7)	15 (#124)
			Through / Right	B (A)	0.66 (0.45)	57.1 (36.5)	65 (73)
		NB	Left	F (F)	1.38 (1.01)	226.3 (112.6)	#292 (#60)
			Through	A (F)	0.41 (1.25)	10.6 (154.1)	77 (#361)
			Right	A (A)	0.56 (0.05)	13.9 (20.7)	57 (8)
		SB	Left	A (A)	0.57 (0.47)	51.5 (45.9)	m#41 (m9)
			Through	F (E)	1.09 (0.90)	100.5 (37.5)	#263 (#156)
			Right	A (A)	0.09 (0.05)	101.7 (24.7)	m24 (m0)
		<b>Overall Intersection</b>	<b>F (F)</b>	<b>1.24 (1.45)</b>	<b>79.9 (159.3)</b>	<b>-- (--)</b>	
Solandt Road and Legget Drive	Signalized	EB	Left	C (A)	0.71 (0.33)	14.4 (36.4)	86 (23)
			Through / Right	A (A)	0.45 (0.08)	9.6 (33.8)	49 (13)
		WB	Left	A (A)	0.00 (0.21)	7.1 (34.9)	1 (19)
			Through / Right	A (B)	0.02 (0.66)	7.2 (43.8)	4 (53)
		NB	Left	A (C)	0.41 (0.75)	17.7 (34.3)	30 (#87)
			Through / Right	A (A)	0.50 (0.10)	18.0 (5.2)	56 (15)
		SB	Left	A (A)	0.13 (0.01)	15.5 (17.9)	12 (2)
			Through / Right	A (F)	0.52 (1.10)	18.1 (96.2)	58 (#258)
		<b>Overall Intersection</b>	<b>B (E)</b>	<b>0.64 (0.91)</b>	<b>14.5 (63.5)</b>	<b>-- (--)</b>	
Terry Fox Drive and Legget Drive	Minor Stop	EB	Through / Right	C (A)	0.73 (0.14)	0.0 (0.0)	0 (0)
		WB	Left / Through	A (A)	0.12 (0.02)	5.2 (0.6)	3 (1)
		NB	Left / Right	D (F)	0.45 (1.30)	37.2 (191.4)	16 (142)
			<b>Overall Intersection</b>	<b>D (C)</b>	<b>0.81 (0.81)</b>	<b>2.4 (54.4)</b>	<b>-- (--)</b>



Intersection	Intersection Control	Approach / Movement	LOS	V/C	Delay (s)	Queue 95th (m)	
Terry Fox Drive and McKinley Drive	Minor Stop	EB	Left	A (A)	0.04 (0.20)	7.7 (12.2)	1 (6)
			Through	B (A)	0.66 (0.14)	0.0 (0.0)	0 (0)
		WB	Left/Through	A (C)	0.04 (0.66)	1.5 (2.4)	1 (2)
			Left/Right	D (A)	0.98 (0.37)	112.4 (37.8)	61 (30)
		<b>Overall Intersection</b>	<b>B (D)</b>	<b>0.69 (0.79)</b>	<b>9.8 (4.6)</b>	<b>--(--)</b>	

Notes:

1. Table format: AM (PM)
2. v/c – represents the anticipated volume divided by the predicted capacity
3. # 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles
4. Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections

### Intersection Multi-Modal Level of Service (MMLOS)

A multi-modal level of service (MMLOS) assessment was completed for the signalized intersection within the study area under 2022 existing conditions. The results of this analyses can be found in **Table 16** below.

**Table 16 – 2022 Existing - Multi-Modal Level of Service Assessment**

Intersection		PLOS	BLOS	TLOS	TkLOS	VLOS
<b>March Road at Morgan's Grant Way</b>	Existing	F	F	F	C	B
	Target	C	B	D	D	D
<b>March Road at Terry Fox Drive</b>	Existing	F	F	F	A	D
	Target	C	B	D	B	D
<b>March Road at Solandt Road</b>	Existing	F	F	F	A	F
	Target	C	C	D	B	D
<b>Solandt Road at Legget Drive</b>	Existing	F	C	F	C	E
	Target	C	C	D	D	D

#### March Road and Morgan's Grant Way

The intersection of March Road and Morgan's Grant is situated in a General Urban Area. March Road is classified as an Arterial roadway and Morgan's Grant Way is classified as a collector roadway. The Pedestrian Level of Service (PLOS) at this intersection is operating at PLOS F, which does not meet the desired target of C for both the Arterial and Collector Roadway. Reducing the number of lanes at the intersection is not feasible. However, incorporating pedestrian refuge areas by means of wide medians (i.e. >2.4m) is not expected to improve the PLOS.

The Bicycle Level of Service (BLOS) is currently operating at a BLOS of F at the intersection of March Road at Morgan's Grant Way, which does not meet the desired target of B. Based on the MMLOS guidelines, intersection BLOS is influenced by the availability of dedicated cycling amenities, number of lanes cyclists must cross to negotiate a turn at intersections, and roadway operating speeds. Introducing dedicated bike lanes as well as reducing the speed limit to



50 km/h is expected to result in meeting the desired BLOS target of E. As the March Road BRT plans include cycling infrastructure (i.e., cycle tracks), it is not recommended to implement any improvements as an interim mitigation measure. The Ultimate Cycling Network from the City of Ottawa's Cycling Plan (2013) designates March Road as a spine cycling route. The intersection is therefore subject to a Bicycle Level of Service (BLOS) target of B.

#### March Road and Terry Fox Drive

The intersection of March Road and Terry Fox Drive is situated in an Urban Employment Area with March Road being classified as an arterial roadway and Terry Fox Drive classified as a major collector roadway across the frontage of the subject site. Based on these classifications, the governing Pedestrian Level of Service (PLOS) target is C (for a Urban Employment Area). The Ultimate Cycling Network from the City of Ottawa's Cycling Plan (2013) designates both March Road and Terry Fox Drive as a spine cycling route. The intersection is therefore subject to a Bicycle Level of Service (BLOS) target of C. March Road is designated as a transit route with isolated transit priority measures in 2021 in the vicinity of the intersection, equating to a Transit Level of Service (TLOS) target of D. The Truck Level of Service (TkLOS) is D.

The intersection of March Road and Terry Fox Drive currently operates with a Pedestrian Level of Service (PLOS) of F, which does not meet the target of C. This is attributed to the 130s cycle length during the PM peak period coupled with the short effective walk times in the east-west direction due to the 28s phase length. Another contributing factor is the high number of lanes that have to be crossed by pedestrians (10+ lanes) along all the legs of the intersection. Reducing the cycle length and the number of lanes on March Road and Terry Fox Drive and incorporating raised crosswalks at this intersection would improve the PLOS based on the PETS I score. To improve the PLOS based on the pedestrian delay, the cycle length would need to be greatly reduced. Although these methods would improve the PLOS at this intersection, they are not feasible options as they would be to the detriment of the vehicles. It is noted that the future March Road cross section (2031 and beyond) will see different infrastructure and lane arrangements.

The Bicycle Level of Service (BLOS) at the intersection of March Road and Terry Fox Drive currently operates with a BLOS of F, which does not meet the target of B. Methods for improving the BLOS at this intersection include reducing the speed limit and number of lanes along March Road and Terry Fox Drive, but this approach is not feasible as it would be to the detriment of the vehicles on the roadway. Another method for improving the BLOS operations would be to install multi-use pathways with two-stage left turns. It is noted that the future March Road cross section (2031 and beyond) will see different infrastructure and lane arrangements.

The Transit Level of Service (TLOS) at the intersection of March Road and Terry Fox Drive currently operates with a TLOS of F, which does not meet the target of D. Based on the MMLOS guidelines, intersection TLOS is governed by the delay at the intersection. It is noted that transit measures including transit priority and queue jump lanes signaling along March Road will be constructed by 2031 and coupled with the March Road BRT between Maxwell Bridge and Highway 417 (by 2031), is anticipated to result in reductions in vehicular traffic that would allow for shorter bus travel times and signal timing optimizations.

The Truck Level of Service (TkLOS) at the intersection of March Road and Terry Fox Drive currently operates with a TkLOS of A, which meets the desired target of B.

Once the aforementioned transit priority measures and BRT are completed, the operations and lane geometry at this intersection will change. It is therefore not recommended to address the MMLOS at this time.



### March Road at Solandt Road

The PLOS, BLOS and TLOS current operations are similar to those at March Road at Terry Fox Drive, the aforementioned solutions apply to this intersection to meet their respective targets.

The Vehicular Level of Service (VLOS) at the intersection of March Road at Terry Fox Drive is currently operating at VLOS of F, which does not meet the desired target of D. With the implementation of BRT along this intersection, transit ridership is expected to increase hence reducing auto passenger trips.

### Solandt at Legget Drive

The intersection of Solandt at Legget Drive is situated in the Employment Area. Both Solandt Road and Legget Drive are classified as collector roadways. The Pedestrian Level of Service (PLOS) is projected to operate at F, which does not meet the desired target C. Based on the MMLOS guidelines, intersection PLOS is largely influenced by the number of lanes pedestrians cross. Due to the nature of arterial roads, reducing the number of lanes at the intersection is not a feasible option especially with the implementation of the March Road BRT.

The intersection meets the Bicycle Level of Service (BLOS) target of C.

The Transit Level of Service (TLOS) is projected to operate with a TLOS of F, which does not meet the targeted value of C. Based on the MMLOS guidelines, intersection TLOS is governed by the delay at the intersection. Buses are expected to operate with less than 40 seconds of delay, which is significantly high compared to general traffic. Implementing intersection modifications or operating aggressive forms of TSP operations (i.e. skipping and rotating traffic phases) could improve transit service but can severely impact other modes of transportation.

The Vehicular Level of Service (VLOS) is projected to operate with a VLOS of E, which does not meet the desired target of D. Increasing the number of lanes at this intersection would increase capacity and thus improve the VLOS, however, it would be to the detriment of the other modes of transportation and is therefore not recommended.

Intersection MMLOS results can be found in **Appendix D**.

## **4.9.2.2 2032 Future Background Conditions**

The 2032 future background traffic volumes represent traffic volumes adjacent to the site before adding in trips generated by the site. **Figure 17** illustrates 2032 Future Background traffic volumes at the study area intersection during the AM and PM peak hours, respectively.

### **Intersection Capacity Analysis**

**Table 17** summarizes the results of the Synchro analysis for the 2032 Future Background intersection operations.

### **March Road at Morgan's Grant**

During the 2032 horizon year, the intersection of March Road and Morgan's Grant will begin to experience at capacity operations at several movements during both the AM and PM peak hours. More specifically, the westbound and



southbound left turn movements during the AM peak hour, and the westbound, northbound, and southbound left turn movements during the PM peak hour.

**March Road at Terry Fox Drive**

The intersection of March Road at Terry Fox Drive will operate with several individual movements operating with delays exceeding 60 seconds. In addition, the eastbound and westbound left turn movements are operating at capacity during the AM and PM peak hours. The critical movements are the northbound right and southbound left during the AM peak hour operating with more than two minutes of delay per vehicle. This suggests there is little residual capacity for any future growth at this intersection. This signal timing plan at this intersection will be optimized in subsequent horizons to determine if the operations can be improved.

**March Road at Solandt Road**

The intersection of March Road at Solandt Road will continue to operate with several individual movements operating at or above theoretical capacity with excessive delays during both the AM and PM peak hours. Of particular note are the northbound left and through/right movements which will operate with excessive delays during both peak hours. During the PM peak hour, the eastbound right westbound left and northbound left will operate over capacity. Overall, this intersection is expected to continue experiencing major capacity issues with motorists having to wait for significant periods of time. The signal timing plan of this intersection will be optimized in subsequent horizons to determine if the operations can be improved.

**Solandt Road at Legget Drive**

This intersection will operate under capacity during background conditions as a result of signal timing optimization.

**Terry Fox Drive at Legget Drive**

The intersection of Terry Fox Drive at Legget Drive will generally operate at acceptable levels besides the northbound left/right movement operating at 1.8 minutes of delay in the PM peak period.

**Terry Fox Drive and McKinley Drive**

The intersection of Terry Fox Drive and McKinley Drive will operate at satisfactory levels of service in 2032 during background traffic conditions except southbound left/through/right movement which is operating at theoretical capacity with a delay of 2.8 minutes during the AM peak hour.

Synchro analysis results can be found in **Appendix C**.

**Table 17 - 2032 Future Background Intersection Operations**

Intersection	Intersection Control	Approach / Movement	LOS	V/C	Delay (s)	Queue 95th (m)	
<b>March Road and Morgan's Grant Way</b>	Signalized	EB	Through	A (A)	0.31 (0.36)	52.7 (54.1)	28 (30)
			Right	A (A)	0.09 (0.05)	50.7 (51.1)	17 (11)
		WB	Left	B (A)	0.66 (0.58)	63.8 (60.1)	43 (37)
			Through	A (A)	0.09 (0.38)	50.7 (54.3)	11 (31)
			Right	A (A)	0.02 (0.29)	50.0 (53.5)	0 (30)
		NB	Left	A (B)	0.43 (0.67)	53.6 (66.7)	M20 (m77)



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Intersection	Intersection Control	Approach / Movement	LOS	V/C	Delay (s)	Queue 95th (m)			
		Through	A (D)	0.36 (0.85)	8.5 (10.2)	26 (m210)			
		Right	A (A)	0.02 (0.13)	11.3 (0.2)	m0 (m0)			
		Left	B (B)	0.66 (0.66)	60.2 (60.2)	59 (59)			
		Through	B (A)	0.64 (0.48)	13.6 (22.7)	154 (83)			
		Right	A (A)	0.01 (0.01)	7.4 (17.0)	0 (0)			
		<b>Overall Intersection</b>	<b>B (D)</b>	<b>0.66 (0.81)</b>	<b>18.5 (23.0)</b>	<b>-- (--)</b>			
March Road and Terry Fox Drive	Signalized	EB	Left	B (C)	0.70 (0.77)	68.1 (63.7)	#34 (55)		
			Through	B (A)	0.68 (0.20)	51.4 (43.8)	72 (22)		
			Right	A (A)	0.16 (0.49)	43.8 (47.7)	21 (50)		
		WB	Left	A (B)	0.47 (0.62)	61.8 (59.3)	18 (38)		
			Through	A (A)	0.20 (0.55)	45.6 (49.7)	22 (51)		
			Right	A (C)	0.05 (0.73)	44.3 (59.9)	0 (71)		
		NB	Left	B (B)	0.64 (0.66)	39.1 (60.1)	45 (41)		
			Through	A (F)	0.56 (1.08)	64.1 (70.0)	90 (#299)		
			Right	A (A)	0.11 (0.07)	154.1 (32.5)	37 (m5)		
		SB	Left	F (A)	1.14 (0.55)	136.0 (60.6)	#234 (41)		
			Through	C (A)	0.79 (0.57)	24.0 (41.7)	#187 (86)		
			Right	A (A)	0.17 (0.13)	6.2 (79.7)	8 (25)		
		<b>Overall Intersection</b>	<b>D (E)</b>	<b>0.89 (0.91)</b>	<b>53.4 (58.5)</b>	<b>-- (--)</b>			
		March Road and Solandt Road	Signalized	EB	Left	A (C)	0.55 (0.74)	70.1 (76.3)	21 (#54)
					Through	A (A)	0.44 (0.10)	54.1 (38.3)	39 (19)
Right	A (F)				0.08 (1.50)	50.5 (290.6)	6 (#257)		
WB	Left			A (F)	0.36 (1.75)	62.0 (407.9)	13 (#149)		
	Through / Right			B (A)	0.68 (0.49)	63.0 (42.4)	56 (67)		
NB	Left			F (F)	1.83 (1.44)	439.0 (320.4)	#290 (#75)		
	Through/Right			F (F)	1.08 (1.51)	77.5 (268.8)	#307 (#479)		
SB	Left			B (C)	0.62 (0.74)	57.9 (117.4)	#83 (#19)		
	Through/Right			F (F)	1.23 (1.07)	146.5 (84.1)	#383 (#268)		
<b>Overall Intersection</b>	<b>F (F)</b>			<b>1.25 (1.59)</b>	<b>144.1 (218.9)</b>	<b>-- (--)</b>			
Solandt Road and Legget Drive	Signalized			EB	Left	C (A)	0.73 (0.32)	15.8 (35.9)	97 (24)
		Through / Right	A (A)		0.39 (0.04)	9.5 (33.4)	40 (11)		
		WB	Left	A (A)	0.02 (0.19)	7.5 (34.6)	3 (16)		
			Through / Right	A (A)	0.02 (0.53)	7.4 (38.8)	4 (41)		
		NB	Left	A (B)	0.42 (0.64)	19.2 (21.7)	31 (58)		
			Through / Right	A (A)	0.40 (0.07)	18.4 (4.5)	49 (10)		
		SB	Left	A (A)	0.01 (0.01)	15.9 (16.4)	3 (2)		
			Through / Right	A (E)	0.58 (0.90)	20.7 (40.5)	72 (#191)		
		<b>Overall Intersection</b>	<b>B (C)</b>	<b>0.68 (0.75)</b>	<b>15.6 (33.0)</b>	<b>-- (--)</b>			
Terry Fox Drive and Legget Drive	Minor Stop	EB	Through / Right	B (A)	0.67 (0.14)	0.0 (0.0)	0 (0)		
		WB	Left / Through	A (A)	0.09 (0.02)	3.8 (0.5)	2 (0)		
		NB	Left / Right	A (F)	0.35 (1.06)	29.9 (105.5)	11 (92)		
		<b>Overall Intersection</b>	<b>C(C)</b>	<b>0.74 (0.76)</b>	<b>2.1 (27.0)</b>	<b>-- (--)</b>			
Terry Fox and McKinley Drive	Minor Stop	EB	Left	A (A)	0.03 (0.16)	7.8 (11.5)	1 (4)		
			Through	B (A)	0.64 (0.19)	0.0 (0.0)	0 (0)		
		WB	Through/Right	A (B)	0.13 (0.62)	0.0 (0.0)	0 (0)		
		SB	Left/Through/Right	F (A)	1.07 (0.28)	164.8 (8.5)	60 (9)		
		<b>Overall Intersection</b>		<b>0.69 (0.73)</b>	<b>15.6 (1.9)</b>	<b>--(--)</b>			

**Notes:**

1. Table format: AM (PM)
2. v/c – represents the anticipated volume divided by the predicted capacity
3. # 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles
4. Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections



### **Multi-Modal Level of Service Assessment**

The intersection operations remain similar to existing conditions; therefore, the intersection MMLOS discussion in **Section 4.9.2.1** applies to the 2022 future background analysis.

**Appendix D** contains the detailed MMLOS analysis and is provided for reference

### **4.9.2.3 2032 Future Total Traffic Conditions**

The 2032 future total traffic volumes represent traffic volumes at the site after adding the trips generated by the site to the 2032 background traffic network. **Figure 19** illustrates 2032 Total Future traffic volumes at the study area intersection during the AM and PM peak hours, respectively.

### **Intersection Capacity Analysis**

**Table 18** summarizes the results of the Synchro analysis for the 2032 Future Total Traffic intersection operations.

#### **March Road at Morgan's Grant**

During the 2032 horizon year, the intersection of March Road and Morgan's Grant will operate at similar levels of service as the 2032 background traffic volume scenario with the westbound and southbound left turn movements during the AM peak hour, and the westbound, northbound, and southbound left turn movements during the PM peak hour experiencing delays in excess of 1 minute.

#### **March Road at Terry Fox Drive**

The intersection of March Road at Terry Fox Drive will operate with a few individual movements operating at or above theoretical capacity with excessive delays during both the AM and PM peak hours. Of particular note is the northbound through movement with almost two minutes of delay during the AM peak hour. Overall, this intersection is not experiencing major capacity issues and motorists will not have to wait for significant periods of time.

#### **March Road at Solandt Road**

The intersection of March Road at Solandt Road will operate with several individual movements operating at or above theoretical capacity with excessive delays during both the AM and PM peak hours. Of particular note are the northbound and southbound approaches during both peak hours and the eastbound and westbound approaches during the PM peak hour. Overall, this intersection will experience major capacity issues and motorists will have to wait for significant periods of time. The completion of the BRT to Maxwell Bridge is anticipated to reduce the number of vehicle trips as people transition to transit. The current shift to telecommuting may also contribute to improved operations at this intersection.

#### **Solandt Road at Legget Drive**

The southbound through/right movement at the intersection of Solandt Road at Legget Drive will operate at theoretical capacity during the PM peak hour with a v/c ratio of 1.01 and a delay in excess of 1 min. Therefore, the delays at this intersection are not significant.



### Terry Fox Drive at Legget Drive

The intersection of Terry Fox Drive at Legget Drive will generally operate at acceptable levels.

### Terry Fox Drive and McKinley Drive

The intersection of Terry Fox Drive and McKinley Drive will operate at satisfactory levels of service with the addition of site traffic opposite McKinley Drive.

### Site Accesses

The northbound through movement at site accesses 1-4 currently operate at or above theoretical capacity during the PM peak hour with delay of 2 minutes at the unsignalized access (March Road and site access 4).

The other study area intersections were found to operate at acceptable levels of service.

Synchro analysis results can be found in **Appendix C**.

**Table 18 - 2032 Future Total Traffic Intersection Operations**

Intersection	Intersection Control	Approach / Movement	LOS	V/C	Delay (s)	Queue 95th (m)		
March Road and Morgan's Grant Way	Signalized	EB	Through	A (A)	0.31 (0.36)	52.7 (54.1)	28 (30)	
			Right	A (A)	0.09 (0.05)	50.7 (51.1)	17 (11)	
		WB	Left	B (A)	0.66 (0.58)	63.8 (60.1)	43 (37)	
			Through	A (A)	0.09 (0.38)	50.7 (54.3)	11 (31)	
			Right	A (A)	0.02 (0.30)	50.0 (53.5)	0 (31)	
		NB	Left	A (B)	0.43 (0.67)	51.5 (67.2)	m19 (m70)	
			Through	A (E)	0.39 (0.91)	12.2 (9.4)	32 (m206)	
			Right	A (A)	0.02 (0.13)	11.3 (0.0)	m0 (m0)	
		SB	Left	B (B)	0.66 (0.66)	60.2 (60.2)	59 (59)	
			Through	B (A)	0.70 (0.53)	14.9 (23.5)	181 (94)	
			Right	A (A)	0.01 (0.01)	7.4 (17.0)	0 (0)	
		<b>Overall Intersection</b>			<b>C (D)</b>	<b>0.71 (0.85)</b>	<b>19.8 (22.4)</b>	<b>-- (--)</b>
		March Road and Terry Fox Drive	Signalized	EB	Left	B (C)	0.70 (0.77)	68.1 (63.7)
Through	B (A)				0.65 (0.30)	50.6 (46.1)	69 (31)	
Right	A (A)				0.22 (0.50)	44.6 (49.2)	25 (51)	
WB	Left			A (A)	0.42 (0.56)	61.4 (58.8)	17 (32)	
	Through			A (A)	0.19 (0.56)	45.8 (52.8)	20 (46)	
	Right			A (A)	0.04 (0.60)	44.5 (55.5)	0 (54)	
NB	Left			C (C)	0.71 (0.74)	45.8 (49.4)	m55 (m43)	
	Through			B (F)	0.61 (1.20)	61.6 (126.2)	91 (m#300)	
	Right			A (A)	0.11 (0.11)	157.4 (35.1)	m30 (m6)	
SB	Left			F (B)	1.04 (0.65)	104.2 (59.6)	#214 (54)	
	Through			E (B)	0.95 (0.65)	34.8 (47.4)	#243 (94)	
	Right			A (A)	0.20 (0.13)	8.1 (94.9)	11 (27)	
<b>Overall Intersection</b>				<b>E (E)</b>	<b>0.93 (0.99)</b>	<b>52.6 (80.9)</b>	<b>-- (--)</b>	
	Signalized	EB	Left	A (C)	0.55 (0.74)	70.1 (76.3)	21 (#54)	



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Intersection	Intersection Control	Approach / Movement	LOS	V/C	Delay (s)	Queue 95th (m)		
March Road and Solandt Road		WB	Through	A (A)	0.44 (0.10)	54.1 (38.3)	39 (19)	
			Right	A (F)	0.08 (1.50)	50.5 (290.6)	6 (#257)	
		NB	Left	A (F)	0.42 (2.01)	62.6 (521.8)	15 (#173)	
			Through / Right	B (A)	0.68 (0.49)	63.0 (42.4)	56 (67)	
		SB	Left	F (F)	1.83 (1.44)	439.0 (320.4)	#290 (#75)	
			Through/Right	F (F)	1.28 (1.70)	161.0 (352.3)	#407 (#558)	
		Overall Intersection			F (F)	1.35 (1.23)	197.9 (147.7)	#434 (#330)
					F (F)	1.31 (1.73)	192.9 (284.2)	-- (--)
		Solandt Road and Legget Drive	Signalized	EB	Left	A (A)	0.40 (0.17)	9.5 (34.5)
Through / Right	A (A)				0.39 (0.04)	9.4 (33.4)	27 (11)	
WB	Left			A (A)	0.03 (0.19)	7.7 (34.2)	3 (16)	
	Through / Right			A (A)	0.03 (0.53)	7.7 (36.4)	3 (41)	
NB	Left			A (B)	0.34 (0.70)	11.8 (24.7)	16 (67)	
	Through / Right			A (A)	0.38 (0.07)	11.7 (4.5)	26 (10)	
SB	Left			A (A)	0.01 (0.01)	10.0 (16.4)	2 (2)	
	Through / Right			A (F)	0.56 (1.01)	13.3 (66.3)	39 (#226)	
Overall Intersection					A (D)	0.47 (0.83)	11.0 (48.8)	-- (--)
Terry Fox Drive and Legget Drive	Minor Stop	EB	Through / Right	B (A)	0.60 (0.12)	0.0 (0.0)	0 (0)	
		WB	Left / Through	A (A)	0.08 (0.02)	3.3 (0.5)	2 (0)	
		NB	Left / Right	A (A)	0.17 (0.61)	20.2 (31.9)	5 (29)	
		Overall Intersection			B (B)	0.66 (0.69)	1.3 (6.0)	-- (--)
March Road & Site Access 1	Minor stop	WB	Right	A (A)	0.01 (0.01)	11.8 (11.5)	0 (0)	
		NB	Through	B (F)	0.61 (1.05)	0.0 (0.0)	0 (0)	
			Right	A (A)	0.53 (0.56)	0.0 (0.0)	0 (0)	
		SB	Through	A (A)	0.0 (0.00)	0.0 (0.0)	0 (0)	
		Overall Intersection			A (D)	0.60 (0.82)	0.0 (0.0)	--(--)
March and Site Access 2	Minor Stop	WB	Right	A (A)	0.01 (0.01)	11.5 (0.0)	0 (0)	
		NB	Through	A (F)	0.52 (1.05)	0.0 (0.0)	0 (0)	
			Right	A (A)	0.30 (0.56)	0.0 (0.0)	0 (0)	
		SB	Left	A (A)	0.00 (0.00)	0.0 (0.0)	0 (0)	
			Through	A (A)	0.00 (0.00)	0.0 (0.0)	0 (0)	
Overall Intersection			A (D)	0.47 (0.82)	0.0 (0.0)	-- (--)		
March Road and Site Access 3	Minor Stop	WB	Right	A (A)	0.03 (0.03)	11.1 (11.1)	1 (1)	
		NB	Through	A (F)	0.52 (1.03)	0.0 (0.0)	0 (0)	
			Right	A (A)	0.26 (0.52)	0.0 (0.0)	0 (0)	
		SB	Left	A (A)	0.0 (0.00)	0.0 (0.0)	0 (0)	
			Through	A (A)	0.0 (0.00)	0.0 (0.0)	0 (0)	
Overall Intersection			A (C)	0.45 (0.79)	0.2 (0.1)	-- (--)		
March Road and Site Access 4	Minor Stop	EB	Left	A (A)	0.09 (0.11)	60.6 (46.1)	5 (6)	
			Through/Right	A (A)	0.13 (0.02)	62.7 (44.5)	8 (7)	
		WB	Left	B (E)	0.68 (0.99)	55.0 (108.3)	63 (#111)	
			Through/Right	A (F)	0.12 (1.24)	48.9 (190.9)	20 (#167)	
		NB	Left	A (A)	0.33 (0.04)	61.5 (1.7)	m2 (m0)	
			Through	D (F)	0.85 (1.04)	22.8 (34.4)	m59 (m18)	
			Right	A (A)	0.00 (0.14)	65.0 (0.0)	m2 (m0)	
		SB	Left	B (B)	0.69 (0.74)	66.2 (92.6)	m102 (m#27)	
			Through	D (B)	0.83 (0.63)	23.2 (11.2)	#145 (66)	
Overall Intersection			D (F)	0.83 (1.07)	29.4 (42.1)	-- (--)		
Site Access 5 and Terry Fox Drive	Minor Stop	EB	Left	A (A)	0.06 (0.03)	8.0 (10.0)	2 (1)	
			Through/Right	A (A)	0.61 (0.27)	0.0 (0.0)	0 (0)	
		WB	Right/Through	A (A)	0.16 (0.55)	0.0 (0.0)	0 (0)	



Intersection	Intersection Control	Approach / Movement		LOS	V/C	Delay (s)	Queue 95th (m)
<b>and McKinley Drive</b>		NB	Right	A (A)	0.02 (0.01)	17.8 (10.2)	1 (0)
		SB	Left/Right	C (A)	0.75 (0.31)	68.9 (21.7)	49 (9)
		<b>Overall Intersection</b>		<b>A (A)</b>	<b>0.76 (0.60)</b>	<b>8.9 (1.5)</b>	<b>-- (--)</b>
<b>Site Access 6</b>	Signalized	EB	Left/Through/Right	A (A)	0.58 (0.10)	18.7 (11.8)	28 (3)
		WB	Left/Through/Right	A (A)	0.20 (0.42)	29.3 (26.3)	6 (15)
		NB	Right	A (A)	0.03 (0.15)	3.3 (4.4)	1 (4)
		SB	Left/Right	A (A)	0.02 (0.01)	0.7 (0.7)	0 (0)
		<b>Overall Intersection</b>		<b>A (A)</b>	<b>0.49 (0.52)</b>	<b>9.2 (8.2)</b>	<b>-- (--)</b>
<b>Legget Drive and Site Access 7</b>	Minor Stop	EB		A (A)	0.09 (0.41)	13.2 (13.0)	2 (15)
		NB		A (A)	0.01 (0.00)	1.6 (0.1)	0 (0)
		SB		A (A)	0.45 (0.14)	0.0 (0.0)	0 (0)
		<b>Overall Intersection</b>		<b>A (A)</b>	<b>0.52 (0.36)</b>	<b>0.7 (5.8)</b>	<b>--(--)</b>
<b>Legget Drive and Site Access 8</b>	Minor Stop	EB	Left / Right	A (A)	0.07 (0.41)	10.9 (13.0)	15 (2)
		NB	Left/ Through	A (A)	0.00 (0.00)	1.0 (0.2)	0 (0)
		SB	Through/Right	A (A)	0.22 (0.14)	0.0 (0.0)	0 (0)
		<b>Overall Intersection</b>		<b>A (A)</b>	<b>0.28 (0.36)</b>	<b>1.2 (5.8)</b>	<b>--(--)</b>
<b>Notes:</b>							
1. Table format: AM (PM)							
2. v/c – represents the anticipated volume divided by the predicted capacity							
3. # 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles							
4. Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections							

### Multi-Modal Level of Service Assessment – 2032 Total future background

The intersection operating conditions remain similar to existing conditions; therefore, the intersection MMLOS discussion in **Section 4.9.2.1** applies to the 2032 total future background analysis.

**Appendix D** contains the detailed MMLOS analysis and is provided for reference.

### 4.9.2.4 2037 Ultimate Conditions

The 2037 ultimate total future traffic volumes represent traffic volumes at the site 5 years after full build-out of the site. **Figure 20** illustrates 2037 Ultimate traffic volumes at the study area intersection during the AM and PM peak hours, respectively.

### Intersection Capacity Analysis

#### March Road at Morgan’s Grant Way

During the 2037 ultimate horizon year, the intersection of March Road and Morgan’s Grant will operate at similar levels of service as the 2032 total traffic volume scenario with the northbound and southbound left turn movements during the PM peak hour, and the northbound through movements during the PM peak hour operating just below theoretical capacity.

#### March Road at Terry Fox Drive

The intersection of March Road at Terry Fox Drive will operate at satisfactory levels of service in the ultimate scenario with only one movement operating at capacity in each peak hour. The northbound through movement during the PM



peak hour will experience 3.6 minutes of delay during the PM peak hour. Southbound through movement is operating over theoretical capacity with a delay of 1.3 minutes. Overall, this intersection is not experiencing major capacity issues and motorists will not have to wait for significant periods of time. The City could advance the timing of the March Road BRT to Maxwell Bridge in order to increase transit capacity and thus decrease the reliance of auto vehicles which will improve intersection operations and increase telecommuting.

**March Road at Solandt Road**

The intersection of March Road at Solandt Road will have several individual movements operating at or above theoretical capacity with excessive delays during both the AM and PM peak hours. Of particular note is the westbound left turn movement (6.9 minutes of delay) during the PM peak hour. During the AM peak hour, the northbound left turn movement experiences 8 minutes of delay, and the southbound through movement experiences 4.5 minutes of delay in AM peak and 2.3 minutes of delay in PM peak. Overall, this intersection will experience major capacity issues and motorists will have to wait for significant periods of time. The completion of the BRT to Maxwell Bridge is anticipated to reduce the number of vehicle trips as people transition to transit. The current shift to telecommuting may also contribute to improved operations at this intersection.

**Solandt Road at Legget Drive**

The southbound through/right movement at the intersection of Solandt Road at Legget Drive will operate at or above theoretical capacity during the PM peak hour with delay of 1.1 minutes. Therefore, the delays at this intersection are not significant. All other movements operate at acceptable delay levels.

**Terry Fox Drive at Legget Drive**

The intersection of Terry Fox Drive at Legget Drive will generally operate at acceptable levels.

**Terry Fox Drive and McKinley Drive**

The intersection of Terry Fox Drive and McKinley Drive will operate at theoretical capacity in the southbound left/right movements during the PM peak with an average delay of 1.9 minutes per vehicles.

**Site Accesses**

The northbound through movements at site accesses 1-4 currently (Figure 21) operate at or above theoretical capacity during the PM peak hour with delay of 2.2 minutes at the northbound through movement at the signalized access (March Road and Site Access 4).

The other study area intersections were found to operate at acceptable levels of service. The proposed development is not anticipated to have a substantial effect on the study area intersections

**Table 19** summarizes the results of the Synchro analysis for the 2037 Ultimate intersection operations.

**Table 19: 2037 Ultimate Intersection Operations**

Intersection	Intersection Control	Approach / Movement	LOS	V/C	Delay (s)	Queue 95th (m)
	Signalized	EB Through	A (A)	0.32 (0.37)	52.2 (53.5)	30 (32)



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Intersection	Intersection Control	Approach / Movement	LOS	V/C	Delay (s)	Queue 95th (m)	
March Road and Morgan's Grant Way		WB	Right	A (A)	0.10 (0.05)	50.0 (50.4)	18 (13)
			Left	B (B)	0.68 (0.62)	65.2 (61.1)	46 (40)
			Through	A (A)	0.10 (0.39)	50.0 (53.8)	12 (33)
		NB	Right	A (A)	0.02 (0.41)	49.4 (54.2)	0 (37)
			Left	A (C)	0.44 (0.75)	54.7 (71.3)	m14 (m69)
			Through	A (F)	0.43 (1.02)	8.6 (23.4)	m24 (m#202)
		SB	Right	A (A)	0.02 (0.15)	12.2 (0.0)	m0 (m0)
			Left	B (B)	0.68 (0.68)	60.1 (59.7)	65 (64)
			Through	C (A)	0.77 (0.57)	17.2 (24.3)	219 (104)
				Right	A (A)	0.01 (0.02)	7.7 (17.0)
		<b>Overall Intersection</b>	<b>C (E)</b>	<b>0.77 (0.94)</b>	<b>20.2 (30.1)</b>	<b>-- (--)</b>	
March Road and Terry Fox Drive	Signalized	EB	Left	E (D)	0.98 (0.82)	121.8 (66.9)	#46 (#64)
			Through	B (A)	0.68 (0.29)	50.4 (44.0)	72 (32)
			Right	A (B)	0.54 (0.62)	48.1 (51.2)	57 (66)
		WB	Left	A (A)	0.52 (0.59)	62.5 (58.9)	20 (35)
			Through	A (A)	0.18 (0.54)	42.9 (49.9)	21 (49)
			Right	A (C)	0.05 (0.71)	41.7 (59.1)	0 (68)
		NB	Left	C (C)	0.71 (0.76)	57.3 (42.0)	#81 (m41)
			Through	D (F)	0.90 (1.39)	61.4 (217.3)	#109 (m#277)
			Right	A (A)	0.17 (0.11)	15.8 (15.4)	16 (m2)
		SB	Left	E (B)	0.91 (0.70)	66.4 (64.9)	#209 (58)
			Through	F (C)	1.09 (0.77)	78.0 (55.0)	#246 (#138)
			Right	A (A)	0.22 (0.14)	20.4 (113.2)	m20 (30)
				<b>Overall Intersection</b>	<b>E (F)</b>	<b>0.98 (1.09)</b>	<b>63.9 (116.9)</b>
March Road and Solandt Road	Signalized	EB	Left	A (C)	0.59 (0.79)	74.1 (81.0)	23 (#59)
			Through	A (A)	0.46 (0.18)	53.3 (48.3)	42 (22)
			Right	A (A)	0.09 (0.59)	8.8 (12.6)	2 (44)
		WB	Left	A (F)	0.45 (1.77)	62.9 (411.8)	16 (#179)
			Through / Right	C (C)	0.71 (0.77)	63.5 (62.1)	60 (81)
		NB	Left	F (B)	1.93 (0.70)	480.6 (43.6)	#317 (#58)
			Through/Right	F (F)	1.41 (1.62)	217.9 (312.9)	#456 (#606)
		SB	Left	B (B)	0.67 (0.67)	61.0 (95.2)	#96 (#20)
			Through/Right	F (F)	1.52 (1.21)	272.0 (133.6)	#489 (#355)
				<b>Overall Intersection</b>	<b>F (F)</b>	<b>1.43 (1.51)</b>	<b>247.6 (219.9)</b>
Solandt Road and Legget Drive	Signalized	EB	Left	A (A)	0.47 (0.17)	10.4 (34.5)	36 (14)
			Through / Right	A (A)	0.42 (0.04)	10.0 (33.4)	34 (11)
		WB	Left	A (A)	0.03 (0.19)	8.1 (34.6)	3 (16)
			Through / Right	A (A)	0.03 (0.53)	8.0 (38.8)	4 (41)
		NB	Left	A (B)	0.39 (0.70)	12.8 (29.6)	20 (67)
			Through / Right	A (A)	0.37 (0.07)	12.3 (4.5)	31 (10)
		SB	Left	A (A)	0.01 (0.01)	10.5 (16.4)	2 (2)
			Through / Right	A (F)	0.59 (1.01)	14.4 (66.3)	49 (#226)
		<b>Overall Intersection</b>	<b>A (D)</b>	<b>0.52 (0.83)</b>	<b>11.8 (48.8)</b>	<b>-- (--)</b>	
Terry Fox Drive and Legget Drive	Minor Stop	EB	Through / Right	B (A)	0.66 (0.13)	0.0 (0.0)	0 (0)
		WB	Left / Through	A (A)	0.09 (0.02)	3.8 (0.5)	2 (1)
		NB	Left / Right	A (C)	0.30 (0.79)	28.3 (50.7)	9 (47)
			<b>Overall Intersection</b>	<b>C (C)</b>	<b>0.72 (0.74)</b>	<b>1.5 (9.9)</b>	<b>-- (--)</b>
March Road & Site Access 1	Minor stop	WB	Right	A (A)	0.01 (0.01)	11.7 (11.8)	0 (0)
		NB	Through	B (F)	0.65 (1.14)	0.0 (0.0)	0 (0)
			Right	A (A)	0.55 (0.60)	0.0 (0.0)	0 (0)
		SB	Through	A (A)	0.0 (0.00)	0.0 (0.0)	0 (0)
		<b>Overall Intersection</b>	<b>B (D)</b>	<b>0.66 (0.88)</b>	<b>0.0 (0.0)</b>	<b>--(--)</b>	



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Intersection	Intersection Control	Approach / Movement		LOS	V/C	Delay (s)	Queue 95th (m)
March and Site Access 2	Minor Stop	WB	Right	A (A)	0.01 (0.01)	11.3 (11.8)	0 (0)
		NB	Through	A (F)	0.56 (1.12)	0.0 (0.0)	0 (0)
			Right	A (A)	0.32 (0.57)	0.0 (0.0)	0 (0)
		SB	Left	A (A)	0.00 (0.00)	0.0 (0.0)	0 (0)
			Through	A (A)	0.00 (0.00)	0.0 (0.0)	0 (0)
<b>Overall Intersection</b>				<b>A (D)</b>	<b>0.50 (0.86)</b>	<b>0.0 (0.0)</b>	<b>-- (--)</b>
March Road and Site Access 3	Minor Stop	WB	Right	A (A)	0.04 (0.04)	11.3 (11.9)	1 (1)
		NB	Through	A (F)	0.56 (1.12)	0.0 (0.0)	0 (0)
			Right	A (A)	0.28 (0.56)	0.0 (0.0)	0 (0)
		SB	Left	A (A)	0.0 (0.00)	0.0 (0.0)	0 (0)
			Through	A (A)	0.0 (0.00)	0.0 (0.0)	0 (0)
<b>Overall Intersection</b>				<b>A (D)</b>	<b>0.48 (0.85)</b>	<b>0.2 (0.1)</b>	<b>-- (--)</b>
March Road and Site Access 4	Signalized	EB	Left	A (A)	0.04 (0.09)	39.4 (39.1)	5 (5)
			Through	A (A)	0.03 (0.02)	39.2 (37.8)	6 (6)
		WB	Left	D (C)	0.81 (0.72)	64.3 (52.9)	#65 (82)
			Through	A (E)	0.12 (0.92)	40.0 (75.1)	18 (#135)
		NB	Left	A (A)	0.09 (0.07)	17.2 (3.7)	4 (m0)
			Through	D (F)	0.81 (1.27)	27.3 (134.1)	166 (m42)
			Right	A (A)	0.08 (0.16)	14.5 (0.5)	10 (m0)
		SB	Left	D (B)	0.89 (0.68)	64.3 (82.2)	#114 (m#19)
Through	D (C)		0.83 (0.76)	12.0 (12.6)	185 (252)		
<b>Overall Intersection</b>				<b>D (F)</b>	<b>0.87 (1.16)</b>	<b>24.1 (79.6)</b>	<b>-- (--)</b>
Terry Fox Drive and McKinley Drive (Site Access 5)	Stop & Right in right out	EB	Left	A (A)	0.06 (0.03)	8.1 (10.5)	1 (1)
			Through/Right	B (A)	0.67 (0.29)	8.0 (0.0)	0 (0)
		WB	Right/Through	A (B)	0.18 (0.61)	0.0 (0.0)	0 (0)
		NB	Right	A (A)	0.02 (0.01)	20.1 (10.5)	1 (0)
		SB	Left/Right	C (A)	1.00 (0.36)	115.0 (25.4)	66 (12)
<b>Overall Intersection</b>				<b>D (B)</b>	<b>0.82 (0.65)</b>	<b>13.7 (1.7)</b>	<b>--(--)</b>
Site Access 6	Signalized	EB	Left/Through/Right	A (A)	0.60 (0.10)	19.4 (12.1)	30 (3)
		WB	Left/Through/Right	A (A)	0.22 (0.47)	33.6 (29.6)	6 (18)
		NB	Left/Through/Right	A (A)	0.03 (0.15)	3.0 (4.4)	1 (4)
		SB	Left/Through/Right	A (A)	0.02 (0.01)	0.6 (0.6)	0 (0)
		<b>Overall Intersection</b>				<b>A (A)</b>	<b>0.50 (0.53)</b>
Legget Drive and Site Access 7	Minor Stop	EB		A (A)	0.10 (0.50)	13.9 (16.5)	2 (21)
		NB		A (A)	0.01 (0.00)	1.0 (0.2)	0 (0)
		SB		A (A)	0.47 (0.14)	0.0 (0.0)	0 (0)
		<b>Overall Intersection</b>				<b>A (A)</b>	<b>0.53 (0.40)</b>
Legget Drive and Site Access 8	Minor Stop	EB	Left / Right	A (A)	0.08 (0.42)	11.2 (13.4)	2 (16)
		NB	Left/ Through	A (A)	0.00 (0.00)	0.5 (0.1)	1 (0)
		SB	Through/Right	A (A)	0.24 (0.15)	0.0 (0.0)	0 (0)
		<b>Overall Intersection</b>				<b>A (A)</b>	<b>0.31 (0.37)</b>

**Notes:**

1. Table format: AM (PM)
2. v/c – represents the anticipated volume divided by the predicted capacity
3. # 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles
4. Level of Service (LOS) calculation is based on volume-to-capacity (v/c) ratios for signalized intersections and delays for unsignalized intersections

## Multi-Modal Level of Service Assessment- 2037 Ultimate MMLOS



A multi-modal level of service (MMLOS) assessment was completed for the signalized intersection within the study area under 2037 existing conditions. The results of this analyses can be found in **Table 20** below.

**Table 20 - 2037 Ultimate – Multi- Modal Level of Service Assessment**

Intersection		PLOS	BLOS	TLOS	TkLOS	VLOS
<b>March Road at Morgan's Grant Way</b>	Ultimate	F	F	C	C	F
	Target	C	B	D	D	D
<b>March Road at Terry Fox Drive</b>	Ultimate	F	F	C	A	F
	Target	C	B	D	B	D
<b>March Road at Solandt Road</b>	Ultimate	F	F	C	C	F
	Target	C	C	D	B	D
<b>Solandt Road at Legget Drive</b>	Ultimate	F	E	C	C	C
	Target	C	C	D	D	D

As per the City of Ottawa's TMP, the March Road Bus Rapid Transit (BRT) is scheduled to be implemented by 2031, between Solandt Road and Highway 417. The subject development is planned to be built and occupied by 2032. The office portion of the subject development is anticipated to be within 400m of the planned BRT station at Solandt Road. Per direction from the City of Ottawa, the March Road BRT, north of Solandt Road, is scheduled to occur beyond the horizons of this subject study (i.e., post 2037). The residential / retail portion of the subject development (north half) are not anticipated to be within 400m of a rapid transit station during the study horizons. As such, the modal shares for the northern and southern portions of the subject development will differ as a direct result of the implementation plan of the March Road BRT.

The multi-modal level of service (MMLOS) targets at intersections are determined by taking the most stringent of the MMLOS targets for each individual roadway segment.

March Road and Morgan's Grant Way

The Pedestrian Level of Service (PLOS) is projected to operate with a PLOS of F, which does not meet the desired target of C for both the Arterial and Collector Roadway. PLOS is largely influenced by the number of lanes pedestrians cross. Due to the nature of arterial roads, reducing the number of lanes at the intersection is not a feasible option. Incorporating other improvements such as pedestrian leading intervals or reducing the corner radii are not expected to highly improve the PLOS to the desired targets and will have minimal impacts to the PLOS.

The Ultimate Cycling Network from the City of Ottawa's Cycling Plan (2013) designates March Road as a spine cycling route. The intersection is therefore subject to a Bicycle Level of Service (BLOS) target of D.



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The Vehicular Level of Service (VLOS) is projected to operate with a VLOS of F, which does not meet the desired target of D. Increasing the number of lanes at this intersection would increase capacity and thus improve the VLOS, however, it would be to the detriment of the other modes of transportation and is therefore not recommended.

Once the aforementioned transit priority measures and BRT are completed, the operations and lane geometry at this intersection will change. It is therefore not recommended to address the MMLOS at this time.

The March Road BRT will support growth along March Road, by providing fast, reliable, comfortable service which is an attractive alternative to the automobile; and supplying increased transportation network capacity necessary to support increased development densities in designated areas including this proposed development.

### March Road and Terry Fox Drive

The intersection of March Road and Terry Fox Drive is situated in an Urban Employment Area with March Road being classified as an arterial roadway and Terry Fox Drive classified as a major collector roadway across the frontage of the subject site. Based on these classifications, the governing Pedestrian Level of Service (PLOS) target is C (for a Urban Employment Area). The intersection of March Road and Terry Fox Drive is projected to operate with a Pedestrian Level of Service (PLOS) of F, which does not meet the target of C. This is attributed to the 130s cycle length during the PM peak period coupled with the short effective walk times in the east-west direction due to the 28s phase length. Another contributing factor is the high number of lanes that have to be crossed by pedestrians (10+ lanes) along all the legs of the intersection. Reducing the cycle length and the number of lanes on March Road and Terry Fox Drive and incorporating raised crosswalks at this intersection would improve the PLOS based on the PETSf score. To improve the PLOS based on the pedestrian delay, the cycle length would need to be greatly reduced. Although these methods would improve the PLOS at this intersection, they are not feasible options as they would be to the detriment of the vehicles. It is noted that the future March Road cross section (2031 and beyond) will see different infrastructure and lane arrangements.

The Bicycle Level of Service (BLOS) at the intersection of March Road and Terry Fox Drive is projected to operate with a BLOS of F, which does not meet the target of B. Methods for improving the BLOS at this intersection include reducing the speed limit and number of lanes along March Road and Terry Fox Drive, but this approach is not feasible as it would be to the detriment of the vehicles on the roadway. Another method for improving the BLOS operations would be to install multi-use pathways with two-stage left turns. It is noted that the future March Road cross section (2031 and beyond) will see different infrastructure and lane arrangements.

Once the aforementioned transit priority measures and BRT are completed, the operations and lane geometry at this intersection will change. It is therefore not recommended to address the MMLOS at this time.

### March Road at Solandt Road

The Pedestrian Level of Service (PLOS) is projected to operate with a PLOS of F, which does not meet the desired target of C. Based on the MMLOS guidelines, intersection PLOS is largely influenced by the number of lanes pedestrians cross. Due to the nature of arterial roads, reducing the number of lanes at the intersection is not a feasible option. Incorporating other improvements such as pedestrian leading intervals or reducing the corner radii are not expected to highly improve the PLOS to the desired targets and will have minimal impacts to the PLOS.



The Bicycle Level of Service (BLOS) at the intersection of March Road and Solandt Road is projected to operate with a BLOS of F, which does not meet the target of C. Methods for improving the BLOS at this intersection include reducing the speed limit and number of lanes along March Road and Solandt Road, but this approach is not feasible as it would be to the detriment of the vehicles on the roadway. Another method for improving the BLOS operations would be to install multi-use pathways with two-stage left turns. It is noted that the future March Road cross section (2031 and beyond) will see different infrastructure and lane arrangements.

The Transit Level of Service (TLOS) at the intersection of March Road and Solandt Road is projected to operate with a TLOS of C, which meets the target of D.

The Truck Level of Service (TkLOS) at the intersection of March Road and Solandt Road is projected to operate with a TkLOS of C, which meets the desired target of D.

The Vehicular Level of Service (VLOS) is projected to operate with a VLOS of F, which does not meet the desired target of D. Increasing the number of lanes at this intersection would increase capacity and thus improve the VLOS, however, would not be possible with the implementation of the March Road BRT. It is anticipated that as transit ridership increases the VLOS will improve.

#### Solandt Road at Legget Drive

The PLOS is projected to operate with a PLOS of F, which does not meet the desired target of C. No conceptual measures will reduce the pedestrian crossing delay and no geometric changes will improve the PETSE scores.

Solandt at Legget Drive is projected to be a local route by the City of Ottawa's Ultimate Cycling Plan which is likely to improve the level of service to meet the target of C for the Bicycle Level of Service (BLOS) at the intersection of Solandt Road and Legget Drive

The Transit Level of Service (TLOS), Truck Level of Service (TkLOS) and Vehicular Level of Service (VLOS) all meet the required targets for their respective roadways.

### **4.9.3 Summary of Required Road Improvements**

According to *Appendix E of the March Road BRT study*, the implementation of the March Road BRT will significantly assist in buses encountering less delays when operating in a dedicated transit facility compared to a mixed-use roadway. The queue length transit priority measure up-stream of March/Solandt intersection was found to have limited benefit because of the residual northbound left- turning queues at March and Terry Fox Drive intersection. There is also an opportunity to minimize the impact of auto delays/queues by providing a two-stage pedestrian crossing associated with a median in place. Reducing the east/west pedestrian clearance times to facilitate the two-stage pedestrian crossing, green time can be provided to the major northbound and south bound movements in form of additional capacity.

The construction of the March Road BRT after it's completion will improve the modal splits from Section 4.2 (Table 12) of the *TRANS Trip Generation Summary Report* reducing the auto driver split for the area by 12% and increasing the transit split by 12% for the office trips and 9% increase in transit split percentage for retail trips. The supplemental transportation demand management measures discussed in **Section 4.5** are expected to reduce the auto trips generated by the proposed development in the future.



The new signalized intersection on March Road will not impact the future BRT despite the signals being closely spaced (approximately 350m from March and Terry Fox intersection) because the BRT will have signal priority and traffic signals will be coordinated throughout the corridor. *The Ontario Traffic Manual Book 12 Traffic Signals, page 54*, states that, traffic signals on roads posted at 80 km/h require a distance of 350 m for proper design of "back to back" left turn lanes and tapers.

## 5.0 SUMMARY AND CONCLUSIONS

This Transportation Impact Assessment (TIA) was prepared in support of a Zoning By-Law Amendment application for a proposed mixed-use development to be build out by 2032. The proposed development is located at 600 March Road (southeast quadrant of the March Road at Terry Fox Drive intersection) in the Brookside-Briarbrook-Morgan's Grant community in Kanata, Ontario. The current development concept consists of eleven residential buildings, six of which have a commercial component, as well as two office buildings, which both have a commercial component. It should be noted that this concept plan is subject to change as the development proceeds through the approvals process. The site is bound by an existing office building to the south, March Road to the west, Legget Drive to the east, and Terry Fox Drive to the north.

Bicycle lanes will be provided along the March Road corridor to encourage active mode of transportation within the area. Bicycle lanes will be designed as a segregated facility during detail design stage of the project.

The March Road BRT will support growth along March Road, by providing fast, reliable, comfortable service which is an attractive alternative to the automobile; and supplying increased transportation network capacity necessary to support increased development densities in designated areas including this proposed development.

The proposed development is anticipated to generate 1358 and 1305 net new auto trips (two-way) during the AM and PM peak hours, respectively. As the subject site currently includes office space, the trip generation for the existing office building was calculated to be 552 during the am peak hour and 442 during the pm peak hour and subsequently removed from the transportation network. This is to avoid double counting the future trips associated with this development parcel.

The trip generation accounted for transit modal shares observed in the TRANS 2011 O-D Survey, and as such, resulted in a slightly conservative analysis of total and ultimate future conditions. The supplemental transportation demand management measures discussed in **Section 4.5** are expected to reduce the auto trips generated by the proposed development in the future.

Applying the concept of demand rationalization, the traffic was reduced by 15% during the year 2032 due to peak spreading (flexible work schedules), telecommuting, and the expansion of the BRT line to the west.

The analysis of the study area intersections under the base year (2032 background traffic) conditions found that the signalized intersection of March Road and Terry Fox Drive has a number of movements that are expected to operate at capacity with an overall LOS of E during the PM peak hours. The southbound left movement was found to operate with a v/c ratio of 1.14 and a delay of 136s. At the signalized intersection of March Road and Solandt Road, the analysis found that the overall intersection LOS is F during the PM peak hours. All remaining study area intersections were found to operate satisfactorily.



## 600 March Road Transportation Impact Assessment

### Summary and Conclusions

July 18, 2022

Under the 2032 total future conditions, carrying forward the demand rationalization and signal timing plan improvements from the future background conditions, the analysis found that the operations in the study area are not projected to significantly change as a result of the addition of the site traffic. The signalized intersection of March Road and Terry Fox Drive has a number of movements that are expected to operate at capacity with an overall intersection LOS of E during both the AM and PM peak hours. The signalized intersection of March Road and Solandt Drive will continue to operate with several movements over capacity and overall intersection LOS of F during both the AM and PM Peak hours. The newly signalized intersection of March Road and Ste Access #4 along with the remaining study area intersections are anticipated to operate satisfactorily.

Under the 2037 ultimate future conditions, March Road in the vicinity of the subject site is expected to see numerous cross-sectional changes. By this horizon, the median BRT system is anticipated to be finalized.

Traffic operations under the 2037 ultimate horizon are similar to that of the 2032 total traffic horizon. The intersection operations of March Road and Terry Fox Drive will slightly improve with an overall intersection LOS D during the AM peak hour and E during the PM peak hour. The intersection of March Road and Solandt Drive will continue to operate at LOS F during both the AM and PM peak hours with slight improvements to the delays at the intersection in both the northbound and southbound directions.

The TMP sets the objective of increasing the walking modal share across the city from 9.5% in 2011 to 10% in 2031 for the morning peak period. This increase reflects the City's strategic direction to build compact, mixed-use developments. In 2009, the City released the final Ottawa Pedestrian Plan. The goals and objectives of the plan include recommendations to:

- Increase the pedestrian modal share across the city.
- Develop and integrated network of pedestrian facilities that includes sidewalks, pathways and pedestrian friendly spaces throughout the city, providing connections to important destinations and transit facilities.

Considering this and the future BRT Sidewalks will be widened and enhanced ladder style crosswalks at intersections installed that will encourage pedestrian activity. Achieving target PLOS is difficult along the corridor due to the crossing distances. This development will benefit from these enhancements.

The future plans for March Road by the city is for bicycle lanes to be provided along the corridor to encourage active mode of transportation within the area. Bicycle lanes are planned to be designed as a segregated facility during detail design stage of the project. Separating the cycling facility from the general purpose lanes will help increase the BLOS. This development will benefit from these enhancements.

The March Road BRT will support growth along March Road, by providing fast, reliable, comfortable service which is an attractive alternative to the automobile; and supplying increased transportation network capacity necessary to support increased development densities in designated areas including this proposed development.

In conclusion, the analysis found that the background traffic in the area is a major factor behind the deteriorated operations at the intersections Terry Fox and March Road, and March Road and Solandt Road. The development generated site traffic was found to result in some impact to the overall traffic operations in the area. The analysis found that with signal timing and offset optimizations, the signalized study area intersections are projected to operate acceptably. From a transportation standpoint, the proposed development at 600 March Road can be accommodated by the future transportation network without requiring geometric improvements. Signal timing plan improvements are anticipated to be required by the years 2032 and 2037.



## Appendix A TRAFFIC DATA



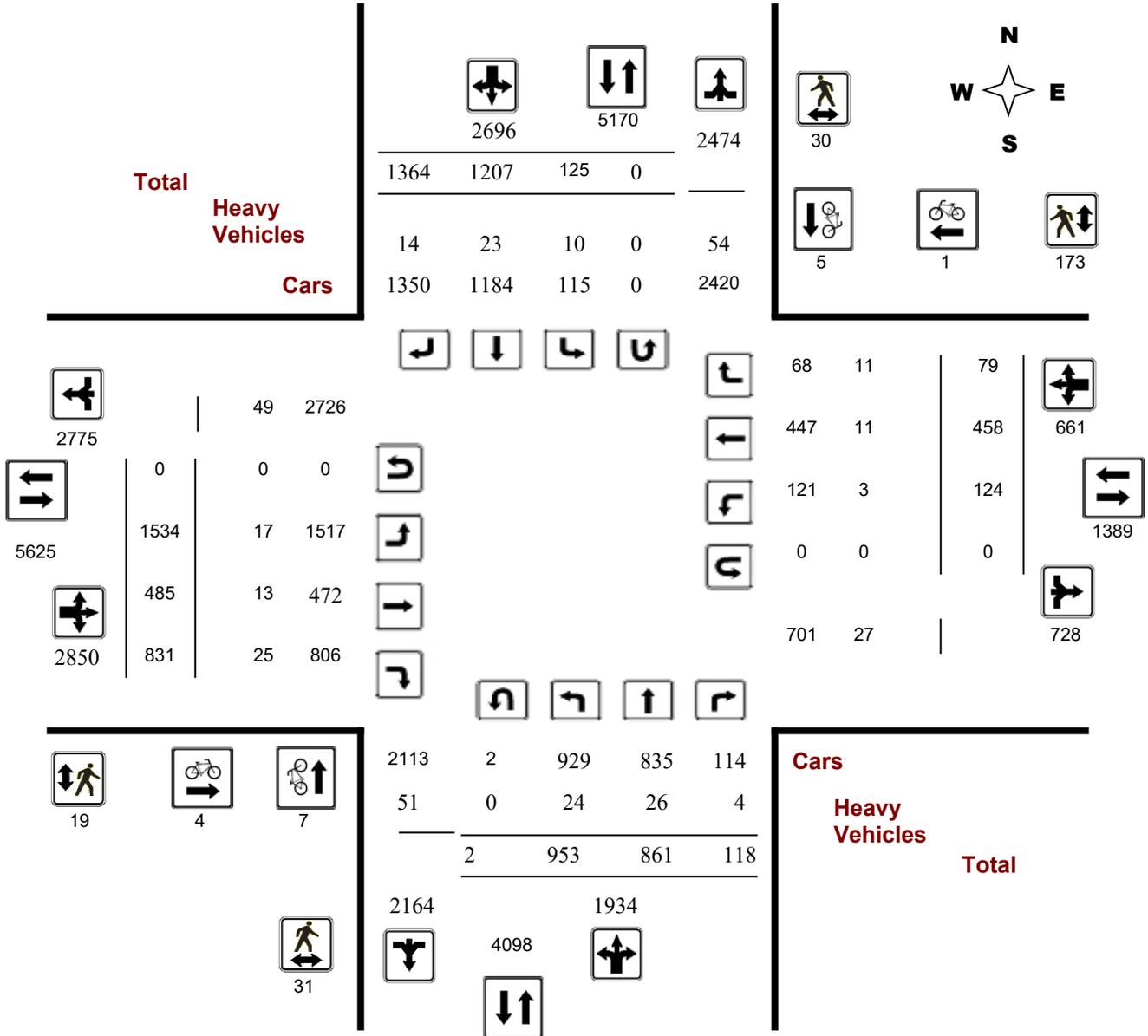
**Survey Date:** Tuesday, April 11, 2017

**WO No:** 36905

**Start Time:** 07:00

**Device:** Miovision

### Full Study Diagram



## Turning Movement Count - Study Results

### LEGGET DR @ SOLANDT RD

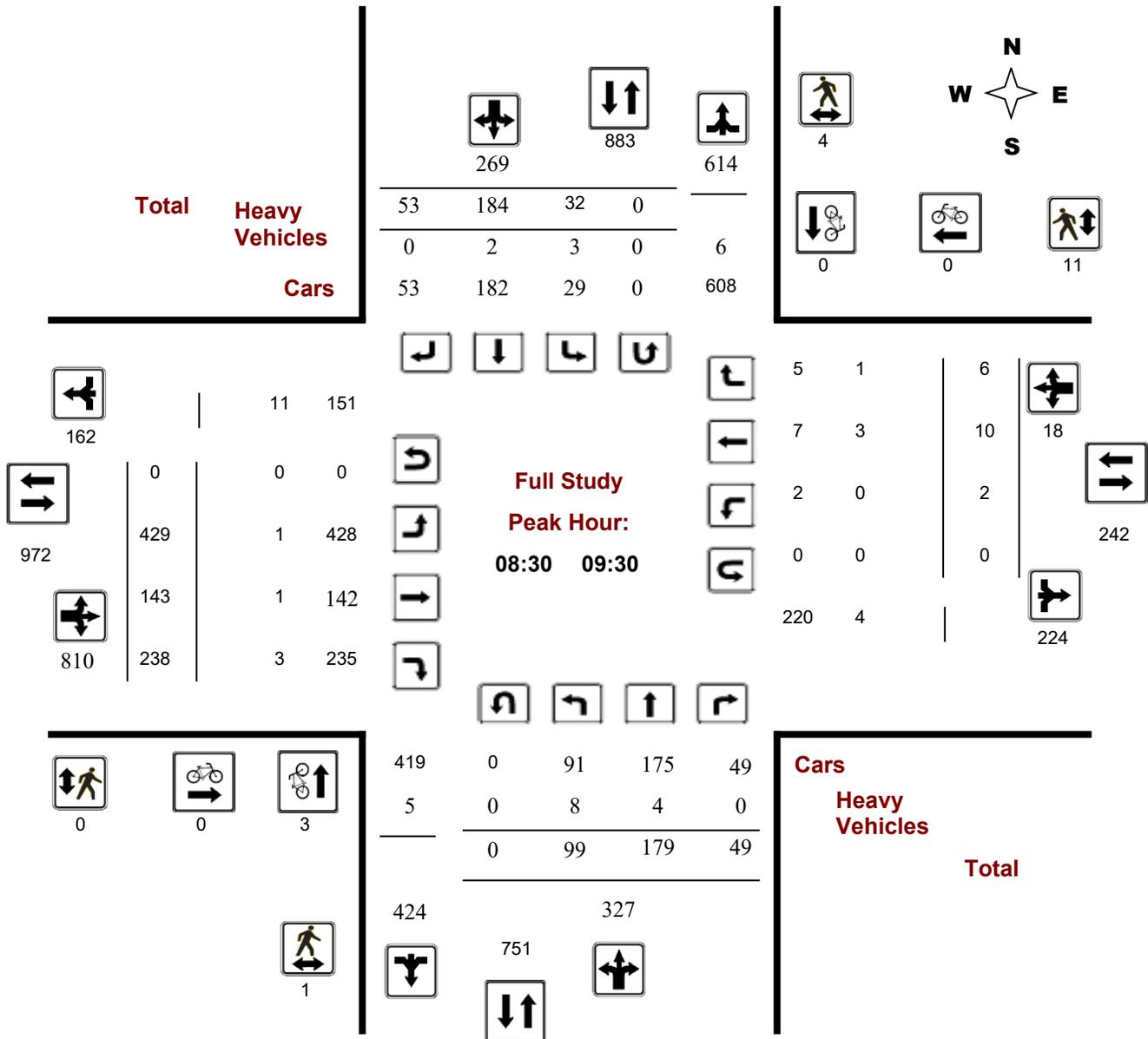
**Survey Date:** Tuesday, April 11, 2017

**WO No:** 36905

**Start Time:** 07:00

**Device:** Miovision

### Full Study Peak Hour Diagram



## Turning Movement Count - Peak Hour Diagram

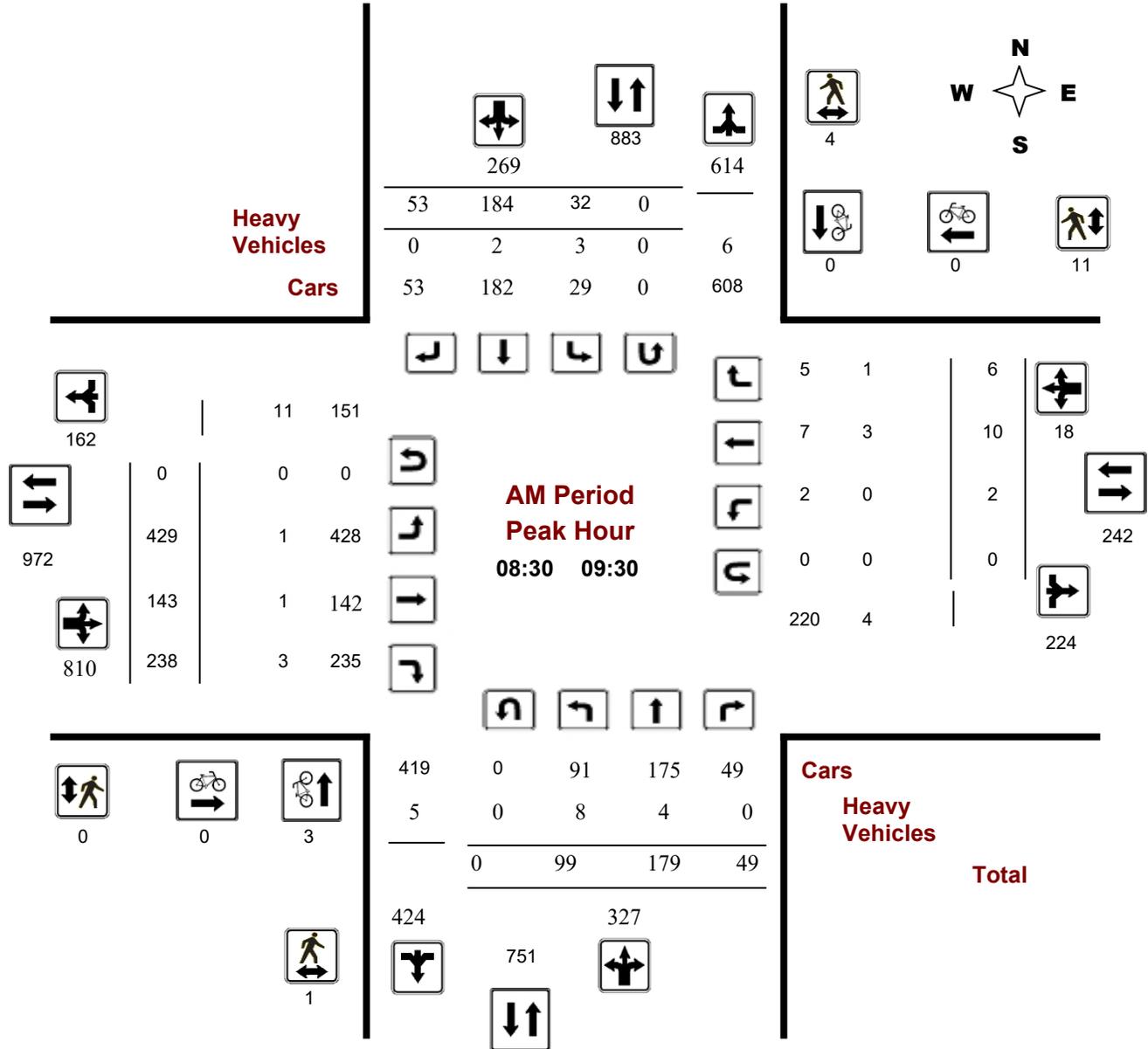
### LEGGET DR @ SOLANDT RD

**Survey Date:** Tuesday, April 11, 2017

**Start Time:** 07:00

**WO No:** 36905

**Device:** Miovision



**Comments**

## Turning Movement Count - Peak Hour Diagram

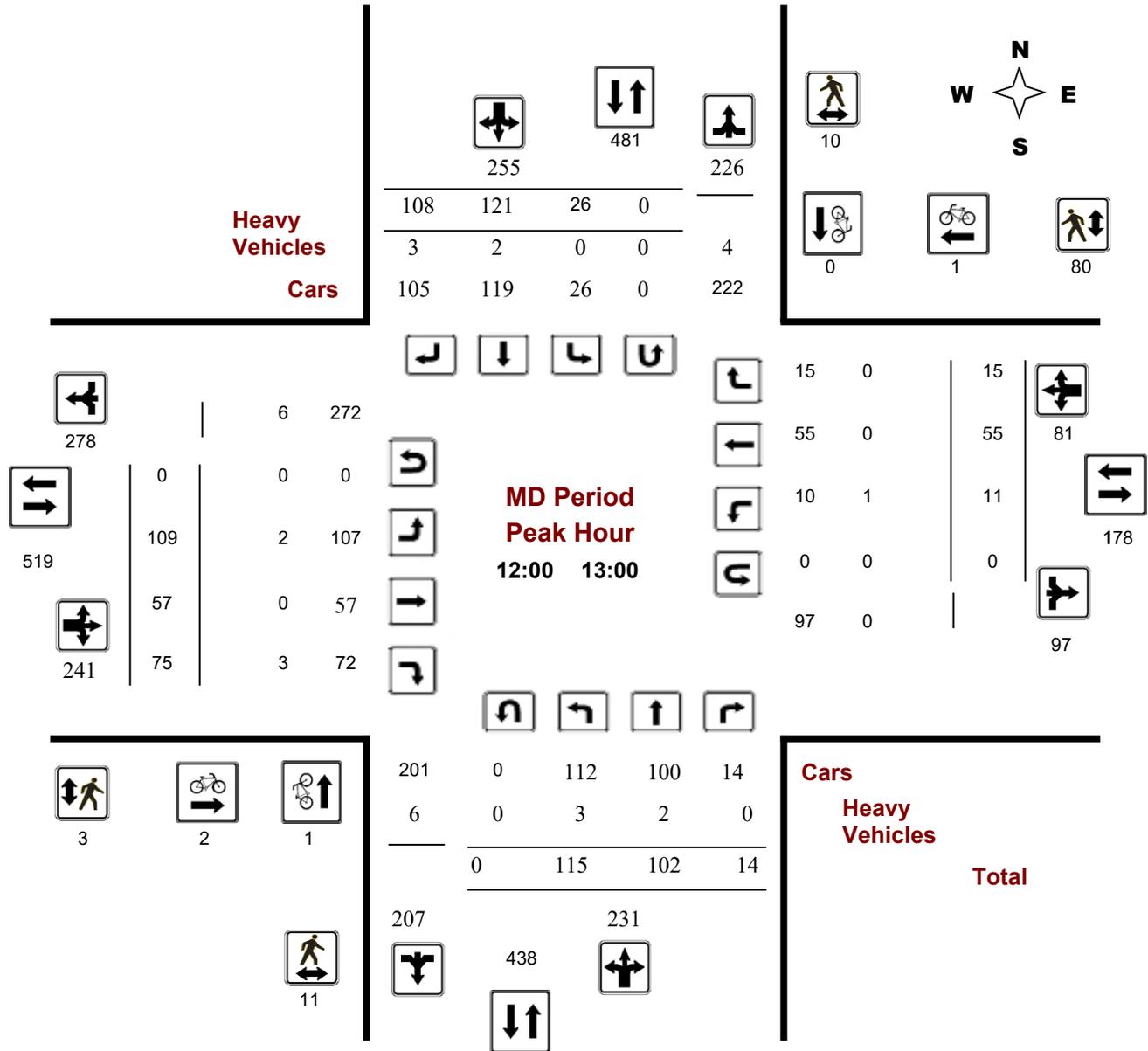
### LEGGET DR @ SOLANDT RD

**Survey Date:** Tuesday, April 11, 2017

**Start Time:** 07:00

**WO No:** 36905

**Device:** Miovision



**Comments**

## Turning Movement Count - Peak Hour Diagram

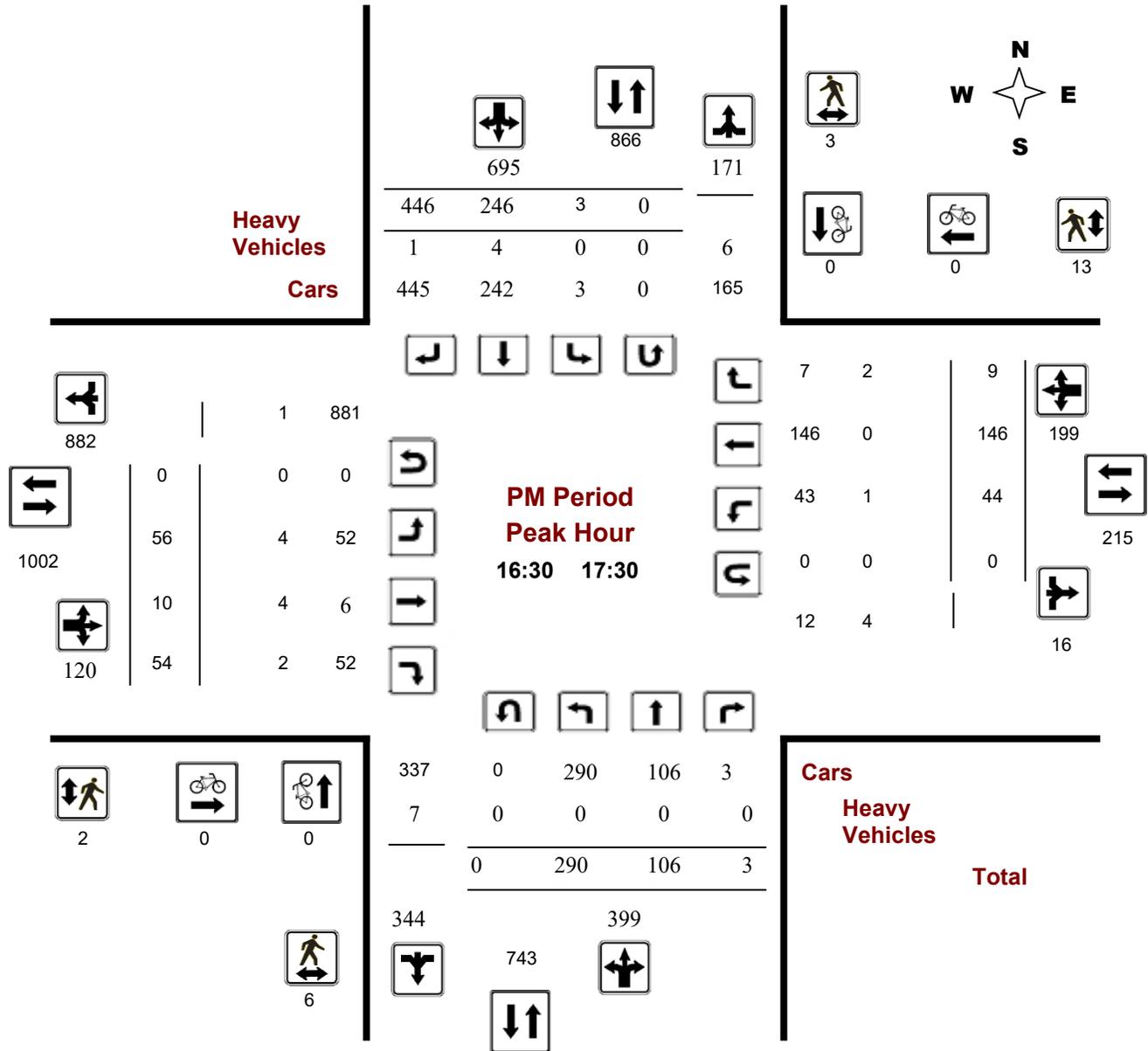
### LEGGET DR @ SOLANDT RD

**Survey Date:** Tuesday, April 11, 2017

**Start Time:** 07:00

**WO No:** 36905

**Device:** Miovision



**Comments**



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ SOLANDT RD

**Survey Date:** Tuesday, April 11, 2017

**WO No:** 36905

**Start Time:** 07:00

**Device:** Miovision

### Full Study Summary (8 HR Standard)

**Survey Date:** Tuesday, April 11, 2017

**Total Observed U-Turns**  
 Northbound: 2      Southbound: 0  
 Eastbound: 0      Westbound: 0

**AADT Factor**  
 .90

Period	Northbound				Southbound				STR TOT	Eastbound				Westbound				STR TOT	Grand Total
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT		LT	ST	RT	EB TOT	LT	ST	RT	WB TOT		
07:00 08:00	25	100	12	137	11	98	36	145	282	309	86	137	532	3	6	3	12	544	826
08:00 09:00	84	161	36	281	37	207	59	303	584	427	147	213	787	5	8	3	16	803	1387
09:00 10:00	69	147	37	253	29	132	49	210	463	372	113	173	658	1	17	6	24	682	1145
11:30 12:30	129	116	13	258	14	89	131	234	492	91	37	47	175	13	68	25	106	281	773
12:30 13:30	68	68	12	148	23	117	94	234	382	131	67	110	308	7	35	8	50	358	740
15:00 16:00	96	67	4	167	5	110	201	316	483	90	12	52	154	23	54	12	89	243	726
16:00 17:00	212	96	3	311	5	238	419	662	973	74	12	43	129	35	124	17	176	305	1278
17:00 18:00	270	106	1	377	1	216	375	592	969	40	11	56	107	37	146	5	188	295	1264
<b>Sub Total</b>	953	861	118	1932	125	1207	1364	2696	4628	1534	485	831	2850	124	458	79	661	3511	8139
<b>U Turns</b>	2			2	0			0	2	0			0	0			0	0	2
<b>Total</b>	955	861	118	1934	125	1207	1364	2696	4630	1534	485	831	2850	124	458	79	661	3511	8141
<b>EQ 12Hr</b>	1327	1197	164	2688	174	1678	1896	3748	6436	2132	674	1155	3961	172	637	110	919	4880	11316
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																<b>1.39</b>			
<b>AVG 12Hr</b>	1194	1077	148	2419	157	1510	1706	3373	5792	1919	607	1040	3566	155	573	99	827	4393	10185
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																<b>.90</b>			
<b>AVG 24Hr</b>	1564	1411	194	3169	206	1978	2235	4419	7588	2514	795	1362	4671	203	751	130	1084	5755	13343
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																<b>1.31</b>			

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



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ SOLANDT RD

**Survey Date:** Tuesday, April 11, 2017

**WO No:** 36905

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute Increments

Time Period	Northbound					Southbound					Eastbound				Westbound				Grand Total	
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT		
07:00	07:15	9	19	3	31	2	16	7	25	56	40	11	27	78	1	3	0	4	82	138
07:15	07:30	5	17	6	28	4	23	4	31	59	72	16	22	110	1	2	1	4	114	173
07:30	07:45	7	32	2	41	3	29	8	40	81	77	29	31	137	1	1	1	3	140	221
07:45	08:00	5	32	1	38	2	30	17	49	87	120	30	57	207	0	0	1	1	208	295
08:00	08:15	13	32	13	58	3	45	12	60	118	116	39	43	198	2	3	0	5	203	321
08:15	08:30	17	35	5	57	16	61	15	92	149	104	42	50	196	1	0	1	2	198	347
08:30	08:45	27	47	10	84	10	59	14	83	167	105	35	62	202	1	1	1	3	205	372
08:45	09:00	27	47	8	82	8	42	18	68	150	102	31	58	191	1	4	1	6	197	347
09:00	09:15	23	35	18	76	6	38	11	55	131	108	49	59	216	0	1	0	1	217	348
09:15	09:30	22	50	13	85	8	45	10	63	148	114	28	59	201	0	4	4	8	209	357
09:30	09:45	13	34	4	51	10	27	16	53	104	81	20	35	136	0	8	1	9	145	249
09:45	10:00	11	28	2	41	5	22	12	39	80	69	16	20	105	1	4	1	6	111	191
11:30	11:45	34	19	5	58	0	18	34	52	110	24	5	11	40	4	17	6	27	67	177
11:45	12:00	28	30	1	59	2	17	37	56	115	23	7	16	46	2	18	7	27	73	188
12:00	12:15	39	39	1	79	7	23	38	68	147	22	8	10	40	3	25	4	32	72	219
12:15	12:30	29	28	6	63	5	31	22	58	121	22	17	10	49	4	8	8	20	69	190
12:30	12:45	27	16	1	44	6	30	28	64	108	32	17	25	74	3	17	1	21	95	203
12:45	13:00	20	19	6	45	8	37	20	65	110	33	15	30	78	1	5	2	8	86	196
13:00	13:15	14	15	2	31	4	26	25	55	86	38	24	32	94	2	4	4	10	104	190
13:15	13:30	7	18	3	28	5	24	21	50	78	28	11	23	62	1	9	1	11	73	151
15:00	15:15	23	15	3	41	1	13	32	46	87	13	4	14	31	5	7	3	15	46	133
15:15	15:30	15	17	0	32	3	24	45	72	104	16	1	13	30	2	13	3	18	48	152
15:30	15:45	26	17	0	43	1	31	70	102	145	35	5	10	50	11	24	2	37	87	232
15:45	16:00	32	18	1	51	0	42	54	96	147	26	2	15	43	5	10	4	19	62	209
16:00	16:15	40	26	1	67	1	68	115	184	251	22	5	11	38	7	33	8	48	86	337
16:15	16:30	52	22	0	74	2	49	83	134	208	16	3	11	30	5	28	1	34	64	272
16:30	16:45	52	25	2	79	2	56	104	162	241	21	1	7	29	13	34	4	51	80	321
16:45	17:00	68	23	0	91	0	65	117	182	273	15	3	14	32	10	29	4	43	75	348
17:00	17:15	94	31	1	126	0	66	121	187	313	12	3	13	28	9	46	0	55	83	396
17:15	17:30	76	27	0	103	1	59	104	164	267	8	3	20	31	12	37	1	50	81	348
17:30	17:45	56	26	0	82	0	54	83	137	219	10	3	12	25	10	38	2	50	75	294
17:45	18:00	44	22	0	66	0	37	67	104	170	10	2	11	23	6	25	2	33	56	226
Total:		955	861	118	1934	125	1207	1364	2696	4630	1534	485	831	2850	124	458	79	661	4630	8,141

Note: U-Turns are included in Totals.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ SOLANDT RD

**Survey Date:** Tuesday, April 11, 2017

**WO No:** 36905

**Start Time:** 07:00

**Device:** Miovision

### Full Study Cyclist Volume

Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 07:15	1	0	1	0	0	0	1
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	0	1	1	0	0	0	1
07:45 08:00	1	0	1	0	0	0	1
08:00 08:15	0	0	0	0	0	0	0
08:15 08:30	0	0	0	1	0	1	1
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	3	0	3	0	0	0	3
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	1	0	1	1	0	1	2
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	1	0	1	0	1	1	2
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	1	0	1	1
12:45 13:00	0	0	0	1	0	1	1
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	0	0	0
17:30 17:45	0	3	3	0	0	0	3
17:45 18:00	0	1	1	0	0	0	1
Total	7	5	12	4	1	5	17



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ SOLANDT RD

**Survey Date:** Tuesday, April 11, 2017

**WO No:** 36905

**Start Time:** 07:00

**Device:** Miovision

### Full Study Pedestrian Volume

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	0	0	0	1	1	1
07:30 07:45	0	1	1	1	2	3	4
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	3	3	6	0	7	7	13
08:15 08:30	2	2	4	2	2	4	8
08:30 08:45	0	1	1	0	1	1	2
08:45 09:00	0	2	2	0	1	1	3
09:00 09:15	1	1	2	0	2	2	4
09:15 09:30	0	0	0	0	7	7	7
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	2	2	2
11:30 11:45	1	2	3	0	5	5	8
11:45 12:00	1	1	2	2	10	12	14
12:00 12:15	0	1	1	1	14	15	16
12:15 12:30	4	0	4	1	23	24	28
12:30 12:45	3	5	8	0	23	23	31
12:45 13:00	4	4	8	1	20	21	29
13:00 13:15	0	2	2	1	11	12	14
13:15 13:30	1	0	1	0	5	5	6
15:00 15:15	2	2	4	0	5	5	9
15:15 15:30	0	0	0	0	4	4	4
15:30 15:45	0	0	0	5	0	5	5
15:45 16:00	0	0	0	0	3	3	3
16:00 16:15	1	0	1	0	1	1	2
16:15 16:30	0	0	0	0	3	3	3
16:30 16:45	1	0	1	0	2	2	3
16:45 17:00	1	1	2	0	3	3	5
17:00 17:15	2	0	2	0	3	3	5
17:15 17:30	2	2	4	2	5	7	11
17:30 17:45	2	0	2	2	7	9	11
17:45 18:00	0	0	0	1	1	2	2
<b>Total</b> .....	<b>31</b>	<b>30</b>	<b>61</b>	<b>19</b>	<b>173</b>	<b>192</b>	<b>253</b>



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ SOLANDT RD

**Survey Date:** Tuesday, April 11, 2017

**WO No:** 36905

**Start Time:** 07:00

**Device:** Miovision

### Full Study Heavy Vehicles

Time Period	Northbound				Southbound				Eastbound				Westbound				Grand Total		
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT		W TOT	STR TOT
07:00 07:15	1	2	1	4	0	1	2	3	7	0	0	1	1	0	0	0	0	1	8
07:15 07:30	1	2	0	3	0	0	1	1	4	0	1	1	2	1	0	0	1	3	7
07:30 07:45	0	3	0	3	1	0	0	1	4	0	0	0	0	0	1	1	2	2	6
07:45 08:00	1	1	0	2	0	0	1	1	3	0	0	1	1	0	0	0	0	1	4
08:00 08:15	0	1	0	1	1	0	0	1	2	1	0	0	1	0	1	0	1	2	4
08:15 08:30	0	0	0	0	1	0	0	1	1	1	0	1	2	0	0	0	0	2	3
08:30 08:45	2	3	0	5	0	0	0	0	5	1	0	0	1	0	1	0	1	2	7
08:45 09:00	3	0	0	3	1	0	0	1	4	0	1	1	2	0	1	0	1	3	7
09:00 09:15	1	1	0	2	0	1	0	1	3	0	0	2	2	0	0	0	0	2	5
09:15 09:30	2	0	0	2	2	1	0	3	5	0	0	0	0	0	1	1	2	2	7
09:30 09:45	0	2	0	2	0	1	1	2	4	0	0	1	1	0	1	0	1	2	6
09:45 10:00	1	2	0	3	1	1	1	3	6	1	0	1	2	0	1	0	1	3	9
11:30 11:45	2	1	2	5	0	2	1	3	8	0	1	1	2	0	2	0	2	4	12
11:45 12:00	1	1	0	2	0	2	0	2	4	0	0	1	1	0	0	0	0	1	5
12:00 12:15	1	0	0	1	0	0	2	2	3	1	0	1	2	1	0	0	1	3	6
12:15 12:30	0	1	0	1	0	1	0	1	2	1	0	0	1	0	0	0	0	1	3
12:30 12:45	1	0	0	1	0	0	1	1	2	0	0	2	2	0	0	0	0	2	4
12:45 13:00	1	1	0	2	0	1	0	1	3	0	0	0	0	0	0	0	0	0	3
13:00 13:15	1	0	0	1	0	0	0	0	1	1	0	1	2	0	0	1	1	3	4
13:15 13:30	0	1	1	2	0	1	0	1	3	0	0	1	1	0	0	0	0	1	4
15:00 15:15	1	0	0	1	0	0	0	0	1	1	1	1	3	0	0	1	1	4	5
15:15 15:30	1	2	0	3	1	2	0	3	6	0	0	0	0	0	1	1	2	2	8
15:30 15:45	2	1	0	3	1	1	1	3	6	1	1	3	5	0	0	0	0	5	11
15:45 16:00	0	0	0	0	0	1	0	1	1	2	0	1	3	0	0	1	1	4	5
16:00 16:15	1	0	0	1	1	1	0	2	3	2	1	0	3	0	1	2	3	6	9
16:15 16:30	0	0	0	0	0	1	2	3	3	0	1	1	2	0	0	0	0	2	5
16:30 16:45	0	0	0	0	0	1	0	1	1	2	0	0	2	0	0	0	0	2	3
16:45 17:00	0	0	0	0	0	1	1	2	2	1	2	1	4	0	0	1	1	5	7
17:00 17:15	0	0	0	0	0	1	0	1	1	1	1	1	3	0	0	0	0	3	4
17:15 17:30	0	0	0	0	0	1	0	1	1	0	1	0	1	1	0	1	2	3	4
17:30 17:45	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	2	2
17:45 18:00	0	1	0	1	0	1	0	1	2	0	1	0	1	0	0	1	1	2	4
Total: None	24	26	4	54	10	23	14	47	101	17	13	25	55	3	11	11	25	80	181



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ SOLANDT RD

**Survey Date:** Tuesday, April 11, 2017

**WO No:** 36905

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute U-Turn Total

Time Period	Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00 - 07:15	1	0	0	0	1
07:15 - 07:30	0	0	0	0	0
07:30 - 07:45	0	0	0	0	0
07:45 - 08:00	0	0	0	0	0
08:00 - 08:15	0	0	0	0	0
08:15 - 08:30	0	0	0	0	0
08:30 - 08:45	0	0	0	0	0
08:45 - 09:00	0	0	0	0	0
09:00 - 09:15	0	0	0	0	0
09:15 - 09:30	0	0	0	0	0
09:30 - 09:45	0	0	0	0	0
09:45 - 10:00	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0
11:45 - 12:00	1	0	0	0	1
12:00 - 12:15	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0
15:00 - 15:15	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0
16:00 - 16:15	0	0	0	0	0
16:15 - 16:30	0	0	0	0	0
16:30 - 16:45	0	0	0	0	0
16:45 - 17:00	0	0	0	0	0
17:00 - 17:15	0	0	0	0	0
17:15 - 17:30	0	0	0	0	0
17:30 - 17:45	0	0	0	0	0
17:45 - 18:00	0	0	0	0	0
<b>Total</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>

## Turning Movement Count - Study Results

### LEGGET DR @ TERRY FOX DR

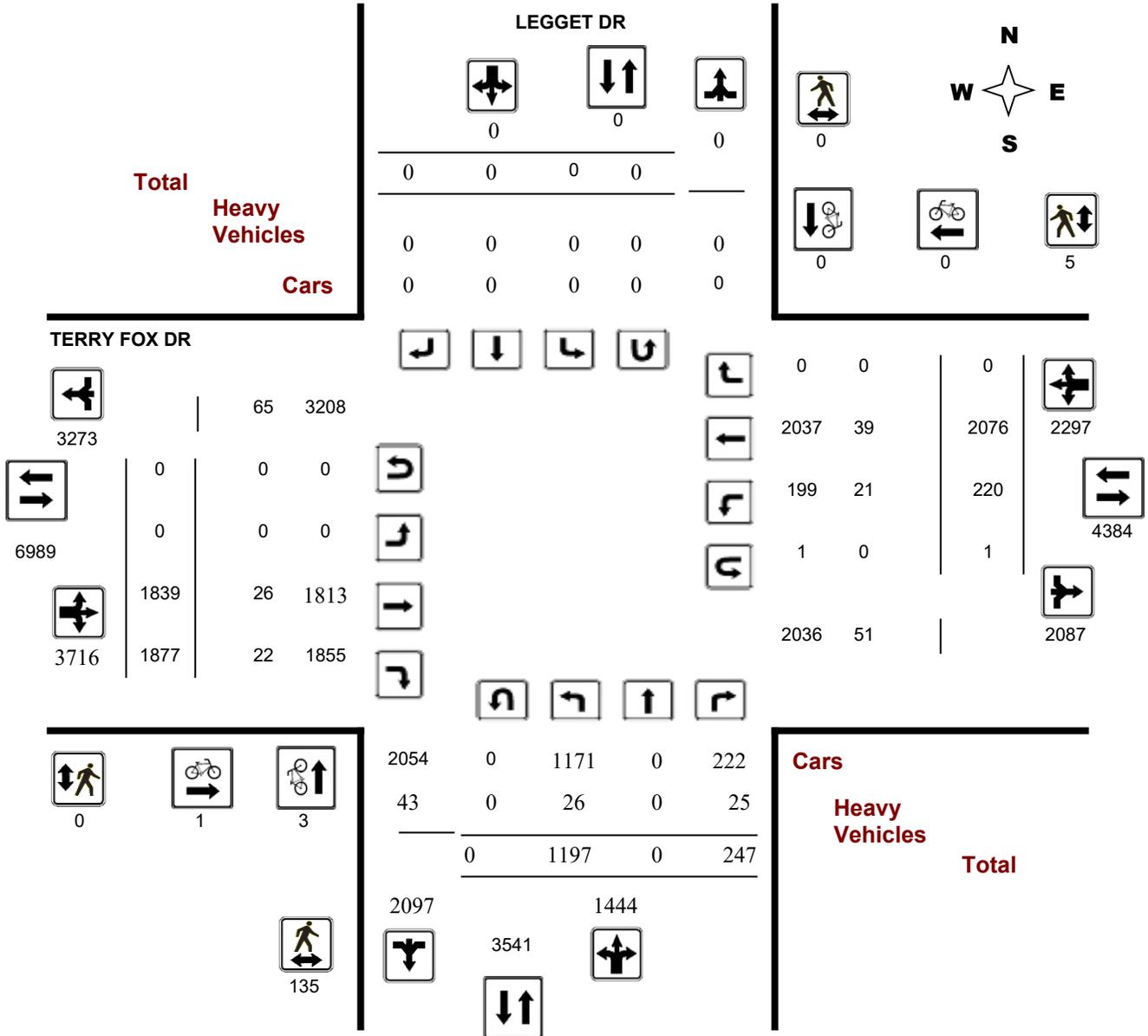
**Survey Date:** Wednesday, February 20, 2019

**WO No:** 38360

**Start Time:** 07:00

**Device:** Miovision

### Full Study Diagram



## Turning Movement Count - Study Results

### LEGGET DR @ TERRY FOX DR

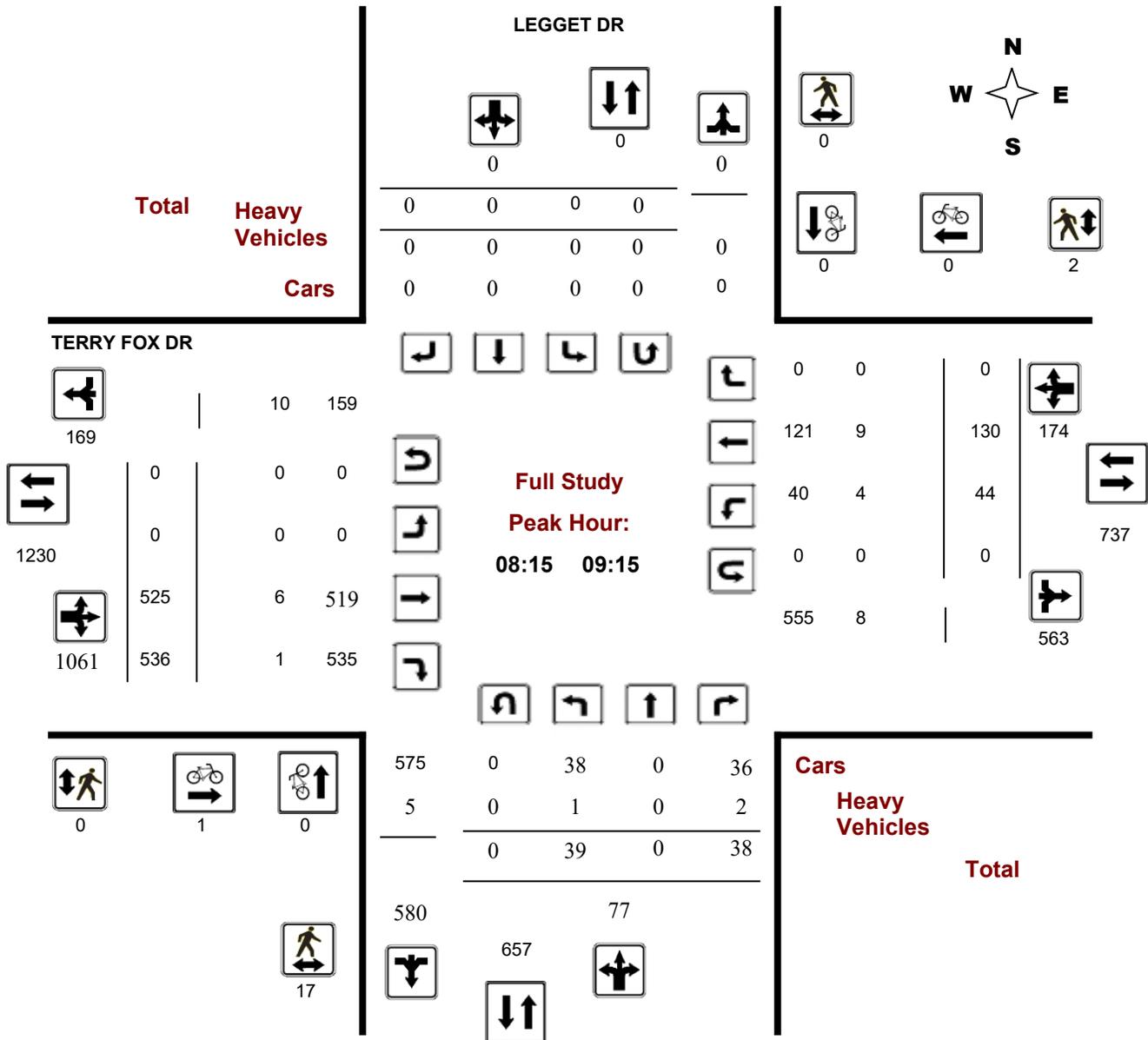
**Survey Date:** Wednesday, February 20, 2019

**WO No:** 38360

**Start Time:** 07:00

**Device:** Miovision

### Full Study Peak Hour Diagram



## Turning Movement Count - Peak Hour Diagram

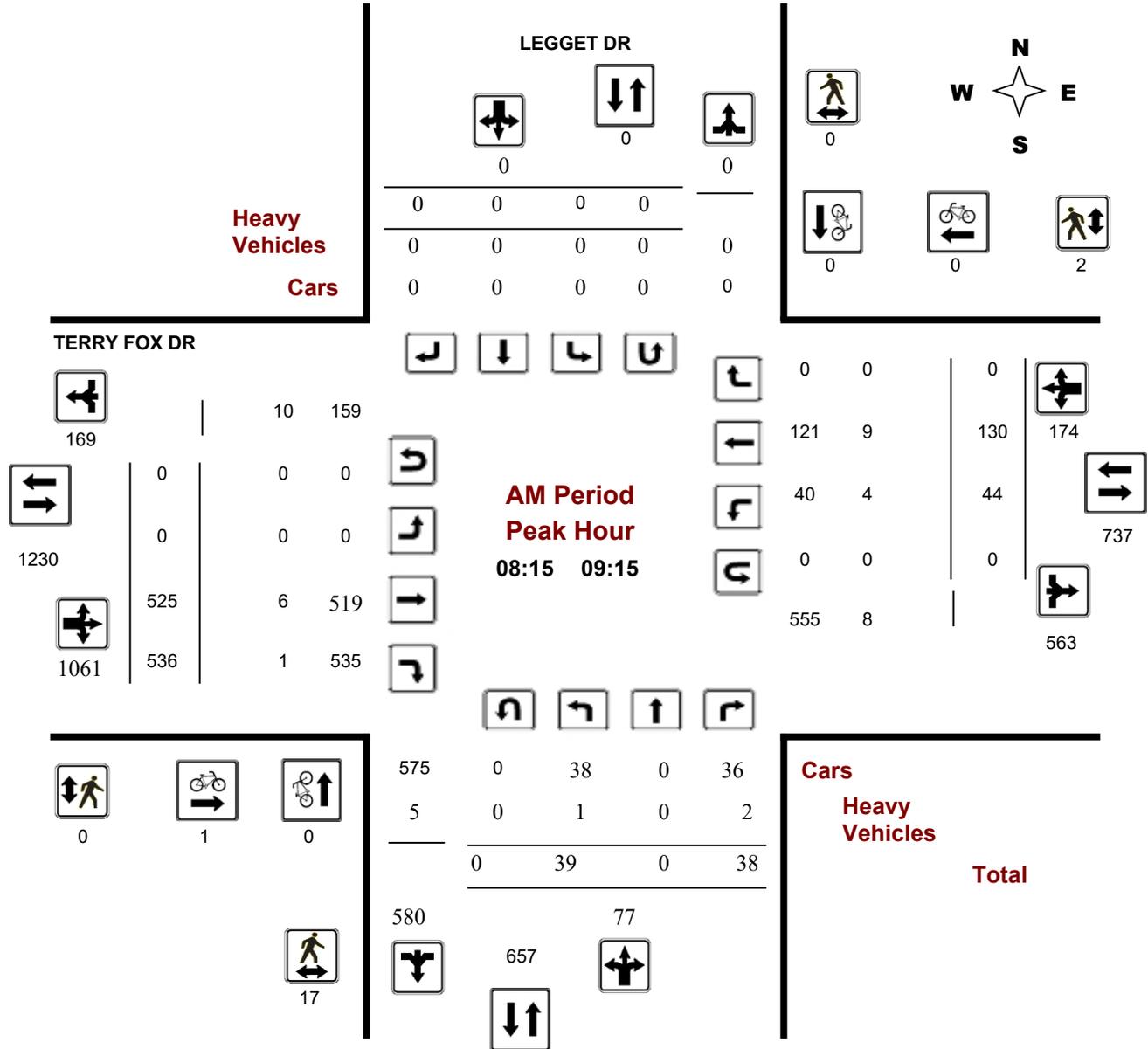
### LEGGET DR @ TERRY FOX DR

**Survey Date:** Wednesday, February 20, 2019

**Start Time:** 07:00

**WO No:** 38360

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

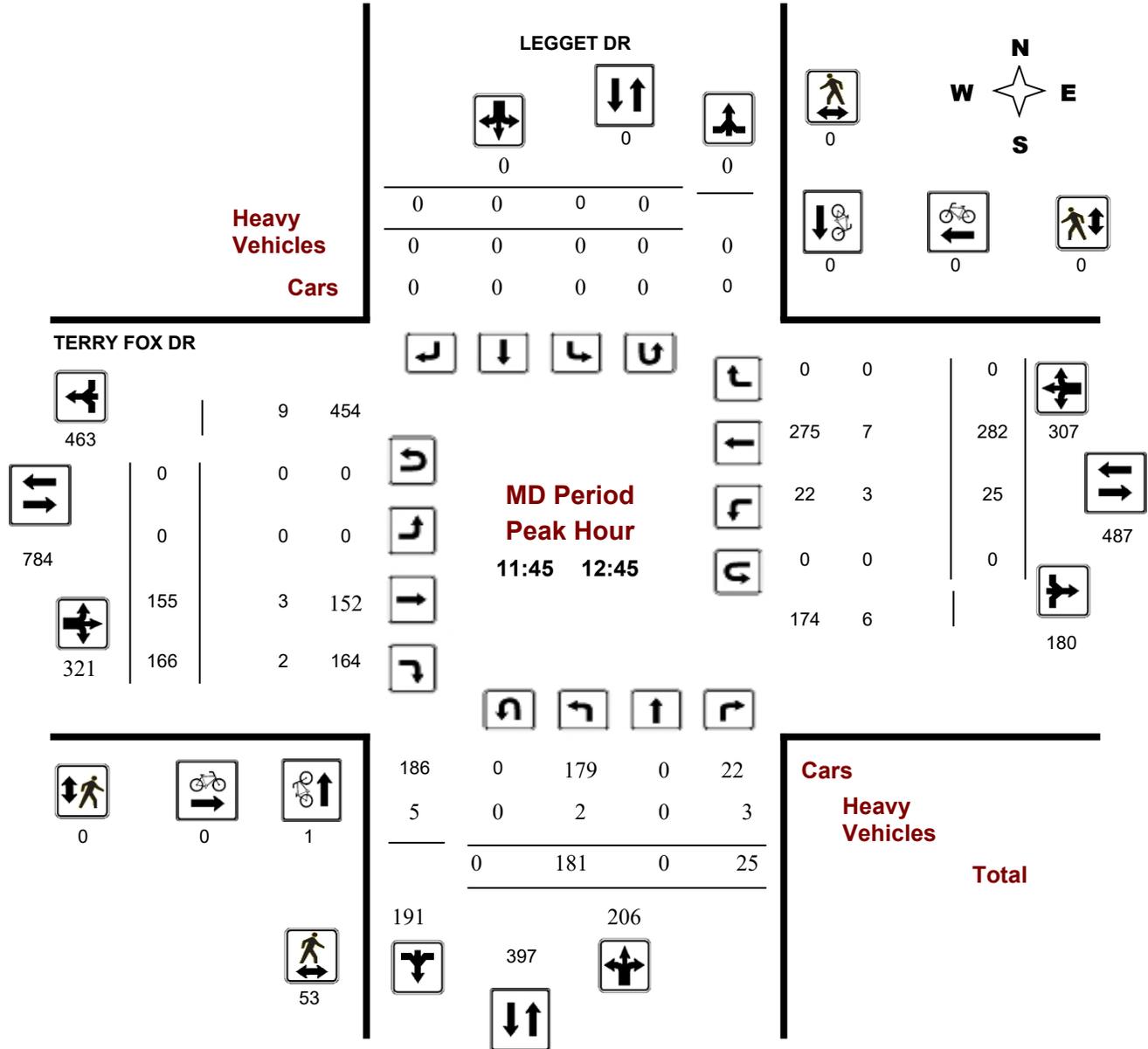
### LEGGET DR @ TERRY FOX DR

**Survey Date:** Wednesday, February 20, 2019

**Start Time:** 07:00

**WO No:** 38360

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

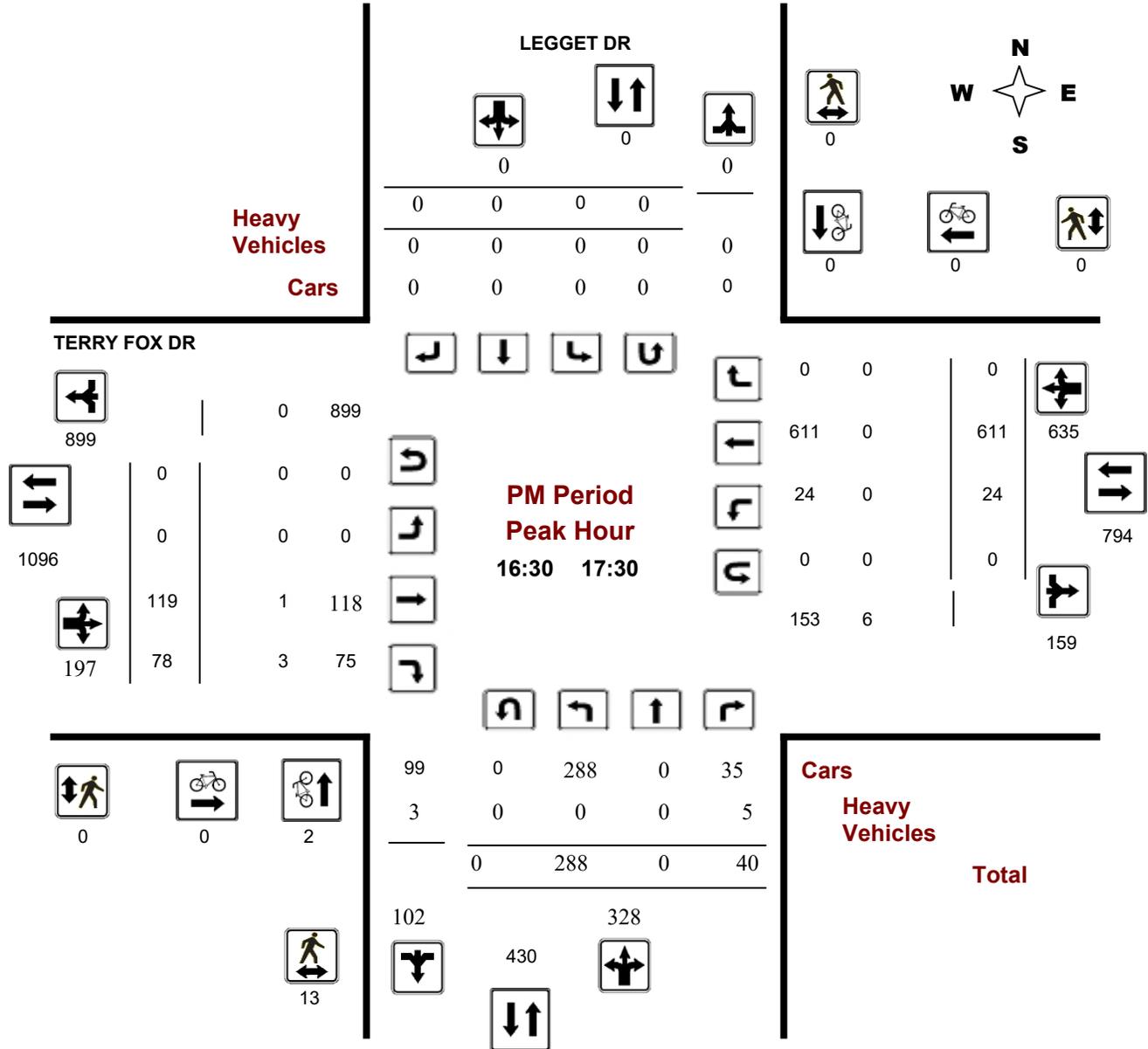
### LEGGET DR @ TERRY FOX DR

**Survey Date:** Wednesday, February 20, 2019

**Start Time:** 07:00

**WO No:** 38360

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ TERRY FOX DR

**Survey Date:** Wednesday, February 20, 2019

**WO No:** 38360

**Start Time:** 07:00

**Device:** Miovision

### Full Study Summary (8 HR Standard)

**Survey Date:** Wednesday, February 20, 2019

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

**AADT Factor**  
 1.00

#### LEGGET DR

#### TERRY FOX DR

Period	Northbound					Southbound					Eastbound					Westbound					Grand Total
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	27	0	21	48	48	0	0	0	0	48	0	324	365	689	37	82	0	120	809	857	
08:00 09:00	41	0	39	80	80	0	0	0	0	80	0	476	553	1029	37	122	0	159	1188	1268	
09:00 10:00	61	0	28	89	89	0	0	0	0	89	0	390	370	760	37	105	0	142	902	991	
11:30 12:30	208	0	29	237	237	0	0	0	0	237	0	125	144	269	22	288	0	310	579	816	
12:30 13:30	115	0	21	136	136	0	0	0	0	136	0	228	206	434	21	147	0	168	602	738	
15:00 16:00	188	0	27	215	215	0	0	0	0	215	0	84	89	173	21	239	0	260	433	648	
16:00 17:00	301	0	45	346	346	0	0	0	0	346	0	107	81	188	18	540	0	558	746	1092	
17:00 18:00	256	0	37	293	293	0	0	0	0	293	0	105	69	174	26	553	0	579	753	1046	
<b>Sub Total</b>	1197	0	247	1444	1444	0	0	0	0	1444	0	1839	1877	3716	220	2076	0	2296	6012	7456	
<b>U Turns</b>	0			0	0				0	0	0			0	1			1	1	1	
<b>Total</b>	1197	0	247	1444	1444	0	0	0	0	1444	0	1839	1877	3716	221	2076	0	2297	6013	7457	
<b>EQ 12Hr</b>	1664	0	343	2007	2007	0	0	0	0	2007	0	2556	2609	5165	307	2886	0	3193	8358	10365	
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																<b>1.39</b>					
<b>AVG 12Hr</b>	1664	0	343	2007	2007	0	0	0	0	2007	0	2556	2609	5165	307	2886	0	3193	8358	10365	
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																<b>1.00</b>					
<b>AVG 24Hr</b>	2180	0	449	2629	2629	0	0	0	0	2629	0	3348	3418	6766	402	3781	0	4183	10949	13578	

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

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



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ TERRY FOX DR

**Survey Date:** Wednesday, February 20, 2019

**WO No:** 38360

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute Increments

#### LEGGET DR

#### TERRY FOX DR

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	6	0	3	9	0	0	0	0	9	0	65	54	119	2	17	0	19	138	147
07:15 07:30	7	0	4	11	0	0	0	0	11	0	99	91	190	7	18	0	25	215	226
07:30 07:45	8	0	7	15	0	0	0	0	15	0	74	89	163	14	18	0	32	195	210
07:45 08:00	6	0	7	13	0	0	0	0	13	0	86	131	217	15	29	0	44	261	274
08:00 08:15	12	0	6	18	0	0	0	0	18	0	83	137	220	6	24	0	30	250	268
08:15 08:30	8	0	11	19	0	0	0	0	19	0	110	141	251	16	31	0	47	298	317
08:30 08:45	12	0	12	24	0	0	0	0	24	0	145	147	292	7	35	0	42	334	358
08:45 09:00	9	0	10	19	0	0	0	0	19	0	138	128	266	8	32	0	40	306	325
09:00 09:15	10	0	5	15	0	0	0	0	15	0	132	120	252	13	32	0	45	297	312
09:15 09:30	25	0	10	35	0	0	0	0	35	0	111	116	227	10	31	0	41	268	303
09:30 09:45	15	0	6	21	0	0	0	0	21	0	79	72	151	5	20	0	25	176	197
09:45 10:00	11	0	7	18	0	0	0	0	18	0	68	62	130	9	22	0	31	161	179
11:30 11:45	57	0	6	63	0	0	0	0	63	0	23	24	47	5	55	0	60	107	170
11:45 12:00	44	0	7	51	0	0	0	0	51	0	22	40	62	6	86	0	92	154	205
12:00 12:15	63	0	10	73	0	0	0	0	73	0	33	34	67	7	87	0	94	161	234
12:15 12:30	44	0	6	50	0	0	0	0	50	0	47	46	93	4	60	0	64	157	207
12:30 12:45	30	0	2	32	0	0	0	0	32	0	53	46	99	8	49	0	57	156	188
12:45 13:00	28	0	5	33	0	0	0	0	33	0	58	57	115	2	43	0	45	160	193
13:00 13:15	30	0	5	35	0	0	0	0	35	0	61	52	113	7	29	0	36	149	184
13:15 13:30	27	0	9	36	0	0	0	0	36	0	56	51	107	4	26	0	30	137	173
15:00 15:15	40	0	0	40	0	0	0	0	40	0	20	17	37	6	50	0	56	93	133
15:15 15:30	38	0	5	43	0	0	0	0	43	0	16	21	37	4	56	0	60	97	140
15:30 15:45	56	0	9	65	0	0	0	0	65	0	24	20	44	7	61	0	68	112	177
15:45 16:00	54	0	13	67	0	0	0	0	67	0	24	31	55	5	72	0	77	132	199
16:00 16:15	87	0	12	99	0	0	0	0	99	0	20	23	43	2	129	0	131	174	273
16:15 16:30	63	0	13	76	0	0	0	0	76	0	34	20	54	5	130	0	135	189	265
16:30 16:45	75	0	13	88	0	0	0	0	88	0	21	18	39	5	142	0	147	186	274
16:45 17:00	76	0	7	83	0	0	0	0	83	0	32	20	52	6	139	0	145	197	280
17:00 17:15	70	0	8	78	0	0	0	0	78	0	35	23	58	5	168	0	173	231	309
17:15 17:30	67	0	12	79	0	0	0	0	79	0	31	17	48	8	162	0	170	218	297
17:30 17:45	72	0	10	82	0	0	0	0	82	0	21	17	38	5	134	0	139	177	259
17:45 18:00	47	0	7	54	0	0	0	0	54	0	18	12	30	8	89	0	97	127	181
<b>Total:</b>	<b>1197</b>	<b>0</b>	<b>247</b>	<b>1444</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1444</b>	<b>0</b>	<b>1839</b>	<b>1877</b>	<b>3716</b>	<b>221</b>	<b>2076</b>	<b>0</b>	<b>2297</b>	<b>1444</b>	<b>7,457</b>

Note: U-Turns are included in Totals.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ TERRY FOX DR

**Survey Date:** Wednesday, February 20, 2019

**WO No:** 38360

**Start Time:** 07:00

**Device:** Miovision

### Full Study Cyclist Volume

Time Period	LEGGET DR			TERRY FOX DR			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	0	0	0	0	0	0	0
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	0	0	0	0	0	0
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	1	0	1	1
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	1	0	1	0	0	0	1
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	1	0	1	0	0	0	1
17:15 17:30	1	0	1	0	0	0	1
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	0	0	0
Total	3	0	3	1	0	1	4



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ TERRY FOX DR

**Survey Date:** Wednesday, February 20, 2019

**WO No:** 38360

**Start Time:** 07:00

**Device:** Miovision

### Full Study Pedestrian Volume

#### LEGGET DR

#### TERRY FOX DR

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	0	1	0	0	0	1
07:15 07:30	1	0	1	0	0	0	1
07:30 07:45	2	0	2	0	0	0	2
07:45 08:00	2	0	2	0	0	0	2
08:00 08:15	5	0	5	0	0	0	5
08:15 08:30	4	0	4	0	2	2	6
08:30 08:45	7	0	7	0	0	0	7
08:45 09:00	3	0	3	0	0	0	3
09:00 09:15	3	0	3	0	0	0	3
09:15 09:30	2	0	2	0	0	0	2
09:30 09:45	3	0	3	0	0	0	3
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	2	0	2	0	0	0	2
11:45 12:00	12	0	12	0	0	0	12
12:00 12:15	11	0	11	0	0	0	11
12:15 12:30	19	0	19	0	0	0	19
12:30 12:45	11	0	11	0	0	0	11
12:45 13:00	6	0	6	0	0	0	6
13:00 13:15	4	0	4	0	0	0	4
13:15 13:30	2	0	2	0	0	0	2
15:00 15:15	4	0	4	0	0	0	4
15:15 15:30	1	0	1	0	0	0	1
15:30 15:45	3	0	3	0	0	0	3
15:45 16:00	1	0	1	0	2	2	3
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	2	0	2	0	1	1	3
16:30 16:45	4	0	4	0	0	0	4
16:45 17:00	2	0	2	0	0	0	2
17:00 17:15	3	0	3	0	0	0	3
17:15 17:30	4	0	4	0	0	0	4
17:30 17:45	6	0	6	0	0	0	6
17:45 18:00	5	0	5	0	0	0	5
<b>Total</b> .....	<b>135</b>	<b>0</b>	<b>135</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>140</b>



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ TERRY FOX DR

**Survey Date:** Wednesday, February 20, 2019

**WO No:** 38360

**Start Time:** 07:00

**Device:** Miovision

### Full Study Heavy Vehicles

#### LEGGET DR

#### TERRY FOX DR

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	2	0	0	2	0	0	0	0	2	0	2	0	2	1	1	0	2	4	6
07:15 07:30	2	0	0	2	0	0	0	0	2	0	0	0	0	1	1	0	2	2	4
07:30 07:45	2	0	1	3	0	0	0	0	3	0	0	1	1	1	2	0	3	4	7
07:45 08:00	1	0	1	2	0	0	0	0	2	0	1	0	1	2	1	0	3	4	6
08:00 08:15	2	0	0	2	0	0	0	0	2	0	0	0	0	1	1	0	2	2	4
08:15 08:30	0	0	0	0	0	0	0	0	0	0	1	0	1	1	4	0	5	6	6
08:30 08:45	1	0	2	3	0	0	0	0	3	0	3	0	3	1	2	0	3	6	9
08:45 09:00	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2
09:00 09:15	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	0	4	6	6
09:15 09:30	1	0	1	2	0	0	0	0	2	0	0	1	1	0	1	0	1	2	4
09:30 09:45	1	0	1	2	0	0	0	0	2	0	1	1	2	1	2	0	3	5	7
09:45 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 11:45	2	0	0	2	0	0	0	0	2	0	2	0	2	0	2	0	2	4	6
11:45 12:00	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	0	4	5	5
12:00 12:15	1	0	1	2	0	0	0	0	2	0	1	0	1	1	2	0	3	4	6
12:15 12:30	0	0	1	1	0	0	0	0	1	0	1	0	1	0	1	0	1	2	3
12:30 12:45	1	0	1	2	0	0	0	0	2	0	1	1	2	1	1	0	2	4	6
12:45 13:00	2	0	0	2	0	0	0	0	2	0	3	0	3	0	1	0	1	4	6
13:00 13:15	2	0	0	2	0	0	0	0	2	0	1	0	1	1	2	0	3	4	6
13:15 13:30	1	0	0	1	0	0	0	0	1	0	1	1	2	2	0	0	2	4	5
15:00 15:15	1	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	1	1	2
15:15 15:30	1	0	3	4	0	0	0	0	4	0	0	3	3	1	0	0	1	4	8
15:30 15:45	3	0	3	6	0	0	0	0	6	0	2	1	3	0	2	0	2	5	11
15:45 16:00	0	0	1	1	0	0	0	0	1	0	0	1	1	1	2	0	3	4	5
16:00 16:15	0	0	1	1	0	0	0	0	1	0	3	1	4	0	3	0	3	7	8
16:15 16:30	0	0	2	2	0	0	0	0	2	0	0	3	3	1	1	0	2	5	7
16:30 16:45	0	0	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	1	2
16:45 17:00	0	0	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	1	2
17:00 17:15	0	0	2	2	0	0	0	0	2	0	0	1	1	0	0	0	0	1	3
17:15 17:30	0	0	1	1	0	0	0	0	1	0	1	0	1	0	0	0	0	1	2
17:30 17:45	0	0	0	0	0	0	0	0	0	0	0	3	3	0	1	0	1	4	4
17:45 18:00	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
<b>Total:</b> None	26	0	25	51	0	0	0	0	51	0	26	22	48	21	39	0	60	108	159



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### LEGGET DR @ TERRY FOX DR

**Survey Date:** Wednesday, February 20, 2019

**WO No:** 38360

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute U-Turn Total

LEGGET DR

TERRY FOX DR

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

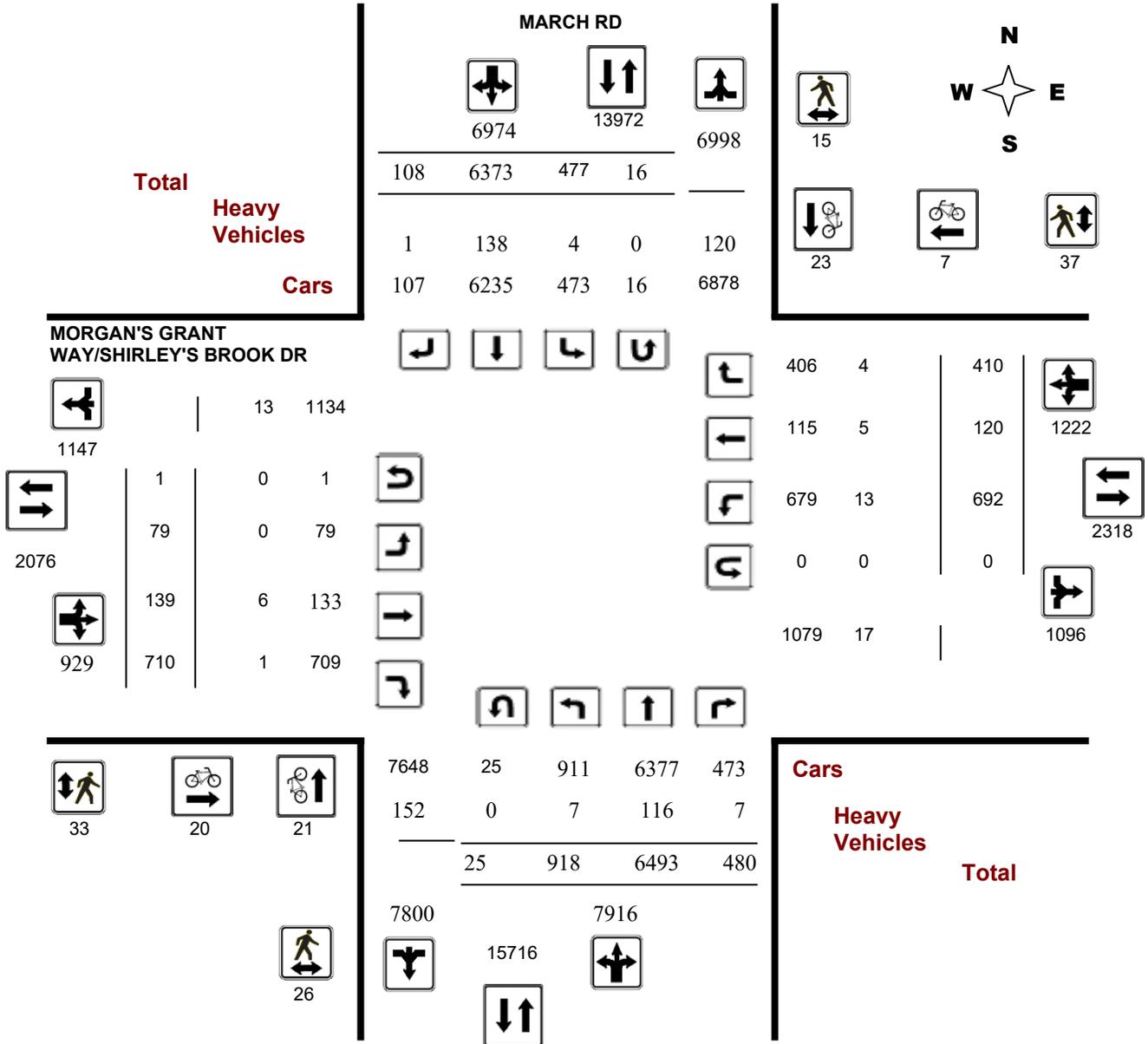
**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36160

**Start Time:** 07:00

**Device:** Miovision

### Full Study Diagram



## Turning Movement Count - Study Results

### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

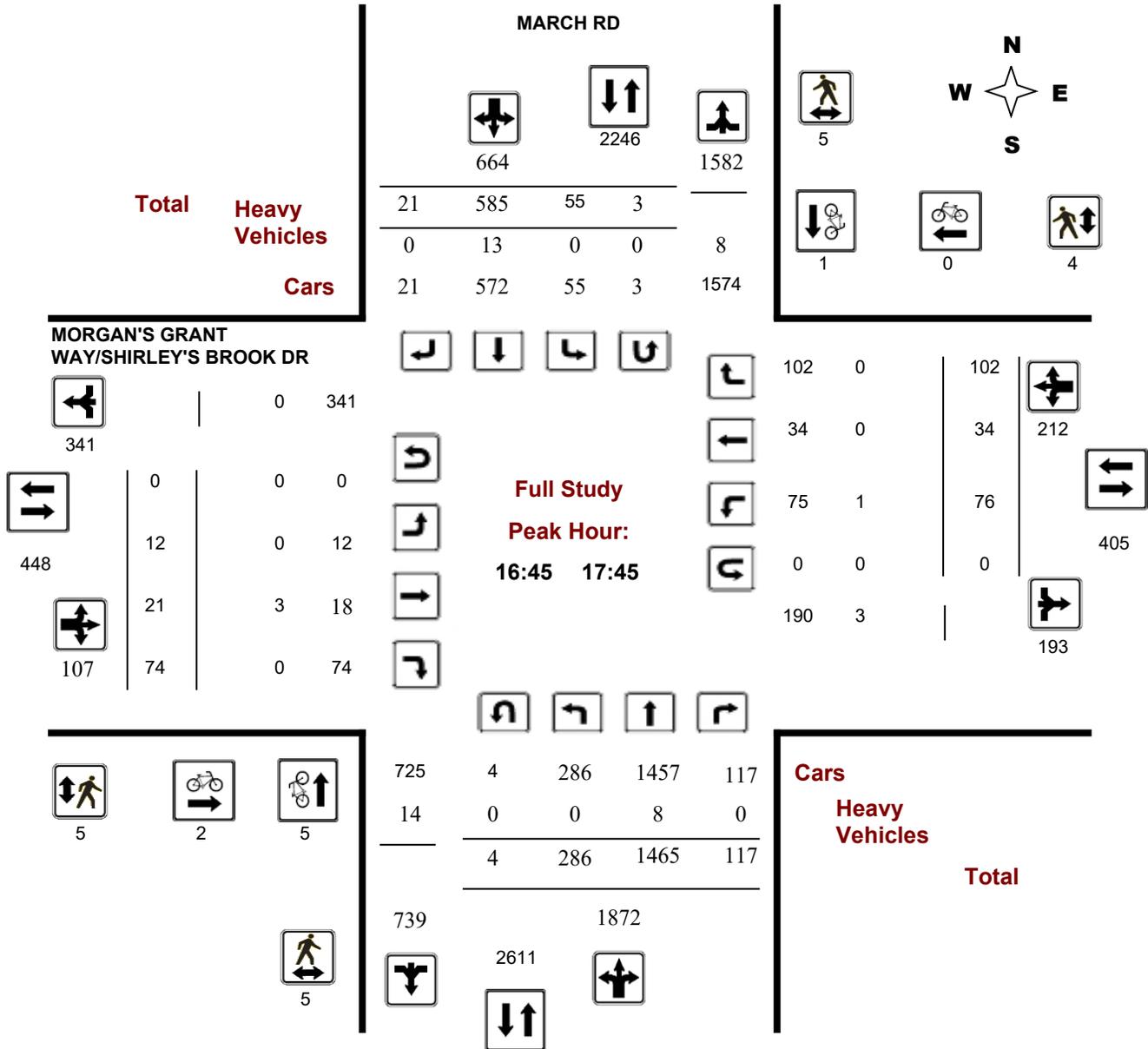
**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36160

**Start Time:** 07:00

**Device:** Miovision

### Full Study Peak Hour Diagram





# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

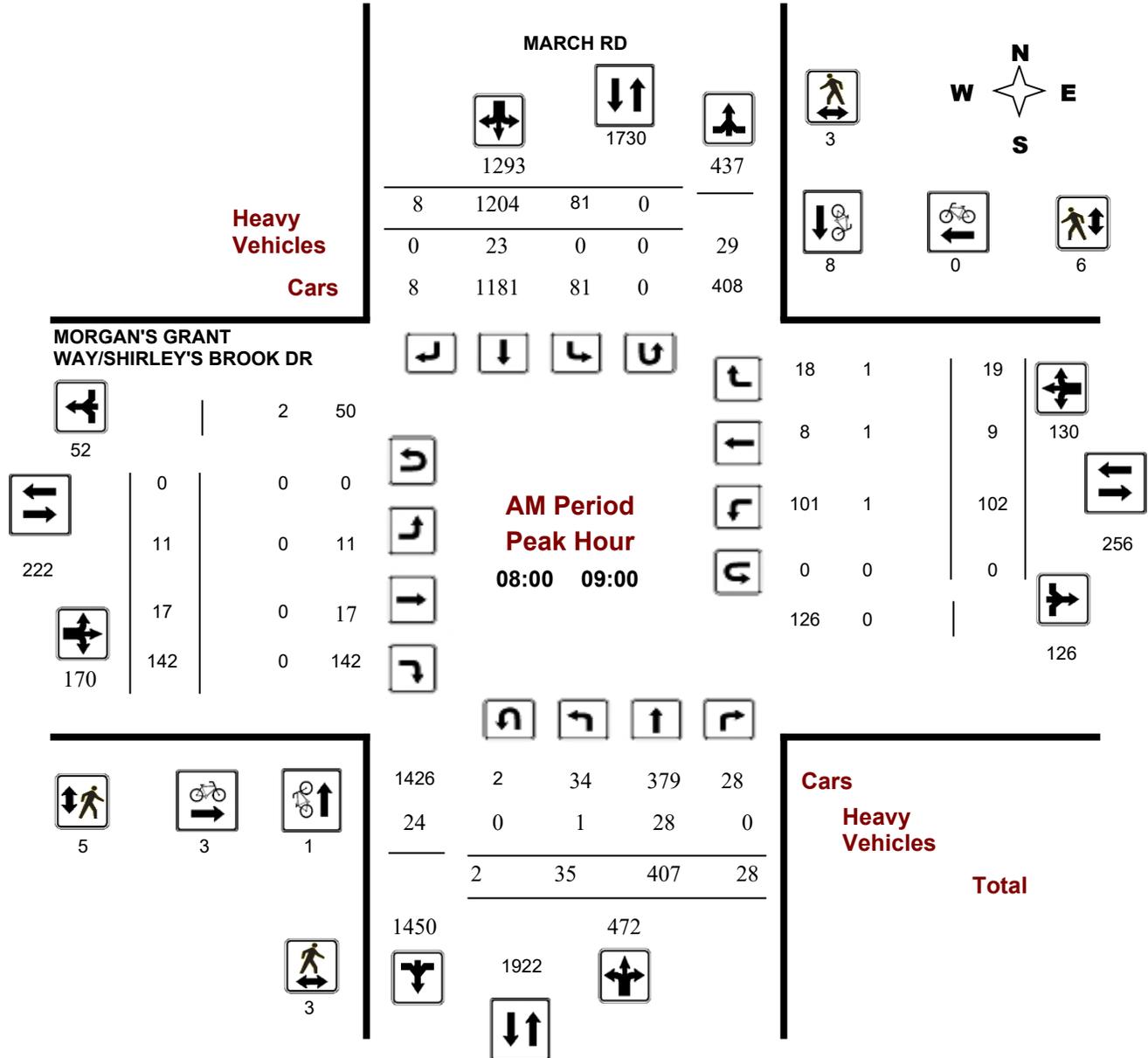
### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

**Survey Date:** Wednesday, August 10, 2016

**Start Time:** 07:00

**WO No:** 36160

**Device:** Miovision



**Comments**

## Turning Movement Count - Peak Hour Diagram

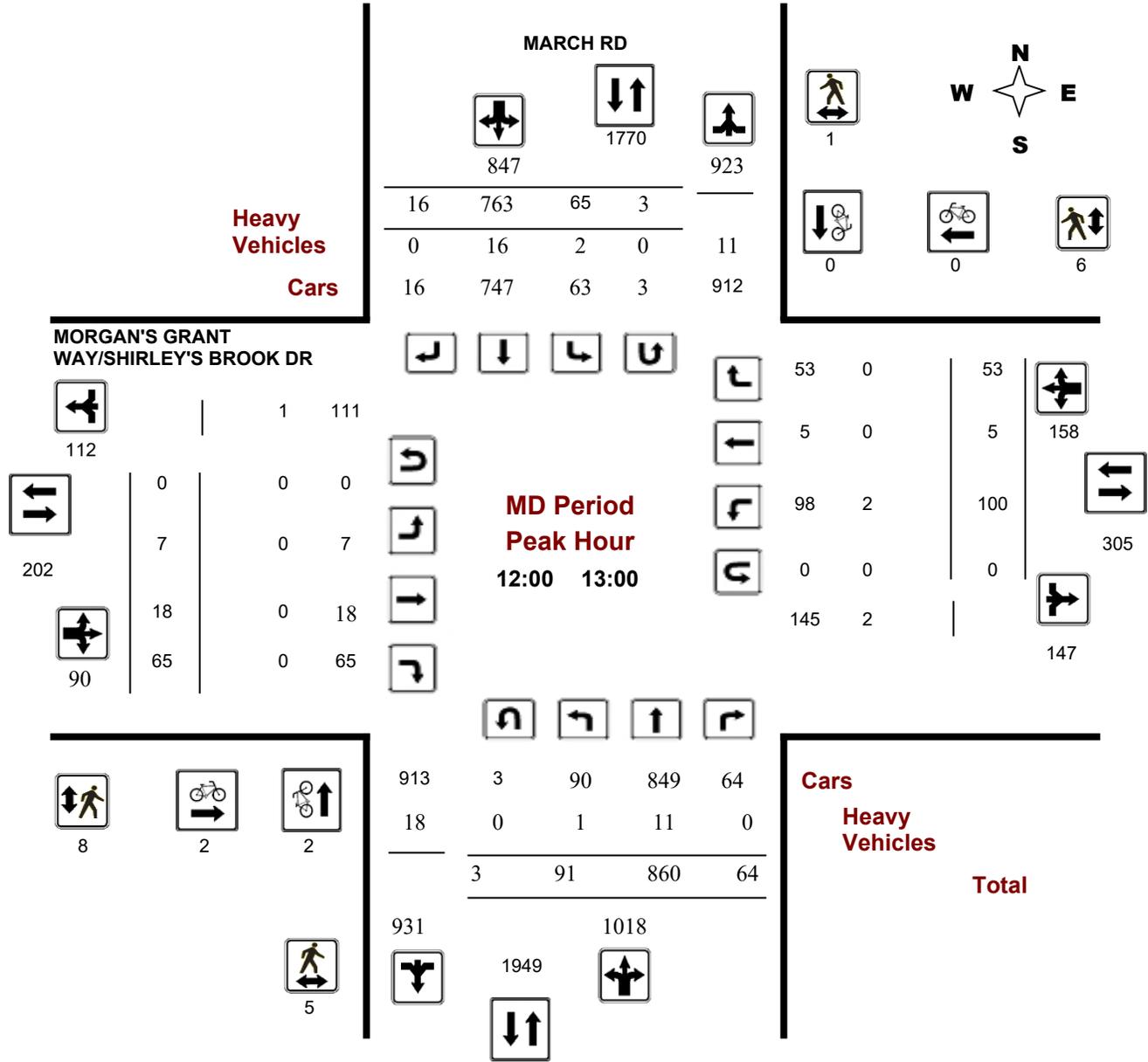
### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

**Survey Date:** Wednesday, August 10, 2016

**Start Time:** 07:00

**WO No:** 36160

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

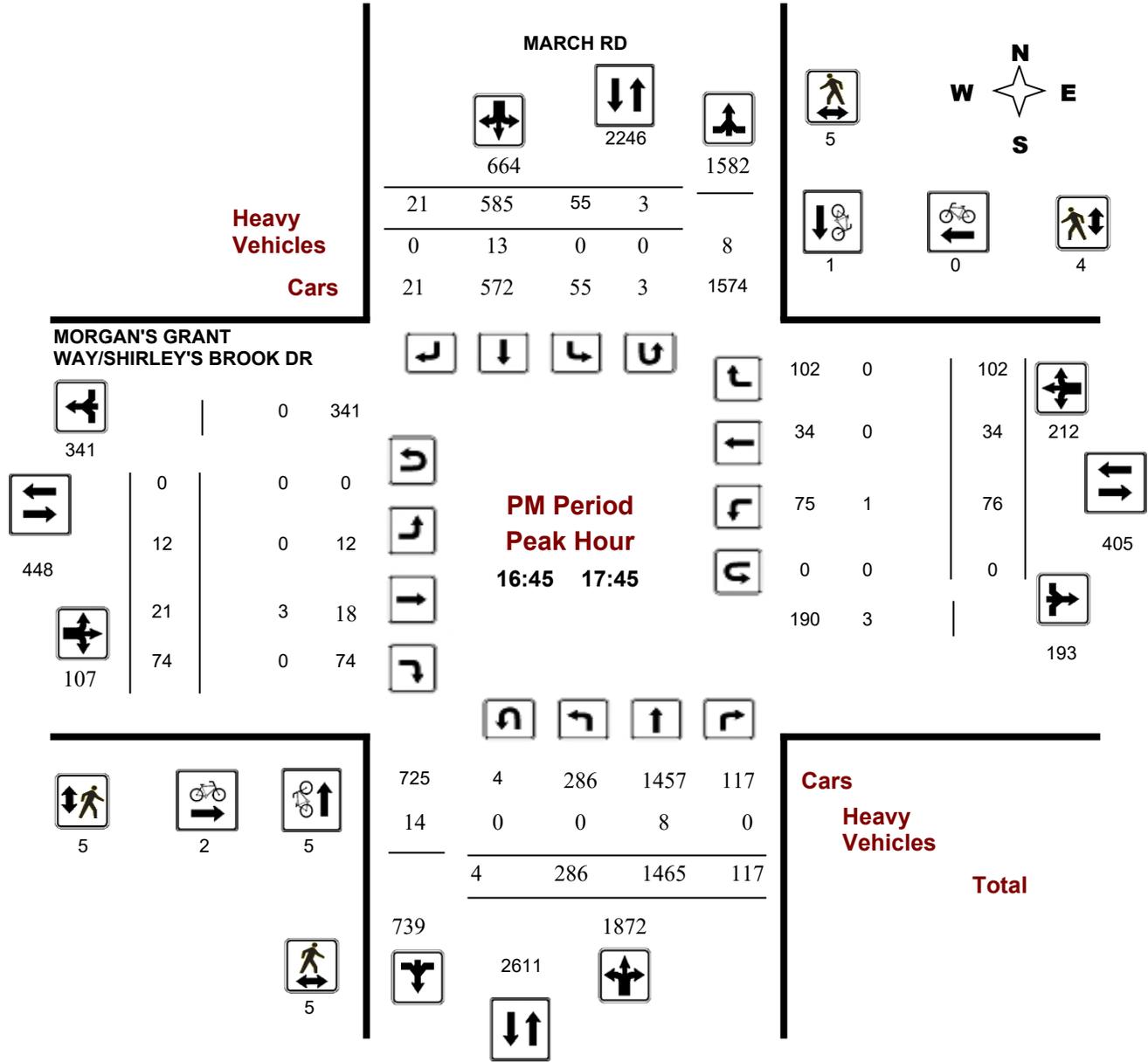
### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

**Survey Date:** Wednesday, August 10, 2016

**Start Time:** 07:00

**WO No:** 36160

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36160

**Start Time:** 07:00

**Device:** Miovision

### Full Study Summary (8 HR Standard)

**Survey Date:** Wednesday, August 10, 2016

**Total Observed U-Turns**  
 Northbound: 25      Southbound: 16  
 Eastbound: 1      Westbound: 0

**AADT Factor**  
 .90

MARCH RD										MORGAN'S GRANT WAY/SHIRLEY'S BROOK DR										Grand Total
Northbound					Southbound					Eastbound					Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total	
07:00 08:00	19	283	25	327	95	1082	9	1186	1513	10	16	140	166	97	9	12	118	284	1797	
08:00 09:00	35	407	28	470	81	1204	8	1293	1763	11	17	142	170	102	9	19	130	300	2063	
09:00 10:00	55	445	31	531	61	873	12	946	1477	6	18	108	132	91	8	28	127	259	1736	
11:30 12:30	86	863	59	1008	52	672	15	739	1747	10	14	46	70	93	3	50	146	216	1963	
12:30 13:30	81	740	52	873	57	787	12	856	1729	9	19	72	100	95	12	50	157	257	1986	
15:00 16:00	136	990	64	1190	29	600	14	643	1833	10	10	56	76	56	14	62	132	208	2041	
16:00 17:00	235	1359	109	1703	46	579	15	640	2343	13	24	77	114	83	31	92	206	320	2663	
17:00 18:00	271	1406	112	1789	56	576	23	655	2444	10	21	69	100	75	34	97	206	306	2750	
<b>Sub Total</b>	918	6493	480	7891	477	6373	108	6958	14849	79	139	710	928	692	120	410	1222	2150	16999	
<b>U Turns</b>	25			25	16			16	41	1			1	0			0	1	42	
<b>Total</b>	943	6493	480	7916	493	6373	108	6974	14890	80	139	710	929	692	120	410	1222	2151	17041	
<b>EQ 12Hr</b>	1311	9025	667	11003	685	8858	150	9693	20696	111	193	987	1291	962	167	570	1699	2990	23686	

Note: These values are calculated by multiplying the totals by the appropriate expansion factor.

**1.39**

**AVG 12Hr** 1180 8122 600 9902 616 7972 135 8723 18625 100 174 888 1162 866 150 513 1529 2691 21316

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.

**.90**

**AVG 24Hr** 1546 10640 786 12972 807 10443 177 11427 24399 131 228 1163 1522 1134 196 672 2002 3524 27923

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

**1.31**

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



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36160

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute Increments

#### MARCH RD

#### MORGAN'S GRANT WAY/SHIRLEY'S BROOK DR

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	6	54	5	65	26	237	0	263	328	0	3	31	34	22	3	2	27	61	389
07:15 07:30	2	74	10	86	27	248	2	277	363	3	3	35	41	22	3	3	28	69	432
07:30 07:45	8	66	2	76	15	292	4	311	387	3	5	33	41	24	1	5	30	71	458
07:45 08:00	5	89	8	102	27	305	3	335	437	5	5	41	51	29	2	2	33	84	521
08:00 08:15	9	102	3	114	20	298	1	319	433	7	2	39	48	23	2	5	30	78	511
08:15 08:30	11	101	7	119	28	287	3	318	437	1	2	46	49	23	2	7	32	81	518
08:30 08:45	7	100	6	113	13	312	3	328	441	2	8	31	41	25	1	4	30	71	512
08:45 09:00	10	104	12	126	20	307	1	328	454	1	5	26	32	31	4	3	38	70	524
09:00 09:15	23	118	8	149	14	243	1	258	407	0	3	31	34	23	2	7	32	66	473
09:15 09:30	8	113	9	130	21	217	6	244	374	2	7	29	38	23	4	7	34	72	446
09:30 09:45	12	116	4	132	14	241	4	259	391	2	2	29	33	26	1	2	29	62	453
09:45 10:00	15	98	10	123	14	172	1	187	310	2	6	19	27	19	1	12	32	59	369
11:30 11:45	20	181	12	213	11	150	3	164	377	1	3	11	15	22	0	9	31	46	423
11:45 12:00	22	215	14	251	8	168	3	179	430	6	2	14	22	28	1	17	46	68	498
12:00 12:15	26	228	20	274	19	169	5	193	467	1	6	9	16	19	0	11	30	46	513
12:15 12:30	19	239	13	271	17	185	4	206	477	2	3	12	17	24	2	13	39	56	533
12:30 12:45	22	185	12	219	20	209	3	232	451	1	6	19	26	25	1	13	39	65	516
12:45 13:00	27	208	19	254	12	200	4	216	470	3	3	25	31	32	2	16	50	81	551
13:00 13:15	18	173	11	202	14	200	2	216	418	3	5	15	23	23	6	11	40	63	481
13:15 13:30	21	174	10	205	11	178	3	192	397	2	5	13	20	15	3	10	28	48	445
15:00 15:15	23	191	7	221	10	156	2	168	389	3	3	18	24	17	3	9	29	53	442
15:15 15:30	32	258	23	313	7	152	4	163	476	1	3	8	12	9	2	24	35	47	523
15:30 15:45	41	273	16	330	6	146	2	154	484	5	0	13	18	22	7	13	42	60	544
15:45 16:00	44	268	18	330	9	146	6	161	491	1	4	17	22	8	2	16	26	48	539
16:00 16:15	48	309	26	383	16	157	6	179	562	2	6	18	26	24	6	20	50	76	638
16:15 16:30	54	351	32	437	13	143	3	159	596	2	5	26	33	16	13	24	53	86	682
16:30 16:45	63	343	24	430	7	138	3	148	578	5	9	14	28	23	6	19	48	76	654
16:45 17:00	72	356	27	455	13	141	3	157	612	4	4	19	27	20	6	29	55	82	694
17:00 17:15	78	399	35	512	17	141	4	162	674	2	3	10	15	13	11	33	57	72	746
17:15 17:30	86	391	27	504	15	147	6	168	672	2	7	19	28	16	7	18	41	69	741
17:30 17:45	54	319	28	401	13	156	8	177	578	4	7	26	37	27	10	22	59	96	674
17:45 18:00	57	297	22	376	16	132	5	153	529	2	4	14	20	19	6	24	49	69	598
Total:	943	6493	480	7916	493	6373	108	6974	14890	80	139	710	929	692	120	410	1222	14890	17,041

Note: U-Turns are included in Totals.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36160

**Start Time:** 07:00

**Device:** Miovision

### Full Study Cyclist Volume

MARCH RD

MORGAN'S GRANT WAY/SHIRLEY'S  
BROOK DR

Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	1	1	0	0	0	1
07:30 07:45	2	1	3	0	0	0	3
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	2	2	0	0	0	2
08:15 08:30	0	2	2	1	0	1	3
08:30 08:45	1	2	3	1	0	1	4
08:45 09:00	0	2	2	1	0	1	3
09:00 09:15	0	1	1	1	0	1	2
09:15 09:30	1	0	1	4	0	4	5
09:30 09:45	0	1	1	2	0	2	3
09:45 10:00	1	1	2	2	0	2	4
11:30 11:45	1	1	2	0	0	0	2
11:45 12:00	1	0	1	3	0	3	4
12:00 12:15	1	0	1	0	0	0	1
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	1	0	1	1	0	1	2
12:45 13:00	0	0	0	1	0	1	1
13:00 13:15	1	1	2	0	0	0	2
13:15 13:30	2	3	5	0	0	0	5
15:00 15:15	0	1	1	0	0	0	1
15:15 15:30	0	0	0	0	2	2	2
15:30 15:45	0	0	0	0	1	1	1
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	1	2	3	0	2	2	5
16:15 16:30	1	1	2	1	1	2	4
16:30 16:45	0	0	0	0	1	1	1
16:45 17:00	1	0	1	1	0	1	2
17:00 17:15	2	0	2	1	0	1	3
17:15 17:30	1	0	1	0	0	0	1
17:30 17:45	1	1	2	0	0	0	2
17:45 18:00	2	0	2	0	0	0	2
<b>Total</b>	<b>21</b>	<b>23</b>	<b>44</b>	<b>20</b>	<b>7</b>	<b>27</b>	<b>71</b>



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36160

**Start Time:** 07:00

**Device:** Miovision

### Full Study Pedestrian Volume

#### MARCH RD

#### MORGAN'S GRANT WAY/SHIRLEY'S BROOK DR

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	2	0	2	0	0	0	2
07:15 07:30	0	0	0	1	0	1	1
07:30 07:45	0	0	0	1	1	2	2
07:45 08:00	1	1	2	0	0	0	2
08:00 08:15	0	0	0	0	1	1	1
08:15 08:30	1	1	2	2	3	5	7
08:30 08:45	1	1	2	1	0	1	3
08:45 09:00	1	1	2	2	2	4	6
09:00 09:15	4	0	4	2	1	3	7
09:15 09:30	2	0	2	2	1	3	5
09:30 09:45	1	0	1	3	2	5	6
09:45 10:00	0	1	1	0	4	4	5
11:30 11:45	0	0	0	0	3	3	3
11:45 12:00	0	0	0	1	1	2	2
12:00 12:15	3	0	3	2	2	4	7
12:15 12:30	0	0	0	5	2	7	7
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	2	1	3	1	2	3	6
13:00 13:15	2	0	2	0	2	2	4
13:15 13:30	0	1	1	2	0	2	3
15:00 15:15	0	0	0	1	1	2	2
15:15 15:30	1	0	1	0	0	0	1
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	0	1	1	1
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	1	0	1	1
16:30 16:45	0	1	1	0	1	1	2
16:45 17:00	2	1	3	0	1	1	4
17:00 17:15	2	0	2	1	0	1	3
17:15 17:30	1	2	3	3	2	5	8
17:30 17:45	0	2	2	1	1	2	4
17:45 18:00	0	2	2	1	3	4	6
<b>Total .....</b>	<b>26</b>	<b>15</b>	<b>41</b>	<b>33</b>	<b>37</b>	<b>70</b>	<b>111</b>



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36160

**Start Time:** 07:00

**Device:** Miovision

### Full Study Heavy Vehicles

**MARCH RD**

**MORGAN'S GRANT WAY/SHIRLEY'S  
BROOK DR**

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	2	0	2	1	5	0	6	8	0	0	0	0	0	1	0	1	1	9
07:15 07:30	1	8	1	10	0	2	0	2	12	0	0	0	0	1	0	0	1	1	13
07:30 07:45	1	4	0	5	0	6	0	6	11	0	0	0	0	1	1	0	2	2	13
07:45 08:00	0	7	0	7	0	3	0	3	10	0	0	0	0	0	1	0	1	1	11
08:00 08:15	1	9	0	10	0	4	0	4	14	0	0	0	0	0	0	1	1	1	15
08:15 08:30	0	10	0	10	0	6	0	6	16	0	0	0	0	0	1	0	1	1	17
08:30 08:45	0	3	0	3	0	7	0	7	10	0	0	0	0	0	0	0	0	0	10
08:45 09:00	0	6	0	6	0	6	0	6	12	0	0	0	0	1	0	0	1	1	13
09:00 09:15	0	5	0	5	0	10	0	10	15	0	0	0	0	0	0	0	0	0	15
09:15 09:30	0	3	0	3	0	4	0	4	7	0	0	0	0	1	1	2	4	4	11
09:30 09:45	0	2	1	3	0	2	0	2	5	0	0	0	0	0	0	0	0	0	5
09:45 10:00	0	5	0	5	0	4	0	4	9	0	0	1	1	1	0	0	1	2	11
11:30 11:45	0	2	1	3	0	7	0	7	10	0	0	0	0	0	0	0	0	0	10
11:45 12:00	1	2	0	3	0	2	0	2	5	0	0	0	0	1	0	0	1	1	6
12:00 12:15	0	3	0	3	1	3	0	4	7	0	0	0	0	0	0	0	0	0	7
12:15 12:30	0	5	0	5	0	3	0	3	8	0	0	0	0	2	0	0	2	2	10
12:30 12:45	0	1	0	1	0	4	0	4	5	0	0	0	0	0	0	0	0	0	5
12:45 13:00	1	2	0	3	1	6	0	7	10	0	0	0	0	0	0	0	0	0	10
13:00 13:15	0	6	0	6	0	2	0	2	8	0	0	0	0	0	0	0	0	0	8
13:15 13:30	0	1	0	1	0	7	0	7	8	0	0	0	0	0	0	0	0	0	8
15:00 15:15	0	3	0	3	0	3	0	3	6	0	0	0	0	1	0	0	1	1	7
15:15 15:30	0	4	2	6	0	3	1	4	10	0	0	0	0	0	0	1	1	1	11
15:30 15:45	0	2	0	2	0	5	0	5	7	0	0	0	0	2	0	0	2	2	9
15:45 16:00	0	2	0	2	1	7	0	8	10	0	1	0	1	0	0	0	0	1	11
16:00 16:15	1	4	1	6	0	5	0	5	11	0	0	0	0	0	0	0	0	0	11
16:15 16:30	0	4	0	4	0	5	0	5	9	0	0	0	0	0	0	0	0	0	9
16:30 16:45	1	2	1	4	0	3	0	3	7	0	1	0	1	1	0	0	1	2	9
16:45 17:00	0	5	0	5	0	2	0	2	7	0	0	0	0	0	0	0	0	0	7
17:00 17:15	0	3	0	3	0	4	0	4	7	0	1	0	1	1	0	0	1	2	9
17:15 17:30	0	0	0	0	0	4	0	4	4	0	1	0	1	0	0	0	0	1	5
17:30 17:45	0	0	0	0	0	3	0	3	3	0	1	0	1	0	0	0	0	1	4
17:45 18:00	0	1	0	1	0	1	0	1	2	0	1	0	1	0	0	0	0	1	3
Total: None	7	116	7	130	4	138	1	143	273	0	6	1	7	13	5	4	22	29	302



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ MORGAN'S GRANT WAY/SHIRLEY'S BROOK

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36160

**Start Time:** 07:00

**Device:** Miovision

#### Full Study 15 Minute U-Turn Total

Time Period	MARCH RD		MORGAN'S GRANT WAY/SHIRLEY'S BROOK DR		Total
	Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	
07:00 - 07:15	1	0	0	0	1
07:15 - 07:30	0	0	1	0	1
07:30 - 07:45	1	0	0	0	1
07:45 - 08:00	0	0	0	0	0
08:00 - 08:15	0	0	0	0	0
08:15 - 08:30	0	0	0	0	0
08:30 - 08:45	2	0	0	0	2
08:45 - 09:00	0	0	0	0	0
09:00 - 09:15	0	1	0	0	1
09:15 - 09:30	1	1	0	0	2
09:30 - 09:45	0	0	0	0	0
09:45 - 10:00	2	0	0	0	2
11:30 - 11:45	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0
12:00 - 12:15	1	2	0	0	3
12:15 - 12:30	0	1	0	0	1
12:30 - 12:45	2	0	0	0	2
12:45 - 13:00	0	0	0	0	0
13:00 - 13:15	3	0	0	0	3
13:15 - 13:30	2	0	0	0	2
15:00 - 15:15	1	0	0	0	1
15:15 - 15:30	1	1	0	0	2
15:30 - 15:45	1	0	0	0	1
15:45 - 16:00	1	2	0	0	3
16:00 - 16:15	0	2	0	0	2
16:15 - 16:30	1	1	0	0	2
16:30 - 16:45	1	0	0	0	1
16:45 - 17:00	0	0	0	0	0
17:00 - 17:15	0	0	0	0	0
17:15 - 17:30	3	2	0	0	5
17:30 - 17:45	1	1	0	0	2
17:45 - 18:00	0	2	0	0	2
<b>Total</b>	<b>25</b>	<b>16</b>	<b>1</b>	<b>0</b>	<b>42</b>

## Turning Movement Count - Study Results

### MARCH RD @ SOLANDT RD

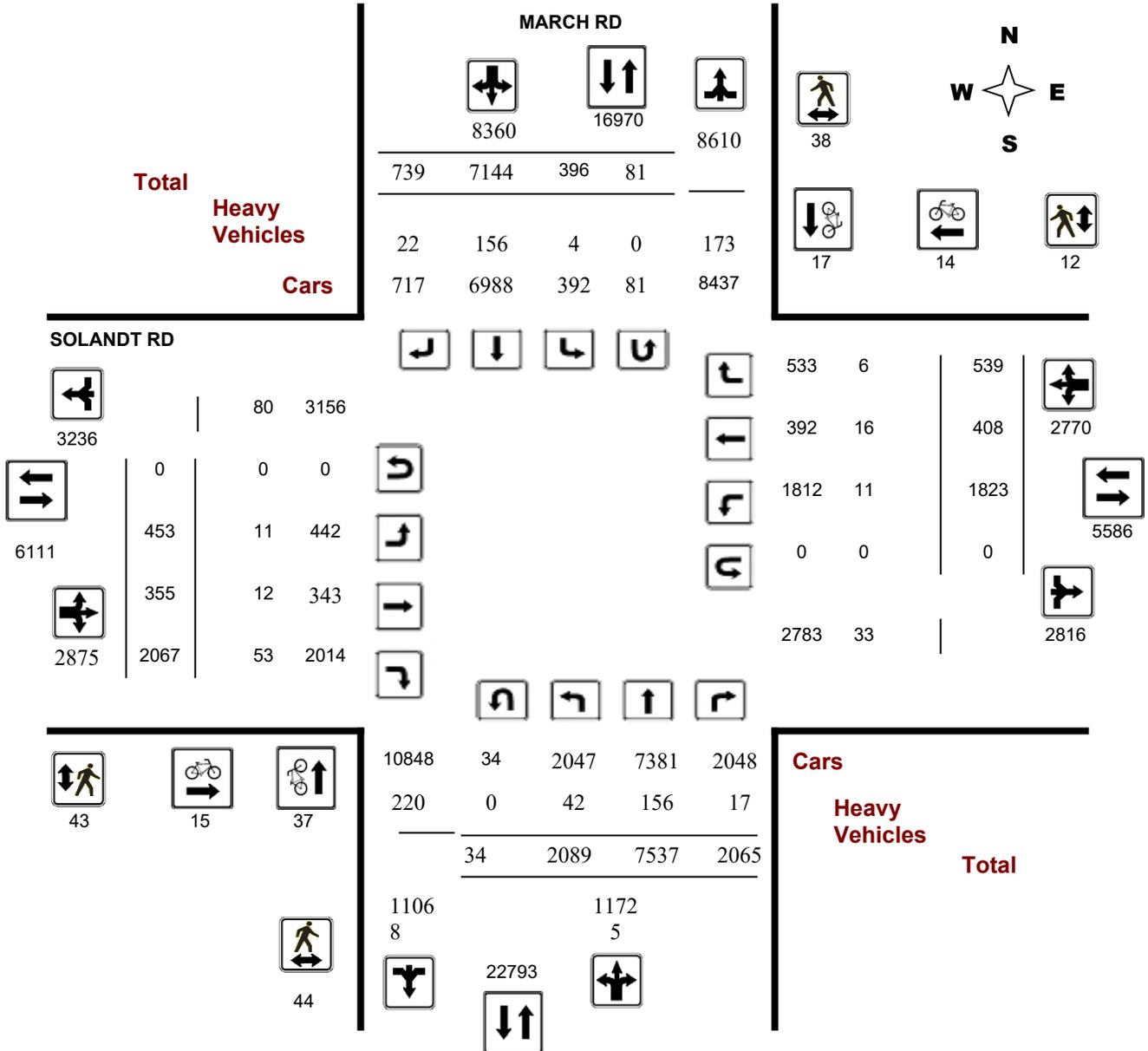
**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36153

**Start Time:** 07:00

**Device:** Miovision

### Full Study Diagram



## Turning Movement Count - Study Results

### MARCH RD @ SOLANDT RD

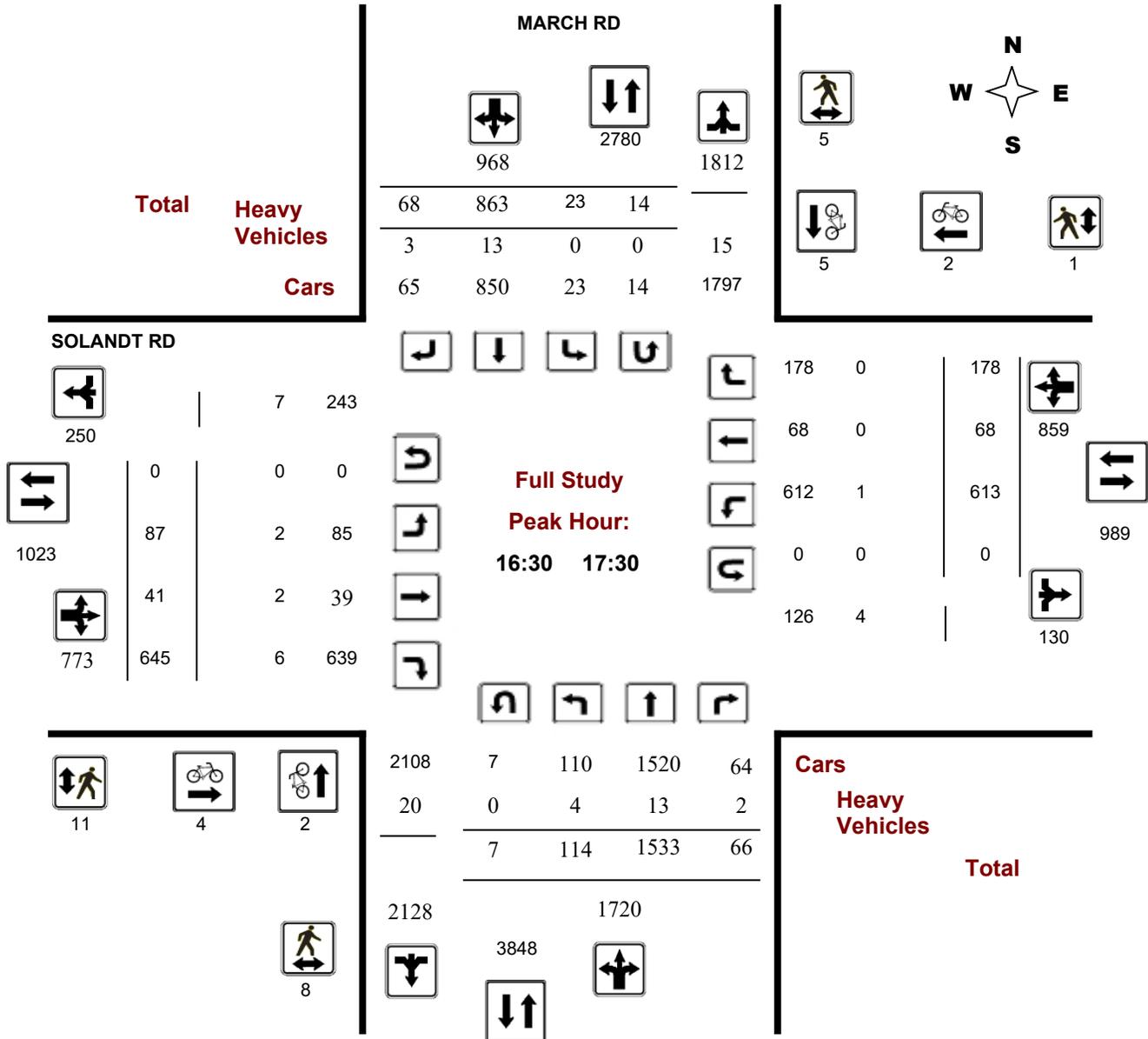
**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36153

**Start Time:** 07:00

**Device:** Miovision

### Full Study Peak Hour Diagram



## Turning Movement Count - Peak Hour Diagram

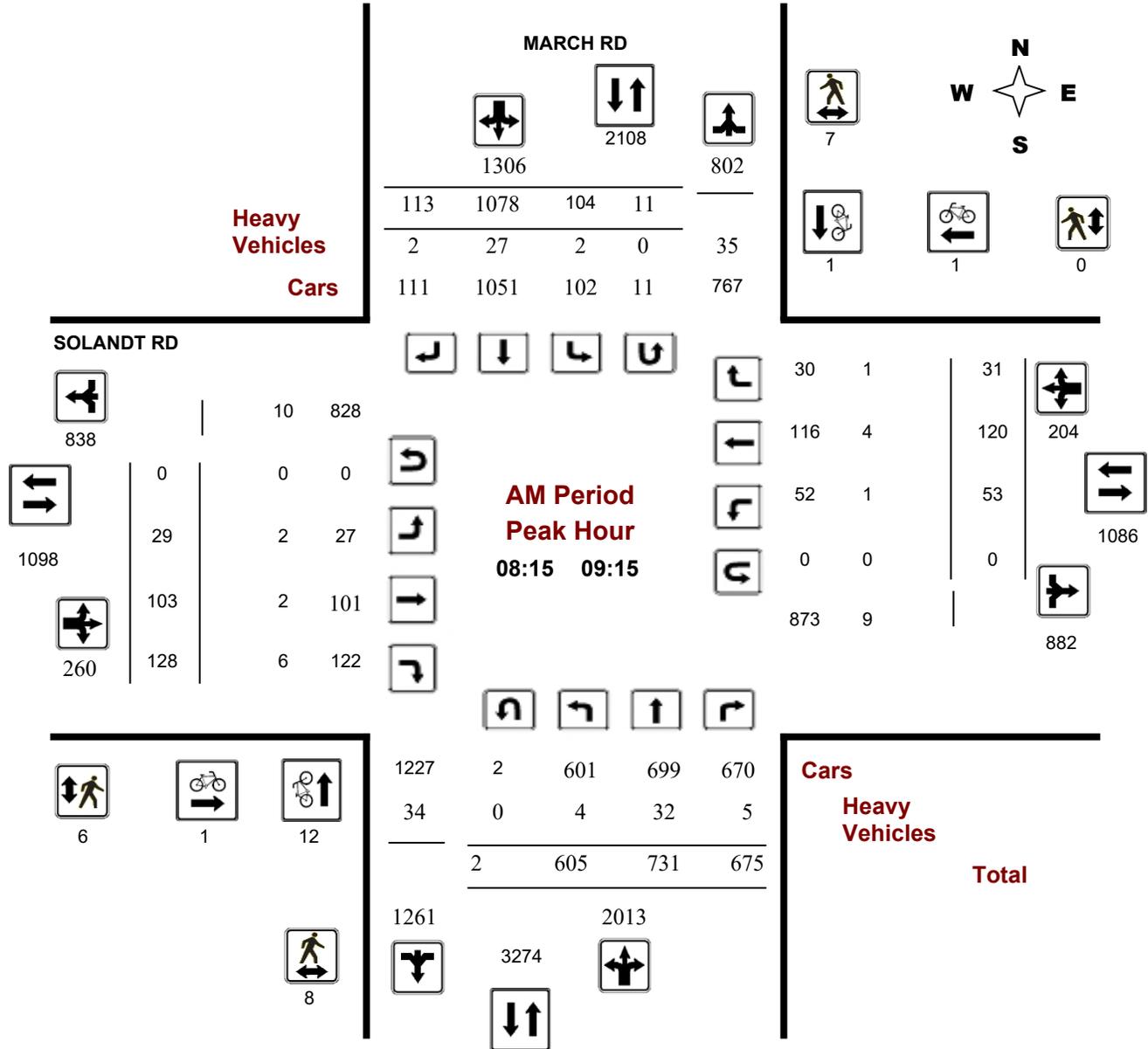
### MARCH RD @ SOLANDT RD

**Survey Date:** Wednesday, August 10, 2016

**Start Time:** 07:00

**WO No:** 36153

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

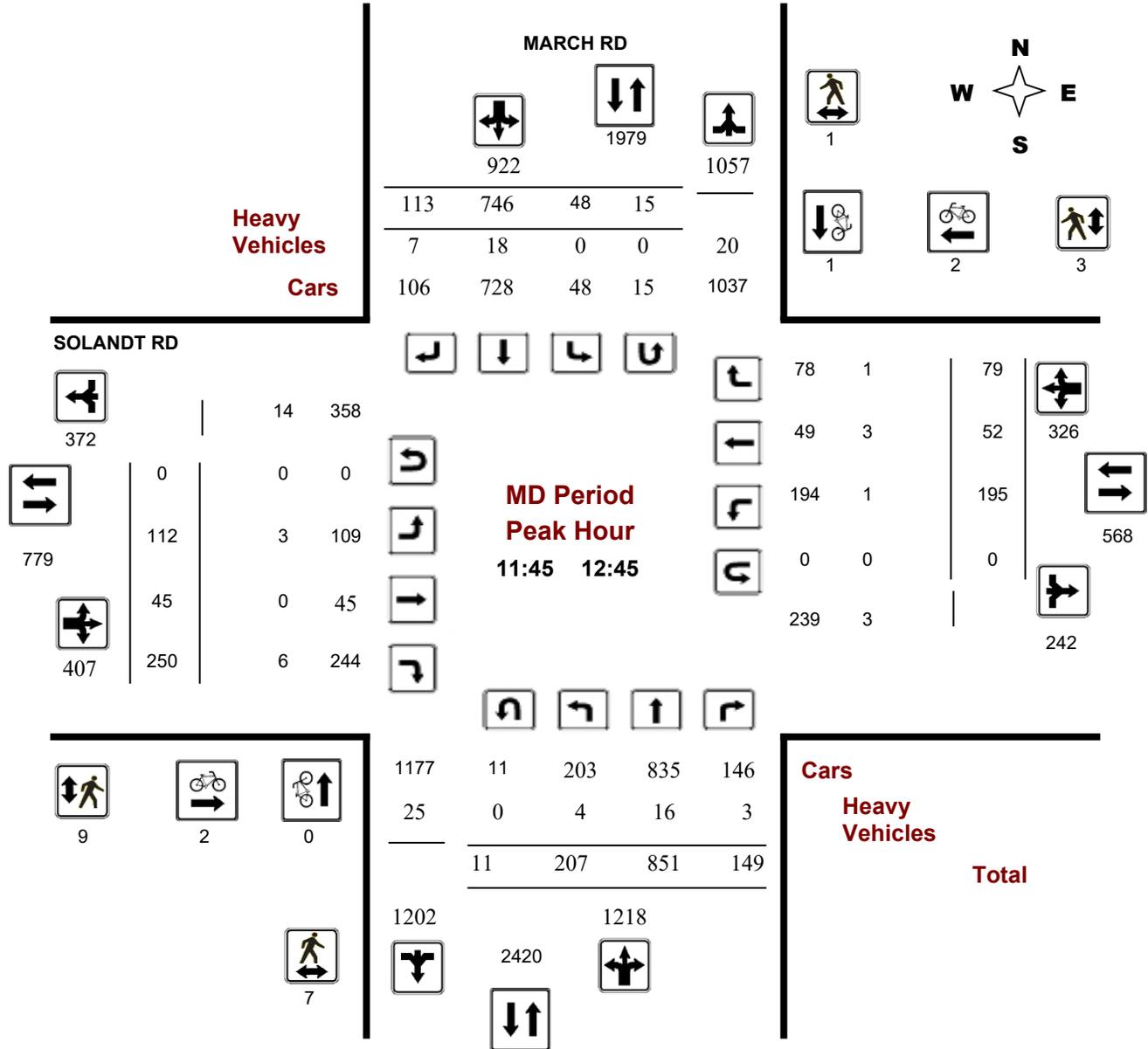
### MARCH RD @ SOLANDT RD

**Survey Date:** Wednesday, August 10, 2016

**Start Time:** 07:00

**WO No:** 36153

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

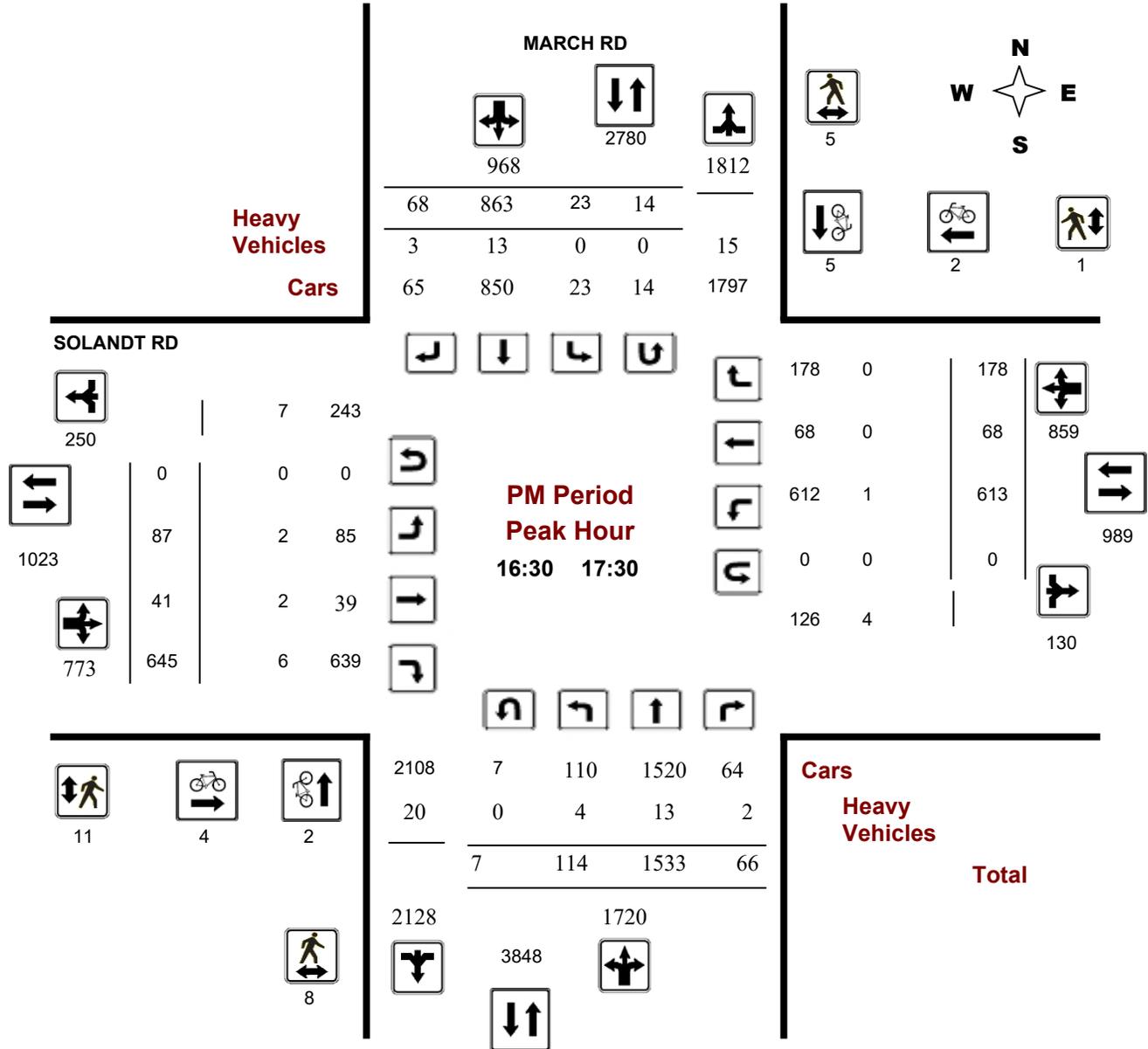
### MARCH RD @ SOLANDT RD

**Survey Date:** Wednesday, August 10, 2016

**Start Time:** 07:00

**WO No:** 36153

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ SOLANDT RD

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36153

**Start Time:** 07:00

**Device:** Miovision

### Full Study Summary (8 HR Standard)

**Survey Date:** Wednesday, August 10, 2016

**Total Observed U-Turns**  
 Northbound: 34      Southbound: 81  
 Eastbound: 0        Westbound: 0

**AADT Factor**  
 .90

Period	MARCH RD									SOLANDT RD									Grand Total
	Northbound			NB TOT	Southbound			SB TOT	STR TOT	Eastbound			EB TOT	Westbound			WB TOT	STR TOT	
LT	ST	RT	LT		ST	RT	LT			ST	RT	LT		ST	RT	LT			ST
07:00 08:00	301	467	367	1135	65	1214	103	1382	2517	8	29	65	102	56	17	10	83	185	2702
08:00 09:00	560	685	645	1890	99	1147	125	1371	3261	27	93	132	252	45	91	29	165	417	3678
09:00 10:00	472	736	518	1726	67	891	83	1041	2767	22	52	111	185	67	71	23	161	346	3113
11:30 12:30	178	824	118	1120	35	728	102	865	1985	109	46	257	412	199	51	87	337	749	2734
12:30 13:30	231	776	182	1189	75	771	149	995	2184	70	40	162	272	122	36	49	207	479	2663
15:00 16:00	104	1098	118	1320	13	698	48	759	2079	57	26	280	363	273	18	53	344	707	2786
16:00 17:00	145	1439	71	1655	21	779	79	879	2534	88	46	573	707	541	65	134	740	1447	3981
17:00 18:00	98	1512	46	1656	21	916	50	987	2643	72	23	487	582	520	59	154	733	1315	3958
<b>Sub Total</b>	2089	7537	2065	11691	396	7144	739	8279	19970	453	355	2067	2875	1823	408	539	2770	5645	25615
<b>U Turns</b>	34			34	81			81	115	0			0	0			0	0	115
<b>Total</b>	2123	7537	2065	11725	477	7144	739	8360	20085	453	355	2067	2875	1823	408	539	2770	5645	25730
<b>EQ 12Hr</b>	2951	10476	2870	16297	663	9930	1027	11620	27917	630	493	2873	3996	2534	567	749	3850	7846	35763
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																<b>1.39</b>			
<b>AVG 12Hr</b>	2656	9428	2583	14667	597	8937	924	10458	25125	567	444	2586	3597	2281	510	674	3465	7062	32187
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																<b>.90</b>			
<b>AVG 24Hr</b>	3479	12351	3384	19214	782	11707	1210	13699	32913	743	582	3388	4713	2988	668	883	4539	9252	42165
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																<b>1.31</b>			

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



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ SOLANDT RD

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36153

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute Increments

#### MARCH RD

#### SOLANDT RD

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	47	89	48	184	16	268	27	311	495	4	3	13	20	13	1	2	16	36	531
07:15 07:30	51	126	77	254	10	307	28	345	599	3	5	17	25	11	2	1	14	39	638
07:30 07:45	66	110	96	272	24	333	24	381	653	1	4	20	25	19	4	2	25	50	703
07:45 08:00	138	142	146	426	19	306	24	349	775	0	17	15	32	13	10	5	28	60	835
08:00 08:15	107	152	152	411	24	292	37	353	764	7	16	31	54	14	3	9	26	80	844
08:15 08:30	158	154	152	464	29	273	29	331	795	10	25	31	66	14	17	8	39	105	900
08:30 08:45	139	181	171	491	18	312	30	360	851	7	28	35	70	6	19	4	29	99	950
08:45 09:00	157	198	170	525	39	270	29	338	863	3	24	35	62	11	52	8	71	133	996
09:00 09:15	153	198	182	533	29	223	25	277	810	9	26	27	62	22	32	11	65	127	937
09:15 09:30	138	190	154	482	18	222	20	260	742	3	14	24	41	14	23	7	44	85	827
09:30 09:45	97	171	113	381	8	253	25	286	667	3	5	35	43	17	10	3	30	73	740
09:45 10:00	86	177	69	332	13	193	13	219	551	7	7	25	39	14	6	2	22	61	612
11:30 11:45	32	169	27	228	11	189	19	219	447	15	8	58	81	45	9	21	75	156	603
11:45 12:00	59	208	29	296	14	173	18	205	501	33	15	85	133	54	15	20	89	222	723
12:00 12:15	48	228	29	305	14	173	27	214	519	38	11	61	110	50	12	29	91	201	720
12:15 12:30	52	219	33	304	10	193	38	241	545	23	12	53	88	50	15	17	82	170	715
12:30 12:45	59	196	58	313	25	207	30	262	575	18	7	51	76	41	10	13	64	140	715
12:45 13:00	72	192	49	313	24	206	49	279	592	19	15	34	68	30	11	10	51	119	711
13:00 13:15	61	196	43	300	22	192	37	251	551	16	12	49	77	27	12	15	54	131	682
13:15 13:30	41	192	32	265	22	166	33	221	486	17	6	28	51	24	3	11	38	89	575
15:00 15:15	20	207	18	245	9	167	16	192	437	12	7	102	121	51	7	13	71	192	629
15:15 15:30	19	291	29	339	6	178	8	192	531	15	11	49	75	52	2	12	66	141	672
15:30 15:45	33	295	40	368	2	197	10	209	577	13	3	49	65	98	5	15	118	183	760
15:45 16:00	34	305	31	370	4	156	14	174	544	17	5	80	102	72	4	13	89	191	735
16:00 16:15	38	355	17	410	6	192	18	216	626	23	10	122	155	143	20	27	190	345	971
16:15 16:30	40	372	17	429	7	200	22	229	658	27	7	113	147	98	13	30	141	288	946
16:30 16:45	47	328	15	390	14	173	25	212	602	19	19	183	221	164	19	43	226	447	1049
16:45 17:00	25	384	22	431	5	214	14	233	664	19	10	155	184	136	13	34	183	367	1031
17:00 17:15	25	418	16	459	7	219	6	232	691	31	7	185	223	192	19	53	264	487	1178
17:15 17:30	24	403	13	440	11	257	23	291	731	18	5	122	145	121	17	48	186	331	1062
17:30 17:45	25	337	4	366	9	241	10	260	626	16	8	95	119	124	14	29	167	286	912
17:45 18:00	32	354	13	399	8	199	11	218	617	7	3	85	95	83	9	24	116	211	828
<b>Total:</b>	<b>2123</b>	<b>7537</b>	<b>2065</b>	<b>1172</b>	<b>477</b>	<b>7144</b>	<b>739</b>	<b>8360</b>	<b>20085</b>	<b>453</b>	<b>355</b>	<b>2067</b>	<b>2875</b>	<b>1823</b>	<b>408</b>	<b>539</b>	<b>2770</b>	<b>20085</b>	<b>25,730</b>

Note: U-Turns are included in Totals.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ SOLANDT RD

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36153

**Start Time:** 07:00

**Device:** Miovision

### Full Study Cyclist Volume

Time Period	MARCH RD			SOLANDT RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	1	0	1	2	0	2	3
07:15 07:30	2	0	2	1	0	1	3
07:30 07:45	0	0	0	0	0	0	0
07:45 08:00	4	0	4	0	0	0	4
08:00 08:15	3	0	3	0	1	1	4
08:15 08:30	2	1	3	0	0	0	3
08:30 08:45	3	0	3	0	1	1	4
08:45 09:00	5	0	5	1	0	1	6
09:00 09:15	2	0	2	0	0	0	2
09:15 09:30	4	0	4	0	0	0	4
09:30 09:45	2	0	2	0	0	0	2
09:45 10:00	1	4	5	0	0	0	5
11:30 11:45	1	0	1	0	0	0	1
11:45 12:00	0	1	1	2	1	3	4
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	1	1	1
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	1	0	1	0	0	0	1
15:00 15:15	1	1	2	0	1	1	3
15:15 15:30	2	1	3	2	0	2	5
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	1	1	2	1	2	3	5
16:00 16:15	0	1	1	1	2	3	4
16:15 16:30	0	1	1	0	1	1	2
16:30 16:45	0	3	3	0	1	1	4
16:45 17:00	1	0	1	2	1	3	4
17:00 17:15	1	1	2	1	0	1	3
17:15 17:30	0	1	1	1	0	1	2
17:30 17:45	0	1	1	1	1	2	3
17:45 18:00	0	0	0	0	1	1	1
<b>Total</b>	<b>37</b>	<b>17</b>	<b>54</b>	<b>15</b>	<b>14</b>	<b>29</b>	<b>83</b>



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ SOLANDT RD

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36153

**Start Time:** 07:00

**Device:** Miovision

### Full Study Pedestrian Volume

#### MARCH RD

#### SOLANDT RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	0	0	0	1	1	1
07:30 07:45	0	0	0	0	0	0	0
07:45 08:00	1	2	3	0	0	0	3
08:00 08:15	0	3	3	0	0	0	3
08:15 08:30	0	0	0	1	0	1	1
08:30 08:45	7	2	9	2	0	2	11
08:45 09:00	1	0	1	2	0	2	3
09:00 09:15	0	5	5	1	0	1	6
09:15 09:30	0	3	3	2	0	2	5
09:30 09:45	0	1	1	0	0	0	1
09:45 10:00	0	1	1	0	0	0	1
11:30 11:45	1	0	1	3	0	3	4
11:45 12:00	0	0	0	1	0	1	1
12:00 12:15	2	0	2	5	1	6	8
12:15 12:30	3	0	3	1	0	1	4
12:30 12:45	2	1	3	2	2	4	7
12:45 13:00	0	2	2	1	4	5	7
13:00 13:15	6	2	8	3	0	3	11
13:15 13:30	1	5	6	1	2	3	9
15:00 15:15	5	2	7	1	0	1	8
15:15 15:30	0	0	0	1	0	1	1
15:30 15:45	2	0	2	2	0	2	4
15:45 16:00	2	2	4	2	1	3	7
16:00 16:15	1	0	1	0	0	0	1
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	1	2	3	1	0	1	4
16:45 17:00	7	1	8	4	1	5	13
17:00 17:15	0	2	2	3	0	3	5
17:15 17:30	0	0	0	3	0	3	3
17:30 17:45	2	0	2	1	0	1	3
17:45 18:00	0	2	2	0	0	0	2
<b>Total</b> .....	<b>44</b>	<b>38</b>	<b>82</b>	<b>43</b>	<b>12</b>	<b>55</b>	<b>137</b>



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ SOLANDT RD

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36153

**Start Time:** 07:00

**Device:** Miovision

### Full Study Heavy Vehicles

#### MARCH RD

#### SOLANDT RD

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	1	7	0	8	0	5	1	6	14	1	0	5	6	0	0	0	0	6	20
07:15 07:30	0	9	0	9	0	4	1	5	14	1	0	2	3	0	0	0	0	3	17
07:30 07:45	2	4	0	6	0	7	0	7	13	0	0	1	1	0	2	0	2	3	16
07:45 08:00	1	4	0	5	0	5	1	6	11	0	1	0	1	0	0	0	0	1	12
08:00 08:15	2	10	0	12	0	5	0	5	17	0	0	2	2	0	1	0	1	3	20
08:15 08:30	2	12	0	14	0	7	0	7	21	2	0	0	2	0	1	0	1	3	24
08:30 08:45	1	4	1	6	0	4	0	4	10	0	1	1	2	0	3	0	3	5	15
08:45 09:00	1	7	1	9	2	8	1	11	20	0	0	4	4	1	0	1	2	6	26
09:00 09:15	0	9	3	12	0	8	1	9	21	0	1	1	2	0	0	0	0	2	23
09:15 09:30	4	4	2	10	0	3	1	4	14	0	0	2	2	1	1	1	3	5	19
09:30 09:45	2	10	0	12	0	5	0	5	17	0	0	6	6	0	1	1	2	8	25
09:45 10:00	1	4	2	7	0	5	0	5	12	0	0	2	2	1	0	0	1	3	15
11:30 11:45	2	0	0	2	0	8	0	8	10	0	0	1	1	0	0	0	0	1	11
11:45 12:00	0	3	0	3	0	5	1	6	9	2	0	3	5	0	0	0	0	5	14
12:00 12:15	2	5	1	8	0	3	1	4	12	0	0	0	0	0	0	0	0	0	12
12:15 12:30	1	7	2	10	0	5	4	9	19	0	0	1	1	1	2	1	4	5	24
12:30 12:45	1	1	0	2	0	5	1	6	8	1	0	2	3	0	1	0	1	4	12
12:45 13:00	4	2	0	6	0	8	1	9	15	0	1	1	2	0	1	0	1	3	18
13:00 13:15	2	10	1	13	1	4	0	5	18	0	1	3	4	1	2	0	3	7	25
13:15 13:30	0	4	1	5	1	4	1	6	11	1	1	3	5	2	0	0	2	7	18
15:00 15:15	0	3	0	3	0	1	1	2	5	0	2	2	4	1	1	0	2	6	11
15:15 15:30	1	6	1	8	0	4	0	4	12	1	2	1	4	0	0	0	0	4	16
15:30 15:45	1	1	0	2	0	6	2	8	10	0	0	0	0	1	0	1	2	2	12
15:45 16:00	2	5	0	7	0	7	0	7	14	0	0	3	3	0	0	0	0	3	17
16:00 16:15	2	5	0	7	0	4	0	4	11	0	0	0	0	1	0	0	1	1	12
16:15 16:30	1	5	0	6	0	7	0	7	13	0	0	1	1	0	0	1	1	2	15
16:30 16:45	1	6	1	8	0	3	1	4	12	0	1	1	2	0	0	0	0	2	14
16:45 17:00	1	2	0	3	0	3	2	5	8	1	0	3	4	1	0	0	1	5	13
17:00 17:15	1	4	0	5	0	2	0	2	7	1	0	1	2	0	0	0	0	2	9
17:15 17:30	1	1	1	3	0	5	0	5	8	0	1	1	2	0	0	0	0	2	10
17:30 17:45	0	2	0	2	0	3	0	3	5	0	0	0	0	0	0	0	0	0	5
17:45 18:00	2	0	0	2	0	3	1	4	6	0	0	0	0	0	0	0	0	0	6
<b>Total:</b> None	42	156	17	215	4	156	22	182	397	11	12	53	76	11	16	6	33	109	506



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ SOLANDT RD

**Survey Date:** Wednesday, August 10, 2016

**WO No:** 36153

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute U-Turn Total

MARCH RD

SOLANDT RD

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	3	0	0	3
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	1	1	0	0	2
08:00	08:15	0	0	0	0	0
08:15	08:30	1	3	0	0	4
08:30	08:45	0	1	0	0	1
08:45	09:00	0	7	0	0	7
09:00	09:15	1	0	0	0	1
09:15	09:30	1	1	0	0	2
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	2	4	0	0	6
11:45	12:00	3	6	0	0	9
12:00	12:15	6	1	0	0	7
12:15	12:30	2	3	0	0	5
12:30	12:45	0	5	0	0	5
12:45	13:00	0	5	0	0	5
13:00	13:15	0	5	0	0	5
13:15	13:30	2	3	0	0	5
15:00	15:15	1	2	0	0	3
15:15	15:30	0	4	0	0	4
15:30	15:45	0	1	0	0	1
15:45	16:00	1	1	0	0	2
16:00	16:15	0	1	0	0	1
16:15	16:30	3	1	0	0	4
16:30	16:45	1	7	0	0	8
16:45	17:00	1	2	0	0	3
17:00	17:15	0	4	0	0	4
17:15	17:30	5	1	0	0	6
17:30	17:45	1	4	0	0	5
17:45	18:00	2	5	0	0	7
Total		34	81	0	0	115

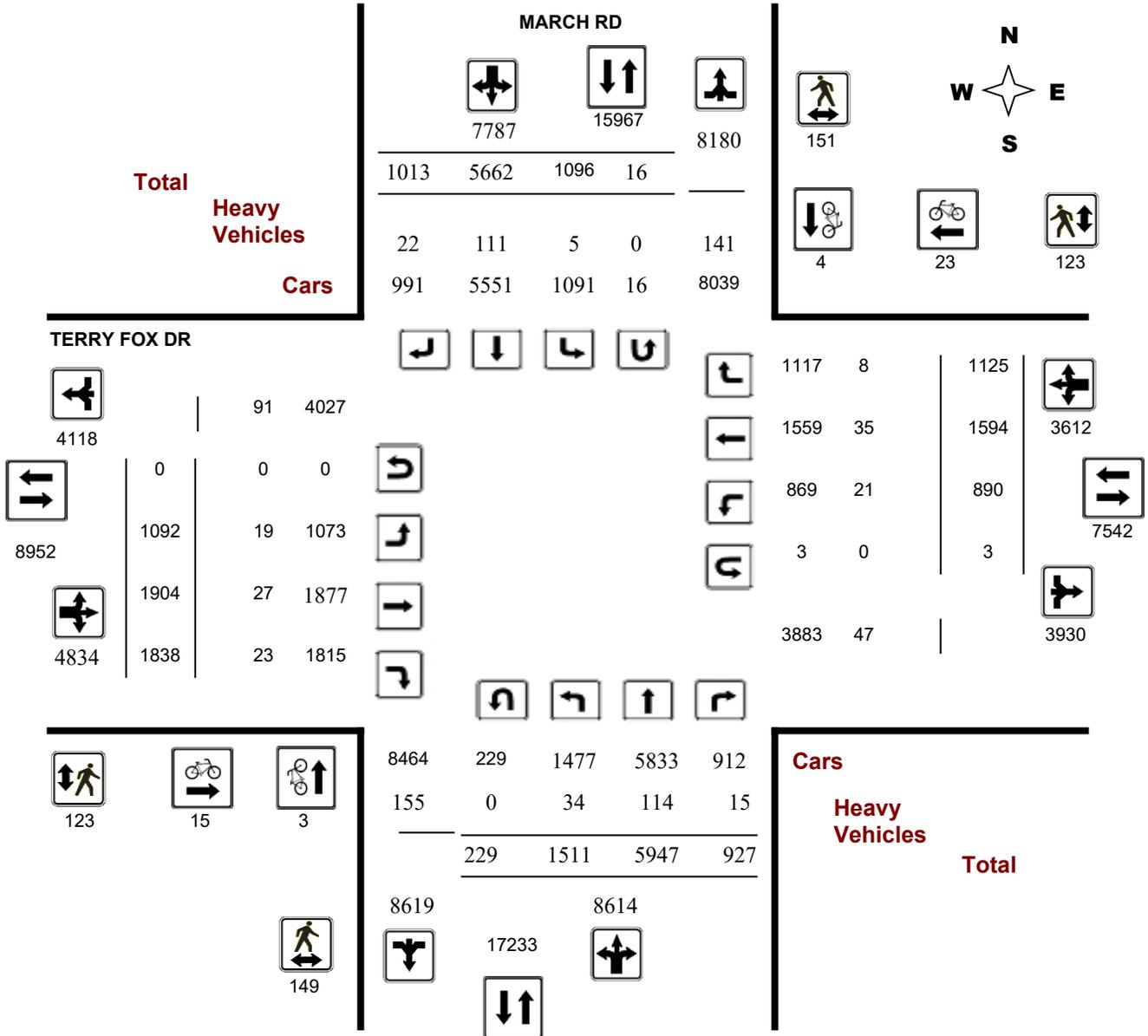
**Survey Date:** Wednesday, April 11, 2018

**WO No:** 37663

**Start Time:** 07:00

**Device:** Miovision

### Full Study Diagram



## Turning Movement Count - Study Results

### MARCH RD @ TERRY FOX DR

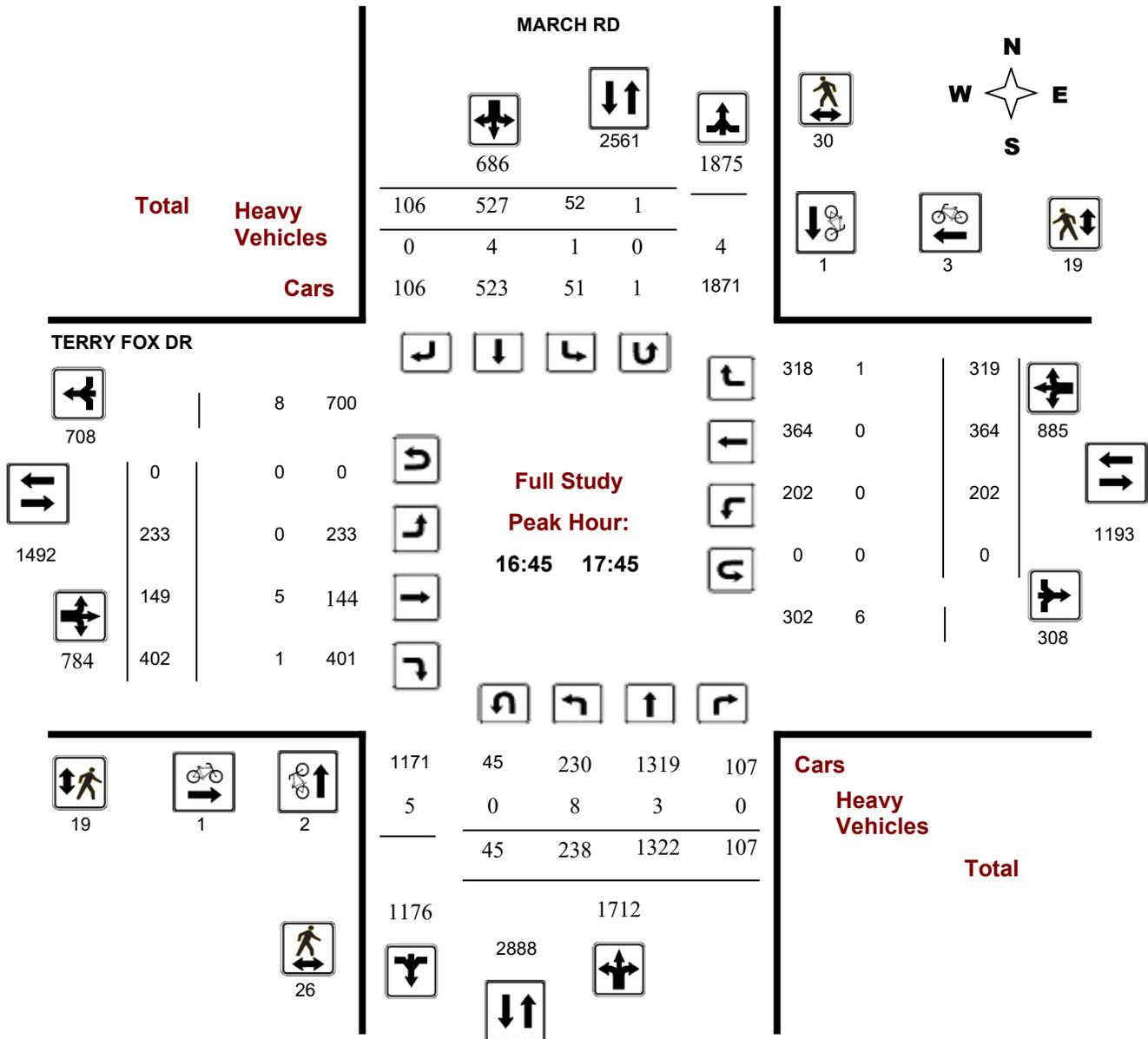
**Survey Date:** Wednesday, April 11, 2018

**WO No:** 37663

**Start Time:** 07:00

**Device:** Miovision

### Full Study Peak Hour Diagram



## Turning Movement Count - Peak Hour Diagram

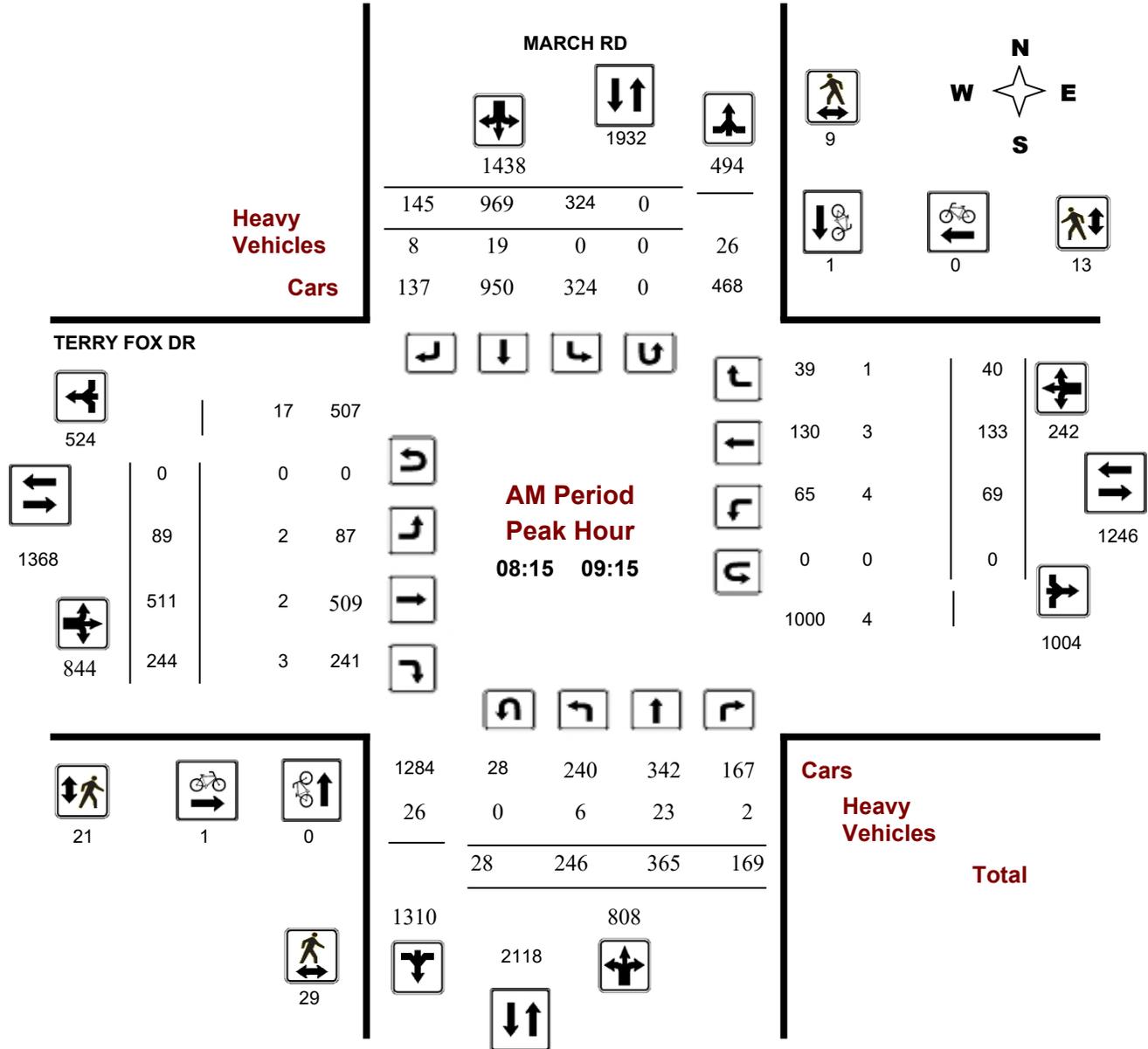
### MARCH RD @ TERRY FOX DR

**Survey Date:** Wednesday, April 11, 2018

**Start Time:** 07:00

**WO No:** 37663

**Device:** Miovision



**Comments**

## Turning Movement Count - Peak Hour Diagram

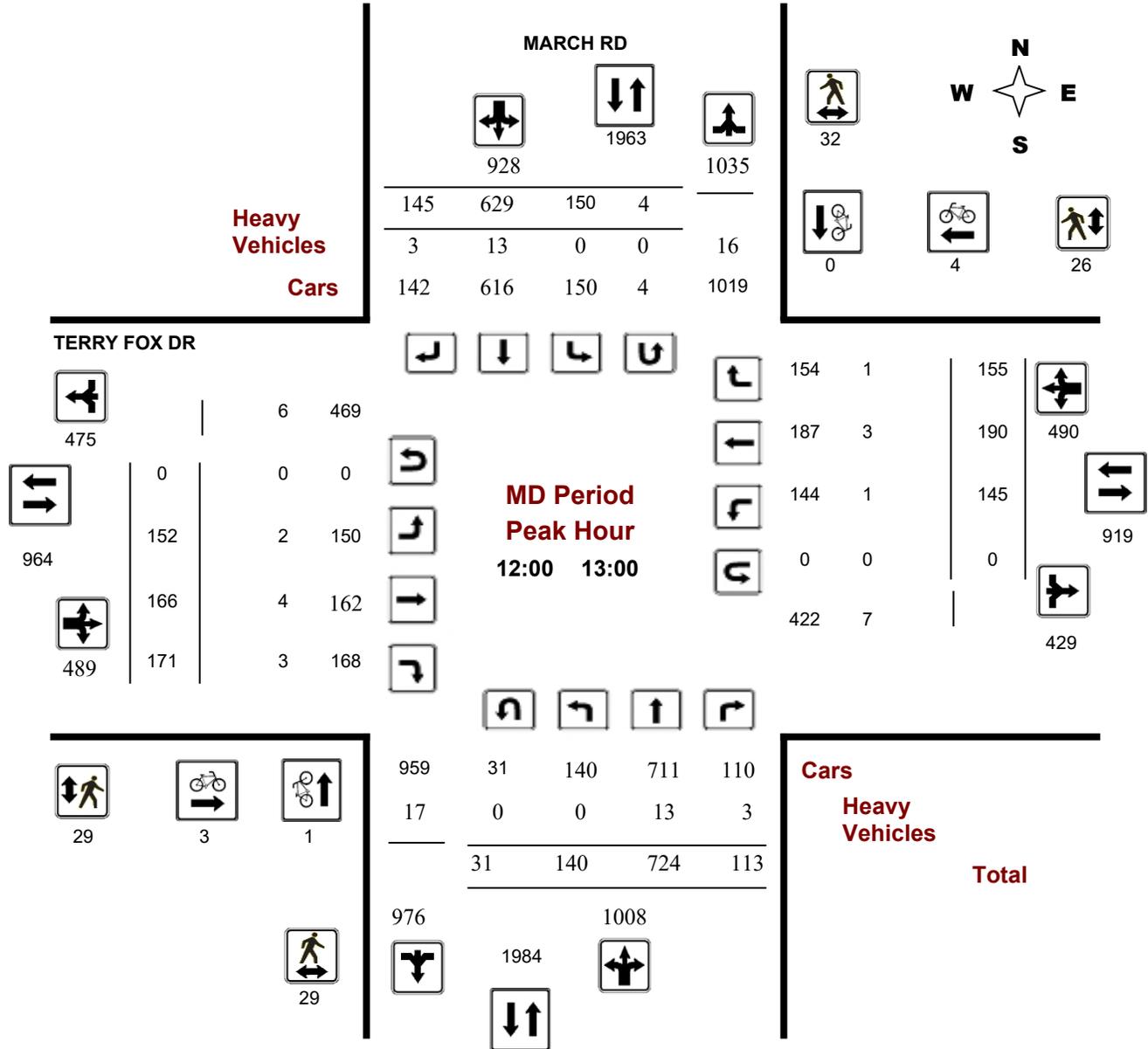
### MARCH RD @ TERRY FOX DR

**Survey Date:** Wednesday, April 11, 2018

**Start Time:** 07:00

**WO No:** 37663

**Device:** Miovision



**Comments**

## Turning Movement Count - Peak Hour Diagram

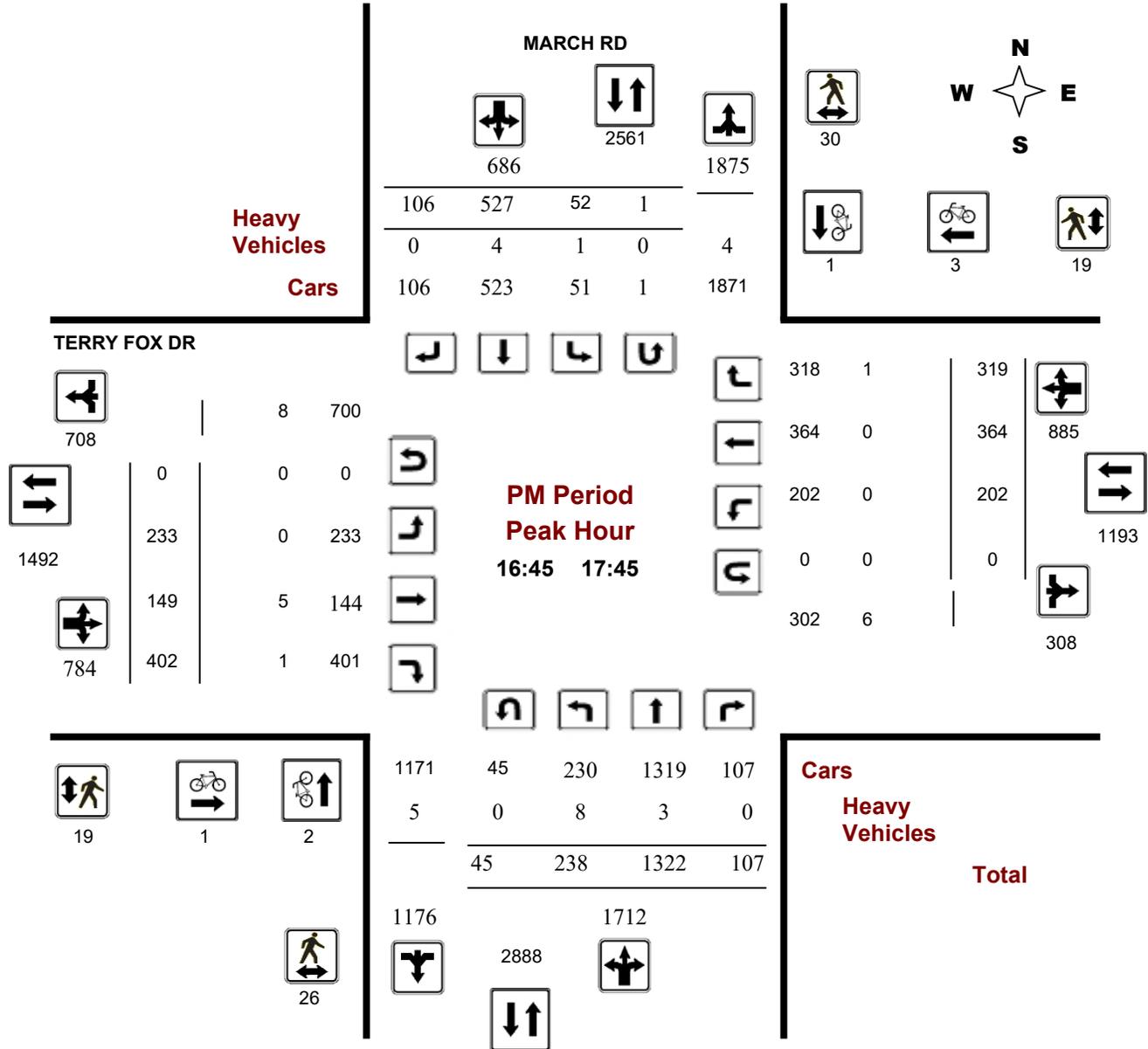
### MARCH RD @ TERRY FOX DR

**Survey Date:** Wednesday, April 11, 2018

**Start Time:** 07:00

**WO No:** 37663

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ TERRY FOX DR

**Survey Date:** Wednesday, April 11, 2018

**WO No:** 37663

**Start Time:** 07:00

**Device:** Miovision

### Full Study Summary (8 HR Standard)

**Survey Date:** Wednesday, April 11, 2018

**Total Observed U-Turns**  
 Northbound: 229      Southbound: 16  
 Eastbound: 0          Westbound: 3

**AADT Factor**  
 .90

Period	MARCH RD										TERRY FOX DR									
	Northbound					Southbound					Eastbound					Westbound				
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total	
07:00 08:00	135	301	99	535	182	1128	111	1421	1956	49	304	229	582	55	74	20	149	731	2687	
08:00 09:00	229	359	167	755	328	966	135	1429	2184	84	480	266	830	55	113	38	206	1036	3220	
09:00 10:00	243	357	139	739	192	836	154	1182	1921	83	412	165	660	65	128	35	228	888	2809	
11:30 12:30	133	676	123	932	104	593	120	817	1749	143	119	172	434	150	222	170	542	976	2725	
12:30 13:30	114	653	106	873	144	625	146	915	1788	134	216	156	506	122	152	99	373	879	2667	
15:00 16:00	192	1076	96	1364	51	463	110	624	1988	183	92	153	428	96	213	166	475	903	2891	
16:00 17:00	245	1242	105	1592	36	510	125	671	2263	187	126	291	604	132	327	272	731	1335	3598	
17:00 18:00	220	1283	92	1595	59	541	112	712	2307	229	155	406	790	215	365	325	905	1695	4002	
<b>Sub Total</b>	1511	5947	927	8385	1096	5662	1013	7771	16156	1092	1904	1838	4834	890	1594	1125	3609	8443	24599	
<b>U Turns</b>	229			229	16			16	245	0			0	3			3	3	248	
<b>Total</b>	1740	5947	927	8614	1112	5662	1013	7787	16401	1092	1904	1838	4834	893	1594	1125	3612	8446	24847	
<b>EQ 12Hr</b>	2419	8266	1289	11974	1546	7870	1408	10824	22798	1518	2647	2555	6720	1241	2216	1564	5021	11741	34539	
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	<b>1.39</b>			
<b>AVG 12Hr</b>	2177	7439	1160	10776	1391	7083	1267	9741	20517	1366	2382	2300	6048	1117	1994	1408	4519	10567	31084	
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	<b>.90</b>			
<b>AVG 24Hr</b>	2852	9745	1520	14117	1822	9279	1660	12761	26878	1789	3120	3013	7922	1463	2612	1844	5919	13841	40719	
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																	<b>1.31</b>			
Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.																				



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ TERRY FOX DR

**Survey Date:** Wednesday, April 11, 2018

**WO No:** 37663

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute Increments

#### MARCH RD

#### TERRY FOX DR

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total	
07:00	07:15	27	58	21	106	26	282	20	328	434	7	42	54	103	11	11	4	26	129	563
07:15	07:30	34	83	21	138	35	274	23	332	470	12	74	62	148	14	16	7	37	185	655
07:30	07:45	37	89	25	151	52	313	28	393	544	10	74	55	139	16	20	7	43	182	726
07:45	08:00	50	71	32	153	71	259	40	370	523	20	114	58	192	15	27	2	44	236	759
08:00	08:15	61	72	46	179	84	259	41	384	563	11	92	68	171	11	24	8	43	214	777
08:15	08:30	59	95	46	200	80	237	22	339	539	26	130	75	231	15	24	15	54	285	824
08:30	08:45	60	96	31	187	86	249	30	365	552	21	124	60	205	13	26	5	44	249	801
08:45	09:00	72	96	44	212	78	221	42	341	553	26	134	63	223	16	39	10	65	288	841
09:00	09:15	83	78	48	209	80	262	51	393	602	16	123	46	185	25	44	10	79	264	866
09:15	09:30	75	90	37	202	58	233	42	333	535	25	135	39	199	13	40	8	61	260	795
09:30	09:45	79	99	27	205	32	183	37	252	457	19	100	45	164	19	27	8	54	218	675
09:45	10:00	41	90	27	158	25	158	24	207	365	23	54	35	112	8	17	9	34	146	511
11:30	11:45	26	149	25	200	26	130	29	185	385	28	19	41	88	31	51	31	113	201	586
11:45	12:00	45	147	34	226	23	163	26	212	438	36	32	45	113	36	59	53	148	261	699
12:00	12:15	54	202	34	290	26	165	29	220	510	44	32	40	116	43	71	41	155	271	781
12:15	12:30	46	178	30	254	34	135	36	205	459	35	36	46	117	40	41	45	126	243	702
12:30	12:45	25	191	21	237	51	176	37	264	501	30	33	39	102	24	35	42	101	203	704
12:45	13:00	46	153	28	227	43	153	43	239	466	43	65	46	154	38	43	27	108	262	728
13:00	13:15	29	175	26	230	32	166	31	229	459	30	63	34	127	32	42	19	93	220	679
13:15	13:30	28	134	31	193	20	130	35	185	378	31	55	37	123	28	32	11	71	194	572
15:00	15:15	54	230	21	305	18	121	27	166	471	45	22	45	112	27	40	22	89	201	672
15:15	15:30	34	238	27	299	11	101	16	128	427	51	18	31	100	28	42	36	106	206	633
15:30	15:45	63	303	21	387	10	120	28	158	545	41	26	34	101	16	66	50	132	233	778
15:45	16:00	67	305	27	399	13	121	39	173	572	46	26	43	115	26	65	58	149	264	836
16:00	16:15	90	285	31	406	16	130	33	179	585	45	34	68	147	30	89	74	193	340	925
16:15	16:30	62	336	23	421	5	131	30	166	587	47	37	65	149	37	51	76	164	313	900
16:30	16:45	61	272	19	352	9	117	36	162	514	52	30	77	159	38	101	59	198	357	871
16:45	17:00	68	349	32	449	8	132	26	166	615	43	25	81	149	27	86	63	176	325	940
17:00	17:15	74	302	29	405	12	145	26	183	588	68	56	111	235	60	127	92	279	514	1102
17:15	17:30	82	373	22	477	17	126	21	164	641	56	36	107	199	65	70	84	219	418	1059
17:30	17:45	59	298	24	381	16	124	33	173	554	66	32	103	201	50	81	80	211	412	966
17:45	18:00	49	310	17	376	15	146	32	193	569	39	31	85	155	41	87	69	197	352	921
Total:		1740	5947	927	8614	1112	5662	1013	7787	16401	1092	1904	1838	4834	893	1594	1125	3612	16401	24,847

Note: U-Turns are included in Totals.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ TERRY FOX DR

**Survey Date:** Wednesday, April 11, 2018

**WO No:** 37663

**Start Time:** 07:00

**Device:** Miovision

### Full Study Cyclist Volume

Time Period	MARCH RD			TERRY FOX DR			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	0	1	1	1	0	1	2
07:15 07:30	0	0	0	0	1	1	1
07:30 07:45	0	0	0	1	1	2	2
07:45 08:00	0	1	1	2	1	3	4
08:00 08:15	0	0	0	1	1	2	2
08:15 08:30	0	0	0	1	0	1	1
08:30 08:45	0	1	1	0	0	0	1
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	1	0	1	1
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	1	1	2	2
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	1	6	7	7
12:00 12:15	0	0	0	0	2	2	2
12:15 12:30	0	0	0	0	2	2	2
12:30 12:45	1	0	1	1	0	1	2
12:45 13:00	0	0	0	2	0	2	2
13:00 13:15	0	0	0	1	0	1	1
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	1	1	1
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	1	3	4	4
16:45 17:00	1	1	2	0	1	1	3
17:00 17:15	0	0	0	0	1	1	1
17:15 17:30	1	0	1	0	0	0	1
17:30 17:45	0	0	0	1	1	2	2
17:45 18:00	0	0	0	0	1	1	1
<b>Total</b>	<b>3</b>	<b>4</b>	<b>7</b>	<b>15</b>	<b>23</b>	<b>38</b>	<b>45</b>



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ TERRY FOX DR

**Survey Date:** Wednesday, April 11, 2018

**WO No:** 37663

**Start Time:** 07:00

**Device:** Miovision

### Full Study Pedestrian Volume

**MARCH RD**

**TERRY FOX DR**

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	4	0	4	0	1	1	5
07:15 07:30	0	2	2	0	0	0	2
07:30 07:45	3	1	4	4	3	7	11
07:45 08:00	2	1	3	3	2	5	8
08:00 08:15	3	0	3	1	1	2	5
08:15 08:30	6	1	7	6	2	8	15
08:30 08:45	6	3	9	5	1	6	15
08:45 09:00	10	1	11	4	2	6	17
09:00 09:15	7	4	11	6	8	14	25
09:15 09:30	5	0	5	5	5	10	15
09:30 09:45	1	0	1	1	1	2	3
09:45 10:00	2	0	2	0	1	1	3
11:30 11:45	2	1	3	2	7	9	12
11:45 12:00	14	9	23	9	10	19	42
12:00 12:15	5	7	12	6	2	8	20
12:15 12:30	10	16	26	16	8	24	50
12:30 12:45	7	2	9	0	10	10	19
12:45 13:00	7	7	14	7	6	13	27
13:00 13:15	11	16	27	14	9	23	50
13:15 13:30	7	7	14	7	7	14	28
15:00 15:15	0	4	4	1	0	1	5
15:15 15:30	1	0	1	1	0	1	2
15:30 15:45	1	3	4	0	1	1	5
15:45 16:00	1	3	4	1	3	4	8
16:00 16:15	4	1	5	0	6	6	11
16:15 16:30	0	11	11	2	1	3	14
16:30 16:45	2	14	16	1	4	5	21
16:45 17:00	5	5	10	2	6	8	18
17:00 17:15	12	9	21	8	8	16	37
17:15 17:30	5	9	14	6	4	10	24
17:30 17:45	4	7	11	3	1	4	15
17:45 18:00	2	7	9	2	3	5	14
<b>Total</b> .....	149	151	300	123	123	246	546



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ TERRY FOX DR

**Survey Date:** Wednesday, April 11, 2018

**WO No:** 37663

**Start Time:** 07:00

**Device:** Miovision

### Full Study Heavy Vehicles

#### MARCH RD

#### TERRY FOX DR

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total	
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT				
07:00 07:15	1	3	1	5	0	3	1	4	9	0	1	1	2	0	1	0	1	3	12	
07:15 07:30	1	2	0	3	1	2	2	5	8	1	1	3	5	0	2	0	2	7	15	
07:30 07:45	2	1	0	3	0	4	1	5	8	0	0	1	1	3	2	0	5	6	14	
07:45 08:00	0	3	0	3	0	0	1	1	4	2	0	2	4	4	0	0	4	8	12	
08:00 08:15	0	2	0	2	0	3	1	4	6	1	0	1	2	0	2	0	2	4	10	
08:15 08:30	2	5	1	8	0	4	0	4	12	1	2	2	5	3	0	1	4	9	21	
08:30 08:45	2	5	1	8	0	5	2	7	15	0	0	0	0	0	2	0	2	2	17	
08:45 09:00	1	10	0	11	0	6	2	8	19	0	0	1	1	1	0	0	1	2	21	
09:00 09:15	1	3	0	4	0	4	4	8	12	1	0	0	1	0	1	0	1	2	14	
09:15 09:30	1	5	1	7	0	1	2	3	10	1	0	0	1	0	2	0	2	3	13	
09:30 09:45	0	7	0	7	1	6	0	7	14	0	1	0	1	0	2	1	3	4	18	
09:45 10:00	1	6	0	7	0	6	0	6	13	0	1	0	1	1	2	0	3	4	17	
11:30 11:45	1	4	0	5	0	5	0	5	10	1	1	0	2	2	3	1	6	8	18	
11:45 12:00	1	3	0	4	0	3	0	3	7	1	2	0	3	0	0	0	0	3	10	
12:00 12:15	0	3	0	3	0	7	1	8	11	2	0	0	2	0	1	1	2	4	15	
12:15 12:30	0	3	1	4	0	1	1	2	6	0	1	1	2	0	0	0	0	2	8	
12:30 12:45	0	6	1	7	0	1	1	2	9	0	1	1	2	0	1	0	1	3	12	
12:45 13:00	0	1	1	2	0	4	0	4	6	0	2	1	3	1	1	0	2	5	11	
13:00 13:15	0	6	2	8	1	5	0	6	14	0	1	1	2	1	1	1	3	5	19	
13:15 13:30	2	2	1	5	0	3	1	4	9	0	1	0	1	1	3	2	6	7	16	
15:00 15:15	1	3	0	4	0	4	0	4	8	0	0	3	3	1	3	0	4	7	15	
15:15 15:30	1	4	1	6	0	5	0	5	11	2	0	0	2	1	1	0	2	4	15	
15:30 15:45	0	6	1	7	0	1	0	1	8	2	2	0	4	0	5	0	5	9	17	
15:45 16:00	2	4	1	7	0	8	0	8	15	2	2	1	5	1	0	0	1	6	21	
16:00 16:15	1	4	1	6	0	5	1	6	12	0	1	0	1	1	0	0	1	2	14	
16:15 16:30	2	5	0	7	0	4	1	5	12	1	1	2	4	0	0	0	0	4	16	
16:30 16:45	2	1	1	4	1	5	0	6	10	1	0	1	2	0	0	0	0	2	12	
16:45 17:00	1	0	0	1	0	2	0	2	3	0	1	0	1	0	0	1	1	2	5	
17:00 17:15	3	0	0	3	1	1	0	2	5	0	2	1	3	0	0	0	0	3	8	
17:15 17:30	2	2	0	4	0	1	0	1	5	0	1	0	1	0	0	0	0	1	6	
17:30 17:45	2	1	0	3	0	0	0	0	3	0	1	0	1	0	0	0	0	1	4	
17:45 18:00	1	4	0	5	0	2	0	2	7	0	1	0	1	0	0	0	0	1	8	
<b>Total:</b>	None	34	114	15	163	5	111	22	138	301	19	27	23	69	21	35	8	64	133	434



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### MARCH RD @ TERRY FOX DR

**Survey Date:** Wednesday, April 11, 2018

**WO No:** 37663

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute U-Turn Total

MARCH RD

TERRY FOX DR

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	2	0	0	0	2
07:15	07:30	4	1	0	0	5
07:30	07:45	4	0	0	0	4
07:45	08:00	3	1	0	1	5
08:00	08:15	6	0	0	0	6
08:15	08:30	5	0	0	0	5
08:30	08:45	4	0	0	0	4
08:45	09:00	8	0	0	0	8
09:00	09:15	11	0	0	0	11
09:15	09:30	10	2	0	0	12
09:30	09:45	10	1	0	0	11
09:45	10:00	4	0	0	0	4
11:30	11:45	7	0	0	0	7
11:45	12:00	10	1	0	0	11
12:00	12:15	13	2	0	0	15
12:15	12:30	8	2	0	0	10
12:30	12:45	3	0	0	0	3
12:45	13:00	7	0	0	0	7
13:00	13:15	3	1	0	0	4
13:15	13:30	1	1	0	0	2
15:00	15:15	5	0	0	0	5
15:15	15:30	6	0	0	1	7
15:30	15:45	8	0	0	0	8
15:45	16:00	7	1	0	0	8
16:00	16:15	18	2	0	0	20
16:15	16:30	6	0	0	0	6
16:30	16:45	5	0	0	0	5
16:45	17:00	7	0	0	0	7
17:00	17:15	14	0	0	0	14
17:15	17:30	13	1	0	0	14
17:30	17:45	11	0	0	0	11
17:45	18:00	6	0	0	1	7
Total		229	16	0	3	248

## Turning Movement Count - Peak Hour Diagram

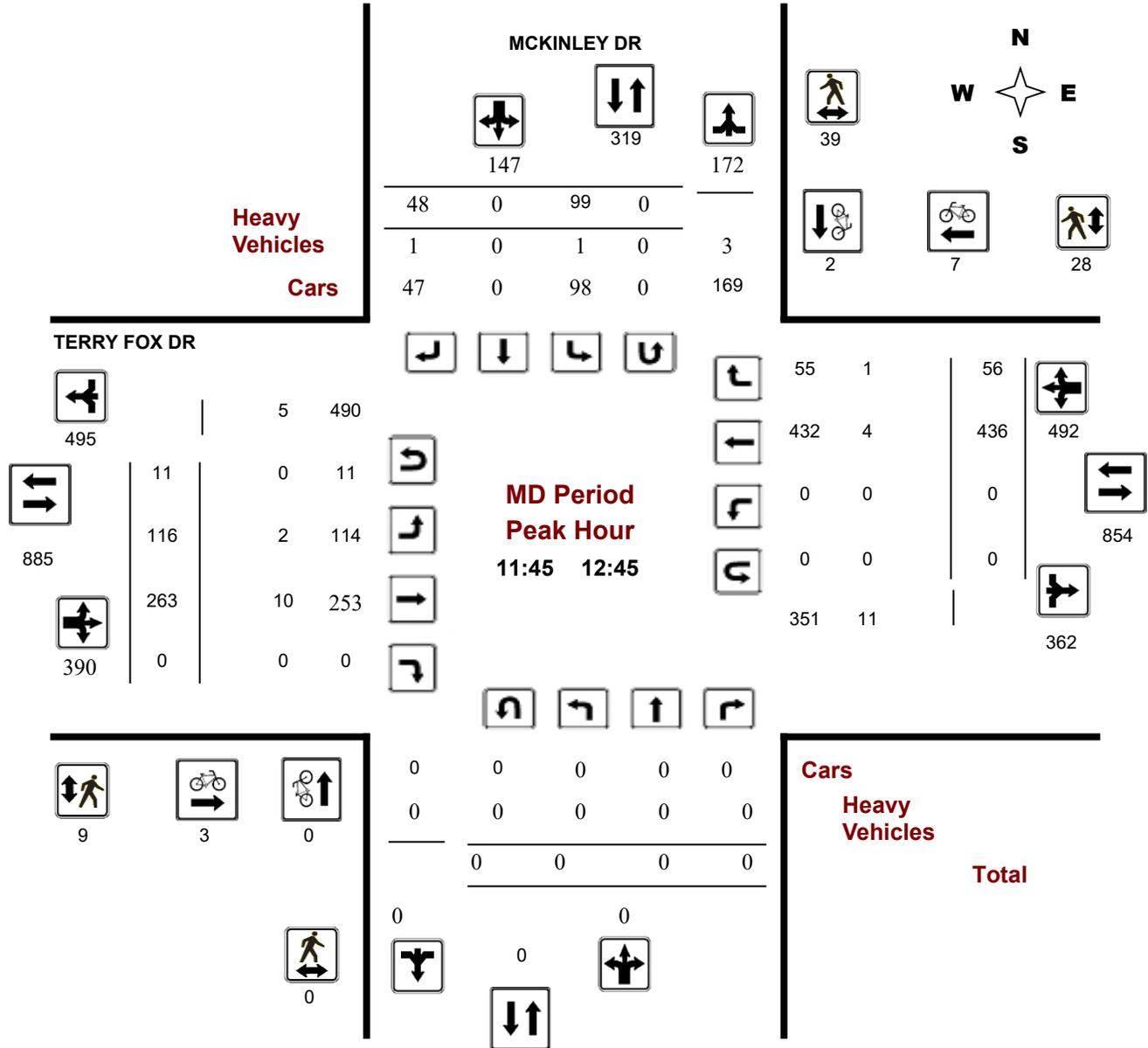
### MCKINLEY DR @ TERRY FOX DR

**Survey Date:** Tuesday, July 09, 2013

**Start Time:** 07:00

**WO No:** 39645

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

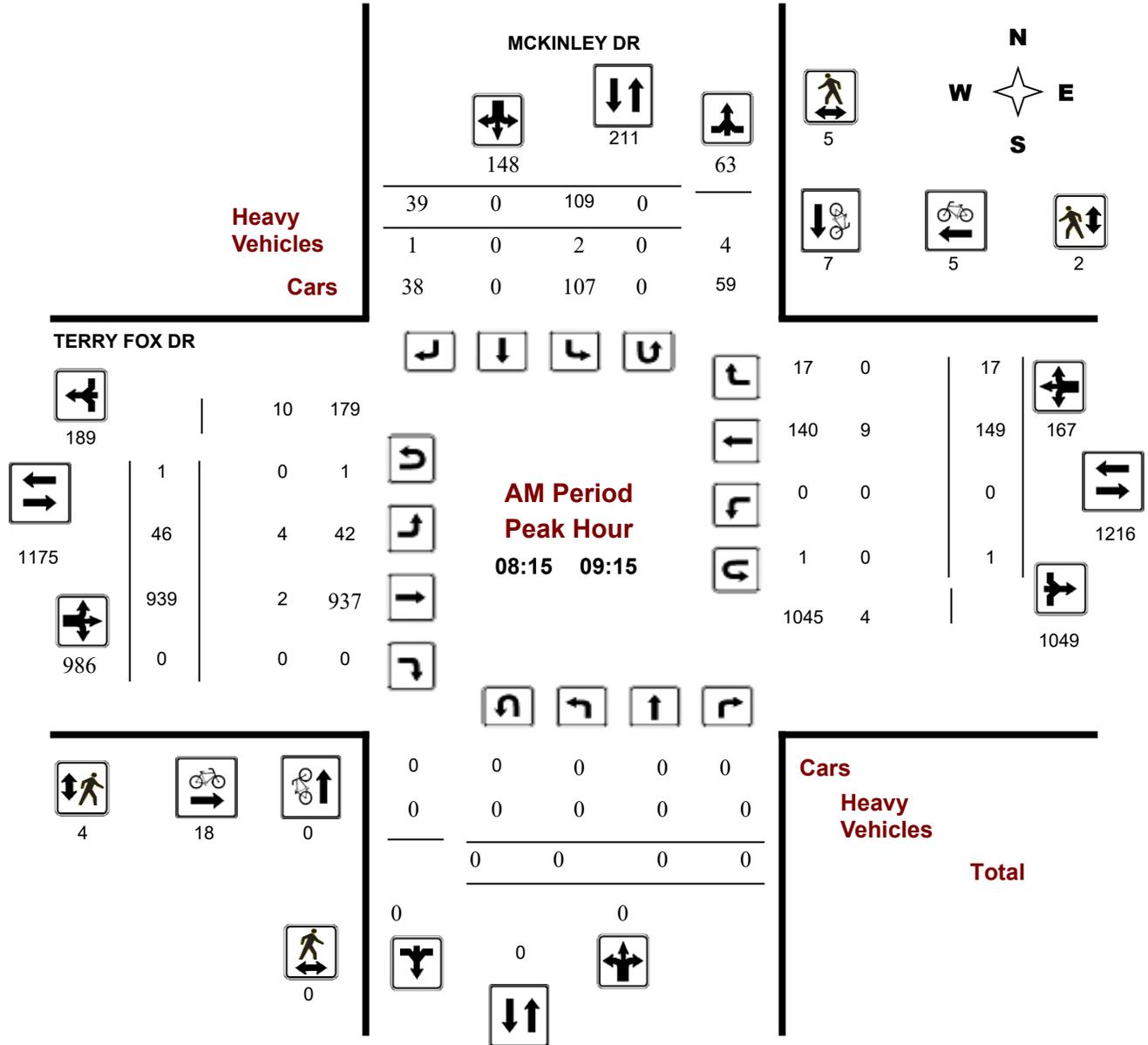
### MCKINLEY DR @ TERRY FOX DR

**Survey Date:** Tuesday, July 09, 2013

**Start Time:** 07:00

**WO No:** 39645

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

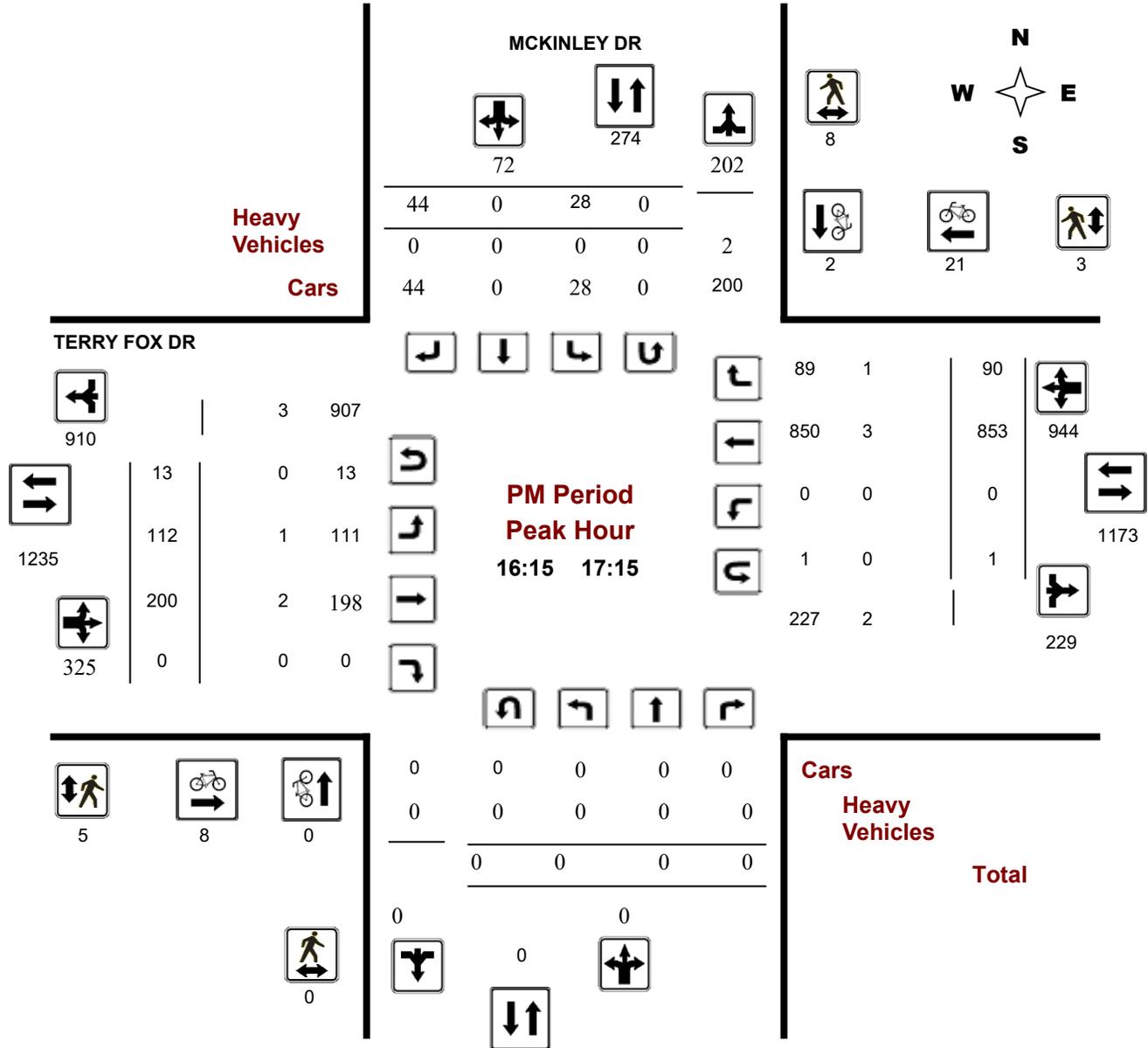
### MCKINLEY DR @ TERRY FOX DR

**Survey Date:** Tuesday, July 09, 2013

**Start Time:** 07:00

**WO No:** 39645

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

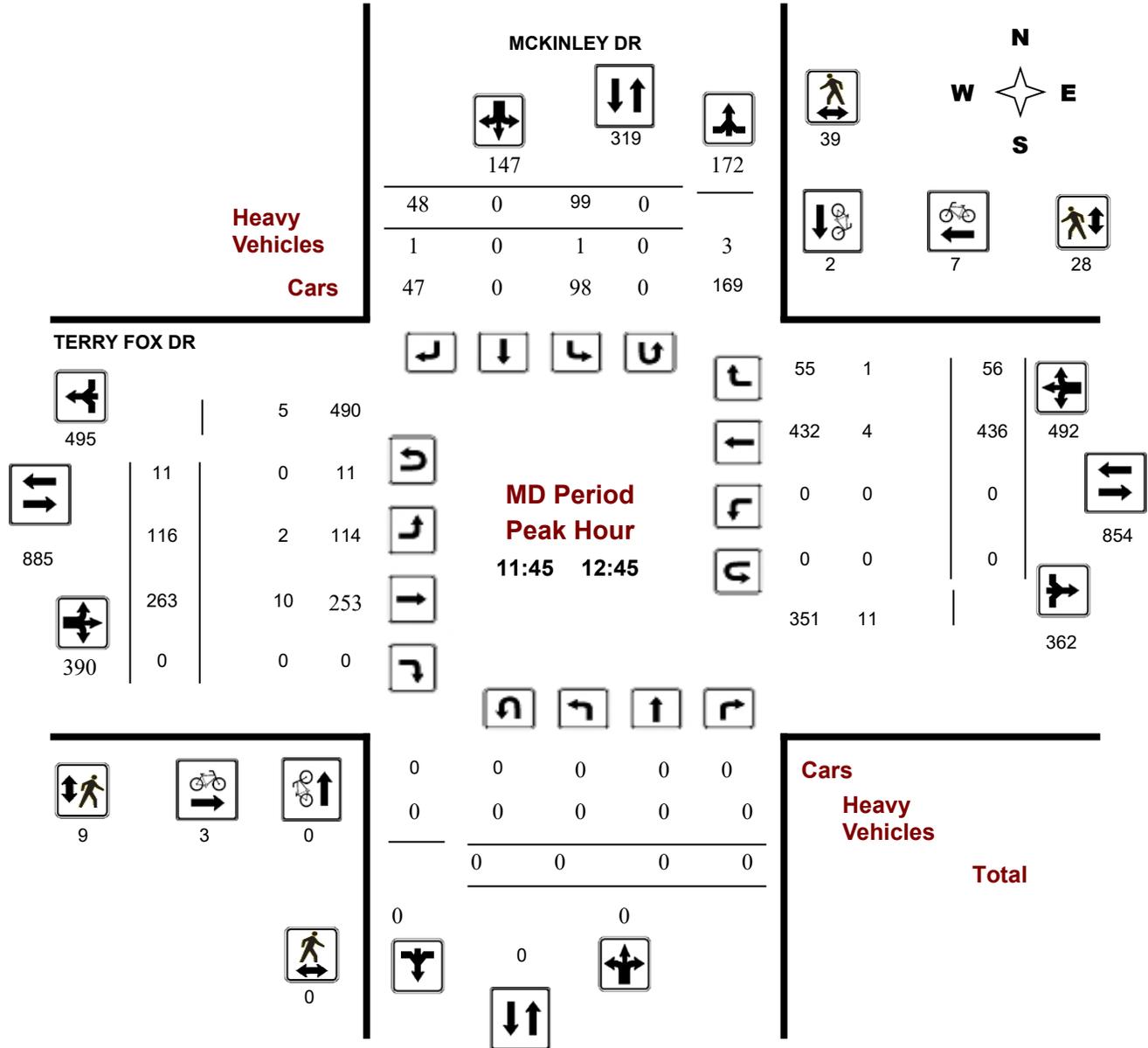
### MCKINLEY DR @ TERRY FOX DR

**Survey Date:** Tuesday, July 09, 2013

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**WO No:** 39645

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

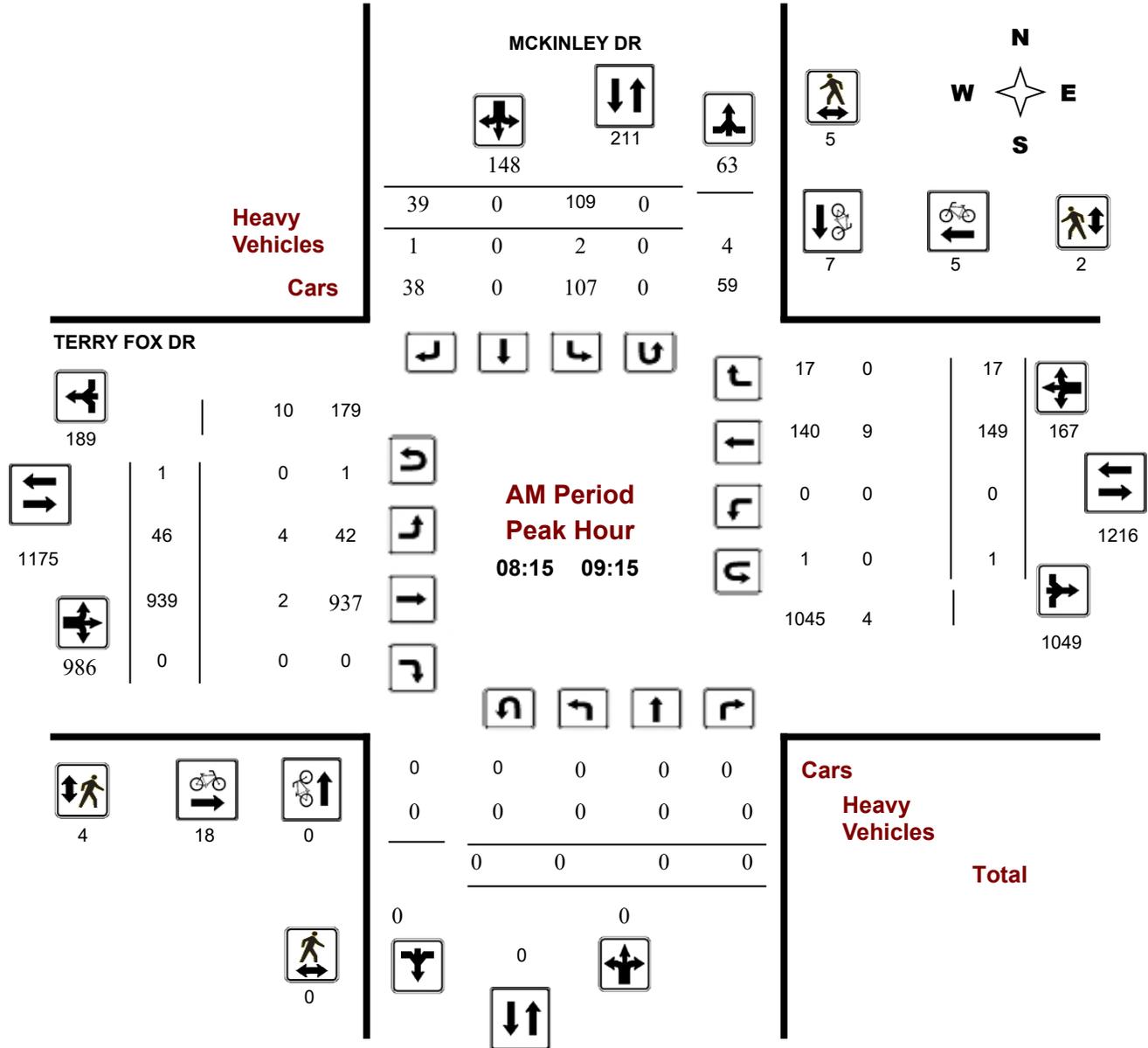
### MCKINLEY DR @ TERRY FOX DR

**Survey Date:** Tuesday, July 09, 2013

**Start Time:** 07:00

**WO No:** 39645

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

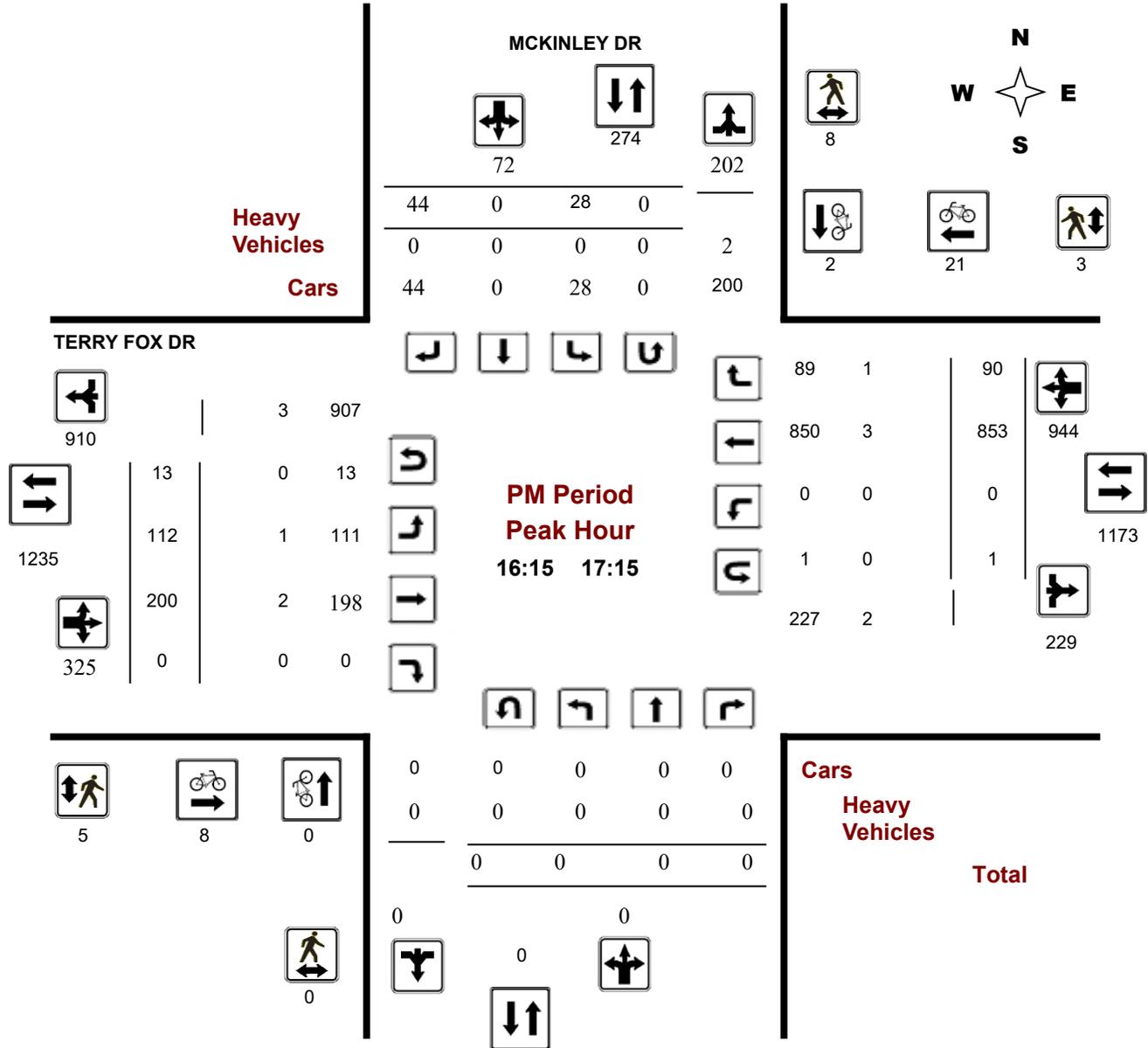
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## Turning Movement Count - Peak Hour Diagram

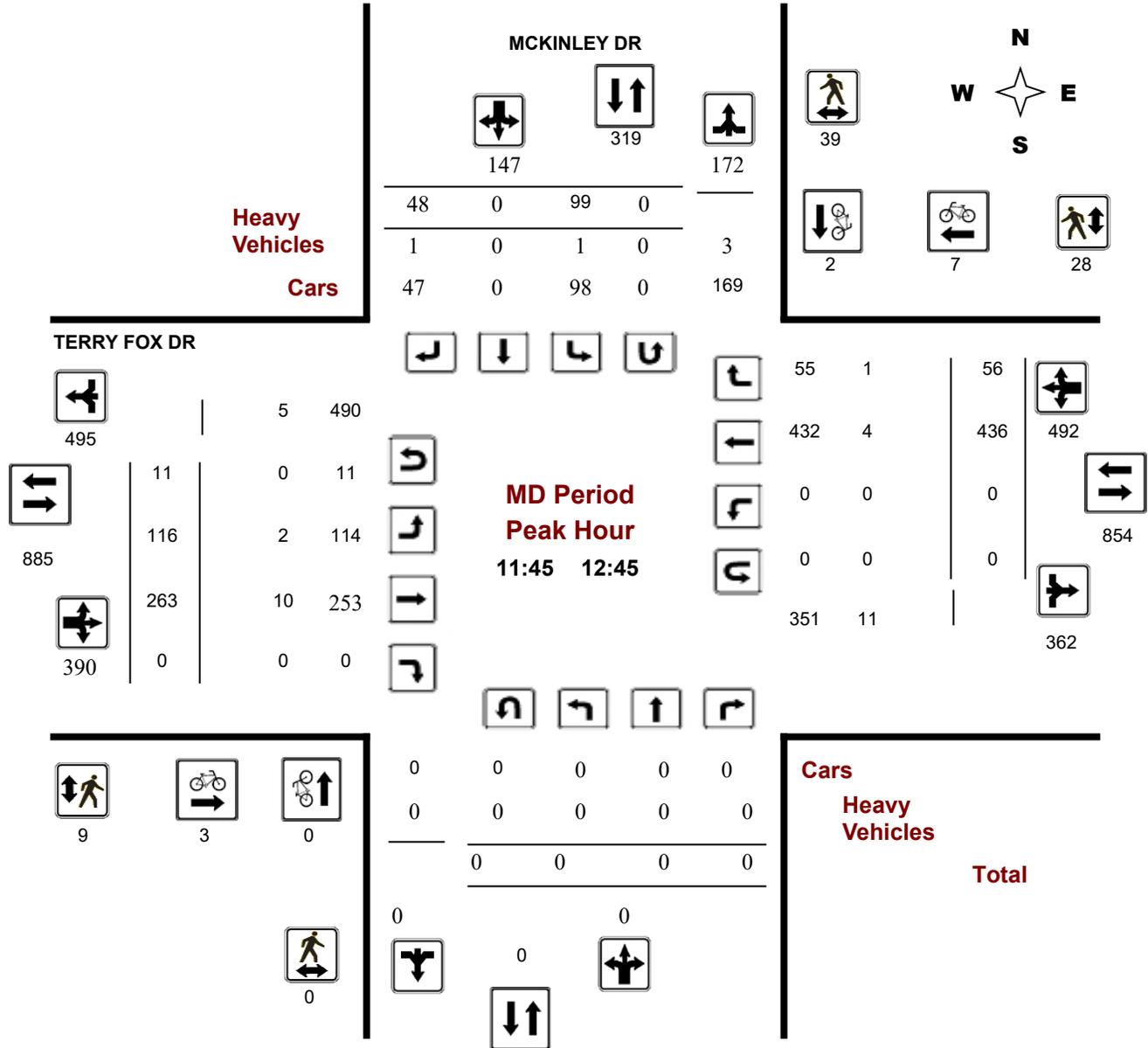
### MCKINLEY DR @ TERRY FOX DR

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**Device:** Miovision



**Comments**

## Turning Movement Count - Peak Hour Diagram

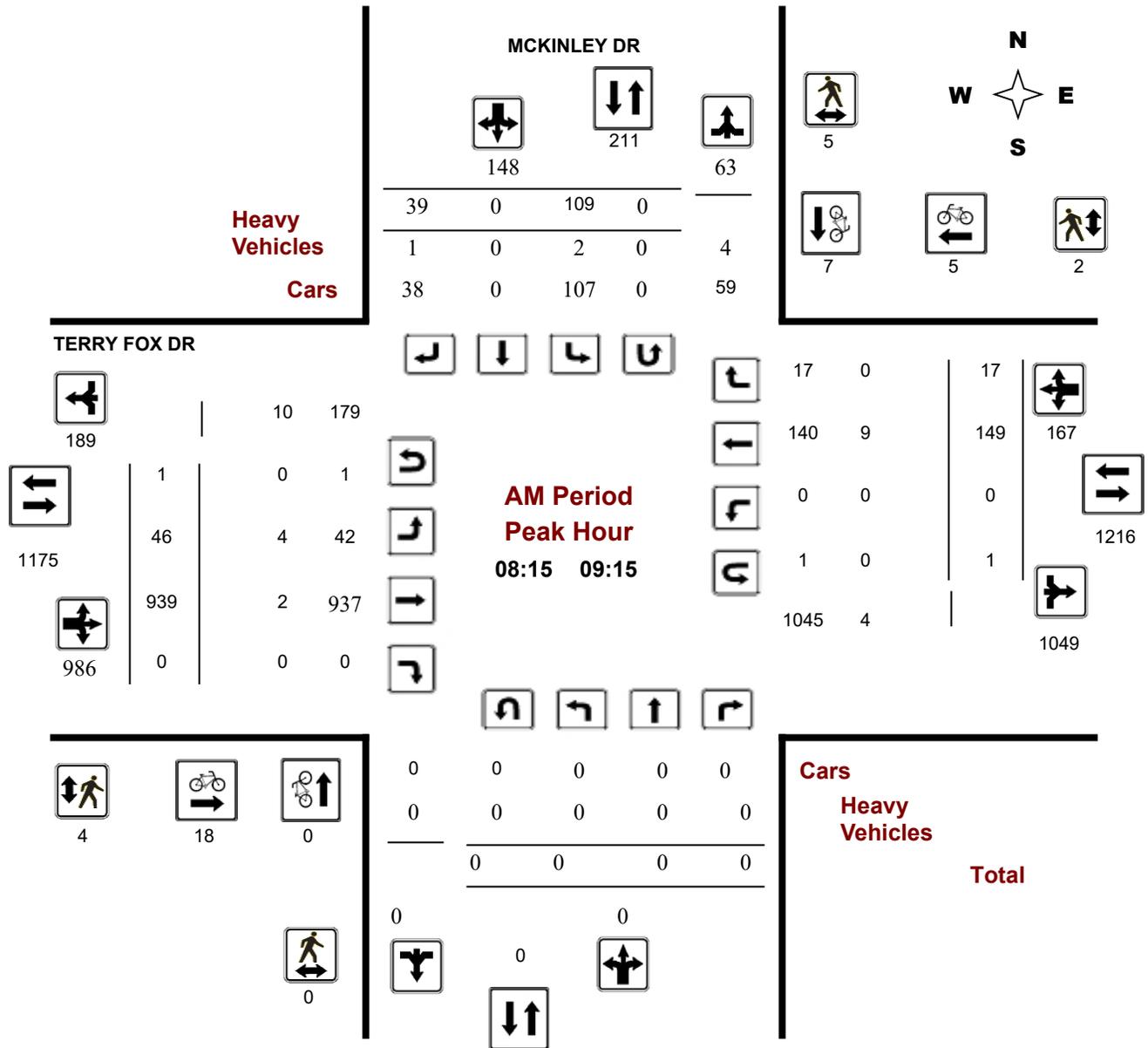
### MCKINLEY DR @ TERRY FOX DR

**Survey Date:** Tuesday, July 09, 2013

**Start Time:** 07:00

**WO No:** 39645

**Device:** Miovision



## Turning Movement Count - Peak Hour Diagram

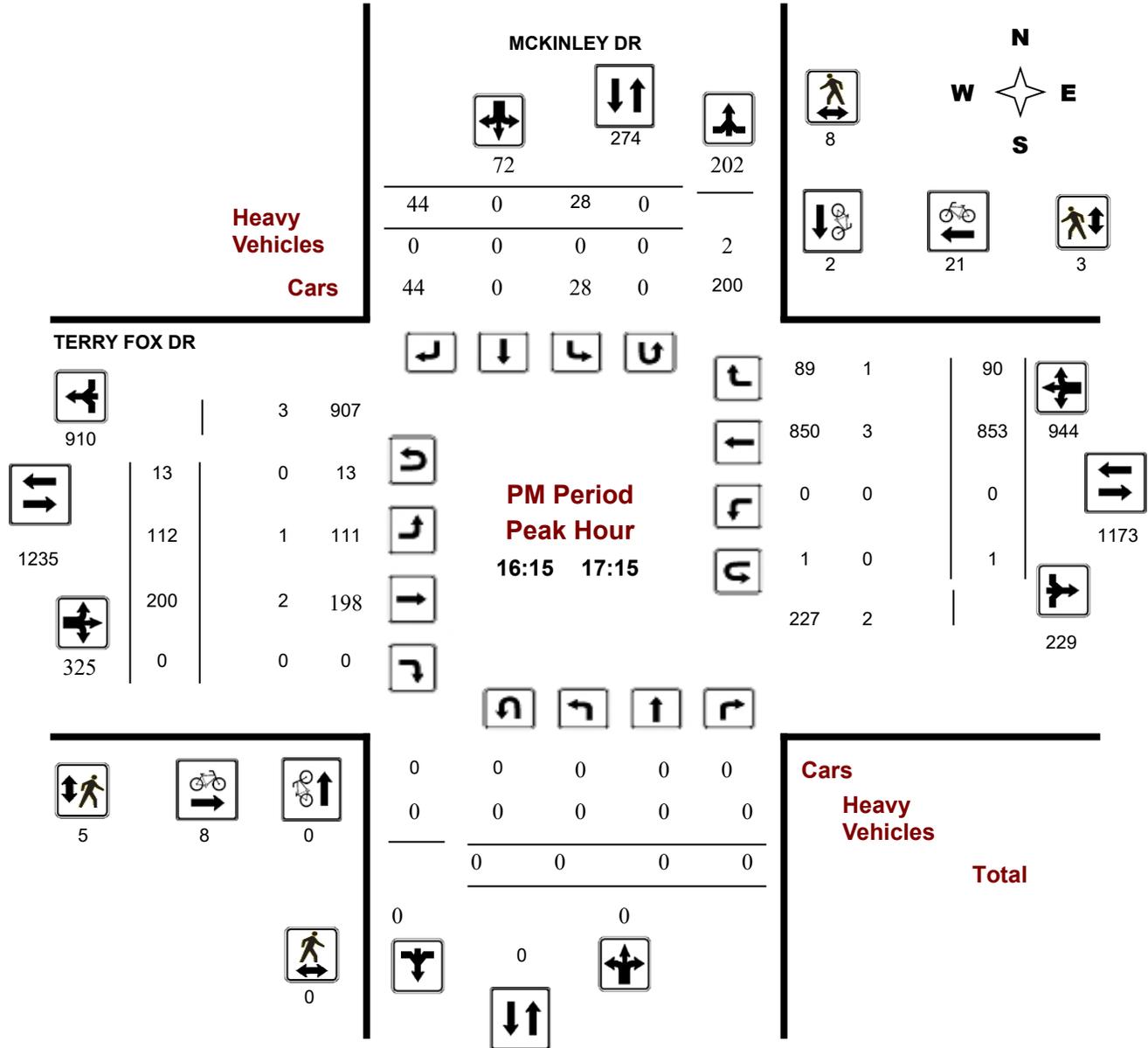
### MCKINLEY DR @ TERRY FOX DR

**Survey Date:** Tuesday, July 09, 2013

**Start Time:** 07:00

**WO No:** 39645

**Device:** Miovision



## Appendix B TRANSPORTATION DEMAND MANAGEMENT CHECKLISTS



## TDM-Supportive Development Design and Infrastructure Checklist: *Residential Developments (multi-family or condominium)*

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

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

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

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
<b>2. WALKING &amp; CYCLING: END-OF-TRIP FACILITIES</b>		
<b>2.1 Bicycle parking</b>		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i> )	<input checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i> )	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i> )	<input checked="" type="checkbox"/>
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	<input checked="" type="checkbox"/>
<b>2.2 Secure bicycle parking</b>		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i> )	<input checked="" type="checkbox"/>
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	<input type="checkbox"/>
<b>2.3 Bicycle repair station</b>		
BETTER	2.3.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input type="checkbox"/>
<b>3. TRANSIT</b>		
<b>3.1 Customer amenities</b>		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input checked="" type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input checked="" type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
<b>4. RIDESHARING</b>		
<b>4.1 Pick-up &amp; drop-off facilities</b>		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	<input checked="" type="checkbox"/>
<b>5. CARSHARING &amp; BIKESHARING</b>		
<b>5.1 Carshare parking spaces</b>		
BETTER	5.1.1 Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses (see <i>Zoning By-law Section 94</i> )	<input type="checkbox"/>
<b>5.2 Bikeshare station location</b>		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input type="checkbox"/>
<b>6. PARKING</b>		
<b>6.1 Number of parking spaces</b>		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	<input checked="" type="checkbox"/>
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input checked="" type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see <i>Zoning By-law Section 104</i> )	<input checked="" type="checkbox"/>
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (see <i>Zoning By-law Section 111</i> )	<input type="checkbox"/>
<b>6.2 Separate long-term &amp; short-term parking areas</b>		
BETTER	6.2.1 Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	<input type="checkbox"/>

**TDM Measures Checklist:**  
*Residential Developments (multi-family, condominium or subdivision)*

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

TDM measures: <i>Residential developments</i>		Check if proposed & add descriptions
<b>1. TDM PROGRAM MANAGEMENT</b>		
<b>1.1 Program coordinator</b>		
BASIC	★ 1.1.1 Designate an internal coordinator, or contract with an external coordinator	<input checked="" type="checkbox"/>
<b>1.2 Travel surveys</b>		
BETTER	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	<input type="checkbox"/>
<b>2. WALKING AND CYCLING</b>		
<b>2.1 Information on walking/cycling routes &amp; destinations</b>		
BASIC	2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances ( <i>multi-family, condominium</i> )	<input checked="" type="checkbox"/>
<b>2.2 Bicycle skills training</b>		
BETTER	2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses	<input type="checkbox"/>

TDM measures: <i>Residential developments</i>		Check if proposed & add descriptions
<b>3. TRANSIT</b>		
<b>3.1 Transit information</b>		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances ( <i>multi-family, condominium</i> )	<input checked="" type="checkbox"/>
BETTER	3.1.2 Provide real-time arrival information display at entrances ( <i>multi-family, condominium</i> )	<input type="checkbox"/>
<b>3.2 Transit fare incentives</b>		
BASIC ★	3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	<input checked="" type="checkbox"/>
BETTER	3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	<input type="checkbox"/>
<b>3.3 Enhanced public transit service</b>		
BETTER ★	3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels ( <i>subdivision</i> )	<input type="checkbox"/>
<b>3.4 Private transit service</b>		
BETTER	3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	<input type="checkbox"/>
<b>4. CARSHARING &amp; BIKESHARING</b>		
<b>4.1 Bikeshare stations &amp; memberships</b>		
BETTER	4.1.1 Contract with provider to install on-site bikeshare station ( <i>multi-family</i> )	<input type="checkbox"/>
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized ( <i>multi-family</i> )	<input type="checkbox"/>
<b>4.2 Carshare vehicles &amp; memberships</b>		
BETTER	4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	<input type="checkbox"/>
BETTER	4.2.2 Provide residents with carshare memberships, either free or subsidized	<input type="checkbox"/>
<b>5. PARKING</b>		
<b>5.1 Priced parking</b>		
BASIC ★	5.1.1 Unbundle parking cost from purchase price ( <i>condominium</i> )	<input type="checkbox"/>
BASIC ★	5.1.2 Unbundle parking cost from monthly rent ( <i>multi-family</i> )	<input checked="" type="checkbox"/>

TDM measures: <i>Residential developments</i>		Check if proposed & add descriptions
<b>6. TDM MARKETING &amp; COMMUNICATIONS</b>		
<b>6.1 Multimodal travel information</b>		
<b>BASIC</b> ★	6.1.1 Provide a multimodal travel option information package to new residents	<input checked="" type="checkbox"/>
<b>6.2 Personalized trip planning</b>		
<b>BETTER</b> ★	6.2.1 Offer personalized trip planning to new residents	<input type="checkbox"/>

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

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

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

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

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

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

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

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

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

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

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

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

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

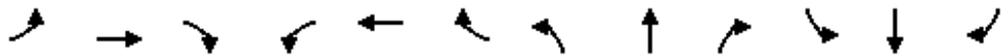
## Appendix C INTERSECTION PERFORMANCE WORKSHEETS



# Timings

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↖	↖	↖	↑↑↑	↖	↖	↑↑↑	↖
Traffic Volume (vph)	13	23	82	85	38	114	319	1632	130	61	575	23
Future Volume (vph)	13	23	82	85	38	114	319	1632	130	61	575	23
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	38.5	38.5	38.5	38.5	38.5	38.5	13.4	24.1	24.1	13.4	24.1	24.1
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	21.0	70.0	70.0	21.0	70.0	70.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	16.2%	53.8%	53.8%	16.2%	53.8%	53.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	1.8	1.5	1.5	1.8	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						
Act Effct Green (s)		15.1	15.1	15.1	15.1	15.1	31.0	87.0	87.0	10.6	63.9	63.9
Actuated g/C Ratio		0.12	0.12	0.12	0.12	0.12	0.24	0.67	0.67	0.08	0.49	0.49
v/c Ratio		0.24	0.36	0.61	0.20	0.44	0.86	0.55	0.14	0.48	0.27	0.03
Control Delay		53.6	13.3	70.7	52.2	13.0	82.4	3.7	0.3	67.8	19.7	0.1
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		53.6	13.3	70.7	52.2	13.0	82.4	3.7	0.3	67.8	19.7	0.1
LOS		D	B	E	D	B	F	A	A	E	B	A
Approach Delay		25.6			39.9			15.5			23.5	
Approach LOS		C			D			B			C	

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 105 (81%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 19.5

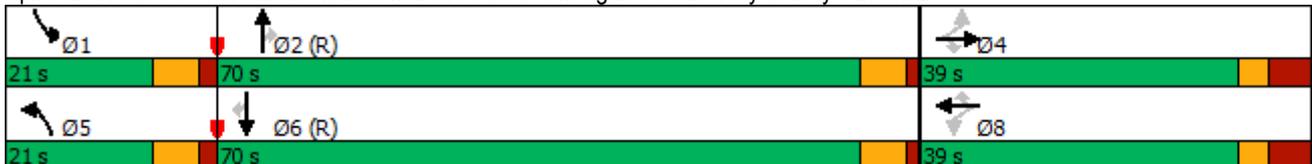
Intersection LOS: B

Intersection Capacity Utilization 72.9%

ICU Level of Service C

Analysis Period (min) 15

### Splits and Phases: 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr



# Queues

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	40	91	94	42	127	354	1813	144	68	639	26
v/c Ratio	0.24	0.36	0.61	0.20	0.44	0.86	0.55	0.14	0.48	0.27	0.03
Control Delay	53.6	13.3	70.7	52.2	13.0	82.4	3.7	0.3	67.8	19.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	13.3	70.7	52.2	13.0	82.4	3.7	0.3	67.8	19.7	0.1
Queue Length 50th (m)	9.5	0.0	23.4	9.9	0.0	96.0	17.5	0.1	17.0	34.1	0.0
Queue Length 95th (m)	19.7	14.9	39.3	20.0	17.3m#	136.1	25.4	m0.0	31.1	42.6	0.0
Internal Link Dist (m)	116.4			136.8			274.6			145.2	
Turn Bay Length (m)		10.0	38.0		38.0	130.0		25.0	68.0		25.0
Base Capacity (vph)	353	436	320	436	464	412	3291	1029	194	2394	775
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.21	0.29	0.10	0.27	0.86	0.55	0.14	0.35	0.27	0.03

### Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕	↗	↖	↑↑↑	↗	↖	↑↑↑	↗
Traffic Volume (vph)	13	23	82	85	38	114	319	1632	130	61	575	23
Future Volume (vph)	13	23	82	85	38	114	319	1632	130	61	575	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1636	1513	1719	1802	1519	1729	4919	1493	1729	4871	1483
Flt Permitted		0.88	1.00	0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1460	1513	1322	1802	1519	1729	4919	1493	1729	4871	1483
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	14	26	91	94	42	127	354	1813	144	68	639	26
RTOR Reduction (vph)	0	0	80	0	0	112	0	0	31	0	0	13
Lane Group Flow (vph)	0	40	11	94	42	15	354	1813	113	68	639	13
Confl. Peds. (#/hr)	5		5	5		5	5		4	4		5
Confl. Bikes (#/hr)			2						1			5
Heavy Vehicles (%)	0%	14%	0%	0%	1%	0%	0%	1%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		15.1	15.1	15.1	15.1	15.1	31.0	85.7	85.7	9.2	63.9	63.9
Effective Green, g (s)		15.1	15.1	15.1	15.1	15.1	31.0	85.7	85.7	9.2	63.9	63.9
Actuated g/C Ratio		0.12	0.12	0.12	0.12	0.12	0.24	0.66	0.66	0.07	0.49	0.49
Clearance Time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
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)		169	175	153	209	176	412	3242	984	122	2394	728
v/s Ratio Prot					0.02		c0.20	c0.37		0.04	0.13	
v/s Ratio Perm		0.03	0.01	c0.07		0.01			0.08			0.01
v/c Ratio		0.24	0.06	0.61	0.20	0.08	0.86	0.56	0.11	0.56	0.27	0.02
Uniform Delay, d1		52.2	51.1	54.7	52.0	51.3	47.4	12.0	8.2	58.4	19.3	17.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.51	0.25	0.03	1.00	1.00	1.00
Incremental Delay, d2		0.7	0.1	7.1	0.5	0.2	9.8	0.4	0.1	5.4	0.3	0.0
Delay (s)		52.9	51.3	61.8	52.5	51.5	81.4	3.4	0.4	63.9	19.6	17.0
Level of Service		D	D	E	D	D	F	A	A	E	B	B
Approach Delay (s)		51.8			55.3			15.2			23.6	
Approach LOS		D			E			B			C	

### Intersection Summary

HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



# Queues

## 2: March Road & Terry Fox Drive

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	279	178	481	241	436	381	337	1580	128	69	630	141
v/c Ratio	0.71	0.19	0.94	0.65	0.48	0.64	0.85	0.92	0.21	0.49	0.45	0.27
Control Delay	65.3	36.7	60.0	63.9	41.9	17.0	65.1	25.7	3.2	72.1	32.7	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	36.7	60.0	63.9	41.9	17.0	65.1	25.7	3.2	72.1	32.7	4.3
Queue Length 50th (m)	35.7	18.0	87.6	30.9	48.6	21.6	39.8	~163.2	4.7	18.6	32.6	0.6
Queue Length 95th (m)	50.1	28.3	#158.4	43.6	65.4	56.7	m33.6	m132.7	m4.3	34.3	43.0	8.8
Internal Link Dist (m)		245.5			130.3			223.1			274.6	
Turn Bay Length (m)	104.0		52.0	72.0		100.0	142.0		82.0	100.0		98.0
Base Capacity (vph)	443	941	521	443	950	605	407	1713	609	209	1398	528
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.19	0.92	0.54	0.46	0.63	0.83	0.92	0.21	0.33	0.45	0.27

### Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 2: March Road & Terry Fox Drive

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↕↕	↗	↔↔	↕↕	↗		↔↔	↕↕↕	↗	↗	↕↕↕
Traffic Volume (vph)	251	160	433	217	392	343	48	256	1422	115	62	567
Future Volume (vph)	251	160	433	217	392	343	48	256	1422	115	62	567
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8	7.0	7.0	6.8	7.0	7.0		6.9	6.7	6.7	6.9	6.7
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.97	0.91	1.00	1.00	0.91
Frbp, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.95		1.00	1.00	0.96	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
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)	3354	3357	1483	3354	3458	1474		3272	4969	1484	1695	4919
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3354	3357	1483	3354	3458	1474		3272	4969	1484	1695	4919
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	279	178	481	241	436	381	53	284	1580	128	69	630
RTOR Reduction (vph)	0	0	106	0	0	203	0	0	0	85	0	0
Lane Group Flow (vph)	279	178	375	241	436	178	0	337	1580	43	69	630
Confl. Peds. (#/hr)	30		26	26		30		19		19	19	
Confl. Bikes (#/hr)			1			3				1		
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	0%	3%	0%	0%	2%	1%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		5	5	2		1	6
Permitted Phases			4			8				2		
Actuated Green, G (s)	15.3	35.5	35.5	14.3	34.5	34.5		15.8	43.5	43.5	9.3	37.0
Effective Green, g (s)	15.3	35.5	35.5	14.3	34.5	34.5		15.8	43.5	43.5	9.3	37.0
Actuated g/C Ratio	0.12	0.27	0.27	0.11	0.27	0.27		0.12	0.33	0.33	0.07	0.28
Clearance Time (s)	6.8	7.0	7.0	6.8	7.0	7.0		6.9	6.7	6.7	6.9	6.7
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)	394	916	404	368	917	391		397	1662	496	121	1400
v/s Ratio Prot	c0.08	0.05		0.07	0.13			c0.10	c0.32		0.04	0.13
v/s Ratio Perm			c0.25			0.12				0.03		
v/c Ratio	0.71	0.19	0.93	0.65	0.48	0.46		0.85	0.95	0.09	0.57	0.45
Uniform Delay, d1	55.2	36.3	46.0	55.5	40.1	39.9		55.9	42.2	29.6	58.4	38.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.13	0.51	0.89	1.07	0.81
Incremental Delay, d2	5.7	0.1	27.2	4.2	0.4	0.8		1.7	1.7	0.0	6.2	1.0
Delay (s)	60.9	36.4	73.2	59.6	40.5	40.8		64.7	23.4	26.3	68.9	31.9
Level of Service	E	D	E	E	D	D		E	C	C	E	C
Approach Delay (s)		62.6			45.0				30.4			33.2
Approach LOS		E			D				C			C

Intersection Summary		
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.94	
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	90.9%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

# HCM Signalized Intersection Capacity Analysis

## 2: March Road & Terry Fox Drive

07/14/2022



Movement	SBR
Lane Configurations	↗
Traffic Volume (vph)	127
Future Volume (vph)	127
Ideal Flow (vphpl)	1800
Total Lost time (s)	6.7
Lane Util. Factor	1.00
Frbp, ped/bikes	0.96
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1483
Flt Permitted	1.00
Satd. Flow (perm)	1483
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	141
RTOR Reduction (vph)	101
Lane Group Flow (vph)	40
Confl. Peds. (#/hr)	19
Confl. Bikes (#/hr)	2
Heavy Vehicles (%)	0%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	37.0
Effective Green, g (s)	37.0
Actuated g/C Ratio	0.28
Clearance Time (s)	6.7
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	422
v/s Ratio Prot	
v/s Ratio Perm	0.03
v/c Ratio	0.10
Uniform Delay, d1	34.2
Progression Factor	0.61
Incremental Delay, d2	0.4
Delay (s)	21.3
Level of Service	C
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

# Timings

## 3: March Road & Solandt Road

07/14/2022

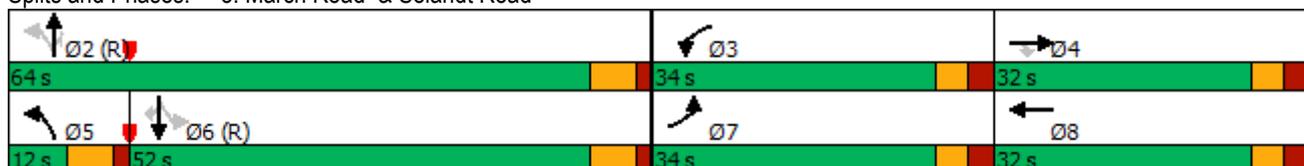


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	87	46	645	613	76	114	1708	66	23	961	68
Future Volume (vph)	87	46	645	613	76	114	1708	66	23	961	68
Turn Type	Prot	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8	5	2			6	
Permitted Phases			4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	5.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	12.9	31.5	31.5	12.9	31.5	11.3	25.3	25.3	25.3	25.3	25.3
Total Split (s)	34.0	32.0	32.0	34.0	32.0	12.0	64.0	64.0	52.0	52.0	52.0
Total Split (%)	26.2%	24.6%	24.6%	26.2%	24.6%	9.2%	49.2%	49.2%	40.0%	40.0%	40.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.6	3.2	3.2	2.6	3.2	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	6.5	6.5	5.9	6.5	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	13.1	25.7	25.7	27.9	40.5	57.7	57.7	57.7	45.7	45.7	45.7
Actuated g/C Ratio	0.10	0.20	0.20	0.21	0.31	0.44	0.44	0.44	0.35	0.35	0.35
v/c Ratio	0.59	0.15	1.79	0.95	0.51	1.01	1.25	0.11	0.46	0.90	0.13
Control Delay	69.9	44.7	393.1	73.5	30.2	110.6	150.7	4.3	49.2	38.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.9	44.7	393.1	73.5	30.2	110.6	150.7	4.3	49.2	38.2	0.5
LOS	E	D	F	E	C	F	F	A	D	D	A
Approach Delay		336.3			60.8		143.1			36.0	
Approach LOS		F			E		F			D	

### Intersection Summary

Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 30 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.79  
 Intersection Signal Delay: 135.8      Intersection LOS: F  
 Intersection Capacity Utilization 111.9%      ICU Level of Service H  
 Analysis Period (min) 15

### Splits and Phases: 3: March Road & Solandt Road



Queues

3: March Road & Solandt Road

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	97	51	717	681	282	127	1898	73	26	1068	76
v/c Ratio	0.59	0.15	1.79	0.95	0.51	1.01	1.25	0.11	0.46	0.90	0.13
Control Delay	69.9	44.7	393.1	73.5	30.2	110.6	150.7	4.3	49.2	38.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.9	44.7	393.1	73.5	30.2	110.6	150.7	4.3	49.2	38.2	0.5
Queue Length 50th (m)	24.1	10.9	~249.7	89.1	41.8	~19.3	~318.7	0.0	4.4	105.0	0.2
Queue Length 95th (m)	40.7	22.6	#323.8	#124.4	73.4	#60.1	#360.8	7.7	m8.5m	#155.8	m0.0
Internal Link Dist (m)		112.5			205.8		333.2			181.1	
Turn Bay Length (m)	65.0		100.0	90.0		157.0			140.0		76.0
Base Capacity (vph)	352	342	400	724	554	126	1519	692	56	1191	590
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.15	1.79	0.94	0.51	1.01	1.25	0.11	0.46	0.90	0.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

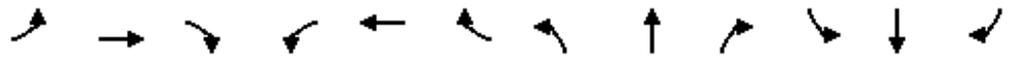
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 3: March Road & Solandt Road

07/14/2022



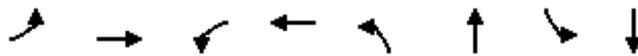
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	46	645	613	76	178	114	1708	66	23	961	68
Future Volume (vph)	87	46	645	613	76	178	114	1708	66	23	961	68
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	0.98		1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.89		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)	1631	1733	1495	3354	1599		1662	3424	1461	1729	3390	1435
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.08	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	1631	1733	1495	3354	1599		135	3424	1461	159	3390	1435
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	97	51	717	681	84	198	127	1898	73	26	1068	76
RTOR Reduction (vph)	0	0	104	0	56	0	0	0	41	0	0	49
Lane Group Flow (vph)	97	51	613	681	226	0	127	1898	32	26	1068	27
Confl. Peds. (#/hr)	8		5	5		8	11		1	1		11
Confl. Bikes (#/hr)			4			2			5			2
Heavy Vehicles (%)	6%	5%	1%	0%	0%	0%	4%	1%	3%	0%	2%	4%
Turn Type	Prot	NA	Perm	Prot	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases			4				2		2	6		6
Actuated Green, G (s)	13.1	25.7	25.7	27.9	40.5		57.7	57.7	57.7	45.7	45.7	45.7
Effective Green, g (s)	13.1	25.7	25.7	27.9	40.5		57.7	57.7	57.7	45.7	45.7	45.7
Actuated g/C Ratio	0.10	0.20	0.20	0.21	0.31		0.44	0.44	0.44	0.35	0.35	0.35
Clearance Time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3	6.3	6.3	6.3	6.3
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)	164	342	295	719	498		126	1519	648	55	1191	504
v/s Ratio Prot	0.06	0.03		c0.20	0.14		0.04	c0.55			0.32	
v/s Ratio Perm			c0.41				0.40		0.02	0.16		0.02
v/c Ratio	0.59	0.15	2.08	0.95	0.45		1.01	1.25	0.05	0.47	0.90	0.05
Uniform Delay, d1	55.9	43.1	52.1	50.3	35.9		30.3	36.1	20.6	32.8	39.9	27.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.77	0.73	0.88
Incremental Delay, d2	5.6	0.2	496.1	21.4	0.7		82.3	117.9	0.1	20.6	8.5	0.2
Delay (s)	61.5	43.3	548.3	71.7	36.5		112.6	154.1	20.7	45.9	37.7	24.7
Level of Service	E	D	F	E	D		F	F	C	D	D	C
Approach Delay (s)		463.9			61.4			146.9			37.0	
Approach LOS		F			E			F			D	

Intersection Summary		
HCM 2000 Control Delay	159.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	1.45	F
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	111.9%	25.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		H

# Timings

## 4: Legget Road & Solandt Road /Solandt Road

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↷	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	56	10	44	146	290	106	3	246
Future Volume (vph)	56	10	44	146	290	106	3	246
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	15.0	15.0	15.0	15.0	7.0	10.0	10.0	10.0
Minimum Split (s)	25.2	25.2	25.2	25.2	13.2	25.2	25.2	25.2
Total Split (s)	41.2	41.2	41.2	41.2	31.2	77.4	46.2	46.2
Total Split (%)	34.7%	34.7%	34.7%	34.7%	26.3%	65.3%	39.0%	39.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes		Yes	Yes
Recall Mode	None	None	None	None	None	Ped	Ped	Ped
Act Effect Green (s)	18.5	18.5	18.5	18.5	69.0	69.0	40.2	40.2
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.69	0.69	0.40	0.40
v/c Ratio	0.33	0.21	0.21	0.66	0.75	0.10	0.01	1.10
Control Delay	41.0	13.3	37.2	50.5	35.4	5.8	21.0	91.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	13.3	37.2	50.5	35.4	5.8	21.0	91.2
LOS	D	B	D	D	D	A	C	F
Approach Delay		26.2		47.6		27.3		91.0
Approach LOS		C		D		C		F

### Intersection Summary

Cycle Length: 118.6

Actuated Cycle Length: 100

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 61.4

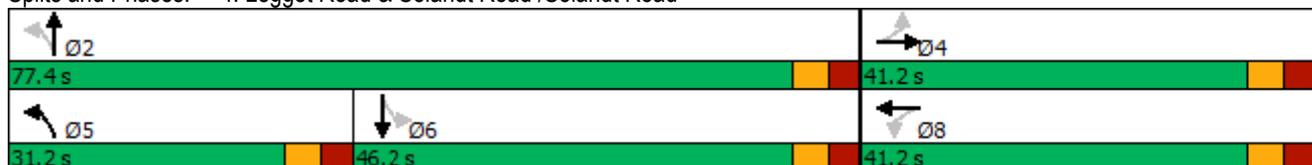
Intersection LOS: E

Intersection Capacity Utilization 105.6%

ICU Level of Service G

Analysis Period (min) 15

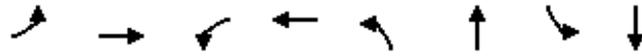
### Splits and Phases: 4: Legget Road & Solandt Road /Solandt Road



Queues

4: Legget Road & Solandt Road /Solandt Road

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	62	71	49	172	322	121	3	769
v/c Ratio	0.33	0.21	0.21	0.66	0.75	0.10	0.01	1.10
Control Delay	41.0	13.3	37.2	50.5	35.4	5.8	21.0	91.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	13.3	37.2	50.5	35.4	5.8	21.0	91.2
Queue Length 50th (m)	10.8	1.8	8.4	31.6	41.9	6.4	0.4	~163.1
Queue Length 95th (m)	22.7	13.1	18.5	53.2	#87.4	15.2	2.3	#258.1
Internal Link Dist (m)		205.8		177.5		261.1		580.4
Turn Bay Length (m)	130.0		42.0		65.0		35.0	
Base Capacity (vph)	357	581	453	491	465	1271	438	701
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.12	0.11	0.35	0.69	0.10	0.01	1.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

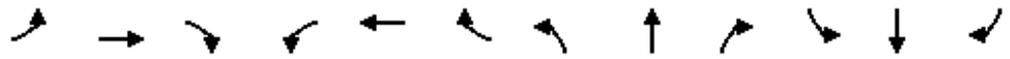
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 4: Legget Road & Solandt Road /Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	10	54	44	146	9	290	106	3	3	246	446
Future Volume (vph)	56	10	54	44	146	9	290	106	3	3	246	446
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.87		1.00	0.99		1.00	1.00		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1716	1544		1725	1393		1601	1776		1533	1624	
Flt Permitted	0.56	1.00		0.71	1.00		0.09	1.00		0.68	1.00	
Satd. Flow (perm)	1019	1544		1291	1393		145	1776		1096	1624	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	62	11	60	49	162	10	322	118	3	3	273	496
RTOR Reduction (vph)	0	49	0	0	2	0	0	1	0	0	50	0
Lane Group Flow (vph)	62	22	0	49	170	0	322	120	0	3	719	0
Confl. Peds. (#/hr)	4		1	1		4			11	11		
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	0%	1%	1%	0%	30%	17%	8%	2%	0%	10%	1%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.5	18.5		18.5	18.5		69.0	69.0		40.2	40.2	
Effective Green, g (s)	18.5	18.5		18.5	18.5		69.0	69.0		40.2	40.2	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.69	0.69		0.40	0.40	
Clearance Time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	188	285		239	257		429	1226		441	653	
v/s Ratio Prot		0.01			c0.12		c0.17	0.07				c0.44
v/s Ratio Perm	0.06			0.04			0.35			0.00		
v/c Ratio	0.33	0.08		0.21	0.66		0.75	0.10		0.01	1.10	
Uniform Delay, d1	35.3	33.6		34.5	37.8		27.0	5.1		17.9	29.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.1		0.4	6.0		7.2	0.0		0.0	66.4	
Delay (s)	36.4	33.8		34.9	43.8		34.3	5.2		17.9	96.2	
Level of Service	D	C		C	D		C	A		B	F	
Approach Delay (s)		35.0			41.8			26.3			95.9	
Approach LOS		C			D			C			F	

### Intersection Summary

HCM 2000 Control Delay	63.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	99.9	Sum of lost time (s)	18.6
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Unsignalized Intersection Capacity Analysis

## 5: Legget Drive & Terry Fox Drive

07/14/2022



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔		↔
Traffic Volume (veh/h)	126	82	25	646	304	42
Future Volume (Veh/h)	126	82	25	646	304	42
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	140	91	28	718	338	47
Pedestrians					13	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	302					
pX, platoon unblocked						
vC, conflicting volume			244		972	198
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			244		972	198
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		0	94
cM capacity (veh/h)			1318		273	805
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	231	746	385			
Volume Left	0	28	338			
Volume Right	91	0	47			
cSH	1700	1318	297			
Volume to Capacity	0.14	0.02	1.30			
Queue Length 95th (m)	0.0	0.5	142.3			
Control Delay (s)	0.0	0.6	191.4			
Lane LOS			A	F		
Approach Delay (s)	0.0	0.6	191.4			
Approach LOS			F			
<b>Intersection Summary</b>						
Average Delay			54.4			
Intersection Capacity Utilization			80.8%	ICU Level of Service	D	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 11: Terry Fox Drive & McKinley Drive

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	112	215	0	0	907	105	0	0	0	30	0	47
Future Volume (Veh/h)	112	215	0	0	907	105	0	0	0	30	0	47
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	124	239	0	0	1008	117	0	0	0	33	0	52
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh		1			1							
Upstream signal (m)		154										
pX, platoon unblocked				0.96			0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	1125			239			1606	1612	239	1554	1554	1066
vC1, stage 1 conf vol							487	487		1066	1066	
vC2, stage 2 conf vol							1118	1125		487	487	
vCu, unblocked vol	1125			190			1610	1616	190	1556	1556	1066
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	80			100			100	100	100	82	100	81
cM capacity (veh/h)	621			1332			71	130	820	186	200	270
Direction, Lane #												
	EB 1	EB 2	WB 1	SB 1								
Volume Total	124	239	1125	85								
Volume Left	124	0	0	33								
Volume Right	0	0	117	52								
cSH	621	1700	1700	229								
Volume to Capacity	0.20	0.14	0.66	0.37								
Queue Length 95th (m)	5.6	0.0	0.0	12.3								
Control Delay (s)	12.2	0.0	0.0	29.6								
Lane LOS	B			D								
Approach Delay (s)	4.2		0.0	29.6								
Approach LOS				D								
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			78.5%		ICU Level of Service					D		
Analysis Period (min)			15									

# Timings

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↖	↖	↖	↑↑↑	↖	↖	↑↑↑	↖
Traffic Volume (vph)	10	49	121	94	17	21	37	885	30	140	1890	8
Future Volume (vph)	10	49	121	94	17	21	37	885	30	140	1890	8
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	38.5	38.5	38.5	38.5	38.5	38.5	13.4	24.1	24.1	13.4	24.1	24.1
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	21.0	70.0	70.0	21.0	70.0	70.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	16.2%	53.8%	53.8%	16.2%	53.8%	53.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	1.8	1.5	1.5	1.8	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						
Act Effct Green (s)		16.1	16.1	16.1	16.1	16.1	8.9	76.2	76.2	17.7	87.7	87.7
Actuated g/C Ratio		0.12	0.12	0.12	0.12	0.12	0.07	0.59	0.59	0.14	0.67	0.67
v/c Ratio		0.31	0.44	0.66	0.09	0.09	0.36	0.36	0.04	0.67	0.63	0.01
Control Delay		53.9	12.3	72.7	48.7	0.7	56.8	9.2	0.4	66.7	14.6	0.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		53.9	12.3	72.7	48.7	0.7	56.8	9.2	0.4	66.7	14.6	0.0
LOS		D	B	E	D	A	E	A	A	E	B	A
Approach Delay		25.9			58.2			10.7			18.2	
Approach LOS		C			E			B			B	

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 95 (73%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 18.0

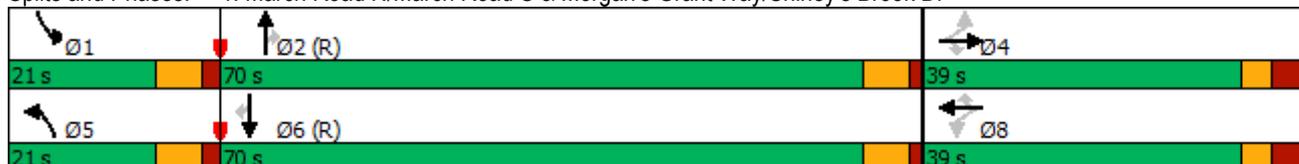
Intersection LOS: B

Intersection Capacity Utilization 76.1%

ICU Level of Service D

Analysis Period (min) 15

### Splits and Phases: 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr



Queues

1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	65	134	104	19	23	41	983	33	156	2100	9
v/c Ratio	0.31	0.44	0.66	0.09	0.09	0.36	0.36	0.04	0.67	0.63	0.01
Control Delay	53.9	12.3	72.7	48.7	0.7	56.8	9.2	0.4	66.7	14.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	12.3	72.7	48.7	0.7	56.8	9.2	0.4	66.7	14.6	0.0
Queue Length 50th (m)	15.4	0.0	25.8	4.4	0.0	11.3	21.3	0.2	38.4	108.3	0.0
Queue Length 95th (m)	28.1	17.3	42.7	11.3	0.0	m20.1	25.7	m0.3	58.9	154.2	0.0
Internal Link Dist (m)	116.4			136.8			274.6			145.2	
Turn Bay Length (m)		10.0	38.0		38.0	130.0		25.0	68.0		25.0
Base Capacity (vph)	417	469	311	401	411	188	2723	902	242	3352	1033
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.29	0.33	0.05	0.06	0.22	0.36	0.04	0.64	0.63	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕	↗	↖	↑↑↑	↗	↖	↑↑↑	↗
Traffic Volume (vph)	10	49	121	94	17	21	37	885	30	140	1890	8
Future Volume (vph)	10	49	121	94	17	21	37	885	30	140	1890	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.95	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1804	1514	1706	1655	1450	1679	4644	1476	1729	4969	1488
Flt Permitted		0.95	1.00	0.71	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1720	1514	1283	1655	1450	1679	4644	1476	1729	4969	1488
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	54	134	104	19	23	41	983	33	156	2100	9
RTOR Reduction (vph)	0	0	117	0	0	20	0	0	14	0	0	3
Lane Group Flow (vph)	0	65	17	104	19	3	41	983	19	156	2100	6
Confl. Peds. (#/hr)	3		3	3		3	5		6	6		5
Confl. Bikes (#/hr)			3						8			1
Heavy Vehicles (%)	0%	0%	0%	1%	10%	5%	3%	7%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		16.1	16.1	16.1	16.1	16.1	7.5	76.2	76.2	17.7	86.4	86.4
Effective Green, g (s)		16.1	16.1	16.1	16.1	16.1	7.5	76.2	76.2	17.7	86.4	86.4
Actuated g/C Ratio		0.12	0.12	0.12	0.12	0.12	0.06	0.59	0.59	0.14	0.66	0.66
Clearance Time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
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)		213	187	158	204	179	96	2722	865	235	3302	988
v/s Ratio Prot					0.01		0.02	0.21		c0.09	c0.42	
v/s Ratio Perm		0.04	0.01	c0.08		0.00			0.01			0.00
v/c Ratio		0.31	0.09	0.66	0.09	0.02	0.43	0.36	0.02	0.66	0.64	0.01
Uniform Delay, d1		51.9	50.5	54.3	50.5	50.0	59.2	14.1	11.3	53.3	12.7	7.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.86	0.58	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.8	0.2	9.5	0.2	0.0	2.7	0.3	0.0	6.9	0.9	0.0
Delay (s)		52.7	50.7	63.8	50.7	50.0	53.6	8.5	11.3	60.2	13.6	7.4
Level of Service		D	D	E	D	D	D	A	B	E	B	A
Approach Delay (s)		51.3			59.9			10.3			16.8	
Approach LOS		D			E			B			B	

### Intersection Summary

HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 2: March Road & Terry Fox Drive

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑	↗	↔↔	↑↑↑	↗	↗	↑↑↑	↗
Traffic Volume (vph)	142	411	207	72	111	67	210	705	146	427	1479	198
Future Volume (vph)	142	411	207	72	111	67	210	705	146	427	1479	198
Turn Type	Prot	NA	Perm									
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	13.8	42.0	42.0	13.8	42.0	42.0	13.9	32.7	32.7	13.9	32.7	32.7
Total Split (s)	16.0	42.0	42.0	16.0	42.0	42.0	25.0	47.0	47.0	25.0	47.0	47.0
Total Split (%)	12.3%	32.3%	32.3%	12.3%	32.3%	32.3%	19.2%	36.2%	36.2%	19.2%	36.2%	36.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.1	3.3	3.3	3.1	3.3	3.3	2.3	2.1	2.1	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes											
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						
Act Effct Green (s)	9.0	25.3	25.3	8.4	21.8	21.8	14.5	40.3	40.3	31.4	57.2	57.2
Actuated g/C Ratio	0.07	0.19	0.19	0.06	0.17	0.17	0.11	0.31	0.31	0.24	0.44	0.44
v/c Ratio	0.69	0.68	0.49	0.39	0.22	0.20	0.64	0.54	0.28	1.14	0.77	0.30
Control Delay	75.3	54.0	8.9	64.0	45.5	1.2	43.2	62.3	23.9	129.4	24.7	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	54.0	8.9	64.0	45.5	1.2	43.2	62.3	23.9	129.4	24.7	2.1
LOS	E	D	A	E	D	A	D	E	C	F	C	A
Approach Delay		45.7			39.0			53.3			43.8	
Approach LOS		D			D			D			D	

### Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 114 (88%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 125	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 46.3	Intersection LOS: D
Intersection Capacity Utilization 96.3%	ICU Level of Service F
Analysis Period (min) 15	

### Splits and Phases: 2: March Road & Terry Fox Drive



Queues

2: March Road & Terry Fox Drive

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	158	457	230	80	123	74	233	783	162	474	1643	220
v/c Ratio	0.69	0.68	0.49	0.39	0.22	0.20	0.64	0.54	0.28	1.14	0.77	0.30
Control Delay	75.3	54.0	8.9	64.0	45.5	1.2	43.2	62.3	23.9	129.4	24.7	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	54.0	8.9	64.0	45.5	1.2	43.2	62.3	23.9	129.4	24.7	2.1
Queue Length 50th (m)	20.7	58.8	0.0	10.3	14.3	0.0	28.0	75.8	16.7	~141.2	132.7	4.1
Queue Length 95th (m)	#33.9	72.3	20.5	18.4	21.7	0.0	44.7	89.5	37.1	#234.4	#187.1	7.5
Internal Link Dist (m)		245.5			95.7			295.3			274.6	
Turn Bay Length (m)	104.0		52.0	72.0		100.0	142.0		82.0	100.0		98.0
Base Capacity (vph)	232	931	562	223	912	502	459	1452	571	417	2144	729
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.49	0.41	0.36	0.13	0.15	0.51	0.54	0.28	1.14	0.77	0.30

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

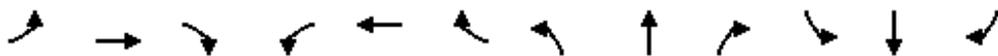
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 2: March Road & Terry Fox Drive

07/14/2022



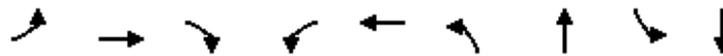
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↘	↖↗	↕	↘	↖↗	↕	↘	↖↗	↕	↘
Traffic Volume (vph)	142	411	207	72	111	67	210	705	146	427	1479	198
Future Volume (vph)	142	411	207	72	111	67	210	705	146	427	1479	198
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	158	457	230	80	123	74	233	783	162	474	1643	220
RTOR Reduction (vph)	0	0	185	0	0	61	0	0	114	0	0	116
Lane Group Flow (vph)	158	457	45	80	123	13	233	783	48	474	1643	104
Confl. Peds. (#/hr)	9		29	29		9	21		13	13		21
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	2%	0%	1%	6%	2%	3%	2%	6%	1%	0%	2%	6%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.0	25.3	25.3	7.0	23.3	23.3	14.5	38.9	38.9	31.4	55.8	55.8
Effective Green, g (s)	9.0	25.3	25.3	7.0	23.3	23.3	14.5	38.9	38.9	31.4	55.8	55.8
Actuated g/C Ratio	0.07	0.19	0.19	0.05	0.18	0.18	0.11	0.30	0.30	0.24	0.43	0.43
Clearance Time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	227	672	284	170	607	263	366	1402	443	417	2090	599
v/s Ratio Prot	c0.05	c0.13		0.03	0.04		0.07	0.17		c0.27	c0.34	
v/s Ratio Perm			0.03			0.01			0.03			0.07
v/c Ratio	0.70	0.68	0.16	0.47	0.20	0.05	0.64	0.56	0.11	1.14	0.79	0.17
Uniform Delay, d1	59.2	48.6	43.5	59.7	45.4	44.2	55.2	38.3	33.0	49.3	32.0	22.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.65	1.63	4.65	1.07	0.67	0.25
Incremental Delay, d2	8.9	2.8	0.3	2.1	0.2	0.1	3.4	1.5	0.5	83.0	2.5	0.5
Delay (s)	68.1	51.4	43.8	61.8	45.6	44.3	39.1	64.1	154.1	136.0	24.0	6.2
Level of Service	E	D	D	E	D	D	D	E	F	F	C	A
Approach Delay (s)		52.5			49.9			71.5			45.0	
Approach LOS		D			D			E			D	

Intersection Summary		
HCM 2000 Control Delay	53.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.89	
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	96.3%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

# Timings

## 3: March Road & Solandt Road

07/14/2022

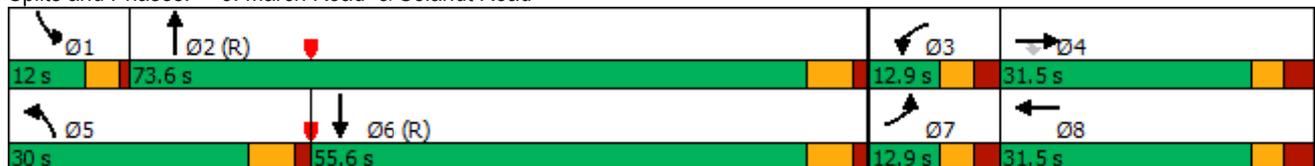


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	34	89	109	46	105	514	1049	127	1546
Future Volume (vph)	34	89	109	46	105	514	1049	127	1546
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	7.0	15.0	5.0	15.0
Minimum Split (s)	12.9	31.5	31.5	12.9	31.5	13.3	25.3	9.5	25.3
Total Split (s)	12.9	31.5	31.5	12.9	31.5	30.0	73.6	12.0	55.6
Total Split (%)	9.9%	24.2%	24.2%	9.9%	24.2%	23.1%	56.6%	9.2%	42.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	4.6	4.6	3.5	4.6
All-Red Time (s)	2.6	3.2	3.2	2.6	3.2	1.7	1.7	1.0	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	6.5	6.5	5.9	6.5	6.3	6.3	4.5	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	7.0	16.3	16.3	7.0	16.3	23.7	68.5	17.6	60.6
Actuated g/C Ratio	0.05	0.13	0.13	0.05	0.13	0.18	0.53	0.14	0.47
v/c Ratio	0.44	0.44	0.37	0.29	0.69	1.83	1.06	0.62	1.21
Control Delay	75.5	57.7	5.2	63.5	66.2	416.6	67.6	67.0	132.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.5	57.7	5.2	63.5	66.2	416.6	67.6	67.0	132.5
LOS	E	E	A	E	E	F	E	E	F
Approach Delay		35.7			65.5		151.0		127.9
Approach LOS		D			E		F		F

### Intersection Summary

Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.83  
 Intersection Signal Delay: 131.7      Intersection LOS: F  
 Intersection Capacity Utilization 117.8%      ICU Level of Service H  
 Analysis Period (min) 15

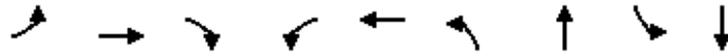
### Splits and Phases: 3: March Road & Solandt Road



Queues

3: March Road & Solandt Road

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	38	99	121	51	154	571	1818	141	1870
v/c Ratio	0.44	0.44	0.37	0.29	0.69	1.83	1.06	0.62	1.21
Control Delay	75.5	57.7	5.2	63.5	66.2	416.6	67.6	67.0	132.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.5	57.7	5.2	63.5	66.2	416.6	67.6	67.0	132.5
Queue Length 50th (m)	9.6	23.9	0.0	6.5	35.6	~220.9	~264.1	35.0	~317.3
Queue Length 95th (m)	21.3	39.4	5.7	13.4	55.5	#289.5	#306.8	#82.8	#383.1
Internal Link Dist (m)		112.5			205.8		333.2		208.2
Turn Bay Length (m)	65.0		100.0	90.0		157.0		140.0	
Base Capacity (vph)	87	343	411	177	334	312	1719	229	1547
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.29	0.29	0.29	0.46	1.83	1.06	0.62	1.21

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 3: March Road & Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	89	109	46	105	33	514	1049	587	127	1546	137
Future Volume (vph)	34	89	109	46	105	33	514	1049	587	127	1546	137
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3		4.5	6.3	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1616	1784	1435	3288	1693		1712	3155		1695	3311	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1616	1784	1435	3288	1693		1712	3155		1695	3311	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	38	99	121	51	117	37	571	1166	652	141	1718	152
RTOR Reduction (vph)	0	0	106	0	10	0	0	59	0	0	4	0
Lane Group Flow (vph)	38	99	15	51	144	0	571	1759	0	141	1866	0
Confl. Peds. (#/hr)	7		8	8		7	6					6
Confl. Bikes (#/hr)			1			1			1			12
Heavy Vehicles (%)	7%	2%	5%	2%	3%	3%	1%	4%	1%	2%	3%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	5.6	16.3	16.3	5.6	16.3		23.7	67.3		17.6	59.4	
Effective Green, g (s)	5.6	16.3	16.3	5.6	16.3		23.7	67.3		17.6	59.4	
Actuated g/C Ratio	0.04	0.13	0.13	0.04	0.13		0.18	0.52		0.14	0.46	
Clearance Time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3		4.5	6.3	
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)	69	223	179	141	212		312	1633		229	1512	
v/s Ratio Prot	c0.02	0.06		0.02	c0.09		c0.33	0.56		0.08	c0.56	
v/s Ratio Perm			0.01									
v/c Ratio	0.55	0.44	0.08	0.36	0.68		1.83	1.08		0.62	1.23	
Uniform Delay, d1	61.0	52.7	50.3	60.5	54.4		53.1	31.4		53.0	35.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.2	1.4	0.2	1.6	8.7		385.9	46.2		4.9	111.2	
Delay (s)	70.1	54.1	50.5	62.0	63.0		439.0	77.5		57.9	146.5	
Level of Service	E	D	D	E	E		F	E		E	F	
Approach Delay (s)		54.7			62.8			163.9			140.3	
Approach LOS		D			E			F			F	

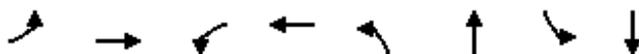
### Intersection Summary

HCM 2000 Control Delay	144.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	117.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022

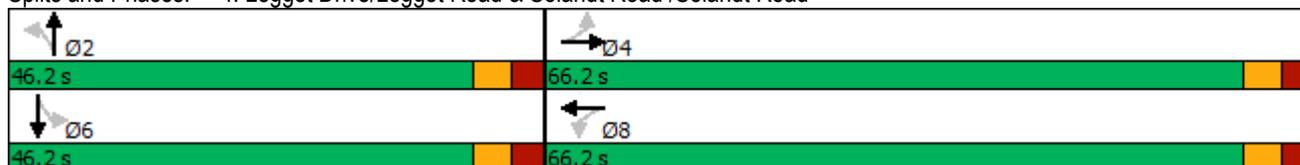


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	456	120	10	10	90	145	4	218
Future Volume (vph)	456	120	10	10	90	145	4	218
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	15.0	15.0	15.0	15.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2
Total Split (s)	66.2	66.2	66.2	66.2	46.2	46.2	46.2	46.2
Total Split (%)	58.9%	58.9%	58.9%	58.9%	41.1%	41.1%	41.1%	41.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None							
Act Effect Green (s)	31.9	31.9	31.9	31.9	17.8	17.8	17.8	17.8
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.28	0.28	0.28	0.28
v/c Ratio	0.75	0.44	0.02	0.03	0.43	0.42	0.01	0.60
Control Delay	20.9	8.1	8.6	6.6	29.1	22.9	21.8	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	8.1	8.6	6.6	29.1	22.9	21.8	27.1
LOS	C	A	A	A	C	C	C	C
Approach Delay		15.4		7.4		24.9		27.0
Approach LOS		B		A		C		C

### Intersection Summary

Cycle Length: 112.4  
 Actuated Cycle Length: 63.5  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 19.5  
 Intersection LOS: B  
 Intersection Capacity Utilization 72.6%  
 ICU Level of Service C  
 Analysis Period (min) 15

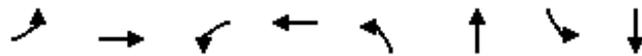
### Splits and Phases: 4: Legget Drive/Legget Road & Solandt Road /Solandt Road



# Queues

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	507	379	11	19	100	208	4	300
v/c Ratio	0.75	0.44	0.02	0.03	0.43	0.42	0.01	0.60
Control Delay	20.9	8.1	8.6	6.6	29.1	22.9	21.8	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	8.1	8.6	6.6	29.1	22.9	21.8	27.1
Queue Length 50th (m)	39.9	14.6	0.6	0.6	8.7	16.7	0.3	26.5
Queue Length 95th (m)	96.8	40.4	3.1	3.8	30.5	48.9	3.0	72.3
Internal Link Dist (m)		205.8		177.5		261.1		203.5
Turn Bay Length (m)	130.0		42.0		65.0		35.0	
Base Capacity (vph)	1188	1436	816	1199	571	1186	701	1210
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.26	0.01	0.02	0.18	0.18	0.01	0.25
<b>Intersection Summary</b>								

# HCM Signalized Intersection Capacity Analysis

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	456	120	221	10	10	7	90	145	42	4	218	52
Future Volume (vph)	456	120	221	10	10	7	90	145	42	4	218	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.90		1.00	0.94		1.00	0.97		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)	1718	1604		1727	1354		1601	1717		1551	1748	
Flt Permitted	0.75	1.00		0.51	1.00		0.49	1.00		0.63	1.00	
Satd. Flow (perm)	1347	1604		919	1354		827	1717		1024	1748	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	507	133	246	11	11	8	100	161	47	4	242	58
RTOR Reduction (vph)	0	62	0	0	4	0	0	11	0	0	9	0
Lane Group Flow (vph)	507	317	0	11	15	0	100	197	0	4	291	0
Confl. Peds. (#/hr)	4		1	1		4			11	11		
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	0%	1%	1%	0%	30%	17%	8%	2%	0%	10%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.9	31.9		31.9	31.9		17.8	17.8		17.8	17.8	
Effective Green, g (s)	31.9	31.9		31.9	31.9		17.8	17.8		17.8	17.8	
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.29	0.29		0.29	0.29	
Clearance Time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	691	823		472	695		237	492		293	501	
v/s Ratio Prot		0.20			0.01			0.11			c0.17	
v/s Ratio Perm	c0.38			0.01			0.12			0.00		
v/c Ratio	0.73	0.39		0.02	0.02		0.42	0.40		0.01	0.58	
Uniform Delay, d1	11.8	9.2		7.4	7.4		18.0	17.9		15.9	19.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	0.3		0.0	0.0		1.2	0.5		0.0	1.7	
Delay (s)	15.8	9.5		7.5	7.4		19.2	18.4		15.9	20.7	
Level of Service	B	A		A	A		B	B		B	C	
Approach Delay (s)		13.1			7.4			18.7			20.6	
Approach LOS		B			A			B			C	

### Intersection Summary

HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	62.1	Sum of lost time (s)	12.4
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Unsignalized Intersection Capacity Analysis

## 5: Legget Drive & Terry Fox Drive

07/14/2022



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (veh/h)	538	494	40	147	41	27
Future Volume (Veh/h)	538	494	40	147	41	27
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	598	549	44	163	46	30
Pedestrians				2	17	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.1	1.1	
Percent Blockage				0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	306					
pX, platoon unblocked			0.83		0.83	0.83
vC, conflicting volume			1164		1140	892
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1093		1065	763
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			91		75	91
cM capacity (veh/h)			495		182	324
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1147	207	76			
Volume Left	0	44	46			
Volume Right	549	0	30			
cSH	1700	495	220			
Volume to Capacity	0.67	0.09	0.35			
Queue Length 95th (m)	0.0	2.2	11.1			
Control Delay (s)	0.0	3.8	29.8			
Lane LOS			A			D
Approach Delay (s)	0.0	3.8	29.8			
Approach LOS				D		
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			74.1%	ICU Level of Service	D	
Analysis Period (min)	15					

# HCM Unsignalized Intersection Capacity Analysis

## 6: March Road & Site Access 1 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕			↕
Traffic Volume (veh/h)	0	0	1085	0	0	0
Future Volume (Veh/h)	0	0	1085	0	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	1206	0	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	232			247		
pX, platoon unblocked	0.54	0.54			0.54	
vC, conflicting volume	1206	603			1206	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	552	585			875	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	0	804	402	0	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.00	0.47	0.24	0.00	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay	0.0					
Intersection Capacity Utilization	35.0%		ICU Level of Service		A	
Analysis Period (min)	15					

# HCM Unsignalized Intersection Capacity Analysis

## 7: March Road & Site Access 2 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕			↖
Traffic Volume (veh/h)	0	0	1085	0	0	0
Future Volume (Veh/h)	0	0	1085	0	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	1206	0	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	322			157		
pX, platoon unblocked	0.56	0.56			0.56	
vC, conflicting volume	1206	603			1206	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	572	606			907	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	0	804	402	0	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.00	0.47	0.24	0.00	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			35.0%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 8: March Road & Site Access 3 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕			↕
Traffic Volume (veh/h)	0	0	1085	0	0	0
Future Volume (Veh/h)	0	0	1085	0	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	1206	0	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	401			78		
pX, platoon unblocked	0.58	0.58			0.58	
vC, conflicting volume	1206	603			1206	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	589	625			935	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	0	804	402	0	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.00	0.47	0.24	0.00	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			35.0%	ICU Level of Service	A	
Analysis Period (min)			15			

# Timings

## 9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022

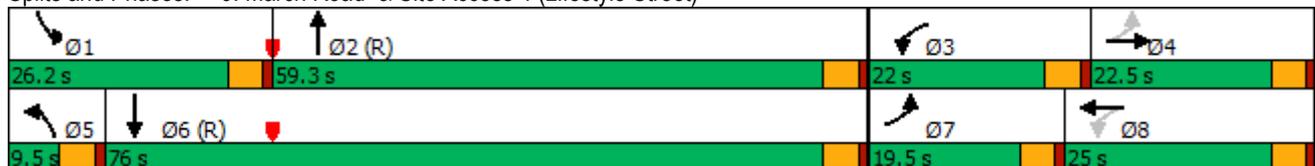


Lane Group	NBT	SBT	Ø1	Ø3	Ø4	Ø5	Ø7	Ø8
Lane Configurations	↑↑	↑↑						
Traffic Volume (vph)	1085	1759						
Future Volume (vph)	1085	1759						
Turn Type	NA	NA						
Protected Phases	2	6	1	3	4	5	7	8
Permitted Phases								
Detector Phase	2	6						
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	59.3	76.0	26.2	22.0	22.5	9.5	19.5	25.0
Total Split (%)	45.6%	58.5%	20%	17%	17%	7%	15%	19%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0						
Total Lost Time (s)	4.5	4.5						
Lead/Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	130.0	130.0						
Actuated g/C Ratio	1.00	1.00						
v/c Ratio	0.36	0.58						
Control Delay	0.0	10.2						
Queue Delay	0.0	0.0						
Total Delay	0.0	10.2						
LOS	A	B						
Approach Delay		10.2						
Approach LOS		B						

### Intersection Summary

Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.58  
 Intersection Signal Delay: 6.3  
 Intersection LOS: A  
 Intersection Capacity Utilization 55.1%  
 ICU Level of Service B  
 Analysis Period (min) 15

### Splits and Phases: 9: March Road & Site Access 4 (Lifestyle Street)



Queues

9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Lane Group	NBT	SBT
Lane Group Flow (vph)	1206	1954
v/c Ratio	0.36	0.58
Control Delay	0.0	10.2
Queue Delay	0.0	0.0
Total Delay	0.0	10.2
Queue Length 50th (m)	0.0	109.9
Queue Length 95th (m)	m0.0	114.5
Internal Link Dist (m)	54.1	77.0
Turn Bay Length (m)		
Base Capacity (vph)	3390	3390
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.36	0.58

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	1085	0	0	1759	0
Future Volume (vph)	0	0	0	0	0	0	0	1085	0	0	1759	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								4.5			4.5	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3390			3390	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3390			3390	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	0	0	0	1206	0	0	1954	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	1206	0	0	1954	0
Turn Type	pm+pt			pm+pt				Prot	NA		Prot	NA
Protected Phases	7	4		3	8			5	2		1	6
Permitted Phases	4			8								
Actuated Green, G (s)								130.0			130.0	
Effective Green, g (s)								130.0			130.0	
Actuated g/C Ratio								1.00			1.00	
Clearance Time (s)								4.5			4.5	
Vehicle Extension (s)								3.0			3.0	
Lane Grp Cap (vph)								3390			3390	
v/s Ratio Prot								0.36			c0.58	
v/s Ratio Perm												
v/c Ratio								0.36			0.58	
Uniform Delay, d1								0.0			0.0	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.0			0.5	
Delay (s)								0.0			0.5	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			0.0			0.5	
Approach LOS		A			A			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			0.3					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			130.0					Sum of lost time (s)			18.0	
Intersection Capacity Utilization			55.1%					ICU Level of Service			B	
Analysis Period (min)			15									

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 10: Site Access 5 (Residential) & Terry Fox Drive

07/14/2022



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔		↔
Traffic Volume (veh/h)	984	0	0	188	0	0
Future Volume (Veh/h)	984	0	0	188	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1093	0	0	209	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	207					
pX, platoon unblocked			0.84		0.84	0.84
vC, conflicting volume			1093		1302	1093
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1014		1264	1014
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			573		157	243
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	1093	209	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1700			
Volume to Capacity	0.64	0.12	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			58.0%	ICU Level of Service	B	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 11: Legget Drive/Legget Road & Site Access 6 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	0	0	0	19	0	5	0	130	43	0	288	0
Future Volume (Veh/h)	0	0	0	19	0	5	0	130	43	0	288	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	21	0	6	0	144	48	0	320	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	494	512	320	488	488	168	320			192		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	494	512	320	488	488	168	320			192		
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	100	100	96	100	99	100			100		
cM capacity (veh/h)	482	465	721	490	480	876	1240			1381		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	27	192	320								
Volume Left	0	21	0	0								
Volume Right	0	6	48	0								
cSH	1700	543	1240	1381								
Volume to Capacity	0.00	0.05	0.00	0.00								
Queue Length 95th (m)	0.0	1.2	0.0	0.0								
Control Delay (s)	0.0	12.0	0.0	0.0								
Lane LOS	A	B										
Approach Delay (s)	0.0	12.0	0.0	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			26.0%	ICU Level of Service		A						
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 12: Legget Drive & Site Access 7 (Campus)

07/14/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	217	326	0
Future Volume (Veh/h)	0	0	0	217	326	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	241	362	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	388					
pX, platoon unblocked						
vC, conflicting volume	603	362	362			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	603	362	362			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	462	683	1197			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	241	362			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1197	1700			
Volume to Capacity	0.00	0.00	0.21			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay	0.0					
Intersection Capacity Utilization	21.4%			ICU Level of Service	A	
Analysis Period (min)	15					

# HCM Unsignalized Intersection Capacity Analysis

## 13: Site Access 8 (Campus) & Legget Drive

07/14/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	217	326	0
Future Volume (Veh/h)	0	0	0	217	326	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	241	362	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume	603	362	362			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	603	362	362			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	462	683	1197			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	241	362			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1197	1700			
Volume to Capacity	0.00	0.00	0.21			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay	0.0					
Intersection Capacity Utilization	21.4%			ICU Level of Service	A	
Analysis Period (min)	15					

# HCM Unsignalized Intersection Capacity Analysis

## 20: Terry Fox Drive & McKinley Drive

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	984	0	0	188	14	0	0	0	93	0	33
Future Volume (Veh/h)	39	984	0	0	188	14	0	0	0	93	0	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	43	1093	0	0	209	16	0	0	0	103	0	37
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		152										
pX, platoon unblocked				0.84			0.84	0.84	0.84	0.84	0.84	
vC, conflicting volume	225			1093			1433	1404	1093	1396	1396	217
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	225			1016			1420	1386	1016	1376	1376	217
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	100	100	0	100	96
cM capacity (veh/h)	1344			574			89	116	243	100	118	823
Direction, Lane #	EB 1	EB 2	WB 1	SB 1								
Volume Total	43	1093	225	140								
Volume Left	43	0	0	103								
Volume Right	0	0	16	37								
cSH	1344	1700	1700	131								
Volume to Capacity	0.03	0.64	0.13	1.07								
Queue Length 95th (m)	0.8	0.0	0.0	59.7								
Control Delay (s)	7.8	0.0	0.0	164.8								
Lane LOS	A			F								
Approach Delay (s)	0.3		0.0	164.8								
Approach LOS				F								
Intersection Summary												
Average Delay			15.6									
Intersection Capacity Utilization			68.9%		ICU Level of Service					C		
Analysis Period (min)			15									



Queues

1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	70	87	73	230	267	2350	150	156	1170	22
v/c Ratio	0.36	0.28	0.59	0.38	0.66	0.67	0.85	0.16	0.67	0.48	0.03
Control Delay	56.6	10.7	69.2	57.2	19.2	69.2	12.0	0.2	66.7	22.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	10.7	69.2	57.2	19.2	69.2	12.0	0.2	66.7	22.8	0.1
Queue Length 50th (m)	17.2	0.0	21.6	17.7	6.1	65.7	23.0	0.0	38.4	71.1	0.0
Queue Length 95th (m)	30.3	10.6	36.8	30.8	30.2	m76.6	m210.1	m0.0	58.9	83.4	0.0
Internal Link Dist (m)	116.4			136.8			274.6			145.2	
Turn Bay Length (m)		10.0	38.0		38.0	130.0		25.0	68.0		25.0
Base Capacity (vph)	408	428	309	401	505	399	2756	911	242	2442	777
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.16	0.28	0.18	0.46	0.67	0.85	0.16	0.64	0.48	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕	↗	↖	↕↗↖	↗	↖	↕↗↖	↗
Traffic Volume (vph)	12	52	63	78	66	207	240	2115	135	140	1053	20
Future Volume (vph)	12	52	63	78	66	207	240	2115	135	140	1053	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.95	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1802	1514	1706	1655	1450	1679	4644	1476	1729	4969	1488
Flt Permitted		0.93	1.00	0.71	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1684	1514	1276	1655	1450	1679	4644	1476	1729	4969	1488
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	58	70	87	73	230	267	2350	150	156	1170	22
RTOR Reduction (vph)	0	0	62	0	0	180	0	0	37	0	0	11
Lane Group Flow (vph)	0	71	8	87	73	50	267	2350	113	156	1170	11
Confl. Peds. (#/hr)	3		3	3		3	5		6	6		5
Confl. Bikes (#/hr)			3						8			1
Heavy Vehicles (%)	0%	0%	0%	1%	10%	5%	3%	7%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		15.2	15.2	15.2	15.2	15.2	30.9	77.1	77.1	17.7	63.9	63.9
Effective Green, g (s)		15.2	15.2	15.2	15.2	15.2	30.9	77.1	77.1	17.7	63.9	63.9
Actuated g/C Ratio		0.12	0.12	0.12	0.12	0.12	0.24	0.59	0.59	0.14	0.49	0.49
Clearance Time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
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)		196	177	149	193	169	399	2754	875	235	2442	731
v/s Ratio Prot					0.04		c0.16	c0.51		0.09	0.24	
v/s Ratio Perm		0.04	0.01	c0.07		0.03			0.08			0.01
v/c Ratio		0.36	0.05	0.58	0.38	0.29	0.67	0.85	0.13	0.66	0.48	0.01
Uniform Delay, d1		52.9	51.0	54.4	53.0	52.5	44.9	21.8	11.7	53.3	22.0	16.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.46	0.42	0.01	1.00	1.00	1.00
Incremental Delay, d2		1.1	0.1	5.7	1.2	1.0	1.3	1.1	0.1	6.9	0.7	0.0
Delay (s)		54.1	51.1	60.1	54.3	53.5	66.7	10.2	0.2	60.2	22.7	17.0
Level of Service		D	D	E	D	D	E	B	A	E	C	B
Approach Delay (s)		52.6			55.1			15.1			26.9	
Approach LOS		D			E			B			C	

### Intersection Summary

HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 2: March Road & Terry Fox Drive

07/14/2022

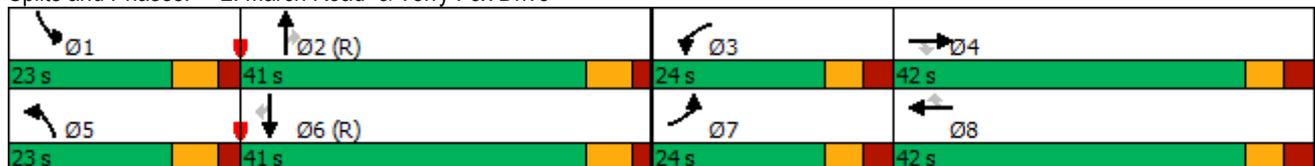


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑	↗	↔↔	↑↑↑	↗	↗	↑↑↑	↗
Traffic Volume (vph)	279	121	342	186	302	373	207	1800	99	77	953	163
Future Volume (vph)	279	121	342	186	302	373	207	1800	99	77	953	163
Turn Type	Prot	NA	Perm									
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	13.8	42.0	42.0	13.8	42.0	42.0	13.9	32.7	32.7	13.9	32.7	32.7
Total Split (s)	24.0	42.0	42.0	24.0	42.0	42.0	23.0	41.0	41.0	23.0	41.0	41.0
Total Split (%)	18.5%	32.3%	32.3%	18.5%	32.3%	32.3%	17.7%	31.5%	31.5%	17.7%	31.5%	31.5%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.1	3.3	3.3	3.1	3.3	3.3	2.3	2.1	2.1	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes											
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						
Act Effct Green (s)	16.0	25.6	25.6	13.7	23.3	23.3	13.9	51.6	51.6	11.7	49.4	49.4
Actuated g/C Ratio	0.12	0.20	0.20	0.11	0.18	0.18	0.11	0.40	0.40	0.09	0.38	0.38
v/c Ratio	0.77	0.20	0.72	0.62	0.55	0.85	0.66	1.08	0.16	0.55	0.57	0.28
Control Delay	68.3	42.4	18.9	63.8	50.9	33.3	64.1	71.7	3.1	68.2	44.7	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	42.4	18.9	63.8	50.9	33.3	64.1	71.7	3.1	68.2	44.7	16.4
LOS	E	D	B	E	D	C	E	E	A	E	D	B
Approach Delay		41.3			46.1			67.7			42.4	
Approach LOS		D			D			E			D	

### Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 96 (74%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 53.8	Intersection LOS: D
Intersection Capacity Utilization 92.5%	ICU Level of Service F
Analysis Period (min) 15	

### Splits and Phases: 2: March Road & Terry Fox Drive



Queues

2: March Road & Terry Fox Drive

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	310	134	380	207	336	414	230	2000	110	86	1059	181
v/c Ratio	0.77	0.20	0.72	0.62	0.55	0.85	0.66	1.08	0.16	0.55	0.57	0.28
Control Delay	68.3	42.4	18.9	63.8	50.9	33.3	64.1	71.7	3.1	68.2	44.7	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	42.4	18.9	63.8	50.9	33.3	64.1	71.7	3.1	68.2	44.7	16.4
Queue Length 50th (m)	39.7	15.2	18.2	26.5	42.0	37.6	28.0	~214.1	0.5	22.5	68.3	4.1
Queue Length 95th (m)	55.3	22.2	50.2	38.4	50.7	70.8	41.3	#299.4	m5.2	40.8	86.1	24.8
Internal Link Dist (m)		245.5			118.4			283.0			274.6	
Turn Bay Length (m)	104.0		52.0	72.0		100.0	142.0		82.0	100.0		98.0
Base Capacity (vph)	435	931	611	418	912	594	407	1859	678	214	1851	643
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.14	0.62	0.50	0.37	0.70	0.57	1.08	0.16	0.40	0.57	0.28

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 2: March Road & Terry Fox Drive

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕	↗	↔↔	↕↕	↗	↔↔	↕↕↕	↗	↗	↕↕↕	↗
Traffic Volume (vph)	279	121	342	186	302	373	207	1800	99	77	953	163
Future Volume (vph)	279	121	342	186	302	373	207	1800	99	77	953	163
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	310	134	380	207	336	414	230	2000	110	86	1059	181
RTOR Reduction (vph)	0	0	239	0	0	223	0	0	66	0	0	112
Lane Group Flow (vph)	310	134	141	207	336	191	230	2000	44	86	1059	69
Confl. Peds. (#/hr)	9		29	29		9	21		13	13		21
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	2%	0%	1%	6%	2%	3%	2%	6%	1%	0%	2%	6%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	16.0	25.6	25.6	13.7	23.3	23.3	13.9	51.6	51.6	11.7	49.4	49.4
Effective Green, g (s)	16.0	25.6	25.6	13.7	23.3	23.3	13.9	51.6	51.6	11.7	49.4	49.4
Actuated g/C Ratio	0.12	0.20	0.20	0.11	0.18	0.18	0.11	0.40	0.40	0.09	0.38	0.38
Clearance Time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	404	680	288	333	607	263	351	1860	588	155	1850	530
v/s Ratio Prot	c0.09	0.04		0.07	0.10		c0.07	c0.43		0.05	0.22	
v/s Ratio Perm			0.10			c0.13			0.03			0.05
v/c Ratio	0.77	0.20	0.49	0.62	0.55	0.73	0.66	1.08	0.07	0.55	0.57	0.13
Uniform Delay, d1	55.2	43.6	46.4	55.7	48.6	50.3	55.7	39.2	24.4	56.7	31.9	26.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	0.72	1.33	1.00	1.27	3.02
Incremental Delay, d2	8.5	0.1	1.3	3.6	1.1	9.5	3.1	41.7	0.2	3.9	1.2	0.5
Delay (s)	63.7	43.8	47.7	59.3	49.7	59.9	60.9	70.0	32.5	60.6	41.7	79.7
Level of Service	E	D	D	E	D	E	E	E	C	E	D	E
Approach Delay (s)		53.1			56.2			67.3			48.1	
Approach LOS		D			E			E			D	

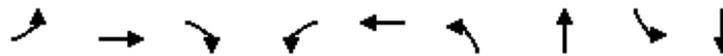
### Intersection Summary

HCM 2000 Control Delay	58.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	27.4
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 3: March Road & Solandt Road

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	96	39	548	521	61	97	1997	26	1270
Future Volume (vph)	96	39	548	521	61	97	1997	26	1270
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	12.9	31.5	31.5	12.9	31.5	11.3	25.3	9.5	25.3
Total Split (s)	18.2	38.0	38.0	19.0	38.8	12.0	63.5	9.5	61.0
Total Split (%)	14.0%	29.2%	29.2%	14.6%	29.8%	9.2%	48.8%	7.3%	46.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	4.6	4.6	3.5	4.6
All-Red Time (s)	2.6	3.2	3.2	2.6	3.2	1.7	1.7	1.0	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	6.5	6.5	5.9	6.5	6.3	6.3	4.5	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	11.6	31.5	31.5	13.1	33.0	5.7	61.0	5.0	54.7
Actuated g/C Ratio	0.09	0.24	0.24	0.10	0.25	0.04	0.47	0.04	0.42
v/c Ratio	0.75	0.10	1.40	1.75	0.58	1.44	1.47	0.45	1.07
Control Delay	87.4	39.1	224.2	383.2	30.3	300.7	242.4	82.4	82.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	39.1	224.2	383.2	30.3	300.7	242.4	82.4	82.5
LOS	F	D	F	F	C	F	F	F	F
Approach Delay		194.4			268.7		245.0		82.5
Approach LOS		F			F		F		F

### Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.75	
Intersection Signal Delay: 196.8	Intersection LOS: F
Intersection Capacity Utilization 110.6%	ICU Level of Service H
Analysis Period (min) 15	

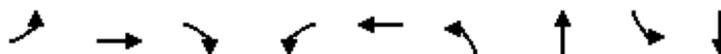
### Splits and Phases: 3: March Road & Solandt Road



# Queues

## 3: March Road & Solandt Road

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	107	43	609	579	278	108	2280	29	1503
v/c Ratio	0.75	0.10	1.40	1.75	0.58	1.44	1.47	0.45	1.07
Control Delay	87.4	39.1	224.2	383.2	30.3	300.7	242.4	82.4	82.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	39.1	224.2	383.2	30.3	300.7	242.4	82.4	82.5
Queue Length 50th (m)	27.0	8.6	~185.9	~113.4	37.0	~37.5	~437.6	7.4	~224.6
Queue Length 95th (m)	#53.5	18.5	#257.2	#148.7	66.5	#74.8	#478.6	#18.9	#267.8
Internal Link Dist (m)		112.5			205.8		333.2		208.2
Turn Bay Length (m)	65.0		100.0	90.0		157.0		140.0	
Base Capacity (vph)	152	432	435	331	476	75	1555	65	1401
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.10	1.40	1.75	0.58	1.44	1.47	0.45	1.07

### Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 3: March Road & Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	39	548	521	61	189	97	1997	55	26	1270	83
Future Volume (vph)	96	39	548	521	61	189	97	1997	55	26	1270	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3		4.5	6.3	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1616	1784	1436	3288	1539		1712	3312		1695	3322	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1616	1784	1436	3288	1539		1712	3312		1695	3322	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	107	43	609	579	68	210	108	2219	61	29	1411	92
RTOR Reduction (vph)	0	0	87	0	85	0	0	2	0	0	3	0
Lane Group Flow (vph)	107	43	522	579	193	0	108	2278	0	29	1500	0
Confl. Peds. (#/hr)	7		8	8		7	6					6
Confl. Bikes (#/hr)			1			1			1			12
Heavy Vehicles (%)	7%	2%	5%	2%	3%	3%	1%	4%	1%	2%	3%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	11.6	31.5	31.5	13.1	33.0		5.7	59.2		3.0	54.7	
Effective Green, g (s)	11.6	31.5	31.5	13.1	33.0		5.7	59.2		3.0	54.7	
Actuated g/C Ratio	0.09	0.24	0.24	0.10	0.25		0.04	0.46		0.02	0.42	
Clearance Time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3		4.5	6.3	
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)	144	432	347	331	390		75	1508		39	1397	
v/s Ratio Prot	0.07	0.02		c0.18	0.13		c0.06	c0.69		0.02	0.45	
v/s Ratio Perm			c0.36									
v/c Ratio	0.74	0.10	1.50	1.75	0.49		1.44	1.51		0.74	1.07	
Uniform Delay, d1	57.7	38.2	49.2	58.5	41.4		62.1	35.4		63.1	37.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.6	0.1	241.3	349.4	1.0		258.2	233.4		54.3	46.4	
Delay (s)	76.3	38.3	290.6	407.9	42.4		320.4	268.8		117.4	84.1	
Level of Service	E	D	F	F	D		F	F		F	F	
Approach Delay (s)		246.1			289.3			271.1			84.7	
Approach LOS		F			F			F			F	

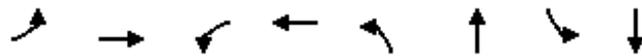
### Intersection Summary

HCM 2000 Control Delay	218.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022

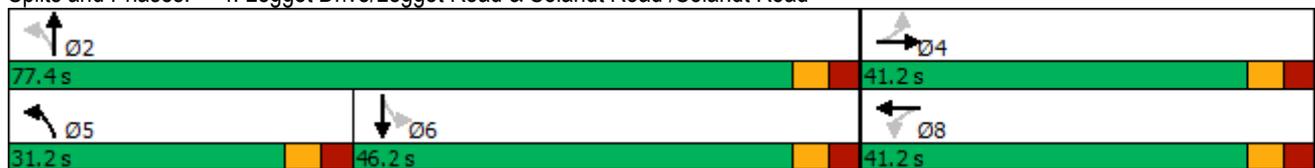


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	59	1	37	107	264	79	3	207
Future Volume (vph)	59	1	37	107	264	79	3	207
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	15.0	15.0	15.0	15.0	7.0	10.0	10.0	10.0
Minimum Split (s)	25.2	25.2	25.2	25.2	13.2	25.2	25.2	25.2
Total Split (s)	41.2	41.2	41.2	41.2	31.2	77.4	46.2	46.2
Total Split (%)	34.7%	34.7%	34.7%	34.7%	26.3%	65.3%	39.0%	39.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes		Yes	Yes
Recall Mode	None	None	None	None	None	Ped	Ped	Ped
Act Effect Green (s)	16.3	16.3	16.3	16.3	67.4	67.4	40.1	40.1
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.70	0.70	0.42	0.42
v/c Ratio	0.32	0.19	0.19	0.54	0.65	0.07	0.01	0.90
Control Delay	40.9	11.6	37.7	45.3	21.7	4.7	19.0	41.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	11.6	37.7	45.3	21.7	4.7	19.0	41.9
LOS	D	B	D	D	C	A	B	D
Approach Delay		27.1		43.5		17.6		41.8
Approach LOS		C		D		B		D

### Intersection Summary

Cycle Length: 118.6	
Actuated Cycle Length: 96.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 33.7	Intersection LOS: C
Intersection Capacity Utilization 80.2%	ICU Level of Service D
Analysis Period (min) 15	

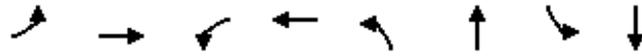
### Splits and Phases: 4: Legget Drive/Legget Road & Solandt Road /Solandt Road



# Queues

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	59	41	129	293	91	3	656
v/c Ratio	0.32	0.19	0.19	0.54	0.65	0.07	0.01	0.90
Control Delay	40.9	11.6	37.7	45.3	21.7	4.7	19.0	41.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	11.6	37.7	45.3	21.7	4.7	19.0	41.9
Queue Length 50th (m)	11.1	0.2	6.8	21.9	25.7	4.2	0.3	100.7
Queue Length 95th (m)	24.1	10.6	16.4	40.8	57.6	10.1	2.3	#190.6
Internal Link Dist (m)		205.8		177.5		261.1		203.5
Turn Bay Length (m)	130.0		42.0		65.0		35.0	
Base Capacity (vph)	443	585	476	510	511	1317	467	726
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.10	0.09	0.25	0.57	0.07	0.01	0.90

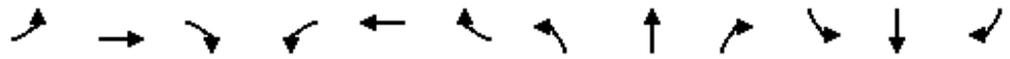
### Intersection Summary

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

# HCM Signalized Intersection Capacity Analysis

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	1	52	37	107	9	264	79	3	3	207	383
Future Volume (vph)	59	1	52	37	107	9	264	79	3	3	207	383
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.85		1.00	0.99		1.00	1.00		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1714	1502		1725	1391		1601	1774		1533	1623	
Flt Permitted	0.67	1.00		0.72	1.00		0.13	1.00		0.70	1.00	
Satd. Flow (perm)	1217	1502		1305	1391		215	1774		1127	1623	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	66	1	58	41	119	10	293	88	3	3	230	426
RTOR Reduction (vph)	0	48	0	0	3	0	0	1	0	0	50	0
Lane Group Flow (vph)	66	11	0	41	126	0	293	90	0	3	606	0
Confl. Peds. (#/hr)	4		1	1		4			11	11		
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	0%	1%	1%	0%	30%	17%	8%	2%	0%	10%	1%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.3	16.3		16.3	16.3		67.4	67.4		40.1	40.1	
Effective Green, g (s)	16.3	16.3		16.3	16.3		67.4	67.4		40.1	40.1	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.70	0.70		0.42	0.42	
Clearance Time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	206	254		221	235		455	1244		470	677	
v/s Ratio Prot		0.01			c0.09		c0.14	0.05			c0.37	
v/s Ratio Perm	0.05			0.03			0.31			0.00		
v/c Ratio	0.32	0.04		0.19	0.53		0.64	0.07		0.01	0.90	
Uniform Delay, d1	35.0	33.4		34.2	36.4		18.6	4.5		16.4	26.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.1		0.4	2.3		3.1	0.0		0.0	14.4	
Delay (s)	35.9	33.4		34.6	38.8		21.7	4.5		16.4	40.5	
Level of Service	D	C		C	D		C	A		B	D	
Approach Delay (s)		34.8			37.8			17.6			40.4	
Approach LOS		C			D			B			D	

### Intersection Summary

HCM 2000 Control Delay	33.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	96.1	Sum of lost time (s)	18.6
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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Intersection Sign configuration not allowed in HCM analysis.

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# HCM Unsignalized Intersection Capacity Analysis

## 6: March Road & Site Access 1 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕			↕
Traffic Volume (veh/h)	0	0	2145	0	0	0
Future Volume (Veh/h)	0	0	2145	0	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	2383	0	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	232			247		
pX, platoon unblocked	0.55	0.55			0.55	
vC, conflicting volume	2383	1192			2383	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1888	0			1888	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	34	602			174	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	0	1589	794	0	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.00	0.93	0.47	0.00	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			65.9%	ICU Level of Service	C	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 7: March Road & Site Access 2 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕			↕
Traffic Volume (veh/h)	0	0	2145	0	0	0
Future Volume (Veh/h)	0	0	2145	0	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	2383	0	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	322			157		
pX, platoon unblocked	0.56	0.56			0.56	
vC, conflicting volume	2383	1192			2383	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1895	0			1895	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	34	605			174	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	0	1589	794	0	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.00	0.93	0.47	0.00	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			65.9%	ICU Level of Service	C	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 8: March Road & Site Access 3 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕			↕
Traffic Volume (veh/h)	0	0	2145	0	0	0
Future Volume (Veh/h)	0	0	2145	0	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	2383	0	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	401			78		
pX, platoon unblocked	0.56	0.56			0.56	
vC, conflicting volume	2383	1192			2383	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1901	0			1901	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	34	609			174	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	0	1589	794	0	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.00	0.93	0.47	0.00	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay	0.0					
Intersection Capacity Utilization	65.9%			ICU Level of Service		C
Analysis Period (min)	15					

# Timings

## 9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022

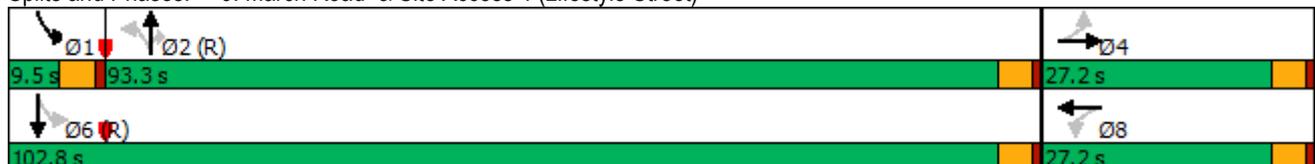


Lane Group	NBT	SBT	Ø1	Ø4	Ø8
Lane Configurations	↑↑	↑↑			
Traffic Volume (vph)	2145	1481			
Future Volume (vph)	2145	1481			
Turn Type	NA	NA			
Protected Phases	2	6	1	4	8
Permitted Phases					
Detector Phase	2	6			
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5
Total Split (s)	93.3	102.8	9.5	27.2	27.2
Total Split (%)	71.8%	79.1%	7%	21%	21%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			
Total Lost Time (s)	4.5	4.5			
Lead/Lag	Lag		Lead		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	C-Max	C-Max	None	None	None
Act Effct Green (s)	130.0	130.0			
Actuated g/C Ratio	1.00	1.00			
v/c Ratio	0.70	0.49			
Control Delay	10.5	4.0			
Queue Delay	0.0	0.0			
Total Delay	10.5	4.0			
LOS	B	A			
Approach Delay	10.5	4.0			
Approach LOS	B	A			

### Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 7.8	Intersection LOS: A
Intersection Capacity Utilization 66.3%	ICU Level of Service C
Analysis Period (min) 15	

### Splits and Phases: 9: March Road & Site Access 4 (Lifestyle Street)



Queues

9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Lane Group	NBT	SBT
Lane Group Flow (vph)	2383	1646
v/c Ratio	0.70	0.49
Control Delay	10.5	4.0
Queue Delay	0.0	0.0
Total Delay	10.5	4.0
Queue Length 50th (m)	107.4	37.6
Queue Length 95th (m)	m6.4	55.5
Internal Link Dist (m)	54.1	89.2
Turn Bay Length (m)		
Base Capacity (vph)	3390	3390
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.70	0.49

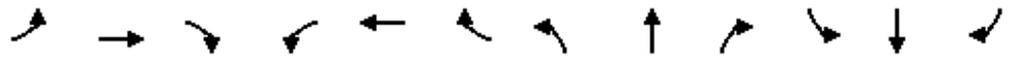
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	2145	0	0	1481	0
Future Volume (vph)	0	0	0	0	0	0	0	2145	0	0	1481	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								4.5			4.5	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3390			3390	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3390			3390	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	0	0	0	2383	0	0	1646	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	2383	0	0	1646	0
Turn Type	Perm			Perm			Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)								130.0			130.0	
Effective Green, g (s)								130.0			130.0	
Actuated g/C Ratio								1.00			1.00	
Clearance Time (s)								4.5			4.5	
Vehicle Extension (s)								3.0			3.0	
Lane Grp Cap (vph)								3390			3390	
v/s Ratio Prot								0.70			0.49	
v/s Ratio Perm												
v/c Ratio								0.70			0.49	
Uniform Delay, d1								0.0			0.0	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.4	
Delay (s)								0.1			0.4	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			0.1			0.4	
Approach LOS		A			A			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			0.2					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			130.0					Sum of lost time (s)			13.5	
Intersection Capacity Utilization			66.3%					ICU Level of Service			C	
Analysis Period (min)			15									

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 10: Site Access 5 (Residential) & Terry Fox Drive

07/14/2022



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	296	0	0	873	0	0
Future Volume (Veh/h)	296	0	0	873	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	329	0	0	970	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	214					
pX, platoon unblocked				0.98	0.98	0.98
vC, conflicting volume				329	1299	329
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				299	1294	299
tC, single (s)				4.1	6.4	6.2
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				100	100	100
cM capacity (veh/h)				1231	175	722
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	329	970	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1700			
Volume to Capacity	0.19	0.57	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS				A		
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS				A		
<b>Intersection Summary</b>						
Average Delay				0.0		
Intersection Capacity Utilization				51.8%	ICU Level of Service	A
Analysis Period (min)				15		

# HCM Unsignalized Intersection Capacity Analysis

## 11: Legget Drive/Legget Road & Site Access 6 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	0	0	0	49	0	23	0	177	12	0	51	0
Future Volume (Veh/h)	0	0	0	49	0	23	0	177	12	0	51	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	54	0	26	0	197	13	0	57	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	286	267	57	260	260	204	57			210		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	286	267	57	260	260	204	57			210		
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	100	100	92	100	97	100			100		
cM capacity (veh/h)	645	639	1009	692	644	837	1547			1361		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	0	80	210	57								
Volume Left	0	54	0	0								
Volume Right	0	26	13	0								
cSH	1700	734	1547	1361								
Volume to Capacity	0.00	0.11	0.00	0.00								
Queue Length 95th (m)	0.0	2.8	0.0	0.0								
Control Delay (s)	0.0	10.5	0.0	0.0								
Lane LOS	A	B										
Approach Delay (s)	0.0	10.5	0.0	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			21.6%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 12: Legget Drive & Site Access 7 (Campus)

07/14/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	177	149	0
Future Volume (Veh/h)	0	0	0	177	149	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	197	166	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	388					
pX, platoon unblocked						
vC, conflicting volume	363	166	166			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	363	166	166			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	636	878	1412			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	197	166			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1412	1700			
Volume to Capacity	0.00	0.00	0.10			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay	0.0					
Intersection Capacity Utilization	13.2%			ICU Level of Service	A	
Analysis Period (min)	15					

# HCM Unsignalized Intersection Capacity Analysis

## 13: Site Access 8 (Campus) & Legget Drive

07/14/2022

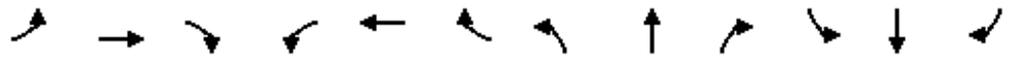


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	177	149	0
Future Volume (Veh/h)	0	0	0	177	149	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	197	166	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume	363	166	166			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	363	166	166			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	636	878	1412			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	197	166			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1412	1700			
Volume to Capacity	0.00	0.00	0.10			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay	0.0					
Intersection Capacity Utilization	13.2%			ICU Level of Service	A	
Analysis Period (min)	15					

# HCM Unsignalized Intersection Capacity Analysis

## 20: Terry Fox Drive & McKinley Drive

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	95	296	0	0	873	77	0	0	0	24	0	37	
Future Volume (Veh/h)	95	296	0	0	873	77	0	0	0	24	0	37	
Sign Control	Free				Free		Stop				Stop		
Grade	0%				0%		0%				0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	106	329	0	0	970	86	0	0	0	27	0	41	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	Raised				Raised								
Median storage veh	1				1								
Upstream signal (m)	142												
pX, platoon unblocked				0.96				0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	1056			329			1595	1597	329	1554	1554	1013	
vC1, stage 1 conf vol							541	541			1013	1013	
vC2, stage 2 conf vol							1054	1056			541	541	
vCu, unblocked vol	1056			284			1599	1601	284	1556	1556	1013	
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)							6.1	5.5			6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	84			100			100	100	100	86	100	86	
cM capacity (veh/h)	659			1231			108	155	727	193	208	290	
Direction, Lane #	EB 1	EB 2	WB 1	SB 1									
Volume Total	106	329	1056	68									
Volume Left	106	0	0	27									
Volume Right	0	0	86	41									
cSH	659	1700	1700	242									
Volume to Capacity	0.16	0.19	0.62	0.28									
Queue Length 95th (m)	4.3	0.0	0.0	8.5									
Control Delay (s)	11.5	0.0	0.0	25.6									
Lane LOS	B		D										
Approach Delay (s)	2.8		0.0		25.6								
Approach LOS			D										
Intersection Summary													
Average Delay			1.9										
Intersection Capacity Utilization			72.8%		ICU Level of Service				C				
Analysis Period (min)			15										

# Timings

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022

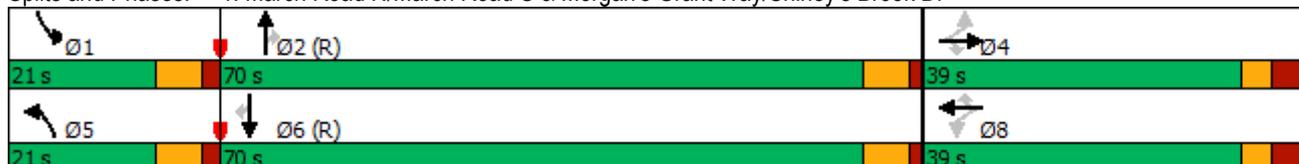


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↖	↗	↖	↑↑↑	↗	↖	↑↑↑	↗
Traffic Volume (vph)	10	49	121	94	17	21	37	947	30	140	2070	8
Future Volume (vph)	10	49	121	94	17	21	37	947	30	140	2070	8
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	38.5	38.5	38.5	38.5	38.5	38.5	13.4	24.1	24.1	13.4	24.1	24.1
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	21.0	70.0	70.0	21.0	70.0	70.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	16.2%	53.8%	53.8%	16.2%	53.8%	53.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	1.8	1.5	1.5	1.8	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						
Act Effct Green (s)		16.1	16.1	16.1	16.1	16.1	8.9	76.2	76.2	17.7	87.7	87.7
Actuated g/C Ratio		0.12	0.12	0.12	0.12	0.12	0.07	0.59	0.59	0.14	0.67	0.67
v/c Ratio		0.31	0.44	0.66	0.09	0.09	0.36	0.39	0.04	0.67	0.69	0.01
Control Delay		53.9	12.3	72.7	48.7	0.7	54.6	13.2	0.4	66.7	16.0	0.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		53.9	12.3	72.7	48.7	0.7	54.6	13.2	0.4	66.7	16.0	0.0
LOS		D	B	E	D	A	D	B	A	E	B	A
Approach Delay		25.9			58.2			14.3			19.1	
Approach LOS		C			E			B			B	

### Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 95 (73%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 19.6	Intersection LOS: B
Intersection Capacity Utilization 79.8%	ICU Level of Service D
Analysis Period (min) 15	

### Splits and Phases: 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr



Queues

1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	65	134	104	19	23	41	1052	33	156	2300	9
v/c Ratio	0.31	0.44	0.66	0.09	0.09	0.36	0.39	0.04	0.67	0.69	0.01
Control Delay	53.9	12.3	72.7	48.7	0.7	54.6	13.2	0.4	66.7	16.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	12.3	72.7	48.7	0.7	54.6	13.2	0.4	66.7	16.0	0.0
Queue Length 50th (m)	15.4	0.0	25.8	4.4	0.0	11.2	33.3	0.1	38.4	127.6	0.0
Queue Length 95th (m)	28.1	17.3	42.7	11.3	0.0	m18.9	31.5	m0.2	58.9	180.7	0.0
Internal Link Dist (m)	116.4			136.8			274.6			145.2	
Turn Bay Length (m)		10.0	38.0		38.0	130.0		25.0	68.0		25.0
Base Capacity (vph)	417	469	311	401	411	188	2723	902	242	3352	1033
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.29	0.33	0.05	0.06	0.22	0.39	0.04	0.64	0.69	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕	↗	↖	↑↑↑	↗	↖	↑↑↑	↗
Traffic Volume (vph)	10	49	121	94	17	21	37	947	30	140	2070	8
Future Volume (vph)	10	49	121	94	17	21	37	947	30	140	2070	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.95	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1804	1514	1706	1655	1450	1679	4644	1476	1729	4969	1488
Flt Permitted		0.95	1.00	0.71	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1720	1514	1283	1655	1450	1679	4644	1476	1729	4969	1488
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	54	134	104	19	23	41	1052	33	156	2300	9
RTOR Reduction (vph)	0	0	117	0	0	20	0	0	14	0	0	3
Lane Group Flow (vph)	0	65	17	104	19	3	41	1052	19	156	2300	6
Confl. Peds. (#/hr)	3		3	3		3	5		6	6		5
Confl. Bikes (#/hr)			3						8			1
Heavy Vehicles (%)	0%	0%	0%	1%	10%	5%	3%	7%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		16.1	16.1	16.1	16.1	16.1	7.5	76.2	76.2	17.7	86.4	86.4
Effective Green, g (s)		16.1	16.1	16.1	16.1	16.1	7.5	76.2	76.2	17.7	86.4	86.4
Actuated g/C Ratio		0.12	0.12	0.12	0.12	0.12	0.06	0.59	0.59	0.14	0.66	0.66
Clearance Time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
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)		213	187	158	204	179	96	2722	865	235	3302	988
v/s Ratio Prot					0.01		0.02	0.23		c0.09	c0.46	
v/s Ratio Perm		0.04	0.01	c0.08		0.00			0.01			0.00
v/c Ratio		0.31	0.09	0.66	0.09	0.02	0.43	0.39	0.02	0.66	0.70	0.01
Uniform Delay, d1		51.9	50.5	54.3	50.5	50.0	59.2	14.4	11.3	53.3	13.6	7.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.83	0.82	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.8	0.2	9.5	0.2	0.0	2.6	0.3	0.0	6.9	1.2	0.0
Delay (s)		52.7	50.7	63.8	50.7	50.0	51.5	12.2	11.3	60.2	14.9	7.4
Level of Service		D	D	E	D	D	D	B	B	E	B	A
Approach Delay (s)		51.3			59.9			13.6			17.7	
Approach LOS		D			E			B			B	

### Intersection Summary

HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 2: March Road & Terry Fox Drive

07/14/2022

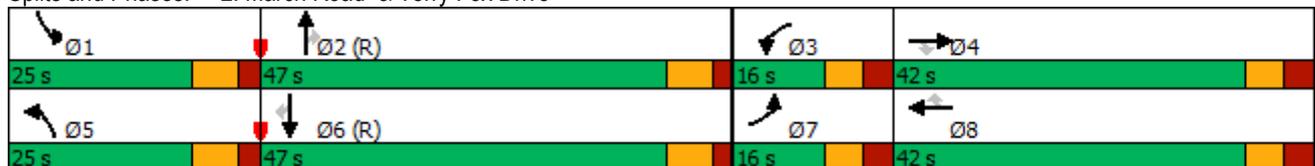


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗	↘	↖↖	↗↗	↘	↖↖	↗↗↗	↘	↘	↗↗↗	↘
Traffic Volume (vph)	142	390	294	62	103	57	288	776	145	395	1690	198
Future Volume (vph)	142	390	294	62	103	57	288	776	145	395	1690	198
Turn Type	Prot	NA	Perm									
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	13.8	42.0	42.0	13.8	42.0	42.0	13.9	32.7	32.7	13.9	32.7	32.7
Total Split (s)	16.0	42.0	42.0	16.0	42.0	42.0	25.0	47.0	47.0	25.0	47.0	47.0
Total Split (%)	12.3%	32.3%	32.3%	12.3%	32.3%	32.3%	19.2%	36.2%	36.2%	19.2%	36.2%	36.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.1	3.3	3.3	3.1	3.3	3.3	2.3	2.1	2.1	2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes											
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						
Act Effct Green (s)	9.0	25.1	25.1	8.2	21.4	21.4	17.8	40.3	40.3	31.8	54.3	54.3
Actuated g/C Ratio	0.07	0.19	0.19	0.06	0.16	0.16	0.14	0.31	0.31	0.24	0.42	0.42
v/c Ratio	0.69	0.65	0.60	0.35	0.20	0.17	0.71	0.59	0.28	1.04	0.92	0.32
Control Delay	75.3	53.2	9.3	63.1	45.6	1.0	48.1	59.9	24.2	100.6	34.0	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	53.2	9.3	63.1	45.6	1.0	48.1	59.9	24.2	100.6	34.0	3.2
LOS	E	D	A	E	D	A	D	E	C	F	C	A
Approach Delay		41.4			39.1			52.8			42.8	
Approach LOS		D			D			D			D	

### Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 114 (88%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 135	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 45.0	Intersection LOS: D
Intersection Capacity Utilization 90.2%	ICU Level of Service E
Analysis Period (min) 15	

### Splits and Phases: 2: March Road & Terry Fox Drive



Queues

2: March Road & Terry Fox Drive

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	158	433	327	69	114	63	320	862	161	439	1878	220
v/c Ratio	0.69	0.65	0.60	0.35	0.20	0.17	0.71	0.59	0.28	1.04	0.92	0.32
Control Delay	75.3	53.2	9.3	63.1	45.6	1.0	48.1	59.9	24.2	100.6	34.0	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	53.2	9.3	63.1	45.6	1.0	48.1	59.9	24.2	100.6	34.0	3.2
Queue Length 50th (m)	20.7	55.3	0.0	8.9	13.3	0.0	44.7	62.7	12.8	~121.5	168.8	5.7
Queue Length 95th (m)	#33.9	68.5	25.0	16.5	20.4	0.0	m55.4	90.8	m30.1	#214.0	#242.6	11.2
Internal Link Dist (m)		245.5			137.1			295.3			274.6	
Turn Bay Length (m)	104.0		52.0	72.0		100.0	142.0		82.0	100.0		98.0
Base Capacity (vph)	232	931	633	223	912	502	487	1452	570	423	2036	687
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.47	0.52	0.31	0.13	0.13	0.66	0.59	0.28	1.04	0.92	0.32

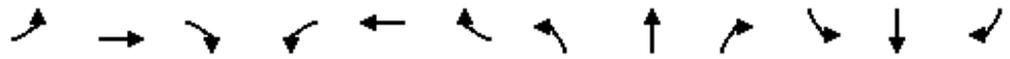
Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 2: March Road & Terry Fox Drive

07/14/2022



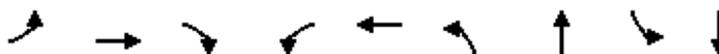
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↘	↖↗	↕	↘	↖↗	↕	↘	↖↗	↕	↘
Traffic Volume (vph)	142	390	294	62	103	57	288	776	145	395	1690	198
Future Volume (vph)	142	390	294	62	103	57	288	776	145	395	1690	198
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	158	433	327	69	114	63	320	862	161	439	1878	220
RTOR Reduction (vph)	0	0	264	0	0	52	0	0	113	0	0	106
Lane Group Flow (vph)	158	433	63	69	114	11	320	862	48	439	1878	114
Confl. Peds. (#/hr)	9		29	29		9	21		13	13		21
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	2%	0%	1%	6%	2%	3%	2%	6%	1%	0%	2%	6%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.0	25.1	25.1	6.8	22.9	22.9	17.8	38.9	38.9	31.8	52.9	52.9
Effective Green, g (s)	9.0	25.1	25.1	6.8	22.9	22.9	17.8	38.9	38.9	31.8	52.9	52.9
Actuated g/C Ratio	0.07	0.19	0.19	0.05	0.18	0.18	0.14	0.30	0.30	0.24	0.41	0.41
Clearance Time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	227	667	282	165	597	258	450	1402	443	422	1982	568
v/s Ratio Prot	c0.05	c0.13		0.02	0.03		0.10	0.18		c0.25	c0.39	
v/s Ratio Perm			0.04			0.01			0.03			0.08
v/c Ratio	0.70	0.65	0.22	0.42	0.19	0.04	0.71	0.61	0.11	1.04	0.95	0.20
Uniform Delay, d1	59.2	48.4	44.2	59.7	45.7	44.5	53.6	39.1	33.0	49.1	37.2	24.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.79	1.54	4.76	1.13	0.69	0.30
Incremental Delay, d2	8.9	2.2	0.4	1.7	0.2	0.1	3.4	1.3	0.3	48.9	9.0	0.6
Delay (s)	68.1	50.6	44.6	61.4	45.8	44.5	45.8	61.6	157.4	104.2	34.8	8.1
Level of Service	E	D	D	E	D	D	D	E	F	F	C	A
Approach Delay (s)		51.5			49.9			69.3			44.5	
Approach LOS		D			D			E			D	

Intersection Summary		
HCM 2000 Control Delay	52.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.93	
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	90.2%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

# Timings

## 3: March Road & Solandt Road

07/14/2022

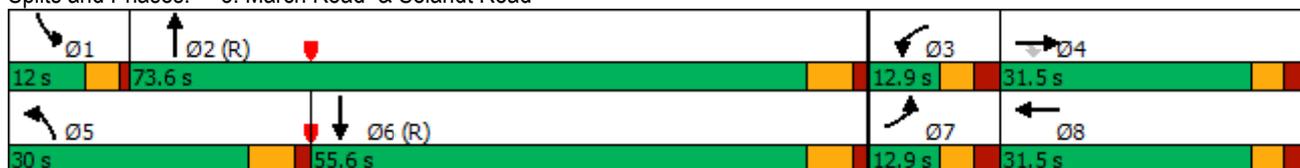


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	34	89	109	53	105	514	1544	127	1708
Future Volume (vph)	34	89	109	53	105	514	1544	127	1708
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	7.0	15.0	5.0	15.0
Minimum Split (s)	12.9	31.5	31.5	12.9	31.5	13.3	25.3	9.5	25.3
Total Split (s)	12.9	31.5	31.5	12.9	31.5	30.0	73.6	12.0	55.6
Total Split (%)	9.9%	24.2%	24.2%	9.9%	24.2%	23.1%	56.6%	9.2%	42.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	4.6	4.6	3.5	4.6
All-Red Time (s)	2.6	3.2	3.2	2.6	3.2	1.7	1.7	1.0	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	6.5	6.5	5.9	6.5	6.3	6.3	4.5	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	7.0	16.3	16.3	7.0	16.3	23.7	68.5	17.6	60.6
Actuated g/C Ratio	0.05	0.13	0.13	0.05	0.13	0.18	0.53	0.14	0.47
v/c Ratio	0.44	0.44	0.37	0.33	0.69	1.83	1.25	0.62	1.32
Control Delay	75.5	57.7	5.2	64.6	66.2	416.6	147.4	67.0	181.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.5	57.7	5.2	64.6	66.2	416.6	147.4	67.0	181.0
LOS	E	E	A	E	E	F	F	E	F
Approach Delay		35.7			65.7		203.8		173.7
Approach LOS		D			E		F		F

### Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.83	
Intersection Signal Delay: 178.0	Intersection LOS: F
Intersection Capacity Utilization 122.5%	ICU Level of Service H
Analysis Period (min) 15	

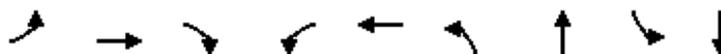
### Splits and Phases: 3: March Road & Solandt Road



# Queues

## 3: March Road & Solandt Road

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	38	99	121	59	154	571	2152	141	2050
v/c Ratio	0.44	0.44	0.37	0.33	0.69	1.83	1.25	0.62	1.32
Control Delay	75.5	57.7	5.2	64.6	66.2	416.6	147.4	67.0	181.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.5	57.7	5.2	64.6	66.2	416.6	147.4	67.0	181.0
Queue Length 50th (m)	9.6	23.9	0.0	7.6	35.6	~220.9	~365.6	35.0	~368.4
Queue Length 95th (m)	21.3	39.4	5.7	14.8	55.5	#289.5	#407.4	#82.8	#433.6
Internal Link Dist (m)		112.5			205.8		333.2		208.2
Turn Bay Length (m)	65.0		100.0	90.0		157.0		140.0	
Base Capacity (vph)	87	343	411	177	334	312	1718	229	1548
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.29	0.29	0.33	0.46	1.83	1.25	0.62	1.32

### Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 3: March Road & Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	89	109	53	105	33	514	1544	392	127	1708	137
Future Volume (vph)	34	89	109	53	105	33	514	1544	392	127	1708	137
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3		4.5	6.3	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1616	1784	1435	3288	1693		1712	3229		1695	3315	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1616	1784	1435	3288	1693		1712	3229		1695	3315	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	38	99	121	59	117	37	571	1716	436	141	1898	152
RTOR Reduction (vph)	0	0	106	0	10	0	0	17	0	0	4	0
Lane Group Flow (vph)	38	99	15	59	144	0	571	2135	0	141	2046	0
Confl. Peds. (#/hr)	7		8	8		7	6					6
Confl. Bikes (#/hr)			1			1			1			12
Heavy Vehicles (%)	7%	2%	5%	2%	3%	3%	1%	4%	1%	2%	3%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	5.6	16.3	16.3	5.6	16.3		23.7	67.3		17.6	59.4	
Effective Green, g (s)	5.6	16.3	16.3	5.6	16.3		23.7	67.3		17.6	59.4	
Actuated g/C Ratio	0.04	0.13	0.13	0.04	0.13		0.18	0.52		0.14	0.46	
Clearance Time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3		4.5	6.3	
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)	69	223	179	141	212		312	1671		229	1514	
v/s Ratio Prot	c0.02	0.06		0.02	c0.09		c0.33	0.66		0.08	c0.62	
v/s Ratio Perm			0.01									
v/c Ratio	0.55	0.44	0.08	0.42	0.68		1.83	1.28		0.62	1.35	
Uniform Delay, d1	61.0	52.7	50.3	60.6	54.4		53.1	31.4		53.0	35.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.2	1.4	0.2	2.0	8.7		385.9	129.6		4.9	162.6	
Delay (s)	70.1	54.1	50.5	62.6	63.0		439.0	161.0		57.9	197.9	
Level of Service	E	D	D	E	E		F	F		E	F	
Approach Delay (s)		54.7			62.9			219.3			188.9	
Approach LOS		D			E			F			F	

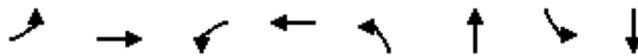
### Intersection Summary

HCM 2000 Control Delay	192.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022

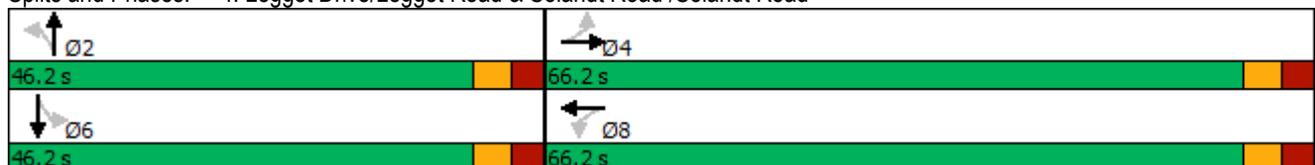


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	192	102	10	10	90	145	4	218
Future Volume (vph)	192	102	10	10	90	145	4	218
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	15.0	15.0	15.0	15.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2
Total Split (s)	66.2	66.2	66.2	66.2	46.2	46.2	46.2	46.2
Total Split (%)	58.9%	58.9%	58.9%	58.9%	41.1%	41.1%	41.1%	41.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None							
Act Effect Green (s)	16.4	16.4	16.4	16.4	12.7	12.7	12.7	12.7
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.30	0.30	0.30	0.30
v/c Ratio	0.40	0.46	0.03	0.04	0.34	0.39	0.01	0.57
Control Delay	12.7	8.5	9.0	7.3	15.2	13.2	10.5	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	8.5	9.0	7.3	15.2	13.2	10.5	16.5
LOS	B	A	A	A	B	B	B	B
Approach Delay		10.1		7.9		13.9		16.4
Approach LOS		B		A		B		B

### Intersection Summary

Cycle Length: 112.4  
 Actuated Cycle Length: 41.7  
 Natural Cycle: 55  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.57  
 Intersection Signal Delay: 12.7  
 Intersection LOS: B  
 Intersection Capacity Utilization 57.6%  
 ICU Level of Service B  
 Analysis Period (min) 15

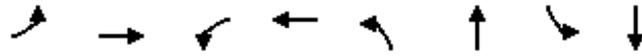
### Splits and Phases: 4: Legget Drive/Legget Road & Solandt Road /Solandt Road



Queues

4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022

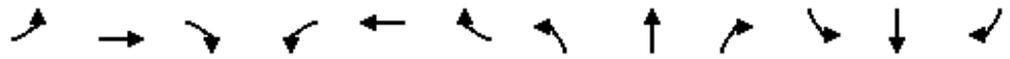


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	213	322	11	19	100	208	4	308
v/c Ratio	0.40	0.46	0.03	0.04	0.34	0.39	0.01	0.57
Control Delay	12.7	8.5	9.0	7.3	15.2	13.2	10.5	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	8.5	9.0	7.3	15.2	13.2	10.5	16.5
Queue Length 50th (m)	9.8	8.6	0.4	0.4	5.0	9.9	0.2	16.0
Queue Length 95th (m)	26.8	26.9	2.7	3.4	16.0	25.9	1.7	39.0
Internal Link Dist (m)		205.8		177.5		261.1		203.5
Turn Bay Length (m)	130.0		42.0		65.0		35.0	
Base Capacity (vph)	1340	1603	1028	1351	912	1616	959	1646
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.20	0.01	0.01	0.11	0.13	0.00	0.19
<b>Intersection Summary</b>								

# HCM Signalized Intersection Capacity Analysis

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	102	188	10	10	7	90	145	42	4	218	59
Future Volume (vph)	192	102	188	10	10	7	90	145	42	4	218	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.90		1.00	0.94		1.00	0.97		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)	1722	1604		1728	1355		1601	1719		1558	1742	
Flt Permitted	0.75	1.00		0.57	1.00		0.57	1.00		0.63	1.00	
Satd. Flow (perm)	1350	1604		1029	1355		965	1719		1029	1742	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	213	113	209	11	11	8	100	161	47	4	242	66
RTOR Reduction (vph)	0	77	0	0	5	0	0	10	0	0	10	0
Lane Group Flow (vph)	213	245	0	11	14	0	100	198	0	4	298	0
Confl. Peds. (#/hr)	4		1	1		4			11	11		
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	0%	1%	1%	0%	30%	17%	8%	2%	0%	10%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.4	16.4		16.4	16.4		12.7	12.7		12.7	12.7	
Effective Green, g (s)	16.4	16.4		16.4	16.4		12.7	12.7		12.7	12.7	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.31	0.31		0.31	0.31	
Clearance Time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	533	633		406	535		295	526		314	533	
v/s Ratio Prot		0.15			0.01			0.11				c0.17
v/s Ratio Perm	c0.16			0.01			0.10			0.00		
v/c Ratio	0.40	0.39		0.03	0.03		0.34	0.38		0.01	0.56	
Uniform Delay, d1	9.0	9.0		7.7	7.7		11.1	11.3		10.0	12.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4		0.0	0.0		0.7	0.5		0.0	1.3	
Delay (s)	9.5	9.4		7.7	7.7		11.8	11.7		10.0	13.3	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		9.4			7.7			11.8			13.3	
Approach LOS		A			A			B			B	

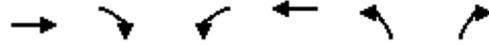
### Intersection Summary

HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	12.4
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Unsignalized Intersection Capacity Analysis

## 5: Legget Drive & Terry Fox Drive

07/14/2022



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (veh/h)	538	380	40	147	15	27
Future Volume (Veh/h)	538	380	40	147	15	27
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	598	422	44	163	17	30
Pedestrians				2	17	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.1	1.1	
Percent Blockage				0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	302					
pX, platoon unblocked			0.85		0.85	0.85
vC, conflicting volume			1037		1077	828
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			953		1001	707
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			92		92	92
cM capacity (veh/h)			575		206	358
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1020	207	47			
Volume Left	0	44	17			
Volume Right	422	0	30			
cSH	1700	575	283			
Volume to Capacity	0.60	0.08	0.17			
Queue Length 95th (m)	0.0	1.9	4.5			
Control Delay (s)	0.0	3.3	20.2			
Lane LOS			A			C
Approach Delay (s)	0.0	3.3	20.2			
Approach LOS				C		
<b>Intersection Summary</b>						
Average Delay			1.3			
Intersection Capacity Utilization			65.7%	ICU Level of Service	C	
Analysis Period (min)	15					

# HCM Unsignalized Intersection Capacity Analysis

## 6: March Road & Site Access 1 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↕
Traffic Volume (veh/h)	0	5	1398	348	0	0
Future Volume (Veh/h)	0	5	1398	348	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	6	1553	387	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			232			247
pX, platoon unblocked	0.49	0.49			0.49	
vC, conflicting volume	1746	970			1940	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	463	0			855	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	261	536			386	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	6	1035	905	0	0	
Volume Left	0	0	0	0	0	
Volume Right	6	0	387	0	0	
cSH	536	1700	1700	1700	1700	
Volume to Capacity	0.01	0.61	0.53	0.00	0.00	
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	
Control Delay (s)	11.8	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.8	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			62.5%		ICU Level of Service	B
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 7: March Road & Site Access 2 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕			↕
Traffic Volume (veh/h)	0	5	1186	57	0	0
Future Volume (Veh/h)	0	5	1186	57	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	6	1318	63	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			322			157
pX, platoon unblocked	0.54	0.54			0.54	
vC, conflicting volume	1350	690			1381	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	551	585			874	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	6	879	502	0	0	
Volume Left	0	0	0	0	0	
Volume Right	6	0	63	0	0	
cSH	585	1700	1700	1700	1700	
Volume to Capacity	0.01	0.52	0.30	0.00	0.00	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	11.2	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.2	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			46.5%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 8: March Road & Site Access 3 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↕
Traffic Volume (veh/h)	0	19	1186	5	0	0
Future Volume (Veh/h)	0	19	1186	5	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	21	1318	6	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			401			78
pX, platoon unblocked	0.57	0.57			0.57	
vC, conflicting volume	1321	662			1324	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	34	0			40	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	552	614			888	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	21	879	445	0	0	
Volume Left	0	0	0	0	0	
Volume Right	21	0	6	0	0	
cSH	614	1700	1700	1700	1700	
Volume to Capacity	0.03	0.52	0.26	0.00	0.00	
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.1	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization			44.8%		ICU Level of Service	A
Analysis Period (min)			15			

# Timings

## 9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↑↑	↗	↖	↑↑
Traffic Volume (vph)	5	5	163	5	5	1103	101	298	1759
Future Volume (vph)	5	5	163	5	5	1103	101	298	1759
Turn Type	pm+pt	NA	pm+pt	NA	Prot	NA	NA	Prot	NA
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8						
Detector Phase	7	4	3	8	5	2		1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	19.5	22.5	22.0	25.0	9.5	59.3		26.2	76.0
Total Split (%)	15.0%	17.3%	16.9%	19.2%	7.3%	45.6%		20.2%	58.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	C-Max		None	C-Max
Act Effct Green (s)	8.9	6.3	20.9	18.6	6.1	58.8	0.0	36.9	97.8
Actuated g/C Ratio	0.07	0.05	0.16	0.14	0.05	0.45	0.00	0.28	0.75
v/c Ratio	0.05	0.14	0.75	0.45	0.08	0.80	0.68	0.69	0.77
Control Delay	43.8	45.7	69.0	12.6	56.2	21.2	17.1	70.5	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	45.7	69.0	12.6	56.2	21.2	17.1	70.5	19.2
LOS	D	D	E	B	E	C	B	E	B
Approach Delay		45.1		43.1		21.0			26.6
Approach LOS		D		D		C			C

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 26.2

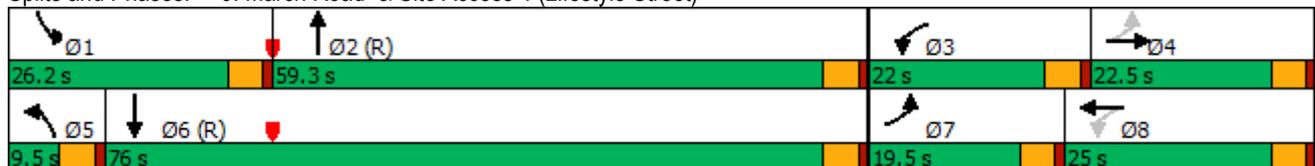
Intersection LOS: C

Intersection Capacity Utilization 82.9%

ICU Level of Service E

Analysis Period (min) 15

### Splits and Phases: 9: March Road & Site Access 4 (Lifestyle Street)



Queues

9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	6	12	181	154	6	1226	112	331	1954
v/c Ratio	0.05	0.14	0.75	0.45	0.08	0.80	0.68	0.69	0.77
Control Delay	43.8	45.7	69.0	12.6	56.2	21.2	17.1	70.5	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	45.7	69.0	12.6	56.2	21.2	17.1	70.5	19.2
Queue Length 50th (m)	1.5	1.5	45.6	1.4	1.7	54.5	5.2	89.1	78.7
Queue Length 95th (m)	4.9	8.0	63.1	20.7	m1.7	m58.7	m2.0	m101.6	#144.6
Internal Link Dist (m)		124.3		188.6		54.1			77.0
Turn Bay Length (m)	37.5		65.0		37.5			75.0	
Base Capacity (vph)	235	233	259	382	79	1532	164	480	2550
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.05	0.70	0.40	0.08	0.80	0.68	0.69	0.77

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	5	163	5	133	5	1103	101	298	1759	0
Future Volume (vph)	5	5	5	163	5	133	5	1103	101	298	1759	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.0	4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.93		1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1695	1650		1695	1527		1695	3390	1517	1695	3390	
Flt Permitted	1.00	1.00		0.48	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1784	1650		860	1527		1695	3390	1517	1695	3390	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	6	6	181	6	148	6	1226	112	331	1954	0
RTOR Reduction (vph)	0	6	0	0	127	0	0	0	112	0	0	0
Lane Group Flow (vph)	6	6	0	181	27	0	6	1226	0	331	1954	0
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	NA	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	5.2	3.8		24.5	18.6		1.4	55.1	0.0	36.9	90.6	
Effective Green, g (s)	5.2	3.8		24.5	18.6		1.4	55.1	0.0	36.9	90.6	
Actuated g/C Ratio	0.04	0.03		0.19	0.14		0.01	0.42	0.00	0.28	0.70	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	70	48		266	218		18	1436	0	481	2362	
v/s Ratio Prot	0.00	0.00		c0.08	0.02		0.00	0.36		c0.20	c0.58	
v/s Ratio Perm	0.00			c0.04								
v/c Ratio	0.09	0.13		0.68	0.12		0.33	0.85	0.00	0.69	0.83	
Uniform Delay, d1	60.1	61.5		48.0	48.6		63.8	33.8	65.0	41.4	14.1	
Progression Factor	1.00	1.00		1.00	1.00		0.95	0.66	1.00	1.55	1.52	
Incremental Delay, d2	0.5	1.2		7.0	0.3		1.0	0.7	0.0	2.1	1.8	
Delay (s)	60.6	62.7		55.0	48.9		61.5	22.8	65.0	66.2	23.2	
Level of Service	E	E		D	D		E	C	E	E	C	
Approach Delay (s)		62.0			52.2			26.5			29.4	
Approach LOS		E			D			C			C	

### Intersection Summary

HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 10: Site Access 5 (Residential)/McKinley Drive & Terry Fox Drive

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	846	84	0	222	26	0	0	5	128	0	47
Future Volume (Veh/h)	70	846	84	0	222	26	0	0	5	128	0	47
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	78	940	93	0	247	29	0	0	6	142	0	52
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh		1			1							
Upstream signal (m)		161										
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	276			1033			1456	1418	986	1364	1450	262
vC1, stage 1 conf vol							1142	1142		262	262	
vC2, stage 2 conf vol							314	276		1102	1189	
vCu, unblocked vol	276			950			1448	1404	896	1339	1442	262
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	100	98	23	100	93
cM capacity (veh/h)	1287			614			168	192	288	184	185	777
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total	78	1033	276	6	194							
Volume Left	78	0	0	0	142							
Volume Right	0	93	29	6	52							
cSH	1287	1700	1700	288	232							
Volume to Capacity	0.06	0.61	0.16	0.02	0.84							
Queue Length 95th (m)	1.5	0.0	0.0	0.5	49.4							
Control Delay (s)	8.0	0.0	0.0	17.8	68.9							
Lane LOS	A			C	F							
Approach Delay (s)	0.6		0.0	17.8	68.9							
Approach LOS				C	F							
Intersection Summary												
Average Delay			8.9									
Intersection Capacity Utilization			76.2%		ICU Level of Service				D			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 11: Legget Drive/Legget Road & Site Access 6 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	26	290	19	10	5	30	4	43	26	357	5
Future Volume (Veh/h)	5	26	290	19	10	5	30	4	43	26	357	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	29	322	21	11	6	33	4	48	29	397	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	564	576	400	888	555	28	403			52		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	564	576	400	888	555	28	403			52		
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 %	99	93	50	83	97	99	97			98		
cM capacity (veh/h)	410	408	650	122	419	1047	1156			1554		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	357	38	85	432								
Volume Left	6	21	33	29								
Volume Right	322	6	48	6								
cSH	614	186	1156	1554								
Volume to Capacity	0.58	0.20	0.03	0.02								
Queue Length 95th (m)	28.3	5.6	0.7	0.4								
Control Delay (s)	18.7	29.3	3.3	0.7								
Lane LOS	C	D	A	A								
Approach Delay (s)	18.7	29.3	3.3	0.7								
Approach LOS	C	D										
Intersection Summary												
Average Delay			9.2									
Intersection Capacity Utilization			49.4%	ICU Level of Service						A		
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 12: Legget Drive & Site Access 7 (Campus)

07/14/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	8	5	27	298	386
Future Volume (Veh/h)	31	8	5	27	298	386
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	34	9	6	30	331	429
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	388					
pX, platoon unblocked						
vC, conflicting volume	588	546	760			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	588	546	760			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	98	99			
cM capacity (veh/h)	468	538	852			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	43	36	760			
Volume Left	34	6	0			
Volume Right	9	0	429			
cSH	481	852	1700			
Volume to Capacity	0.09	0.01	0.45			
Queue Length 95th (m)	2.2	0.2	0.0			
Control Delay (s)	13.2	1.6	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.2	1.6	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.7			
Intersection Capacity Utilization			51.5%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 13: Site Access 8 (Campus) & Legget Drive

07/14/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	34	3	19	333	5
Future Volume (Veh/h)	8	34	3	19	333	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	38	3	21	370	6
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume	400	373	376			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	400	373	376			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	94	100			
cM capacity (veh/h)	604	673	1182			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	47	24	376			
Volume Left	9	3	0			
Volume Right	38	0	6			
cSH	659	1182	1700			
Volume to Capacity	0.07	0.00	0.22			
Queue Length 95th (m)	1.7	0.1	0.0			
Control Delay (s)	10.9	1.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.9	1.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			1.2			
Intersection Capacity Utilization			28.8%	ICU Level of Service	A	
Analysis Period (min)			15			



# Queues

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	70	87	73	230	267	2517	150	156	1283	22
v/c Ratio	0.36	0.28	0.59	0.38	0.66	0.67	0.91	0.16	0.67	0.53	0.03
Control Delay	56.6	10.7	69.2	57.2	19.4	69.0	11.8	0.0	66.7	23.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	10.7	69.2	57.2	19.4	69.0	11.8	0.0	66.7	23.6	0.1
Queue Length 50th (m)	17.2	0.0	21.6	17.7	6.4	63.4	222.3	0.0	38.4	80.4	0.0
Queue Length 95th (m)	30.3	10.6	36.8	30.8	30.5	m70.2	m206.4	m0.0	58.9	93.7	0.0
Internal Link Dist (m)	116.4			136.8			274.6			145.2	
Turn Bay Length (m)		10.0	38.0		38.0	130.0		25.0	68.0		25.0
Base Capacity (vph)	408	428	309	401	505	399	2756	911	242	2442	777
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.16	0.28	0.18	0.46	0.67	0.91	0.16	0.64	0.53	0.03

### Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕	↗	↖	↕↕↕	↗	↖	↕↕↕	↗
Traffic Volume (vph)	12	52	63	78	66	207	240	2265	135	140	1155	20
Future Volume (vph)	12	52	63	78	66	207	240	2265	135	140	1155	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.95	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1802	1514	1706	1655	1450	1679	4644	1476	1729	4969	1488
Flt Permitted		0.93	1.00	0.71	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1684	1514	1276	1655	1450	1679	4644	1476	1729	4969	1488
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	58	70	87	73	230	267	2517	150	156	1283	22
RTOR Reduction (vph)	0	0	62	0	0	179	0	0	37	0	0	11
Lane Group Flow (vph)	0	71	8	87	73	51	267	2517	113	156	1283	11
Confl. Peds. (#/hr)	3		3	3		3	5		6	6		5
Confl. Bikes (#/hr)			3						8			1
Heavy Vehicles (%)	0%	0%	0%	1%	10%	5%	3%	7%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		15.2	15.2	15.2	15.2	15.2	30.9	77.1	77.1	17.7	63.9	63.9
Effective Green, g (s)		15.2	15.2	15.2	15.2	15.2	30.9	77.1	77.1	17.7	63.9	63.9
Actuated g/C Ratio		0.12	0.12	0.12	0.12	0.12	0.24	0.59	0.59	0.14	0.49	0.49
Clearance Time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
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)		196	177	149	193	169	399	2754	875	235	2442	731
v/s Ratio Prot					0.04		c0.16	c0.54		0.09	0.26	
v/s Ratio Perm		0.04	0.01	c0.07		0.03			0.08			0.01
v/c Ratio		0.36	0.05	0.58	0.38	0.30	0.67	0.91	0.13	0.66	0.53	0.01
Uniform Delay, d1		52.9	51.0	54.4	53.0	52.5	44.9	23.5	11.7	53.3	22.7	16.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.49	0.37	0.00	1.00	1.00	1.00
Incremental Delay, d2		1.1	0.1	5.7	1.2	1.0	0.4	0.6	0.0	6.9	0.8	0.0
Delay (s)		54.1	51.1	60.1	54.3	53.5	67.5	9.4	0.0	60.2	23.5	17.0
Level of Service		D	D	E	D	D	E	A	A	E	C	B
Approach Delay (s)		52.6			55.1			14.2			27.3	
Approach LOS		D			E			B			C	

### Intersection Summary

HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



# Queues

## 2: March Road & Terry Fox Drive

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	310	191	393	163	290	364	374	2256	153	124	1133	181
v/c Ratio	0.77	0.30	0.75	0.56	0.56	0.80	0.74	1.20	0.22	0.65	0.65	0.29
Control Delay	68.3	45.8	19.6	63.6	54.1	27.1	49.9	122.5	8.4	66.3	49.7	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	45.8	19.6	63.6	54.1	27.1	49.9	122.5	8.4	66.3	49.7	18.4
Queue Length 50th (m)	39.7	22.7	17.4	20.9	37.5	23.0	45.1	~255.7	5.2	31.9	76.5	7.2
Queue Length 95th (m)	55.3	30.7	50.6	31.6	45.6	53.8	m43.2m#299.8	m5.6	54.2	94.1	26.8	
Internal Link Dist (m)		245.5			116.0			283.0			274.6	
Turn Bay Length (m)	104.0		52.0	72.0		100.0	142.0		82.0	100.0		98.0
Base Capacity (vph)	435	931	625	418	912	594	504	1884	684	225	1753	618
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.21	0.63	0.39	0.32	0.61	0.74	1.20	0.22	0.55	0.65	0.29

### Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 2: March Road & Terry Fox Drive

07/14/2022



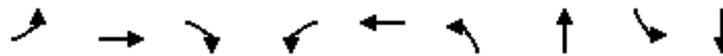
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↘	↖↗	↕	↘	↖↗	↕	↘	↖↗	↕	↘
Traffic Volume (vph)	279	172	354	147	261	328	337	2030	138	112	1020	163
Future Volume (vph)	279	172	354	147	261	328	337	2030	138	112	1020	163
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	310	191	393	163	290	364	374	2256	153	124	1133	181
RTOR Reduction (vph)	0	0	258	0	0	230	0	0	89	0	0	116
Lane Group Flow (vph)	310	191	135	163	290	134	374	2256	64	124	1133	65
Confl. Peds. (#/hr)	9		29	29		9	21		13	13		21
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	2%	0%	1%	6%	2%	3%	2%	6%	1%	0%	2%	6%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	16.0	23.9	23.9	12.0	19.9	19.9	20.0	52.2	52.2	14.5	46.7	46.7
Effective Green, g (s)	16.0	23.9	23.9	12.0	19.9	19.9	20.0	52.2	52.2	14.5	46.7	46.7
Actuated g/C Ratio	0.12	0.18	0.18	0.09	0.15	0.15	0.15	0.40	0.40	0.11	0.36	0.36
Clearance Time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	404	635	268	292	518	224	505	1882	595	192	1749	501
v/s Ratio Prot	c0.09	0.06		0.05	0.09		c0.11	c0.48		0.07	0.23	
v/s Ratio Perm			c0.09			c0.09			0.04			0.05
v/c Ratio	0.77	0.30	0.50	0.56	0.56	0.60	0.74	1.20	0.11	0.65	0.65	0.13
Uniform Delay, d1	55.2	45.8	47.7	56.5	51.0	51.3	52.5	38.9	24.3	55.3	34.8	28.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.93	1.44	0.96	1.32	3.37
Incremental Delay, d2	8.5	0.3	1.5	2.3	1.3	4.2	0.5	89.9	0.0	6.4	1.7	0.5
Delay (s)	63.7	46.1	49.2	58.8	52.3	55.5	49.4	126.2	35.1	59.6	47.4	94.9
Level of Service	E	D	D	E	D	E	D	F	D	E	D	F
Approach Delay (s)		53.6			55.0			110.8			54.5	
Approach LOS		D			E			F			D	

Intersection Summary		
HCM 2000 Control Delay	80.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.99	F
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	97.9%	ICU Level of Service
Analysis Period (min)	15	F
c Critical Lane Group		

# Timings

## 3: March Road & Solandt Road

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↙	↑	↘	↙↘	↘	↙	↕	↙	↕
Traffic Volume (vph)	96	39	548	598	61	97	2282	26	1469
Future Volume (vph)	96	39	548	598	61	97	2282	26	1469
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	12.9	31.5	31.5	12.9	31.5	11.3	25.3	9.5	25.3
Total Split (s)	18.2	38.0	38.0	19.0	38.8	12.0	63.5	9.5	61.0
Total Split (%)	14.0%	29.2%	29.2%	14.6%	29.8%	9.2%	48.8%	7.3%	46.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	4.6	4.6	3.5	4.6
All-Red Time (s)	2.6	3.2	3.2	2.6	3.2	1.7	1.7	1.0	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	6.5	6.5	5.9	6.5	6.3	6.3	4.5	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	11.6	31.5	31.5	13.1	33.0	5.7	61.0	5.0	54.7
Actuated g/C Ratio	0.09	0.24	0.24	0.10	0.25	0.04	0.47	0.04	0.42
v/c Ratio	0.75	0.10	1.40	2.01	0.58	1.44	1.65	0.45	1.23
Control Delay	87.4	39.1	224.2	492.8	30.3	300.7	321.4	82.4	143.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	39.1	224.2	492.8	30.3	300.7	321.4	82.4	143.7
LOS	F	D	F	F	C	F	F	F	F
Approach Delay		194.4			356.3		320.5		142.7
Approach LOS		F			F		F		F

### Intersection Summary

Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 2.01  
 Intersection Signal Delay: 259.6      Intersection LOS: F  
 Intersection Capacity Utilization 120.3%      ICU Level of Service H  
 Analysis Period (min) 15

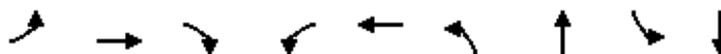
### Splits and Phases: 3: March Road & Solandt Road



# Queues

## 3: March Road & Solandt Road

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	107	43	609	664	278	108	2566	29	1724
v/c Ratio	0.75	0.10	1.40	2.01	0.58	1.44	1.65	0.45	1.23
Control Delay	87.4	39.1	224.2	492.8	30.3	300.7	321.4	82.4	143.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	39.1	224.2	492.8	30.3	300.7	321.4	82.4	143.7
Queue Length 50th (m)	27.0	8.6	~185.9	~136.7	37.0	~37.5	~518.9	7.4	~287.4
Queue Length 95th (m)	#53.5	18.5	#257.2	#173.4	66.5	#74.8	#558.4	#18.9	#330.4
Internal Link Dist (m)		112.5			205.8		333.2		208.2
Turn Bay Length (m)	65.0		100.0	90.0		157.0		140.0	
Base Capacity (vph)	152	432	435	331	476	75	1557	65	1402
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.10	1.40	2.01	0.58	1.44	1.65	0.45	1.23

### Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 3: March Road & Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	39	548	598	61	189	97	2282	27	26	1469	83
Future Volume (vph)	96	39	548	598	61	189	97	2282	27	26	1469	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3		4.5	6.3	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1616	1784	1436	3288	1539		1712	3319		1695	3327	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1616	1784	1436	3288	1539		1712	3319		1695	3327	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	107	43	609	664	68	210	108	2536	30	29	1632	92
RTOR Reduction (vph)	0	0	87	0	85	0	0	1	0	0	3	0
Lane Group Flow (vph)	107	43	522	664	193	0	108	2565	0	29	1721	0
Confl. Peds. (#/hr)	7		8	8		7	6					6
Confl. Bikes (#/hr)			1			1			1			12
Heavy Vehicles (%)	7%	2%	5%	2%	3%	3%	1%	4%	1%	2%	3%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	11.6	31.5	31.5	13.1	33.0		5.7	59.2		3.0	54.7	
Effective Green, g (s)	11.6	31.5	31.5	13.1	33.0		5.7	59.2		3.0	54.7	
Actuated g/C Ratio	0.09	0.24	0.24	0.10	0.25		0.04	0.46		0.02	0.42	
Clearance Time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3		4.5	6.3	
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)	144	432	347	331	390		75	1511		39	1399	
v/s Ratio Prot	0.07	0.02		c0.20	0.13		c0.06	c0.77		0.02	0.52	
v/s Ratio Perm			c0.36									
v/c Ratio	0.74	0.10	1.50	2.01	0.49		1.44	1.70		0.74	1.23	
Uniform Delay, d1	57.7	38.2	49.2	58.5	41.4		62.1	35.4		63.1	37.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.6	0.1	241.3	463.3	1.0		258.2	316.9		54.3	110.1	
Delay (s)	76.3	38.3	290.6	521.8	42.4		320.4	352.3		117.4	147.7	
Level of Service	E	D	F	F	D		F	F		F	F	
Approach Delay (s)		246.1			380.3			351.0			147.2	
Approach LOS		F			F			F			F	

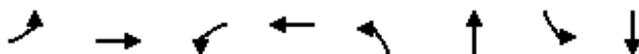
### Intersection Summary

HCM 2000 Control Delay	284.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.73		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	120.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	31	1	37	107	264	79	3	207
Future Volume (vph)	31	1	37	107	264	79	3	207
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	15.0	15.0	15.0	15.0	7.0	10.0	10.0	10.0
Minimum Split (s)	25.2	25.2	25.2	25.2	13.2	25.2	25.2	25.2
Total Split (s)	41.2	41.2	41.2	41.2	31.2	77.4	46.2	46.2
Total Split (%)	34.7%	34.7%	34.7%	34.7%	26.3%	65.3%	39.0%	39.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes		Yes	Yes
Recall Mode	None	None	None	None	None	Ped	Ped	Ped
Act Effect Green (s)	16.3	16.3	16.3	16.3	67.4	67.4	40.1	40.1
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.70	0.70	0.42	0.42
v/c Ratio	0.17	0.19	0.19	0.54	0.70	0.07	0.01	1.01
Control Delay	37.5	11.6	37.7	45.3	29.9	4.7	19.0	63.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	11.6	37.7	45.3	29.9	4.7	19.0	63.0
LOS	D	B	D	D	C	A	B	E
Approach Delay		21.1		43.5		23.9		62.8
Approach LOS		C		D		C		E

### Intersection Summary

Cycle Length: 118.6	
Actuated Cycle Length: 96.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 46.9	Intersection LOS: D
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

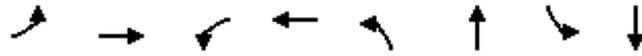
### Splits and Phases: 4: Legget Drive/Legget Road & Solandt Road /Solandt Road



Queues

4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	59	41	129	293	91	3	741
v/c Ratio	0.17	0.19	0.19	0.54	0.70	0.07	0.01	1.01
Control Delay	37.5	11.6	37.7	45.3	29.9	4.7	19.0	63.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	11.6	37.7	45.3	29.9	4.7	19.0	63.0
Queue Length 50th (m)	5.6	0.2	6.8	21.9	33.9	4.2	0.3	~129.3
Queue Length 95th (m)	14.2	10.6	16.4	40.8	66.7	10.1	2.3	#225.7
Internal Link Dist (m)		205.8		177.5		261.1		203.5
Turn Bay Length (m)	130.0		42.0		65.0		35.0	
Base Capacity (vph)	443	585	476	510	481	1317	467	731
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.10	0.09	0.25	0.61	0.07	0.01	1.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

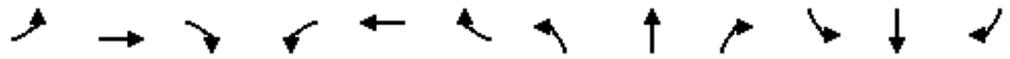
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	1	52	37	107	9	264	79	3	3	207	460
Future Volume (vph)	31	1	52	37	107	9	264	79	3	3	207	460
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.85		1.00	0.99		1.00	1.00		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1714	1502		1725	1391		1601	1774		1533	1611	
Flt Permitted	0.67	1.00		0.72	1.00		0.09	1.00		0.70	1.00	
Satd. Flow (perm)	1217	1502		1305	1391		146	1774		1127	1611	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	34	1	58	41	119	10	293	88	3	3	230	511
RTOR Reduction (vph)	0	48	0	0	3	0	0	1	0	0	59	0
Lane Group Flow (vph)	34	11	0	41	126	0	293	90	0	3	682	0
Confl. Peds. (#/hr)	4		1	1		4			11	11		
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	0%	1%	1%	0%	30%	17%	8%	2%	0%	10%	1%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.3	16.3		16.3	16.3		67.4	67.4		40.1	40.1	
Effective Green, g (s)	16.3	16.3		16.3	16.3		67.4	67.4		40.1	40.1	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.70	0.70		0.42	0.42	
Clearance Time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	206	254		221	235		421	1244		470	672	
v/s Ratio Prot		0.01			c0.09		c0.15	0.05			c0.42	
v/s Ratio Perm	0.03			0.03			0.34			0.00		
v/c Ratio	0.17	0.04		0.19	0.53		0.70	0.07		0.01	1.01	
Uniform Delay, d1	34.1	33.4		34.2	36.4		24.7	4.5		16.4	28.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.4	2.3		4.9	0.0		0.0	38.3	
Delay (s)	34.5	33.4		34.6	38.8		29.6	4.5		16.4	66.3	
Level of Service	C	C		C	D		C	A		B	E	
Approach Delay (s)		33.8			37.8			23.7			66.1	
Approach LOS		C			D			C			E	

### Intersection Summary

HCM 2000 Control Delay	48.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	96.1	Sum of lost time (s)	18.6
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Unsignalized Intersection Capacity Analysis

## 5: Legget Drive & Terry Fox Drive

07/14/2022



Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	21	621	143	37	142	45
Future Volume (Veh/h)	21	621	143	37	142	45
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	690	159	41	158	50
Pedestrians	2		17			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	0		2			
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	308					
pX, platoon unblocked						
vC, conflicting volume	225		936		202	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	225		936		202	
tC, single (s)	4.2		6.4		6.2	
tC, 2 stage (s)						
tF (s)	2.3		3.5		3.3	
p0 queue free %	98		44		95	
cM capacity (veh/h)	1277		283		816	
Direction, Lane #	WB 1	NB 1	SE 1			
Volume Total	713	200	208			
Volume Left	23	159	0			
Volume Right	0	41	50			
cSH	1277	327	1700			
Volume to Capacity	0.02	0.61	0.12			
Queue Length 95th (m)	0.4	29.0	0.0			
Control Delay (s)	0.5	31.9	0.0			
Lane LOS	A	D				
Approach Delay (s)	0.5	31.9	0.0			
Approach LOS		D				
<b>Intersection Summary</b>						
Average Delay			6.0			
Intersection Capacity Utilization			Err%	ICU Level of Service	H	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 6: March Road & Site Access 1 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘	↖	↗
Traffic Volume (veh/h)	0	5	2405	48	0	0
Future Volume (Veh/h)	0	5	2405	48	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	6	2672	53	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			232			247
pX, platoon unblocked	0.55	0.55			0.55	
vC, conflicting volume	2698	1362			2725	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2457	48			2504	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	14	560			99	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	6	1781	944	0	0	
Volume Left	0	0	0	0	0	
Volume Right	6	0	53	0	0	
cSH	560	1700	1700	1700	1700	
Volume to Capacity	0.01	1.05	0.56	0.00	0.00	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	11.5	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.5	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			81.8%		ICU Level of Service	D
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 7: March Road & Site Access 2 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘	↖	↕
Traffic Volume (veh/h)	0	5	2359	24	0	0
Future Volume (Veh/h)	0	5	2359	24	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	6	2621	27	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			322			157
pX, platoon unblocked	0.56	0.56			0.56	
vC, conflicting volume	2634	1324			2648	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2345	0			2369	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	17	605			113	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	6	1747	901	0	0	
Volume Left	0	0	0	0	0	
Volume Right	6	0	27	0	0	
cSH	605	1700	1700	1700	1700	
Volume to Capacity	0.01	1.03	0.53	0.00	0.00	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	11.0	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.0	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			79.6%		ICU Level of Service	D
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 8: March Road & Site Access 3 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	2359	5	0	0
Future Volume (Veh/h)	0	19	2359	5	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	21	2621	6	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	401			78		
pX, platoon unblocked	0.56	0.56			0.56	
vC, conflicting volume	2624	1314			2627	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2330	0			2335	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	17	609			117	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	21	1747	880	0	0	
Volume Left	0	0	0	0	0	
Volume Right	21	0	6	0	0	
cSH	609	1700	1700	1700	1700	
Volume to Capacity	0.03	1.03	0.52	0.00	0.00	
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.1	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			79.0%	ICU Level of Service	D	
Analysis Period (min)			15			

# Timings

## 9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022

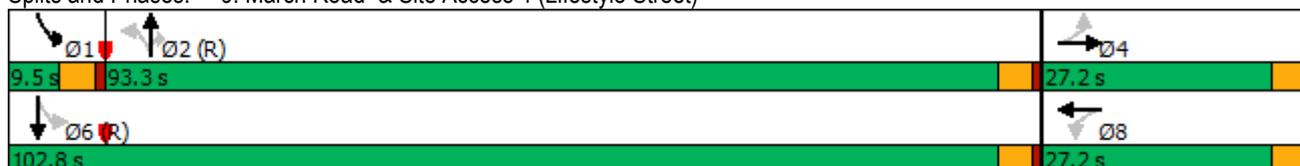


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↑↑	↗	↖	↑↑
Traffic Volume (vph)	5	5	207	5	5	2168	175	79	1458
Future Volume (vph)	5	5	207	5	5	2168	175	79	1458
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases		4		8		2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	8	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	27.2	27.2	27.2	27.2	93.3	93.3	93.3	9.5	102.8
Total Split (%)	20.9%	20.9%	20.9%	20.9%	71.8%	71.8%	71.8%	7.3%	79.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lag	Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
Act Effct Green (s)	22.7	22.7	22.7	22.7	88.8	88.8	88.8	98.3	98.3
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.68	0.68	0.68	0.76	0.76
v/c Ratio	0.11	0.04	0.99	1.20	0.04	1.04	0.18	0.73	0.63
Control Delay	51.0	32.5	109.2	155.4	1.8	36.1	0.0	61.4	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	32.5	109.2	155.4	1.8	36.1	0.0	61.4	11.4
LOS	D	C	F	F	A	D	A	E	B
Approach Delay		38.6		138.1		33.3			14.0
Approach LOS		D		F		C			B

### Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 39.7	Intersection LOS: D
Intersection Capacity Utilization 99.3%	ICU Level of Service F
Analysis Period (min) 15	

### Splits and Phases: 9: March Road & Site Access 4 (Lifestyle Street)



Queues

9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	6	12	230	384	6	2409	194	88	1620
v/c Ratio	0.11	0.04	0.99	1.20	0.04	1.04	0.18	0.73	0.63
Control Delay	51.0	32.5	109.2	155.4	1.8	36.1	0.0	61.4	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	32.5	109.2	155.4	1.8	36.1	0.0	61.4	11.4
Queue Length 50th (m)	1.3	1.3	59.4	~104.8	0.1	~130.8	0.0	3.3	181.4
Queue Length 95th (m)	5.6	7.0	#110.8	#167.0	m0.1	m18.1	m0.0	m#27.3	65.5
Internal Link Dist (m)		124.3		188.6		54.1			89.2
Turn Bay Length (m)			37.5		37.5			37.5	
Base Capacity (vph)	54	293	233	319	155	2315	1082	120	2563
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.04	0.99	1.20	0.04	1.04	0.18	0.73	0.63

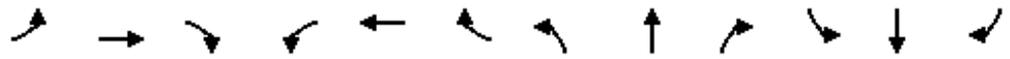
Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷	↷	↶	↷	↷
Traffic Volume (vph)	5	5	5	207	5	340	5	2168	175	79	1458	0
Future Volume (vph)	5	5	5	207	5	340	5	2168	175	79	1458	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.93		1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1695	1650		1695	1521		1695	3390	1517	1695	3390	
Flt Permitted	0.18	1.00		0.75	1.00		0.13	1.00	1.00	0.04	1.00	
Satd. Flow (perm)	314	1650		1338	1521		229	3390	1517	76	3390	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	6	6	230	6	378	6	2409	194	88	1620	0
RTOR Reduction (vph)	0	5	0	0	54	0	0	0	47	0	0	0
Lane Group Flow (vph)	6	7	0	230	330	0	6	2409	147	88	1620	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	22.7	22.7		22.7	22.7		88.8	88.8	88.8	98.3	98.3	
Effective Green, g (s)	22.7	22.7		22.7	22.7		88.8	88.8	88.8	98.3	98.3	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.68	0.68	0.68	0.76	0.76	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
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)	54	288		233	265		156	2315	1036	119	2563	
v/s Ratio Prot		0.00			c0.22			c0.71		0.03	c0.48	
v/s Ratio Perm	0.02			0.17			0.03		0.10	0.52		
v/c Ratio	0.11	0.02		0.99	1.24		0.04	1.04	0.14	0.74	0.63	
Uniform Delay, d1	45.2	44.5		53.5	53.6		6.7	20.6	7.2	39.5	7.4	
Progression Factor	1.00	1.00		1.00	1.00		0.25	0.71	0.00	1.91	1.38	
Incremental Delay, d2	0.9	0.0		54.8	137.3		0.0	19.9	0.0	17.3	1.0	
Delay (s)	46.1	44.5		108.3	190.9		1.7	34.4	0.0	92.6	11.2	
Level of Service	D	D		F	F		A	C	A	F	B	
Approach Delay (s)		45.0			160.0			31.8			15.4	
Approach LOS		D			F			C			B	

### Intersection Summary

HCM 2000 Control Delay	42.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 10: Site Access 5 (Residential)/McKinnley Drive & Terry Fox Drive

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	264	150	0	736	104	0	0	5	34	0	51
Future Volume (Veh/h)	18	264	150	0	736	104	0	0	5	34	0	51
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	20	293	167	0	818	116	0	0	6	38	0	57
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised				Raised						
Median storage veh		1				1						
Upstream signal (m)		140										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	0.93
vC, conflicting volume	934			460			1350	1350	376	1215	1376	876
vC1, stage 1 conf vol							416	416		876	876	
vC2, stage 2 conf vol							933	934		339	500	
vCu, unblocked vol	934			383			1338	1339	293	1194	1367	876
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	100	99	86	100	84
cM capacity (veh/h)	733			1094			195	246	694	265	256	348
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total	20	460	934	6	95							
Volume Left	20	0	0	0	38							
Volume Right	0	167	116	6	57							
cSH	733	1700	1700	694	309							
Volume to Capacity	0.03	0.27	0.55	0.01	0.31							
Queue Length 95th (m)	0.6	0.0	0.0	0.2	9.6							
Control Delay (s)	10.0	0.0	0.0	10.2	21.7							
Lane LOS	B			B	C							
Approach Delay (s)	0.4		0.0	10.2	21.7							
Approach LOS				B	C							
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			59.5%		ICU Level of Service				B			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 11: Legget Drive/Legget Road & Site Access 6 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	6	41	49	39	23	209	216	12	6	60	5
Future Volume (Veh/h)	5	6	41	49	39	23	209	216	12	6	60	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	7	46	54	43	26	232	240	13	7	67	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	842	801	70	844	798	246	73			253		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	842	801	70	844	798	246	73			253		
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 %	97	97	95	77	84	97	85			99		
cM capacity (veh/h)	213	268	993	233	269	792	1527			1312		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	59	123	485	80								
Volume Left	6	54	232	7								
Volume Right	46	26	13	6								
cSH	586	290	1527	1312								
Volume to Capacity	0.10	0.42	0.15	0.01								
Queue Length 95th (m)	2.5	15.3	4.1	0.1								
Control Delay (s)	11.8	26.3	4.4	0.7								
Lane LOS	B	D	A	A								
Approach Delay (s)	11.8	26.3	4.4	0.7								
Approach LOS	B	D										
Intersection Summary												
Average Delay			8.2									
Intersection Capacity Utilization			51.5%	ICU Level of Service						A		
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 12: Legget Drive & Site Access 7 (Campus)

07/14/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	223	56	0	202	96	54
Future Volume (Veh/h)	223	56	0	202	96	54
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	248	62	0	224	107	60
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	388					
pX, platoon unblocked						
vC, conflicting volume	361	137	167			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	361	137	167			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	61	93	100			
cM capacity (veh/h)	638	911	1411			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	310	224	167			
Volume Left	248	0	0			
Volume Right	62	0	60			
cSH	679	1411	1700			
Volume to Capacity	0.46	0.00	0.10			
Queue Length 95th (m)	18.2	0.0	0.0			
Control Delay (s)	14.7	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	14.7	0.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay	6.5					
Intersection Capacity Utilization	34.5%			ICU Level of Service	A	
Analysis Period (min)	15					

# HCM Unsignalized Intersection Capacity Analysis

## 13: Site Access 8 (Campus) & Legget Drive

07/14/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	56	225	3	146	205	5
Future Volume (Veh/h)	56	225	3	146	205	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	62	250	3	162	228	6
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume	399	231	234			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	399	231	234			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	69	100			
cM capacity (veh/h)	605	808	1333			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	312	165	234			
Volume Left	62	3	0			
Volume Right	250	0	6			
cSH	758	1333	1700			
Volume to Capacity	0.41	0.00	0.14			
Queue Length 95th (m)	15.4	0.1	0.0			
Control Delay (s)	13.0	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.0	0.2	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			5.8			
Intersection Capacity Utilization			36.3%	ICU Level of Service	A	
Analysis Period (min)			15			



Queues

1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	72	147	113	21	26	44	1146	36	171	2499	10
v/c Ratio	0.32	0.45	0.68	0.10	0.10	0.38	0.43	0.04	0.68	0.75	0.01
Control Delay	53.4	11.8	73.4	47.9	0.8	56.2	9.2	0.4	66.4	18.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	11.8	73.4	47.9	0.8	56.2	9.2	0.4	66.4	18.6	0.0
Queue Length 50th (m)	17.0	0.0	28.1	4.8	0.0	12.2	20.9	0.1	41.7	154.1	0.0
Queue Length 95th (m)	29.9	17.8	45.6	12.0	0.0	m14.0	m24.1	m0.1	64.7	219.0	0.0
Internal Link Dist (m)	116.4			136.8			274.6			145.2	
Turn Bay Length (m)		10.0	38.0		38.0	130.0		25.0	68.0		25.0
Base Capacity (vph)	417	479	308	401	411	188	2649	879	254	3312	1022
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.31	0.37	0.05	0.06	0.23	0.43	0.04	0.67	0.75	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: March Road N/March Road S & Morgan's Grant Way/Shirley's Brook Dr

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↖	↖	↖	↑↑↑	↖	↖	↑↑↑	↖
Traffic Volume (vph)	11	54	132	102	19	23	40	1031	32	154	2249	9
Future Volume (vph)	11	54	132	102	19	23	40	1031	32	154	2249	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.95	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1804	1515	1706	1655	1450	1679	4644	1475	1729	4969	1488
Flt Permitted		0.95	1.00	0.71	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1722	1515	1275	1655	1450	1679	4644	1475	1729	4969	1488
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	60	147	113	21	26	44	1146	36	171	2499	10
RTOR Reduction (vph)	0	0	128	0	0	23	0	0	15	0	0	3
Lane Group Flow (vph)	0	72	19	113	21	3	44	1146	21	171	2499	7
Confl. Peds. (#/hr)	3		3	3		3	5		6	6		5
Confl. Bikes (#/hr)			3						8			1
Heavy Vehicles (%)	0%	0%	0%	1%	10%	5%	3%	7%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		16.9	16.9	16.9	16.9	16.9	7.7	74.2	74.2	18.9	85.4	85.4
Effective Green, g (s)		16.9	16.9	16.9	16.9	16.9	7.7	74.2	74.2	18.9	85.4	85.4
Actuated g/C Ratio		0.13	0.13	0.13	0.13	0.13	0.06	0.57	0.57	0.15	0.66	0.66
Clearance Time (s)		7.5	7.5	7.5	7.5	7.5	6.4	6.1	6.1	6.4	6.1	6.1
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)		223	196	165	215	188	99	2650	841	251	3264	977
v/s Ratio Prot					0.01		0.03	0.25		c0.10	c0.50	
v/s Ratio Perm		0.04	0.01	c0.09		0.00			0.01			0.00
v/c Ratio		0.32	0.10	0.68	0.10	0.02	0.44	0.43	0.02	0.68	0.77	0.01
Uniform Delay, d1		51.4	49.8	54.0	49.8	49.3	59.1	15.9	12.1	52.7	15.4	7.7
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.90	0.52	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.8	0.2	11.2	0.2	0.0	1.7	0.3	0.0	7.4	1.8	0.0
Delay (s)		52.2	50.0	65.2	50.0	49.4	54.7	8.6	12.2	60.1	17.2	7.7
Level of Service		D	D	E	D	D	D	A	B	E	B	A
Approach Delay (s)		50.8			60.6			10.3			19.9	
Approach LOS		D			E			B			B	

### Intersection Summary

HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 2: March Road & Terry Fox Drive

07/14/2022

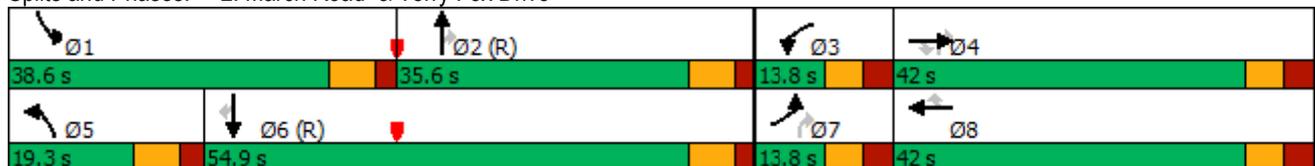


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗	↘	↖↖	↗↗	↘	↖↖	↗↗↗	↘	↖	↗↗↗	↘
Traffic Volume (vph)	156	429	314	79	113	64	308	843	159	436	1831	218
Future Volume (vph)	156	429	314	79	113	64	308	843	159	436	1831	218
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	custom	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2 7 4			6
Detector Phase	7	4	4	3	8	8	5	2	2 7 4	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	15.0		7.0	15.0	15.0
Minimum Split (s)	13.8	42.0	42.0	13.8	42.0	42.0	13.9	32.7		13.9	32.7	32.7
Total Split (s)	13.8	42.0	42.0	13.8	42.0	42.0	19.3	35.6		38.6	54.9	54.9
Total Split (%)	10.6%	32.3%	32.3%	10.6%	32.3%	32.3%	14.8%	27.4%		29.7%	42.2%	42.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	3.1	3.3	3.3	3.1	3.3	3.3	2.3	2.1		2.3	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7		6.9	6.7	6.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes							
Recall Mode	None	C-Max		None	C-Max	C-Max						
Act Effct Green (s)	7.0	26.5	26.5	7.0	26.5	26.5	19.2	28.9	76.2	40.2	49.8	49.8
Actuated g/C Ratio	0.05	0.20	0.20	0.05	0.20	0.20	0.15	0.22	0.59	0.31	0.38	0.38
v/c Ratio	0.98	0.68	0.72	0.52	0.18	0.15	0.70	0.90	0.20	0.91	1.09	0.37
Control Delay	122.9	52.2	23.1	71.1	41.8	0.7	61.7	61.6	5.7	68.5	78.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	122.9	52.2	23.1	71.1	41.8	0.7	61.7	61.6	5.7	68.5	78.3	5.9
LOS	F	D	C	E	D	A	E	E	A	E	E	A
Approach Delay		54.3			40.6			54.8			70.2	
Approach LOS		D			D			D			E	

### Intersection Summary

Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 114 (88%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 61.7	Intersection LOS: E
Intersection Capacity Utilization 98.7%	ICU Level of Service F
Analysis Period (min) 15	

### Splits and Phases: 2: March Road & Terry Fox Drive



Queues

2: March Road & Terry Fox Drive

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	173	477	349	88	126	71	342	937	177	484	2034	242
v/c Ratio	0.98	0.68	0.72	0.52	0.18	0.15	0.70	0.90	0.20	0.91	1.09	0.37
Control Delay	122.9	52.2	23.1	71.1	41.8	0.7	61.7	61.6	5.7	68.5	78.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	122.9	52.2	23.1	71.1	41.8	0.7	61.7	61.6	5.7	68.5	78.3	5.9
Queue Length 50th (m)	23.2	59.8	26.0	11.5	14.1	0.0	42.8	86.1	9.2	96.5	~221.5	1.7
Queue Length 95th (m)	#46.4	71.7	56.5	20.3	21.1	0.0	#80.9	#109.3	16.1	#209.2	#246.4	m20.3
Internal Link Dist (m)		245.5			129.1			295.3			274.6	
Turn Bay Length (m)	104.0		52.0	72.0		100.0	142.0		82.0	100.0		98.0
Base Capacity (vph)	177	931	568	170	912	544	486	1041	997	534	1867	658
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.51	0.61	0.52	0.14	0.13	0.70	0.90	0.18	0.91	1.09	0.37

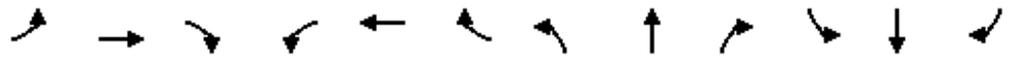
Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 2: March Road & Terry Fox Drive

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑	↗	↔↔	↑↑↑	↗	↗	↑↑↑	↗
Traffic Volume (vph)	156	429	314	79	113	64	308	843	159	436	1831	218
Future Volume (vph)	156	429	314	79	113	64	308	843	159	436	1831	218
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7	6.7	6.9	6.7	6.7
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3288	3458	1463	3164	3390	1469	3288	4687	1483	1729	4871	1397
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	173	477	349	88	126	71	342	937	177	484	2034	242
RTOR Reduction (vph)	0	0	189	0	0	57	0	0	43	0	0	123
Lane Group Flow (vph)	173	477	160	88	126	14	342	937	134	484	2034	119
Confl. Peds. (#/hr)	9		29	29		9	21		13	13		21
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	2%	0%	1%	6%	2%	3%	2%	6%	1%	0%	2%	6%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	custom	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2 7 4			6
Actuated Green, G (s)	7.0	26.5	26.5	7.0	26.5	26.5	19.2	28.9	75.9	40.2	49.9	49.9
Effective Green, g (s)	7.0	26.5	26.5	7.0	26.5	26.5	19.2	28.9	69.1	40.2	49.9	49.9
Actuated g/C Ratio	0.05	0.20	0.20	0.05	0.20	0.20	0.15	0.22	0.53	0.31	0.38	0.38
Clearance Time (s)	6.8	7.0	7.0	6.8	7.0	7.0	6.9	6.7		6.9	6.7	6.7
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)	177	704	298	170	691	299	485	1041	788	534	1869	536
v/s Ratio Prot	c0.05	c0.14		0.03	0.04		0.10	0.20		c0.28	c0.42	
v/s Ratio Perm			0.11			0.01			0.09			0.09
v/c Ratio	0.98	0.68	0.54	0.52	0.18	0.05	0.71	0.90	0.17	0.91	1.09	0.22
Uniform Delay, d1	61.4	47.8	46.2	59.9	42.8	41.6	52.7	49.1	15.7	43.1	40.0	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.78	0.73
Incremental Delay, d2	60.4	2.6	1.8	2.6	0.1	0.1	4.6	12.2	0.1	14.1	46.6	0.7
Delay (s)	121.8	50.4	48.1	62.5	42.9	41.7	57.3	61.4	15.8	66.4	78.0	20.4
Level of Service	F	D	D	E	D	D	E	E	B	E	E	C
Approach Delay (s)		62.0			48.7			54.9			70.9	
Approach LOS		E			D			D			E	

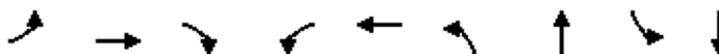
### Intersection Summary

HCM 2000 Control Delay	63.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	27.4
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 3: March Road & Solandt Road

07/14/2022

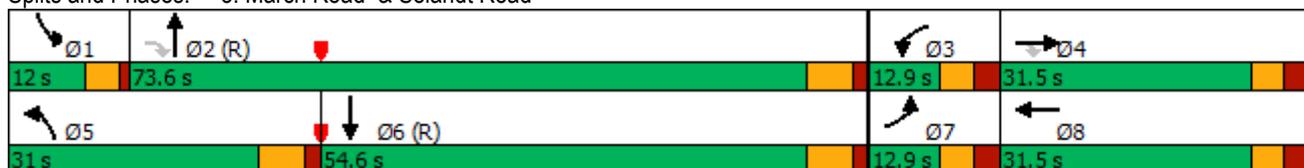


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	37	98	119	57	116	563	1644	139	1845
Future Volume (vph)	37	98	119	57	116	563	1644	139	1845
Turn Type	Prot	NA	custom	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4 2						
Detector Phase	7	4	4 2	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	10.0		7.0	10.0	7.0	15.0	5.0	15.0
Minimum Split (s)	12.9	31.5		12.9	31.5	13.3	25.3	9.5	25.3
Total Split (s)	12.9	31.5		12.9	31.5	31.0	73.6	12.0	54.6
Total Split (%)	9.9%	24.2%		9.9%	24.2%	23.8%	56.6%	9.2%	42.0%
Yellow Time (s)	3.3	3.3		3.3	3.3	4.6	4.6	3.5	4.6
All-Red Time (s)	2.6	3.2		2.6	3.2	1.7	1.7	1.0	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	6.5		5.9	6.5	6.3	6.3	4.5	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	C-Max	None	C-Max
Act Effct Green (s)	7.0	17.4	85.8	7.0	17.4	24.7	67.3	17.6	58.4
Actuated g/C Ratio	0.05	0.13	0.66	0.05	0.13	0.19	0.52	0.14	0.45
v/c Ratio	0.47	0.46	0.13	0.36	0.72	1.93	1.38	0.67	1.48
Control Delay	77.7	56.9	0.8	65.2	66.4	457.1	202.0	70.2	250.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.7	56.9	0.8	65.2	66.4	457.1	202.0	70.2	250.6
LOS	E	E	A	E	E	F	F	E	F
Approach Delay		33.7			66.1		256.2		238.9
Approach LOS		C			E		F		F

### Intersection Summary

Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.93  
 Intersection Signal Delay: 230.8      Intersection LOS: F  
 Intersection Capacity Utilization 129.9%      ICU Level of Service H  
 Analysis Period (min) 15

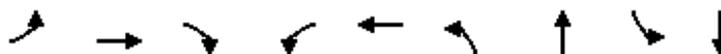
### Splits and Phases: 3: March Road & Solandt Road



# Queues

## 3: March Road & Solandt Road

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	41	109	132	63	169	626	2325	154	2217
v/c Ratio	0.47	0.46	0.13	0.36	0.72	1.93	1.38	0.67	1.48
Control Delay	77.7	56.9	0.8	65.2	66.4	457.1	202.0	70.2	250.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.7	56.9	0.8	65.2	66.4	457.1	202.0	70.2	250.6
Queue Length 50th (m)	10.4	26.1	0.0	8.1	39.3	~246.6	~414.9	39.0	~424.0
Queue Length 95th (m)	22.5	42.0	2.3	15.7	60.2	#317.4	#455.6	#95.6	#489.4
Internal Link Dist (m)		112.5			205.8		333.2		208.2
Turn Bay Length (m)	65.0		100.0	90.0		157.0		140.0	
Base Capacity (vph)	87	343	1069	177	334	325	1687	230	1494
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.32	0.12	0.36	0.51	1.93	1.38	0.67	1.48

### Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 3: March Road & Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	98	119	57	116	36	563	1644	448	139	1845	150
Future Volume (vph)	37	98	119	57	116	36	563	1644	448	139	1845	150
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.9	6.5	6.5	5.9	6.5		6.3	6.3		4.5	6.3	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1616	1784	1437	3288	1694		1712	3224		1695	3314	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1616	1784	1437	3288	1694		1712	3224		1695	3314	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	41	109	132	63	129	40	626	1827	498	154	2050	167
RTOR Reduction (vph)	0	0	47	0	10	0	0	19	0	0	4	0
Lane Group Flow (vph)	41	109	85	63	159	0	626	2306	0	154	2213	0
Confl. Peds. (#/hr)	7		8	8		7	6					6
Confl. Bikes (#/hr)			1			1			1			12
Heavy Vehicles (%)	7%	2%	5%	2%	3%	3%	1%	4%	1%	2%	3%	2%
Turn Type	Prot	NA	custom	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 2									
Actuated Green, G (s)	5.6	17.4	83.6	5.6	17.4		24.7	66.2		17.6	57.3	
Effective Green, g (s)	5.6	17.4	83.6	5.6	17.4		24.7	66.2		17.6	57.3	
Actuated g/C Ratio	0.04	0.13	0.64	0.04	0.13		0.19	0.51		0.14	0.44	
Clearance Time (s)	5.9	6.5		5.9	6.5		6.3	6.3		4.5	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	69	238	924	141	226		325	1641		229	1460	
v/s Ratio Prot	c0.03	0.06		0.02	c0.09		c0.37	0.72		0.09	c0.67	
v/s Ratio Perm			0.06									
v/c Ratio	0.59	0.46	0.09	0.45	0.71		1.93	1.41		0.67	1.52	
Uniform Delay, d1	61.1	51.9	8.8	60.7	53.9		52.6	31.9		53.5	36.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.0	1.4	0.0	2.2	9.6		428.0	186.0		7.6	235.7	
Delay (s)	74.1	53.3	8.8	62.9	63.5		480.6	217.9		61.0	272.0	
Level of Service	E	D	A	E	E		F	F		E	F	
Approach Delay (s)		35.5			63.3			273.7			258.3	
Approach LOS		D			E			F			F	

### Intersection Summary

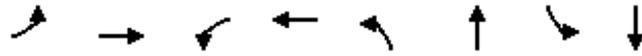
HCM 2000 Control Delay	247.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.43		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	129.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Queues

4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	254	352	12	20	110	213	4	335
v/c Ratio	0.47	0.49	0.03	0.04	0.39	0.38	0.01	0.60
Control Delay	14.3	9.4	9.6	7.8	17.6	14.3	12.0	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	9.4	9.6	7.8	17.6	14.3	12.0	18.1
Queue Length 50th (m)	13.1	10.9	0.5	0.5	5.7	10.5	0.2	18.1
Queue Length 95th (m)	36.0	34.1	3.2	3.8	20.4	30.6	1.9	49.2
Internal Link Dist (m)		205.8		177.5		261.1		203.5
Turn Bay Length (m)	130.0		42.0		65.0		35.0	
Base Capacity (vph)	1330	1592	977	1346	794	1544	901	1555
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.22	0.01	0.01	0.14	0.14	0.00	0.22
<b>Intersection Summary</b>								

# HCM Signalized Intersection Capacity Analysis

## 4: Legget Drive/Legget Road & Solandt Road /Solandt Road

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	229	111	206	11	11	7	99	159	32	4	238	64
Future Volume (vph)	229	111	206	11	11	7	99	159	32	4	238	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.90		1.00	0.94		1.00	0.97		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)	1721	1604		1728	1357		1601	1735		1557	1743	
Flt Permitted	0.74	1.00		0.54	1.00		0.53	1.00		0.62	1.00	
Satd. Flow (perm)	1348	1604		985	1357		889	1735		1024	1743	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	254	123	229	12	12	8	110	177	36	4	264	71
RTOR Reduction (vph)	0	76	0	0	5	0	0	7	0	0	9	0
Lane Group Flow (vph)	254	276	0	12	15	0	110	206	0	4	326	0
Confl. Peds. (#/hr)	4		1	1		4			11	11		
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	0%	1%	1%	0%	30%	17%	8%	2%	0%	10%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.2	18.2		18.2	18.2		14.3	14.3		14.3	14.3	
Effective Green, g (s)	18.2	18.2		18.2	18.2		14.3	14.3		14.3	14.3	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.32	0.32		0.32	0.32	
Clearance Time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	546	650		399	550		283	552		326	555	
v/s Ratio Prot		0.17			0.01			0.12			c0.19	
v/s Ratio Perm	c0.19			0.01			0.12			0.00		
v/c Ratio	0.47	0.42		0.03	0.03		0.39	0.37		0.01	0.59	
Uniform Delay, d1	9.8	9.6		8.0	8.0		11.9	11.8		10.5	12.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.4		0.0	0.0		0.9	0.4		0.0	1.6	
Delay (s)	10.4	10.0		8.1	8.0		12.8	12.3		10.5	14.4	
Level of Service	B	B		A	A		B	B		B	B	
Approach Delay (s)		10.2			8.1			12.4			14.4	
Approach LOS		B			A			B			B	

### Intersection Summary

HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	44.9	Sum of lost time (s)	12.4
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Unsignalized Intersection Capacity Analysis

## 5: Legget Drive & Terry Fox Drive

07/14/2022



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔		↔
Traffic Volume (veh/h)	589	427	43	161	30	30
Future Volume (Veh/h)	589	427	43	161	30	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	654	474	48	179	33	33
Pedestrians				2	17	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.1	1.1	
Percent Blockage				0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	305					
pX, platoon unblocked			0.83		0.83	0.83
vC, conflicting volume			1145		1183	910
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1071		1117	788
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			91		80	90
cM capacity (veh/h)			506		168	315
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1128	227	66			
Volume Left	0	48	33			
Volume Right	474	0	33			
cSH	1700	506	219			
Volume to Capacity	0.66	0.09	0.30			
Queue Length 95th (m)	0.0	2.4	9.2			
Control Delay (s)	0.0	3.8	28.3			
Lane LOS			A			D
Approach Delay (s)	0.0	3.8	28.3			
Approach LOS				D		
<b>Intersection Summary</b>						
Average Delay			1.9			
Intersection Capacity Utilization			72.0%	ICU Level of Service	C	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 6: March Road & Site Access 1 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘	↖	↕
Traffic Volume (veh/h)	0	5	1501	348	0	0
Future Volume (Veh/h)	0	5	1501	348	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	6	1668	387	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			232			247
pX, platoon unblocked	0.50	0.50			0.50	
vC, conflicting volume	1862	1028			2055	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	735	0			1120	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	178	545			311	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	6	1112	943	0	0	
Volume Left	0	0	0	0	0	
Volume Right	6	0	387	0	0	
cSH	545	1700	1700	1700	1700	
Volume to Capacity	0.01	0.65	0.55	0.00	0.00	
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.7	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			65.5%		ICU Level of Service	C
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 7: March Road & Site Access 2 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘	↖	↗
Traffic Volume (veh/h)	0	5	1289	57	0	0
Future Volume (Veh/h)	0	5	1289	57	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	6	1432	63	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			322			157
pX, platoon unblocked	0.53	0.53			0.53	
vC, conflicting volume	1464	748			1495	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	101	0			160	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	470	575			751	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	6	955	540	0	0	
Volume Left	0	0	0	0	0	
Volume Right	6	0	63	0	0	
cSH	575	1700	1700	1700	1700	
Volume to Capacity	0.01	0.56	0.32	0.00	0.00	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	11.3	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.3	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			49.5%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 8: March Road & Site Access 3 (Campus)

07/14/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	1289	5	0	0
Future Volume (Veh/h)	0	19	1289	5	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	21	1432	6	0	0
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	401			78		
pX, platoon unblocked	0.55	0.55			0.55	
vC, conflicting volume	1435	719			1438	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	137	0			143	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	460	593			786	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	21	955	483	0	0	
Volume Left	0	0	0	0	0	
Volume Right	21	0	6	0	0	
cSH	593	1700	1700	1700	1700	
Volume to Capacity	0.04	0.56	0.28	0.00	0.00	
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	
Control Delay (s)	11.3	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.3	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization			47.8%	ICU Level of Service	A	
Analysis Period (min)			15			



Queues

9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	6	12	170	154	6	1369	112	331	2146
v/c Ratio	0.04	0.05	0.81	0.42	0.09	0.81	0.14	0.89	0.83
Control Delay	38.6	27.7	71.6	11.0	21.0	28.8	4.2	68.7	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	27.7	71.6	11.0	21.0	28.8	4.2	68.7	13.1
Queue Length 50th (m)	1.1	1.1	34.7	1.1	0.7	134.1	0.8	68.2	146.2
Queue Length 95th (m)	4.8	6.4	#65.1	18.3	3.6	165.5	10.1	#114.4	185.0
Internal Link Dist (m)		124.3		188.6		54.1			77.0
Turn Bay Length (m)	37.5		65.0		37.5			75.0	
Base Capacity (vph)	158	297	237	392	64	1695	811	392	2575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.04	0.72	0.39	0.09	0.81	0.14	0.84	0.83

Intersection Summary

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

# HCM Signalized Intersection Capacity Analysis

## 9: March Road & Site Access 4 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↗	
Traffic Volume (vph)	5	5	5	153	5	133	5	1232	101	298	1926	5
Future Volume (vph)	5	5	5	153	5	133	5	1232	101	298	1926	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.93		1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1695	1650		1695	1527		1695	3390	1517	1695	3389	
Flt Permitted	0.50	1.00		0.75	1.00		0.07	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	895	1650		1338	1527		130	3390	1517	1695	3389	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	6	6	170	6	148	6	1369	112	331	2140	6
RTOR Reduction (vph)	0	5	0	0	125	0	0	0	53	0	0	0
Lane Group Flow (vph)	6	7	0	170	29	0	6	1369	60	331	2146	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Prot	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2			
Actuated Green, G (s)	17.4	17.4		17.4	17.4		55.0	55.0	55.0	24.1	83.6	
Effective Green, g (s)	17.4	17.4		17.4	17.4		55.0	55.0	55.0	24.1	83.6	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.50	0.50	0.50	0.22	0.76	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
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)	141	261		211	241		65	1695	758	371	2575	
v/s Ratio Prot		0.00			0.02			0.40		0.20	c0.63	
v/s Ratio Perm	0.01			c0.13			0.05		0.04			
v/c Ratio	0.04	0.03		0.81	0.12		0.09	0.81	0.08	0.89	0.83	
Uniform Delay, d1	39.2	39.1		44.7	39.7		14.4	23.1	14.3	41.7	8.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.0		19.6	0.2		2.8	4.3	0.2	22.6	3.3	
Delay (s)	39.4	39.2		64.3	40.0		17.2	27.3	14.5	64.3	12.0	
Level of Service	D	D		E	D		B	C	B	E	B	
Approach Delay (s)		39.2			52.7			26.3			19.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 10: Site Access 5 (Residential)/McKinnley Drive & Terry Fox Drive

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	939	84	0	256	21	0	0	5	132	0	47
Future Volume (Veh/h)	67	939	84	0	256	21	0	0	5	132	0	47
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	74	1043	93	0	284	23	0	0	6	147	0	52
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh		1			1							
Upstream signal (m)		153										
pX, platoon unblocked				0.84			0.84	0.84	0.84	0.84	0.84	
vC, conflicting volume	307			1136			1585	1544	1090	1492	1580	296
vC1, stage 1 conf vol							1238	1238		296	296	
vC2, stage 2 conf vol							348	307		1197	1284	
vCu, unblocked vol	307			1065			1602	1553	1009	1491	1595	296
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	100	98	6	100	93
cM capacity (veh/h)	1254			547			144	168	244	157	161	744
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total	74	1136	307	6	199							
Volume Left	74	0	0	0	147							
Volume Right	0	93	23	6	52							
cSH	1254	1700	1700	244	198							
Volume to Capacity	0.06	0.67	0.18	0.02	1.00							
Queue Length 95th (m)	1.4	0.0	0.0	0.6	66.1							
Control Delay (s)	8.1	0.0	0.0	20.1	115.0							
Lane LOS	A			C	F							
Approach Delay (s)	0.5		0.0	20.1	115.0							
Approach LOS				C	F							
Intersection Summary												
Average Delay			13.7									
Intersection Capacity Utilization			81.6%		ICU Level of Service				D			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 11: Legget Drive/Legget Road & Site Access 6 (Lifestyle Street)

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	26	290	21	5	6	30	9	48	26	373	5
Future Volume (Veh/h)	5	26	290	21	5	6	30	9	48	26	373	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	29	322	23	6	7	33	10	53	29	414	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	588	604	417	914	580	36	420			63		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	588	604	417	914	580	36	420			63		
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 %	98	93	49	80	99	99	97			98		
cM capacity (veh/h)	398	393	636	114	405	1036	1139			1540		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	357	36	96	449								
Volume Left	6	23	33	29								
Volume Right	322	7	53	6								
cSH	600	161	1139	1540								
Volume to Capacity	0.60	0.22	0.03	0.02								
Queue Length 95th (m)	29.7	6.2	0.7	0.4								
Control Delay (s)	19.4	33.6	3.0	0.6								
Lane LOS	C	D	A	A								
Approach Delay (s)	19.4	33.6	3.0	0.6								
Approach LOS	C	D										
Intersection Summary												
Average Delay			9.3									
Intersection Capacity Utilization			50.4%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 12: Legget Drive & Site Access 7 (Campus)

07/14/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	8	5	48	330	386
Future Volume (Veh/h)	31	8	5	48	330	386
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	34	9	6	53	367	429
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	388					
pX, platoon unblocked						
vC, conflicting volume	646	582	796			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	646	582	796			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	98	99			
cM capacity (veh/h)	433	513	826			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	43	59	796			
Volume Left	34	6	0			
Volume Right	9	0	429			
cSH	447	826	1700			
Volume to Capacity	0.10	0.01	0.47			
Queue Length 95th (m)	2.4	0.2	0.0			
Control Delay (s)	13.9	1.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.9	1.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.7			
Intersection Capacity Utilization			53.3%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 13: Site Access 8 (Campus) & Legget Drive

07/14/2022

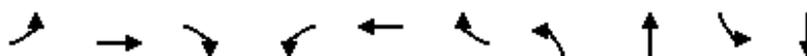


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	34	3	40	365	5
Future Volume (Veh/h)	8	34	3	40	365	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	38	3	44	406	6
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume	459	409	412			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	459	409	412			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	94	100			
cM capacity (veh/h)	559	642	1147			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	47	47	412			
Volume Left	9	3	0			
Volume Right	38	0	6			
cSH	624	1147	1700			
Volume to Capacity	0.08	0.00	0.24			
Queue Length 95th (m)	1.8	0.1	0.0			
Control Delay (s)	11.2	0.5	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.2	0.5	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			1.1			
Intersection Capacity Utilization			30.6%	ICU Level of Service	A	
Analysis Period (min)			15			

# Timings

## 1: Bank St & Heron Rd

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↗	↖	↕	↗	↖↗	↕	↖	↕
Traffic Volume (vph)	227	1148	528	97	155	226	445	587	362	955
Future Volume (vph)	227	1148	528	97	155	226	445	587	362	955
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA
Protected Phases	7	4			8		5	2	1	6
Permitted Phases	4		4	8		8				
Detector Phase	7	4	4	8	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0	10.0	7.0	10.0	7.0	10.0
Minimum Split (s)	13.5	34.4	34.4	32.5	32.5	32.5	13.5	32.4	13.5	32.4
Total Split (s)	13.0	55.0	55.0	42.0	42.0	42.0	32.0	49.0	16.0	33.0
Total Split (%)	10.8%	45.8%	45.8%	35.0%	35.0%	35.0%	26.7%	40.8%	13.3%	27.5%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.1	3.1	1.0	1.0	1.0	3.2	3.1	3.2	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.4	6.4	4.3	4.3	4.3	6.5	6.4	6.5	6.4
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes			Yes						
Recall Mode	None	C-Max	None	C-Max						
Act Effct Green (s)	48.5	48.6	48.6	37.7	37.7	37.7	22.7	42.6	9.5	29.4
Actuated g/C Ratio	0.40	0.40	0.40	0.31	0.31	0.31	0.19	0.36	0.08	0.24
v/c Ratio	0.58	0.94	0.70	1.86	0.17	0.40	0.81	0.63	2.98	1.56
Control Delay	32.6	48.3	11.5	473.2	30.3	5.8	42.1	23.9	929.3	289.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	48.3	11.5	473.2	30.3	5.8	42.1	23.9	929.3	289.9
LOS	C	D	B	F	C	A	D	C	F	F
Approach Delay		36.2			108.8			31.2		447.6
Approach LOS		D			F			C		F

### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 52 (43%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.98

Intersection Signal Delay: 164.1

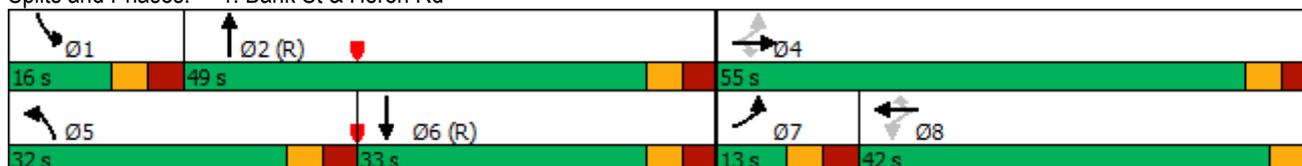
Intersection LOS: F

Intersection Capacity Utilization 107.9%

ICU Level of Service G

Analysis Period (min) 15

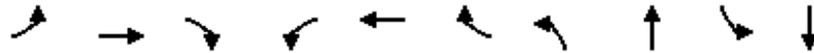
### Splits and Phases: 1: Bank St & Heron Rd



Queues

1: Bank St & Heron Rd

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	252	1276	587	108	172	251	494	728	402	1227
v/c Ratio	0.58	0.94	0.70	1.86	0.17	0.40	0.81	0.63	2.98	1.56
Control Delay	32.6	48.3	11.5	473.2	30.3	5.8	42.1	23.9	929.3	289.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	48.3	11.5	473.2	30.3	5.8	42.1	23.9	929.3	289.9
Queue Length 50th (m)	40.9	149.6	21.5	~38.7	15.4	0.0	46.9	72.1	~163.8	~218.0
Queue Length 95th (m)	62.2	#195.5	65.3	#75.0	24.0	18.1	m52.7	m82.4	#224.0	#267.8
Internal Link Dist (m)		357.8			468.5			97.2		250.8
Turn Bay Length (m)	73.0		85.0	50.0		70.0	110.0		70.0	
Base Capacity (vph)	432	1359	839	58	1034	623	685	1162	135	787
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.94	0.70	1.86	0.17	0.40	0.72	0.63	2.98	1.56

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: Bank St & Heron Rd

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗	↘	↘	↗	↘	↗	↗		↘	↗	
Traffic Volume (vph)	227	1148	528	97	155	226	445	587	68	362	955	149
Future Volume (vph)	227	1148	528	97	155	226	445	587	68	362	955	149
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.4	6.4	4.3	4.3	4.3	6.5	6.4		6.5	6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1706	3357	1404	1660	3293	1438	3225	3258		1712	3171	
Flt Permitted	0.54	1.00	1.00	0.11	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	975	3357	1404	185	3293	1438	3225	3258		1712	3171	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	252	1276	587	108	172	251	494	652	76	402	1061	166
RTOR Reduction (vph)	0	0	271	0	0	172	0	7	0	0	10	0
Lane Group Flow (vph)	252	1276	316	108	172	79	494	721	0	402	1217	0
Confl. Peds. (#/hr)	8		13	13		8	12		20	20		12
Confl. Bikes (#/hr)			1			3			3			9
Heavy Vehicles (%)	1%	3%	7%	4%	5%	5%	4%	3%	13%	1%	7%	2%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	48.6	48.6	48.6	37.7	37.7	37.7	22.7	42.6		9.5	29.4	
Effective Green, g (s)	48.6	48.6	48.6	37.7	37.7	37.7	22.7	42.6		9.5	29.4	
Actuated g/C Ratio	0.41	0.41	0.41	0.31	0.31	0.31	0.19	0.36		0.08	0.24	
Clearance Time (s)	6.5	6.4	6.4	4.3	4.3	4.3	6.5	6.4		6.5	6.4	
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)	434	1359	568	58	1034	451	610	1156		135	776	
v/s Ratio Prot	0.03	c0.38			0.05		c0.15	0.22		c0.23	c0.38	
v/s Ratio Perm	0.20		0.23	c0.58		0.05						
v/c Ratio	0.58	0.94	0.56	1.86	0.17	0.17	0.81	0.62		2.98	1.57	
Uniform Delay, d1	28.0	34.3	27.4	41.1	29.8	29.9	46.6	32.1		55.2	45.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.70		1.00	1.00	
Incremental Delay, d2	2.0	12.4	1.2	446.2	0.1	0.2	5.1	1.6		909.6	262.1	
Delay (s)	30.0	46.7	28.6	487.4	29.9	30.0	39.9	24.0		964.9	307.4	
Level of Service	C	D	C	F	C	C	D	C		F	F	
Approach Delay (s)		39.7			123.0			30.4			469.6	
Approach LOS		D			F			C			F	

### Intersection Summary

HCM 2000 Control Delay	173.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.7
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Queues

2: Alta Vista Dr & Heron Rd

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	174	1560	134	1409	276	27	409	319	723
v/c Ratio	1.21	1.50	0.94	1.35	0.49	0.36	0.91	1.21	1.01
Control Delay	179.9	256.4	104.9	185.8	5.6	43.0	55.7	146.7	62.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	179.9	256.4	104.9	185.8	5.6	43.0	55.7	146.7	62.8
Queue Length 50th (m)	~37.0	~200.7	25.0	~167.2	0.0	3.8	63.7	~47.4	~121.2
Queue Length 95th (m)	#75.5	#242.6	m#44.0	#209.4	m9.6	12.5	#116.9	#98.6	#196.7
Internal Link Dist (m)		468.5		418.0			177.9		246.3
Turn Bay Length (m)	65.0		57.0		85.0			30.0	
Base Capacity (vph)	144	1041	143	1046	566	74	451	264	718
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.21	1.50	0.94	1.35	0.49	0.36	0.91	1.21	1.01

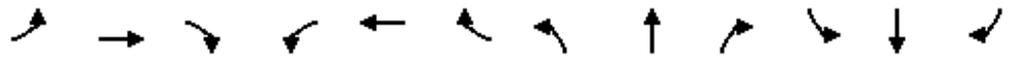
Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 2: Alta Vista Dr & Heron Rd

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	1360	44	121	1268	248	24	235	133	287	495	156
Future Volume (vph)	157	1360	44	121	1268	248	24	235	133	287	495	156
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.4	5.4		5.4	5.4	5.4	5.9	5.9		4.3	5.9	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.83	1.00	0.95		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1712	3269		1695	3293	1213	1592	1600		1620	1714	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.17	1.00		0.20	1.00	
Satd. Flow (perm)	1712	3269		1695	3293	1213	278	1600		333	1714	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	174	1511	49	134	1409	276	27	261	148	319	550	173
RTOR Reduction (vph)	0	3	0	0	0	181	0	23	0	0	12	0
Lane Group Flow (vph)	174	1557	0	134	1409	95	27	386	0	319	711	0
Confl. Peds. (#/hr)	54		37	37		54	21		110	110		21
Heavy Vehicles (%)	1%	5%	1%	2%	5%	6%	8%	2%	3%	6%	2%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	7.6	28.6		7.6	28.6	28.6	24.1	24.1		37.1	37.1	
Effective Green, g (s)	7.6	28.6		7.6	28.6	28.6	24.1	24.1		37.1	37.1	
Actuated g/C Ratio	0.08	0.32		0.08	0.32	0.32	0.27	0.27		0.41	0.41	
Clearance Time (s)	5.4	5.4		5.4	5.4	5.4	5.9	5.9		4.3	5.9	
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)	144	1038		143	1046	385	74	428		261	706	
v/s Ratio Prot	c0.10	c0.48		0.08	0.43			0.24		c0.12	0.41	
v/s Ratio Perm						0.08	0.10			c0.38		
v/c Ratio	1.21	1.50		0.94	1.35	0.25	0.36	0.90		1.22	1.01	
Uniform Delay, d1	41.2	30.7		41.0	30.7	22.7	26.7	31.8		23.2	26.4	
Progression Factor	1.00	1.00		1.24	0.77	0.84	1.00	1.00		1.00	1.00	
Incremental Delay, d2	141.7	230.2		49.2	161.4	1.2	13.3	24.9		129.3	35.5	
Delay (s)	182.9	260.9		100.0	184.9	20.3	40.1	56.7		152.5	61.9	
Level of Service	F	F		F	F	C	D	E		F	E	
Approach Delay (s)		253.1			153.7			55.7			89.7	
Approach LOS		F			F			E			F	

### Intersection Summary

HCM 2000 Control Delay	166.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	113.5%	ICU Level of Service	H
Analysis Period (min)	15		

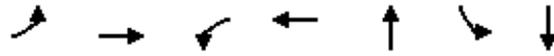
c Critical Lane Group



# Queues

## 3: Baycrest Dr & Heron Rd

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	258	1690	52	1535	260	96	136
v/c Ratio	2.53	0.87	0.75	0.77	0.80	0.29	0.31
Control Delay	706.8	9.0	82.9	25.5	47.8	27.2	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	706.8	9.0	82.9	25.5	47.8	27.2	21.9
Queue Length 50th (m)	~77.0	32.8	9.1	142.0	39.9	13.0	14.9
Queue Length 95th (m)	m#70.2	m27.2	m#22.0	174.2	#66.7	24.3	27.8
Internal Link Dist (m)		191.6		290.4	192.5		36.0
Turn Bay Length (m)	43.0		55.0			30.0	
Base Capacity (vph)	102	1952	69	1995	379	383	513
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	2.53	0.87	0.75	0.77	0.69	0.25	0.27

### Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

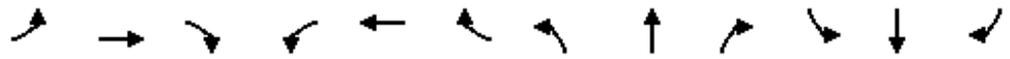
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 3: Baycrest Dr & Heron Rd

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	232	1200	321	47	1366	15	178	18	38	86	22	101
Future Volume (vph)	232	1200	321	47	1366	15	178	18	38	86	22	101
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.7	4.7		4.7	4.7			6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00			1.00		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98		1.00	1.00	
Frt	1.00	0.97		1.00	1.00			0.98		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1726	3178		1478	3288			1612		1721	1540	
Flt Permitted	0.09	1.00		0.07	1.00			0.69		0.66	1.00	
Satd. Flow (perm)	170	3178		114	3288			1155		1189	1540	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	258	1333	357	52	1518	17	198	20	42	96	24	112
RTOR Reduction (vph)	0	24	0	0	1	0	0	8	0	0	18	0
Lane Group Flow (vph)	258	1666	0	52	1534	0	0	252	0	96	118	0
Confl. Peds. (#/hr)	15		27	27		15	31		8	8		31
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	0%	3%	7%	17%	5%	0%	5%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	54.6	54.6		54.6	54.6			24.7		24.7	24.7	
Effective Green, g (s)	54.6	54.6		54.6	54.6			24.7		24.7	24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27		0.27	0.27	
Clearance Time (s)	4.7	4.7		4.7	4.7			6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	103	1927		69	1994			316		326	422	
v/s Ratio Prot		0.52			0.47						0.08	
v/s Ratio Perm	c1.52			0.46				c0.22		0.08		
v/c Ratio	2.50	0.86		0.75	0.77			0.80		0.29	0.28	
Uniform Delay, d1	17.7	14.6		12.8	13.1			30.3		25.8	25.7	
Progression Factor	0.58	0.48		1.73	1.61			1.00		1.00	1.00	
Incremental Delay, d2	679.8	0.5		46.8	2.5			13.1		0.5	0.4	
Delay (s)	690.0	7.5		69.0	23.5			43.4		26.3	26.0	
Level of Service	F	A		E	C			D		C	C	
Approach Delay (s)		97.9			25.0			43.4			26.1	
Approach LOS		F			C			D			C	

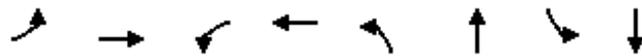
### Intersection Summary

HCM 2000 Control Delay	61.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.7
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 4: Sandalwood Dr & Heron Rd

07/14/2022

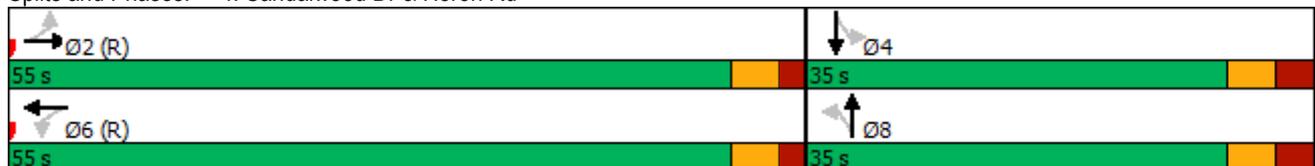


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↶↷	↶	↶↷	↶	↷	↶	↷
Traffic Volume (vph)	68	1153	54	1302	66	24	9	29
Future Volume (vph)	68	1153	54	1302	66	24	9	29
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0
Minimum Split (s)	24.3	24.3	24.3	24.3	24.1	24.1	24.1	24.1
Total Split (s)	55.0	55.0	55.0	55.0	35.0	35.0	35.0	35.0
Total Split (%)	61.1%	61.1%	61.1%	61.1%	38.9%	38.9%	38.9%	38.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.0	2.0	2.0	2.0	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	6.1	6.1	6.1	6.1
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effect Green (s)	67.7	67.7	67.7	67.7	16.4	16.4	16.4	16.4
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.18	0.18	0.18	0.18
v/c Ratio	0.39	0.57	0.30	0.60	0.37	0.22	0.04	0.26
Control Delay	6.3	3.0	16.0	13.5	38.2	17.5	30.4	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	3.0	16.0	13.5	38.2	17.5	30.4	23.6
LOS	A	A	B	B	D	B	C	C
Approach Delay		3.2		13.6		28.2		24.4
Approach LOS		A		B		C		C

### Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 9.8	Intersection LOS: A
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

### Splits and Phases: 4: Sandalwood Dr & Heron Rd



Queues

4: Sandalwood Dr & Heron Rd

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	76	1400	60	1469	73	68	10	83
v/c Ratio	0.39	0.57	0.30	0.60	0.37	0.22	0.04	0.26
Control Delay	6.3	3.0	16.0	13.5	38.2	17.5	30.4	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	3.0	16.0	13.5	38.2	17.5	30.4	23.6
Queue Length 50th (m)	1.6	29.8	5.7	88.3	11.2	4.0	1.5	7.9
Queue Length 95th (m)	m1.3	21.6	m9.5	118.1	23.5	14.6	5.6	19.7
Internal Link Dist (m)		290.4		330.9		175.1		234.5
Turn Bay Length (m)	55.0		55.0		32.0		37.0	
Base Capacity (vph)	195	2440	199	2450	348	523	413	544
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.57	0.30	0.60	0.21	0.13	0.02	0.15

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 4: Sandalwood Dr & Heron Rd

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	1153	107	54	1302	20	66	24	37	9	29	46
Future Volume (vph)	68	1153	107	54	1302	20	66	24	37	9	29	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.3	5.3		5.3	5.3		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1727	3240		1598	3256		1468	1544		1717	1633	
Flt Permitted	0.14	1.00		0.16	1.00		0.70	1.00		0.71	1.00	
Satd. Flow (perm)	259	3240		265	3256		1086	1544		1288	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	76	1281	119	60	1447	22	73	27	41	10	32	51
RTOR Reduction (vph)	0	5	0	0	1	0	0	35	0	0	26	0
Lane Group Flow (vph)	76	1395	0	60	1468	0	73	33	0	10	57	0
Confl. Peds. (#/hr)	7		7	7		7	5		5	5		5
Heavy Vehicles (%)	0%	3%	27%	8%	6%	0%	17%	15%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	65.4	65.4		65.4	65.4		13.2	13.2		13.2	13.2	
Effective Green, g (s)	65.4	65.4		65.4	65.4		13.2	13.2		13.2	13.2	
Actuated g/C Ratio	0.73	0.73		0.73	0.73		0.15	0.15		0.15	0.15	
Clearance Time (s)	5.3	5.3		5.3	5.3		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	188	2354		192	2366		159	226		188	239	
v/s Ratio Prot		0.43			c0.45			0.02			0.04	
v/s Ratio Perm	0.29			0.23			c0.07			0.01		
v/c Ratio	0.40	0.59		0.31	0.62		0.46	0.15		0.05	0.24	
Uniform Delay, d1	4.8	5.9		4.3	6.1		35.1	33.5		33.0	34.0	
Progression Factor	0.39	0.37		1.91	1.79		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.5	0.6		2.8	0.8		2.1	0.3		0.1	0.5	
Delay (s)	5.3	2.8		11.2	11.8		37.2	33.8		33.1	34.5	
Level of Service	A	A		B	B		D	C		C	C	
Approach Delay (s)		2.9			11.7			35.6			34.3	
Approach LOS		A			B			D			C	

### Intersection Summary

HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

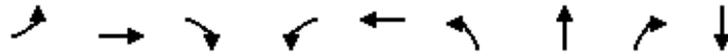
c Critical Lane Group



Queues

5: Heron Rd & Jefferson St

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	96	1231	120	48	1436	90	98	90	162
v/c Ratio	1.00	0.65	0.14	0.38	0.77	0.26	0.18	0.20	0.35
Control Delay	105.5	5.2	0.3	21.7	18.7	26.2	24.2	12.6	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	105.5	5.2	0.3	21.7	18.7	26.2	24.2	12.6	22.3
Queue Length 50th (m)	16.4	15.3	0.0	4.2	92.9	11.8	12.5	4.6	17.6
Queue Length 95th (m)	m#43.7	17.7	m0.1	14.8	124.0	23.6	23.8	15.2	33.5
Internal Link Dist (m)		330.9			441.1		152.5		213.6
Turn Bay Length (m)	58.0		62.0	55.0		18.0		15.0	
Base Capacity (vph)	96	1902	833	127	1856	366	582	470	493
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.65	0.14	0.38	0.77	0.25	0.17	0.19	0.33

Intersection Summary

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

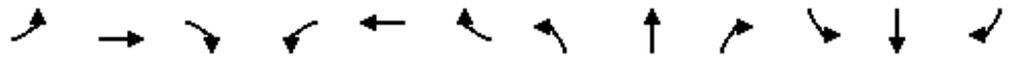
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 5: Heron Rd & Jefferson St

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	1108	108	43	1244	49	81	88	81	42	55	49
Future Volume (vph)	86	1108	108	43	1244	49	81	88	81	42	55	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6	5.6	5.6	5.6	5.6		6.2	6.2	6.2		6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00		1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85		0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1571	3357	1379	1382	3272		1673	1820	1357		1644	
Flt Permitted	0.10	1.00	1.00	0.15	1.00		0.65	1.00	1.00		0.89	
Satd. Flow (perm)	170	3357	1379	225	3272		1147	1820	1357		1482	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	96	1231	120	48	1382	54	90	98	90	47	61	54
RTOR Reduction (vph)	0	0	52	0	3	0	0	0	37	0	20	0
Lane Group Flow (vph)	96	1231	68	48	1433	0	90	98	53	0	142	0
Confl. Peds. (#/hr)	6		4	4		6	5		5	5		5
Confl. Bikes (#/hr)			2						1			
Heavy Vehicles (%)	10%	3%	9%	25%	5%	4%	3%	0%	12%	4%	0%	7%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0		27.2	27.2	27.2		27.2	
Effective Green, g (s)	51.0	51.0	51.0	51.0	51.0		27.2	27.2	27.2		27.2	
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.57		0.30	0.30	0.30		0.30	
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6		6.2	6.2	6.2		6.2	
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)	96	1902	781	127	1854		346	550	410		447	
v/s Ratio Prot		0.37			0.44			0.05				
v/s Ratio Perm	c0.56		0.05	0.21			0.08		0.04		c0.10	
v/c Ratio	1.00	0.65	0.09	0.38	0.77		0.26	0.18	0.13		0.32	
Uniform Delay, d1	19.5	13.3	8.9	10.8	15.0		23.8	23.2	22.8		24.2	
Progression Factor	0.31	0.27	0.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	85.7	1.5	0.2	8.4	3.2		0.4	0.2	0.1		0.4	
Delay (s)	91.7	5.1	0.2	19.1	18.2		24.2	23.3	22.9		24.6	
Level of Service	F	A	A	B	B		C	C	C		C	
Approach Delay (s)		10.5			18.3			23.5			24.6	
Approach LOS		B			B			C			C	

### Intersection Summary

HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

# Timings

## 6: Walkley Rd & Heron Rd

07/14/2022

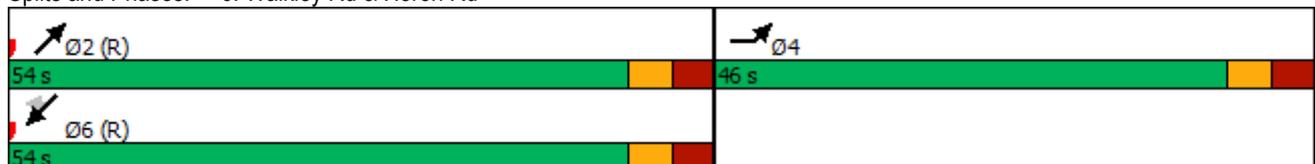


Lane Group	EBL	NET	SWT	SWR
Lane Configurations	↑↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	1218	743	1096	1320
Future Volume (vph)	1218	743	1096	1320
Turn Type	Prot	NA	NA	Perm
Protected Phases	4	2	6	
Permitted Phases				6
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	33.7	16.6	16.6	16.6
Total Split (s)	46.0	54.0	54.0	54.0
Total Split (%)	46.0%	54.0%	54.0%	54.0%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	3.4	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.6	6.6	6.6
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	C-Max	C-Max	C-Max
Act Effect Green (s)	39.3	47.4	47.4	47.4
Actuated g/C Ratio	0.39	0.47	0.47	0.47
v/c Ratio	1.06	0.51	0.76	0.72
Control Delay	72.6	19.7	25.4	3.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	72.6	19.7	25.4	3.2
LOS	E	B	C	A
Approach Delay	72.6	19.7	13.3	
Approach LOS	E	B	B	

### Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 23 (23%), Referenced to phase 2:NET and 6:SWT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 31.0	Intersection LOS: C
Intersection Capacity Utilization 80.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Walkley Rd & Heron Rd



# Queues

## 6: Walkley Rd & Heron Rd

07/14/2022



Lane Group	EBL	NET	SWT	SWR
Lane Group Flow (vph)	1369	826	1218	1467
v/c Ratio	1.06	0.51	0.76	0.72
Control Delay	72.6	19.7	25.4	3.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	72.6	19.7	25.4	3.2
Queue Length 50th (m)	~151.1	56.5	98.4	0.0
Queue Length 95th (m)	#192.1	73.3	124.4	11.7
Internal Link Dist (m)	441.1	369.2	335.8	
Turn Bay Length (m)				65.0
Base Capacity (vph)	1294	1606	1606	2036
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.06	0.51	0.76	0.72

### Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 6: Walkley Rd & Heron Rd

07/14/2022



Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	1218	14	0	743	1096	1320
Future Volume (vph)	1218	14	0	743	1096	1320
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.7			6.6	6.6	6.6
Lane Util. Factor	0.97			0.95	0.95	0.88
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	3293			3390	3390	2669
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	3293			3390	3390	2669
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1353	16	0	826	1218	1467
RTOR Reduction (vph)	1	0	0	0	0	772
Lane Group Flow (vph)	1368	0	0	826	1218	695
Turn Type	Prot			NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases						6
Actuated Green, G (s)	39.3			47.4	47.4	47.4
Effective Green, g (s)	39.3			47.4	47.4	47.4
Actuated g/C Ratio	0.39			0.47	0.47	0.47
Clearance Time (s)	6.7			6.6	6.6	6.6
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1294			1606	1606	1265
v/s Ratio Prot	c0.42			0.24	c0.36	
v/s Ratio Perm						0.26
v/c Ratio	1.06			0.51	0.76	0.55
Uniform Delay, d1	30.4			18.3	21.6	18.7
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	41.7			1.2	3.4	1.7
Delay (s)	72.1			19.5	25.0	20.4
Level of Service	E			B	C	C
Approach Delay (s)	72.1			19.5	22.5	
Approach LOS	E			B	C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			35.9		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.89			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	13.3
Intersection Capacity Utilization			80.2%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

# Timings

## 7: Bank St & Walkley Rd

07/14/2022

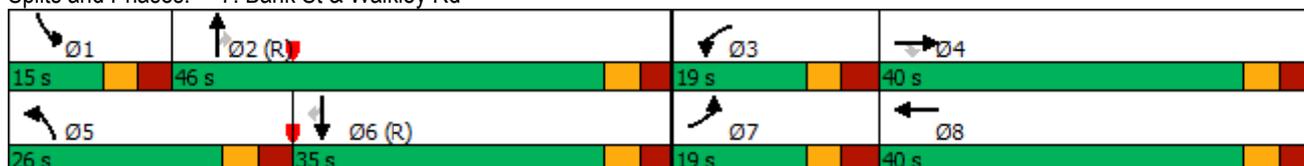


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗	↘	↖↖	↗↗	↘	↗↗↗	↘	↖↖	↗↗	↘
Traffic Volume (vph)	301	472	252	300	539	216	849	246	283	1275	557
Future Volume (vph)	301	472	252	300	539	216	849	246	283	1275	557
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	7.0	29.0	29.0	7.0	29.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	13.8	39.7	39.7	13.8	39.7	13.4	33.4	33.4	13.4	33.4	33.4
Total Split (s)	19.0	40.0	40.0	19.0	40.0	26.0	46.0	46.0	15.0	35.0	35.0
Total Split (%)	15.8%	33.3%	33.3%	15.8%	33.3%	21.7%	38.3%	38.3%	12.5%	29.2%	29.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.4	3.4	3.5	3.4	3.1	3.1	3.1	3.1	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.7	6.7	6.8	6.7	6.4	6.4	6.4	6.4	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	12.2	33.3	33.3	12.2	33.3	19.0	39.6	39.6	8.6	29.2	29.2
Actuated g/C Ratio	0.10	0.28	0.28	0.10	0.28	0.16	0.33	0.33	0.07	0.24	0.24
v/c Ratio	1.00	0.56	0.46	1.00	0.99	0.90	0.59	0.41	1.34	1.72	1.07
Control Delay	103.3	39.8	7.3	102.6	65.9	83.9	35.2	5.4	199.0	359.6	79.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.3	39.8	7.3	102.6	65.9	83.9	35.2	5.4	199.0	359.6	79.8
LOS	F	D	A	F	E	F	D	A	F	F	E
Approach Delay		50.4			75.6		37.6			264.4	
Approach LOS		D			E		D			F	

### Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 79 (66%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.72	
Intersection Signal Delay: 133.6	Intersection LOS: F
Intersection Capacity Utilization 107.9%	ICU Level of Service G
Analysis Period (min) 15	

### Splits and Phases: 7: Bank St & Walkley Rd



Queues

7: Bank St & Walkley Rd

07/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	334	524	280	333	927	240	943	273	314	1417	619
v/c Ratio	1.00	0.56	0.46	1.00	0.99	0.90	0.59	0.41	1.34	1.72	1.07
Control Delay	103.3	39.8	7.3	102.6	65.9	83.9	35.2	5.4	199.0	359.6	79.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.3	39.8	7.3	102.6	65.9	83.9	35.2	5.4	199.0	359.6	79.8
Queue Length 50th (m)	41.1	55.5	1.7	41.0	106.0	55.7	67.3	0.0	~50.3	~267.8	~111.3
Queue Length 95th (m)	#71.1	73.1	22.7	#70.6	#150.1	#99.8	81.5	18.2	m#50.2m#220.8	m#90.5	
Internal Link Dist (m)		130.1			173.3		221.1			236.6	
Turn Bay Length (m)	60.0		50.0	78.0		208.0		70.0	156.0		
Base Capacity (vph)	334	940	604	334	939	276	1607	664	235	825	576
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.56	0.46	1.00	0.99	0.87	0.59	0.41	1.34	1.72	1.07

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 7: Bank St & Walkley Rd

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	301	472	252	300	539	295	216	849	246	283	1275	557
Future Volume (vph)	301	472	252	300	539	295	216	849	246	283	1275	557
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8	6.7	6.7	6.8	6.7		6.4	6.4	6.4	6.4	6.4	6.4
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		1.00	0.91	1.00	0.97	0.95	1.00
Frbp, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		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)	3288	3390	1475	3288	3163		1695	4871	1460	3288	3390	1469
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3288	3390	1475	3288	3163		1695	4871	1460	3288	3390	1469
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	334	524	280	333	599	328	240	943	273	314	1417	619
RTOR Reduction (vph)	0	0	195	0	61	0	0	0	183	0	0	219
Lane Group Flow (vph)	334	524	85	333	866	0	240	943	90	314	1417	400
Confl. Peds. (#/hr)	26		11	11		26	8		17	17		8
Confl. Bikes (#/hr)			5			2			5			10
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	12.2	33.3	33.3	12.2	33.3		19.0	39.6	39.6	8.6	29.2	29.2
Effective Green, g (s)	12.2	33.3	33.3	12.2	33.3		19.0	39.6	39.6	8.6	29.2	29.2
Actuated g/C Ratio	0.10	0.28	0.28	0.10	0.28		0.16	0.33	0.33	0.07	0.24	0.24
Clearance Time (s)	6.8	6.7	6.7	6.8	6.7		6.4	6.4	6.4	6.4	6.4	6.4
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)	334	940	409	334	877		268	1607	481	235	824	357
v/s Ratio Prot	c0.10	0.15		0.10	c0.27		c0.14	0.19		c0.10	c0.42	
v/s Ratio Perm			0.06						0.06			0.27
v/c Ratio	1.00	0.56	0.21	1.00	0.99		0.90	0.59	0.19	1.34	1.72	1.12
Uniform Delay, d1	53.9	37.1	33.2	53.9	43.1		49.5	33.4	28.7	55.7	45.4	45.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.89	1.31	1.72
Incremental Delay, d2	49.2	0.7	0.3	48.1	26.9		29.2	1.6	0.9	159.8	325.4	66.0
Delay (s)	103.1	37.8	33.5	102.0	70.1		78.8	35.0	29.6	209.4	385.1	144.3
Level of Service	F	D	C	F	E		E	C	C	F	F	F
Approach Delay (s)		55.9			78.5			41.2			298.2	
Approach LOS		E			E			D			F	

### Intersection Summary

HCM 2000 Control Delay	148.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.3
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		

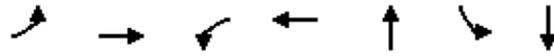
c Critical Lane Group



Queues

8: Walkley Rd & Baycrest Dr

07/14/2022



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	131	936	28	1290	56	129	114
v/c Ratio	0.81	0.47	0.10	0.65	0.17	0.52	0.31
Control Delay	55.4	9.3	9.2	11.9	14.2	30.5	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.4	9.3	9.2	11.9	14.2	30.5	15.0
Queue Length 50th (m)	10.5	27.6	1.2	43.4	3.6	15.6	7.4
Queue Length 95th (m)	#49.4	62.5	6.5	#102.0	9.5	24.4	15.5
Internal Link Dist (m)		336.2		280.5	50.0		252.3
Turn Bay Length (m)	50.0		33.0			20.0	
Base Capacity (vph)	161	2008	273	1981	572	436	615
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.47	0.10	0.65	0.10	0.30	0.19

Intersection Summary

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

# HCM Signalized Intersection Capacity Analysis

## 8: Walkley Rd & Baycrest Dr

07/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↕		↶	↷	
Traffic Volume (vph)	118	823	20	25	942	219	15	14	21	116	23	79
Future Volume (vph)	118	823	20	25	942	219	15	14	21	116	23	79
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.9	5.9		5.9	5.9			6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	0.99			0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00		0.98	1.00	
Frt	1.00	1.00		1.00	0.97			0.94		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1527	3252		1522	3175			1668		1558	1583	
Flt Permitted	0.16	1.00		0.28	1.00			0.89		0.72	1.00	
Satd. Flow (perm)	262	3252		442	3175			1508		1182	1583	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	131	914	22	28	1047	243	17	16	23	129	26	88
RTOR Reduction (vph)	0	2	0	0	20	0	0	18	0	0	38	0
Lane Group Flow (vph)	131	934	0	28	1270	0	0	38	0	129	76	0
Confl. Peds. (#/hr)	9		12	12		9	11		23	23		11
Heavy Vehicles (%)	13%	6%	0%	13%	4%	10%	0%	0%	0%	9%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	43.2	43.2		43.2	43.2			14.8		14.8	14.8	
Effective Green, g (s)	43.2	43.2		43.2	43.2			14.8		14.8	14.8	
Actuated g/C Ratio	0.62	0.62		0.62	0.62			0.21		0.21	0.21	
Clearance Time (s)	5.9	5.9		5.9	5.9			6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	161	2006		272	1959			318		249	334	
v/s Ratio Prot		0.29			0.40						0.05	
v/s Ratio Perm	c0.50			0.06				0.03		c0.11		
v/c Ratio	0.81	0.47		0.10	0.65			0.12		0.52	0.23	
Uniform Delay, d1	10.3	7.2		5.5	8.6			22.3		24.4	22.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	34.6	0.8		0.8	1.7			0.2		1.8	0.3	
Delay (s)	44.9	8.0		6.2	10.2			22.5		26.3	23.2	
Level of Service	D	A		A	B			C		C	C	
Approach Delay (s)		12.5			10.1			22.5			24.8	
Approach LOS		B			B			C			C	

### Intersection Summary

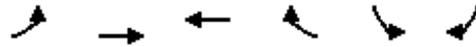
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 29: Heron Rd

07/14/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Volume (veh/h)	0	1324	1333	78	0	95
Future Volume (Veh/h)	0	1324	1333	78	0	95
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	1471	1481	87	0	106
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			215			
pX, platoon unblocked	0.70				0.70	0.70
vC, conflicting volume	1568				2216	740
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	945				1875	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	86
cM capacity (veh/h)	503				44	755
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>WB 3</b>	<b>SB 1</b>
Volume Total	736	736	740	740	87	106
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	87	106
cSH	1700	1700	1700	1700	1700	755
Volume to Capacity	0.43	0.43	0.44	0.44	0.05	0.14
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	3.7
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	10.5
Lane LOS						B
Approach Delay (s)	0.0		0.0			10.5
Approach LOS						B
<b>Intersection Summary</b>						
Average Delay			0.4			
Intersection Capacity Utilization			51.8%		ICU Level of Service	A
Analysis Period (min)			15			

## Appendix D MMLOS TABLE



**Multi-Modal Level of Service - Intersections Form**

Consultant Scenario Comments	Stantec Consulting	Project Date	Nokia Campus Re-development
	2022 Existing		

INTERSECTIONS		March Road and Morgan's Grant Way				March Road and Terry Fox Drive				March Road and Solandt Road				Solandt Road and Legget Drive					
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST		
Pedestrian	Lanes	10+	10+	9	9	10+	10+	10+	10+	10+	10+	10+	10+	6	6	6	6		
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	Median > 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Protected	Permissive	Protected/ Permissive	Permissive	Permissive	Permissive	Protected/ Permissive									
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control												
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed												
	Ped Signal Leading Interval?	No	No	No	No	No	No												
	Right Turn Channel	Conv'tl without Receiving Lane	Conventional with Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conventional with Receiving Lane	Conventional with Receiving Lane	Conventional with Receiving Lane	Conventional with Receiving Lane	Conventional with Receiving Lane	Conventional with Receiving Lane	Conventional with Receiving Lane	Conventional with Receiving Lane	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	15-25m	15-25m	15-25m	15-25m	15-25m	15-25m												
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings												
	<b>PETSI Score</b>	-43	-46	-19	-10	-35	-38	-38	-38	-38	-38	-38	-38	-46	-46	18	18	18	18
	<b>Ped. Exposure to Traffic LoS</b>	#N/A	#N/A	#N/A	F	#N/A	#N/A	#N/A	F	F	F	F							
	Cycle Length	130	130	130	130	130	130	130	130	130	130	130	130	130	119	119	119	119	
Effective Walk Time	8	8	53	53	7	7	15	15	15	8	8	46	34	23	23	59	28		
<b>Average Pedestrian Delay</b>	57	57	23	23	58	58	51	51	51	57	57	27	35	39	39	15	35		
<b>Pedestrian Delay LoS</b>	E	E	C	C	E	E	E	E	E	E	E	C	D	D	D	B	D		
<b>Level of Service</b>	#N/A	#N/A	#N/A	F	#N/A	F	F	F	F										
		#N/A				#N/A				#N/A				F					
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST		
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic											
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	> 50 m	> 50 m	> 50 m	> 50 m		
	Dedicated Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h												
	<b>Cyclist Through Movement</b>	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	F	
	<b>Separated or Mixed Traffic</b>	Separated	Separated	Separated	Separated	Mixed Traffic	Mixed Traffic												
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	
Operating Speed	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		
<b>Left Turning Cyclist</b>	F	F	B	B	F	F	F	F	F	F	F	C	C	C	C	C	C		
<b>Level of Service</b>	F	F	D	D	F	F	F	F	F	F	F	C	F	C	C	C	C		
		F				F				F				C					
Transit	Average Signal Delay	≤ 30 sec	≤ 20 sec	> 40 sec	> 40 sec	≤ 40 sec	> 40 sec	> 40 sec	≤ 30 sec	> 40 sec	≤ 40 sec								
	<b>Level of Service</b>	D	C	F	F	E	F	F	F	F	F	F	F	F	F	D	F	E	
		F				F				F				F					
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m													
	Number of Receiving Lanes on Departure from Intersection	1	1	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	1	1	1	1	
<b>Level of Service</b>	C	C	A	A	A	A	A	A	A	A	A	A	A	C	C	C	C		
		C				A				A				C					
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.81 - 0.90				> 1.00				0.91 - 1.00					
	<b>Level of Service</b>	B				D				F				E					

**Multi-Modal Level of Service - Intersections Form**

Consultant Scenario Comments	Stantec Consulting	Project Date	Nokia Campus Re-development
	2037 Ultimate		

INTERSECTIONS																		
Crossing Side	March Road and Morgan's Grant Way				March Road and Terry Fox Drive				March Road and Solandt Road				Solandt Road and Legget Drive					
	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST		
Pedestrian	Lanes	10+	10+	5	4	10+	10+	8	7	10+	10+	5	5	3	3	3	3	
	Median	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Protected	Protected	Permissive	Permissive	Protected	Protected	Permissive	Permissive	Protected	Protected	Permissive	Permissive	Permissive	Protected/ Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
	Right Turn Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	Smart Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	>25m	>25m	>25m	>25m	>25m	>25m	>25m	>25m	>25m	>25m	>25m	>25m	>25m	15-25m	15-25m	15-25m	15-25m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	<b>PETSI Score</b>	-24	-24	40	58	-24	-24	-9	13	-24	-24	40	40	68	68	68	68	
	<b>Ped. Exposure to Traffic LoS</b>	#N/A	#N/A	E	D	#N/A	#N/A	F	F	#N/A	#N/A	E	E	C	C	C	C	
	Cycle Length	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	
	Effective Walk Time	31	31	18	18	35	35	26	26	25	25	19	19	19	19	19	19	
	<b>Average Pedestrian Delay</b>	38	38	48	48	35	35	42	42	42	42	47	47	47	47	47	47	
<b>Pedestrian Delay LoS</b>	D	D	E	E	D	D	E	E	E	E	E	E	E	E	E	E		
<b>Level of Service</b>	#N/A	#N/A	E	E	#N/A	#N/A	F	F	#N/A	#N/A	E	E	E	E	E	E		
	#N/A				#N/A				#N/A				E					
Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST		
Bicycle	Bicycle Lane Arrangement on Approach	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>	Not Applicable	Not Applicable	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	> 50 m					
	Dedicated Right Turning Speed	Not Applicable	Not Applicable	≤ 25 km/h	>25 km/h	Not Applicable	Not Applicable	>25 km/h	>25 km/h	Not Applicable	Not Applicable	>25 km/h	>25 km/h					
	<b>Cyclist Through Movement</b>	Not Applicable	Not Applicable	F	F	Not Applicable	Not Applicable	F	F	Not Applicable	Not Applicable	F	F					
	<b>Separated or Mixed Traffic</b>	Separated	Separated	Mixed Traffic	Mixed Traffic	Separated	Separated	Mixed Traffic	Mixed Traffic	Separated	Separated	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	One lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	One lane crossed	One lane crossed	One lane crossed	One lane crossed	One lane crossed		
	Operating Speed	≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		
<b>Left Turning Cyclist</b>	F	F	E	C	F	F	F	F	F	F	E	E	E	E	E			
<b>Level of Service</b>	F	F	F	F	F	F	F	F	F	F	F	F	E	E	E			
	F				F				F				E					
Transit	Average Signal Delay	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec	≤ 20 sec		
	<b>Level of Service</b>	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
	C				C				C				C					
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m		
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	1	1	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	1	1	1	1	1		
<b>Level of Service</b>	A	A	C	C	A	A	A	A	A	A	C	C	C	C	C			
	C				A				C				C					
Auto	Volume to Capacity Ratio	> 1.00				> 1.00				> 1.00				0.71 - 0.80				
	<b>Level of Service</b>	F				F				F				C				