

# Wexcom Developments (March Road) Ltd.

## 910 March Road

### Transportation Impact Assessment



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## Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

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PN: 2020-11

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## 1 Screening

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

As a result of the review process, additional comments and analysis have been produced for the City of Ottawa in the form of comment-response documents. The first round of responses to the City's comments have been included in Appendix B and the second round of responses to the City's comments have been included in Appendix C as supplements to the TIA.

Additionally, as the plan has evolved, the building areas have shifted slightly, however these changes are considered minor and have not been reflected in the analysis. Ambiguity surrounding the use of what is shown as Retail B in the most recent plan submitted with this report has required a conservative analysis approach to be adopted. It has been indicated that Retail B may in fact take the form of a restaurant. A previous version of the plan identified the building in question as a restaurant (Restaurant 2) instead of a retail building and as a result, the analysis sections of this TIA have considered this building to be a restaurant in order to produce a conservative analysis. The previous version of the plan is shown in Appendix D which shows the statistics used for Restaurant 2.

## 2 Existing and Planned Conditions

### 2.1 Proposed Development

The subject property, located at 910 March Road, is currently zoned as Rural [Ru] and Development Reserve [DR] and is undeveloped.

The proposed development consists of a 1,835 square metre hardware store, a 234 square metre restaurant with a drive through, a 416 square metre retail store, and a 249 square metre gas bar attached to a 191 square metre Tim Hortons with a drive-through. A total of 164 vehicle parking stalls and 16 bicycle parking spaces will be provided. The site is proposed to have two accesses. Both accesses are located along March Road; the first (Site Access #1) is a full-movement access located approximately 215 metres north of Maxwell Bridge Road, measured from intersection centreline to intersection centreline. Based on professional experience and the development design, signalization of this access is anticipated, however it will be confirmed within this report. The second (Site Access #2) is a right-in / right-out access located approximately 150 metres north of Maxwell Bridge Road, measured intersection centreline to intersection centreline. The anticipated full build-out and occupancy horizon is 2022. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan

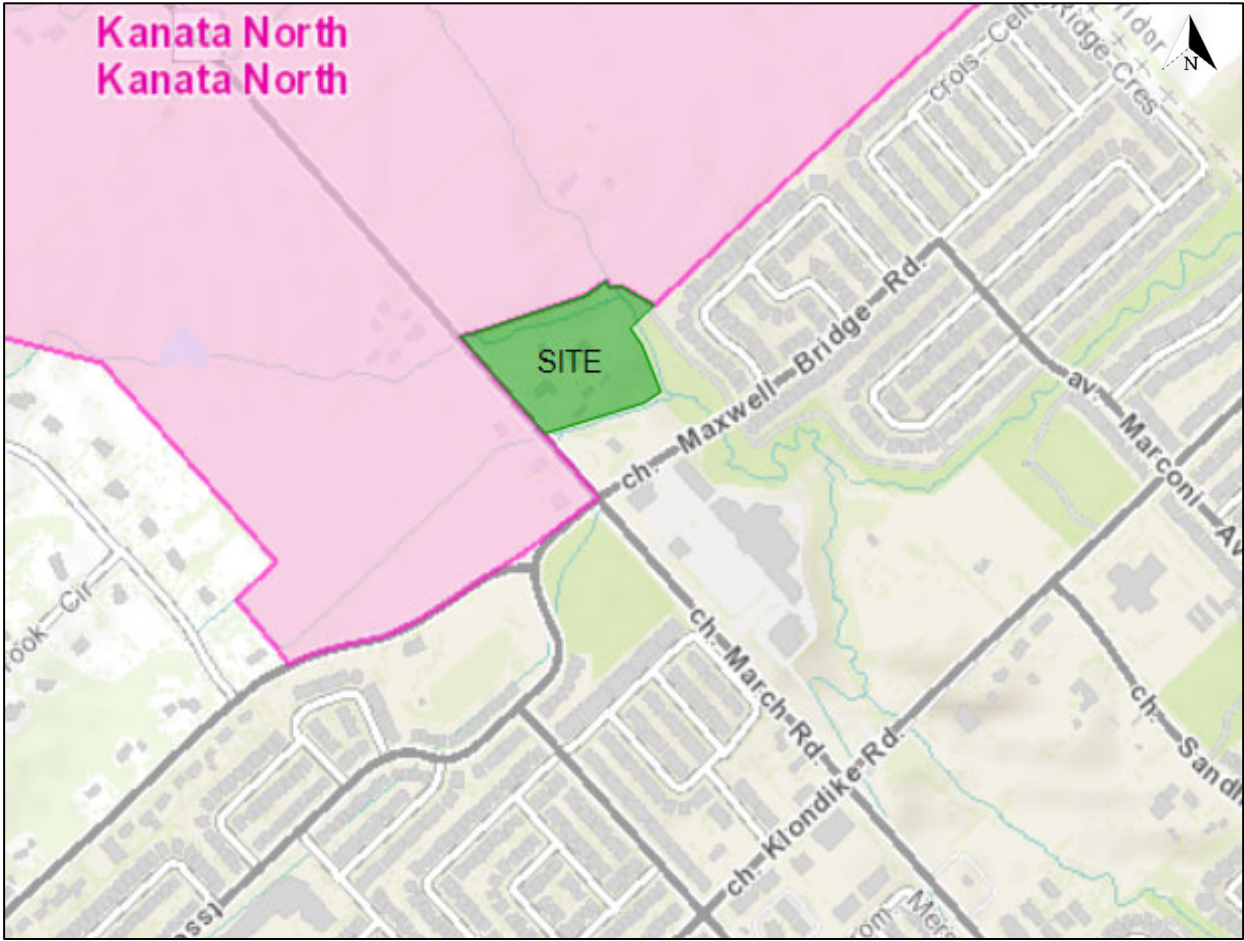
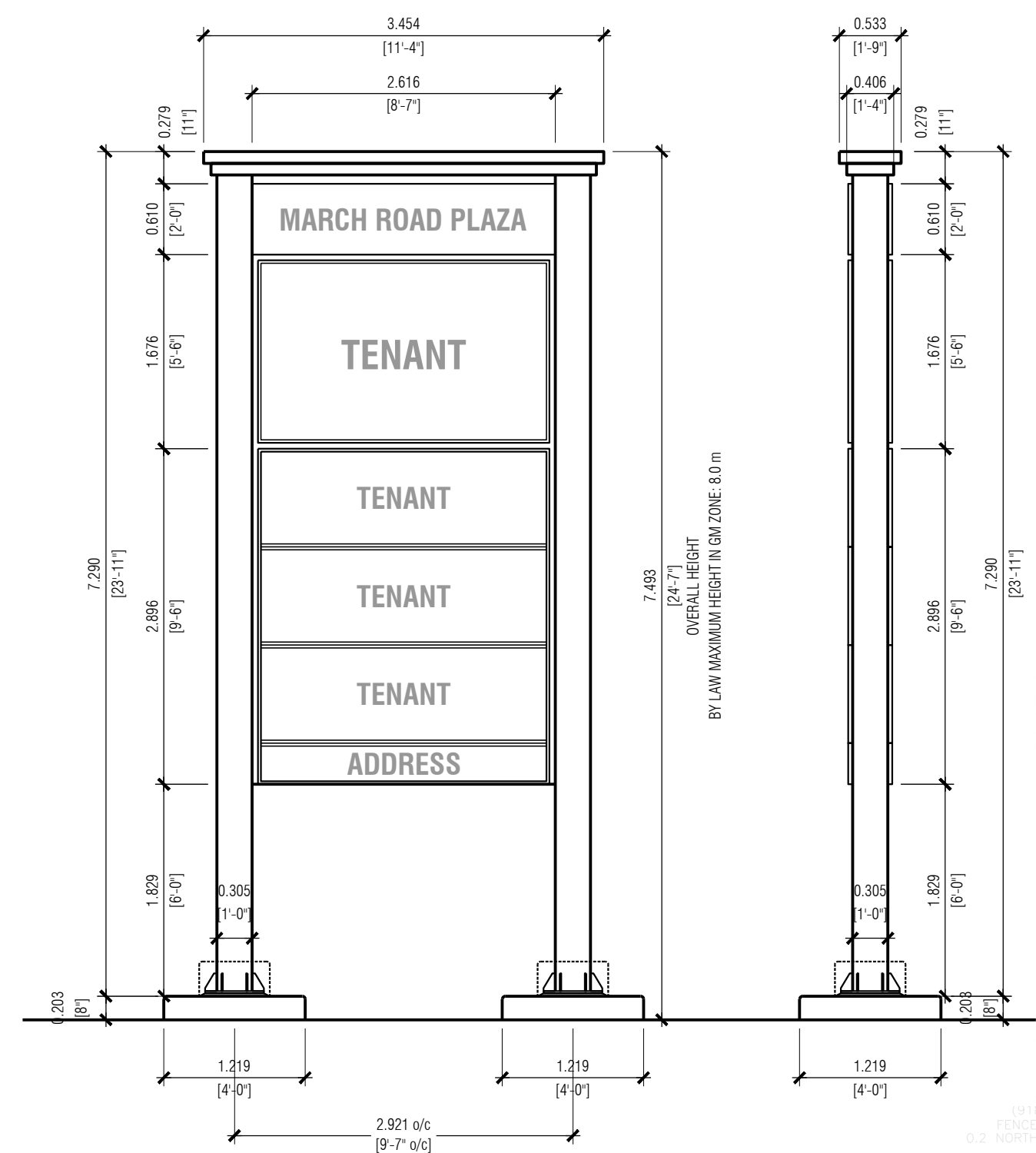
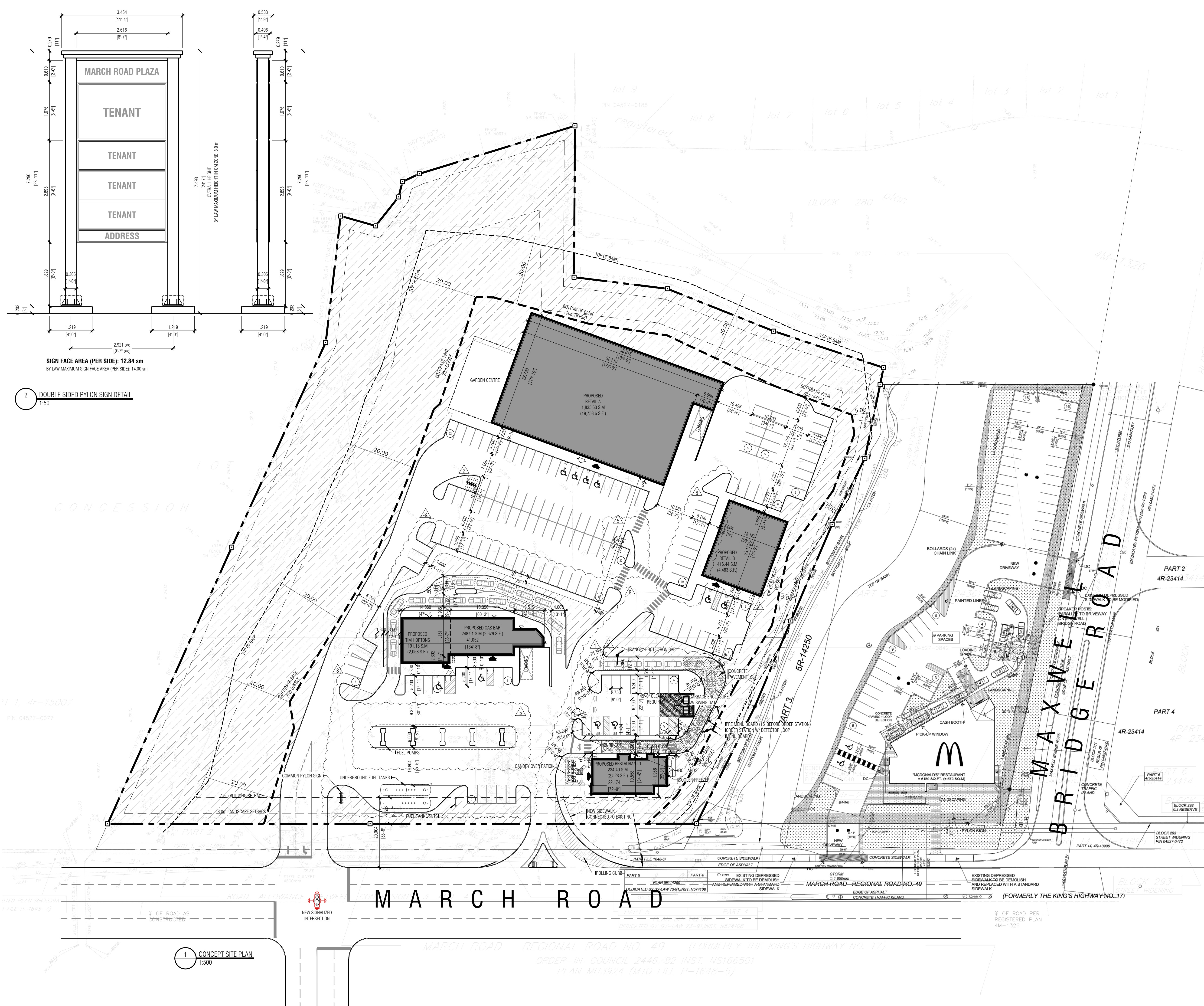


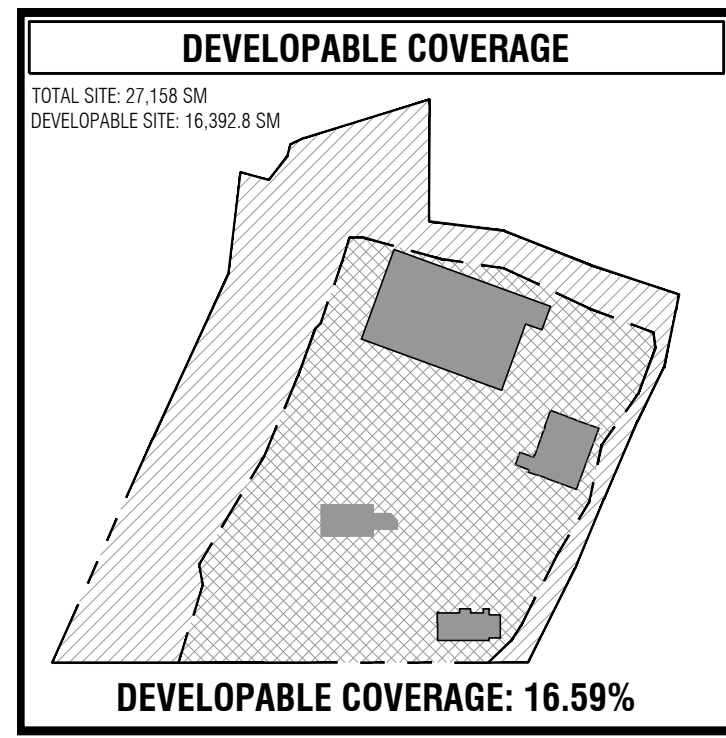
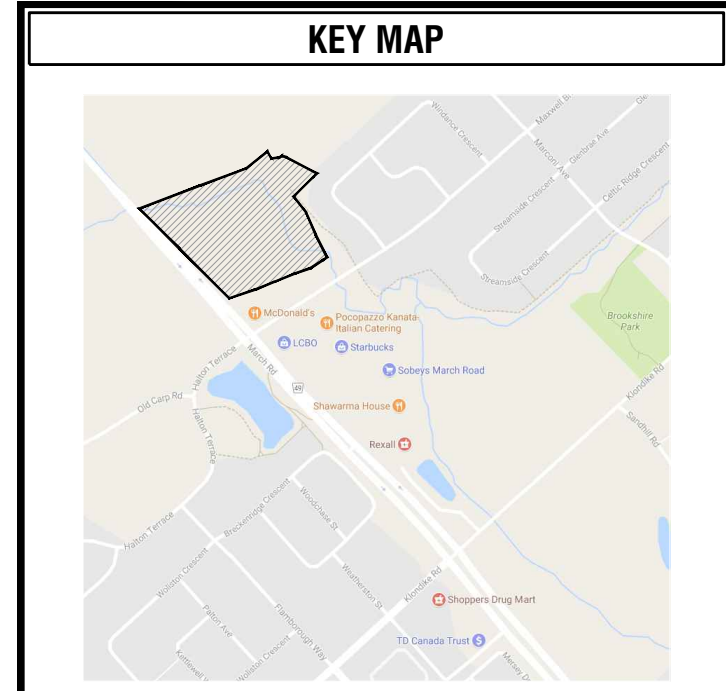


Figure 2: Concept Plan



**SIGN FACE AREA (PER SIDE): 12.84 sm**  
BY LAW MAXIMUM SIGN FACE AREA (PER SIDE): 14.00 sm

**2 DOUBLE SIDED PYLON SIGN DETAIL**  
1:50



**SITE DATA**

	SF	SM	ACRES
TOTAL SITE	292,230	27,158	6.71
TOTAL DEVELOPABLE AREA	174,450	16,392.8	4.09
PROPOSED BUILDING COVERAGE			
GAS BAR C/W TIM HORTONS	4,737	440.10	1.02%
RETAIL A	19,758.6	1,835.63	6.76%
RESTAURANT A	2,523	234.40	0.86%
RETAIL B	4,483	416.44	1.53%
TOTAL	31,501.3	2,926.57	10.78%

**PARKING DATA**

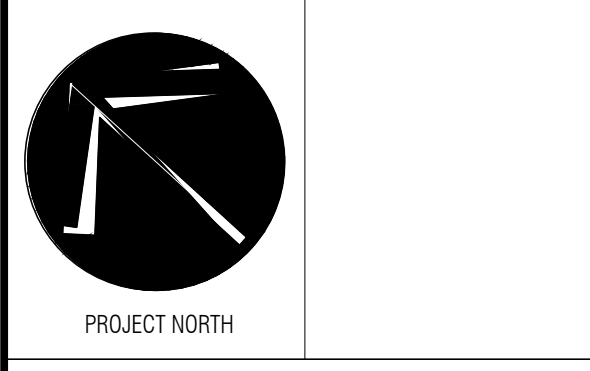
REQUIRED PARKING (AREA C):	SPACES
RETAIL A: 3.4/100SM	63 SPACES
GAS BAR: NONE	0 SPACES
RESTAURANT: 10/100 SM (42:559-43)	43 SPACES
RETAIL B: 3.4/100SM	15 SPACES
<b>TOTAL REQUIRED PARKING</b>	<b>121 SPACES</b>
PROVIDED PARKING	148 SPACES
PROVIDED BARRIER FREE PARKING	10 SPACES
<b>TOTAL PROVIDED PARKING</b>	<b>158 SPACES</b>

REGULAR PARKING SPACE: 2.6m x 5.2m  
BARRIER FREE PARKING SPACE: (WITH 1.5m ACCESS AISLE) 10 SPACES  
TYPE A: 3.4m x 5.2m  
TYPE B: 2.4m x 5.2m

**LEGEND**

---	PROPERTY LINE
---	BUILDING SETBACK
---	EDGE OF BANK
---	EDGE OF BANK OFFSET
□	IRON BAR
□	BARRIER FREE PARKING
→	TRAFFIC FLOW ARROWS
○	PARKING COUNT
■	GARBAGE BIN
⬇	SIGNALIZED INTERSECTION
⬇	SECONDARY ENTRANCE
⬆	PRINCIPLE ENTRANCE
---	PEDESTRIAN CROSSWALK
---	NO PARK ZONE
---	BARRIER FREE SIGN
---	FIRE DEPARTMENT CONNECTION
---	FIRE HYDRANT
---	BIKE RACK - 10 SPOTS
---	BIKE RACK - 2 SPOTS
---	CONCRETE PAVEMENT
---	ADA TACTILE STRIP

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO:  
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**Greystone**  
Kitchener: 100 Conestoga College Blvd, Unit 1116, Kitchener, Ontario N2P 2N6  
Toronto: 2999 Lakeshore Blvd. West, Toronto, Ontario M8V 1J8

REV.	DESCRIPTION	DATE
1	ISSUED FOR SPA	06.26.20
2	ISSUED FOR CLIENT REVIEW	03.27.20
3	REMOVED DRIVE THRU BEHIND TIMS, REMOVED DRIVE AISLE	11.16.20
4	REMOVED RESTAURANT A BUILDING LOCATION / ADDED BIKE RACKS PER ZONING REQUIREMENTS / REVISED CURBS PER WENDY'S DESIGN GUIDELINES	07.20.20
5	REMOVED RESTAURANT A BUILDING SHELL / SHIFTED RBC AND PARKING EAST ON SITE TO ACCOMMODATE FOR NEW RESTAURANT A SHELL	07.08.20
6	REMOVED RETAIL B DRIVE THRU, REVISED PARKING	01.12.21

PROJECT FOR:  
**WEXFORD**  
COMMERCIAL DEVELOPMENTS LTD.

PROJECT: NEW BUILD  
CREEKSIDE LANDING  
MARCH ROAD  
KANATA, ONTARIO

DRAWING: **SITE PLAN**

DRAWN: M.M.W.	CHECKED: S.R.	JOB NUMBER: 17300
DATE: 2021.01.12	SCALE: AS NOTED	
DRAWING NUMBER: A1.0	REVISION NUMBER: R6	

FILE: \Greystone Design Group Inc\2021\17300 - March Rd. Ottawa, ON\Site Plans\17300 - March Rd A1.0 R6 (2021.01.12).dwg  
LAST SAVED BY: Mironosack, 1/12/2021, 4:17 PM



## 2.2 Existing Conditions

### 2.2.1 Area Road Network

#### *March Road*

March Road is a City of Ottawa arterial road with a fluctuating cross-section and a posted speed limit of 80 km/h. South of Klondike Road, March Road has a six-lane cross-section with bike lanes, sidewalks, and curbs and gutters on both sides of the road. Approximately 125 metres north of Klondike Road, March Road becomes a five-lane road with bike lanes, sidewalks, and curbs and gutters on both sides of the road. Approximately 140 metres south of Halton Terrace / Maxwell Bridge Road, March Road becomes a four-lane road with bike lanes, sidewalks, and curbs and gutters on both sides of the road. March Road gradually decreases to a two-lane cross-section with gravel shoulders and no pedestrian or cycling infrastructure starting approximately 110 metres north of Halton Terrace / Maxwell Bridge Road. The Ottawa Official Plan reserves a 44.5 metre right of way. March Road is designated as a trucking route within the Study Area.

#### *Halton Terrace / Maxwell Bridge Road*

Halton Terrace / Maxwell Bridge Road is a City of Ottawa collector road that has a two-lane cross-section and a posted speed-limit of 40 km/h. Halton Terrace / Maxwell Bridge Road has curbs and gutters, as well as sidewalks within the Study Area. Halton Terrace / Maxwell Bridge Road has a measured 24.5 metre right-of-way and is not designated as a trucking route.

#### *Klondike Road*

Klondike Road is a City of Ottawa collector road that has a three-lane cross-section to the west of March Road and a two-lane cross-section to the east of March Road, as well as a posted speed limit of 50 km/h. Sidewalks and curbs and gutters are present on both sides of the road. To the east of March Road, Klondike Road has bike lanes on the south side. The Ottawa Official Plan reserves a 24.0 metre right-of-way. Klondike Road is not a designated trucking route.

### 2.2.2 Existing Intersections

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

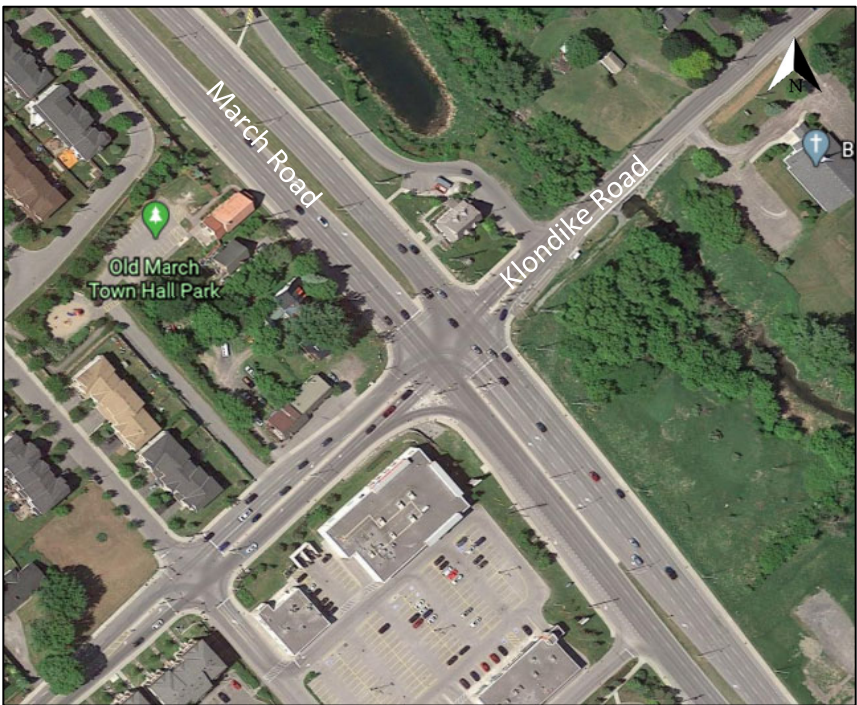
*March Road at Halton Terrace /Maxwell Bridge Road*

The intersection of Maxwell Bridge Road / Halton Terrace at March Road is a signalized intersection with auxiliary left-turn lanes on all four approaches. The northbound and southbound approaches both have two through lanes, an auxiliary right-turn lane and at grade cycling lanes between the through lane and the right turn lane. Both the eastbound and westbound approaches have a shared through / right-turn lane. Pedestrian crossings are provided at each leg. No turn restrictions were noted.



*March Road at Klondike Road*

The intersection of Klondike Road at March Road is a signalized intersection. The northbound approach consists of two auxiliary left-turn lanes, two through lanes and a shared through / right-turn lane. The westbound approach is made up of an auxiliary left-turn lane and a shared through / right-turn lane. The southbound approach consists of an auxiliary left-turn lane, a through lane and a shared through / right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, a through lane and a channelized right-turn lane. Pedestrian crossings are provided at each leg. No turn restrictions were noted.





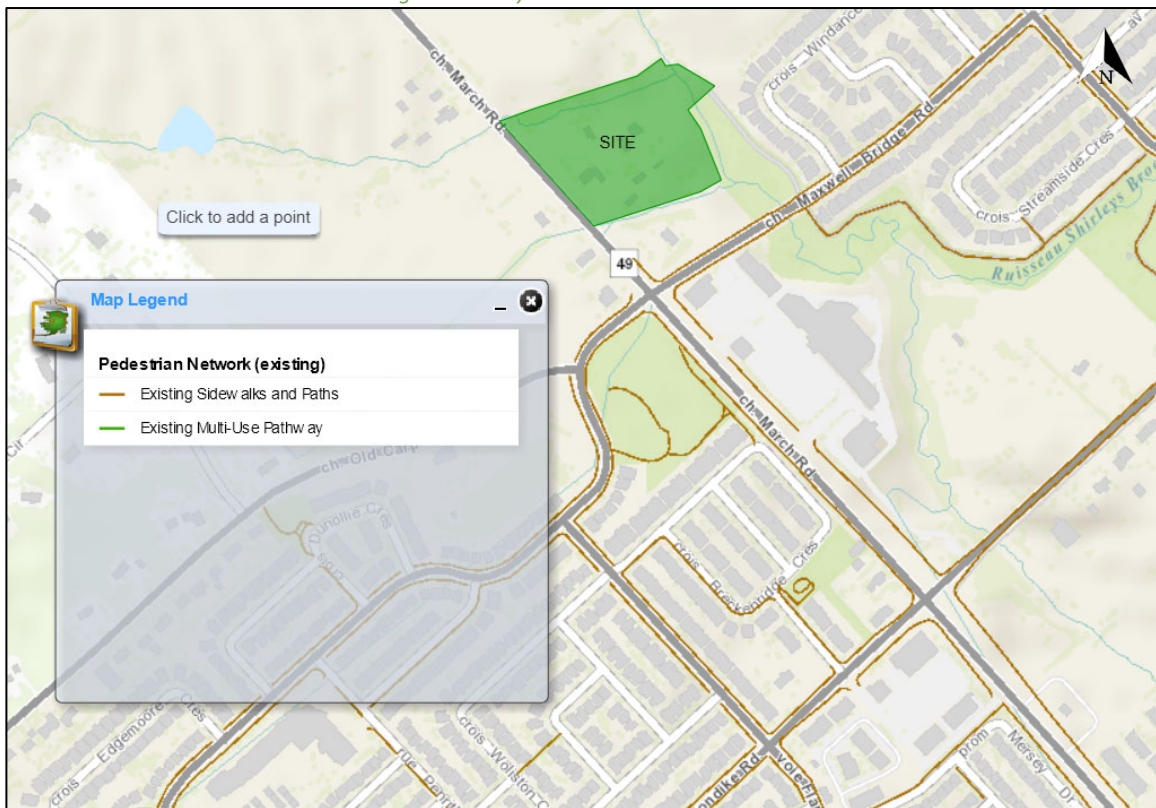
2.2.3 Existing Driveways

Existing driveways are located along March Road within 200 metres of the proposed site accesses. All existing driveways are residential accesses and driveways to existing and future residential developments with the exception of the McDonald’s driveway approximately 50 metres north of Maxwell Bridge Road / Halton Terrace. Any significant traffic generation from these driveways and accesses will be considered in the background traffic of future scenarios and explored further in Section 2.3.2.

2.2.4 Cycling and Pedestrian Facilities

Sidewalks are provided along both sides of Maxwell Bridge Road / Halton Terrace, on March Road with the exception of the two-lane cross-section segment, and Klondike Road west of March Road. A multi-use pathway is provided on Klondike Road east of March Road. The cycling network consists of bike lanes on March Road with the exception of the two-lane segment which has paved shoulders. March Road will be considered a spine route, and both Klondike Road and Halton Terrace will be considered local cycling routes within the Study Area during the ultimate horizon. A gravel pathway is anticipated to connect the northeast side of the proposed development to Maxwell Bridge Road and the adjacent residential development to the southeast. Figure 3 illustrates the pedestrian facilities in the Study Area and Figure 4 illustrates the cycling facilities.

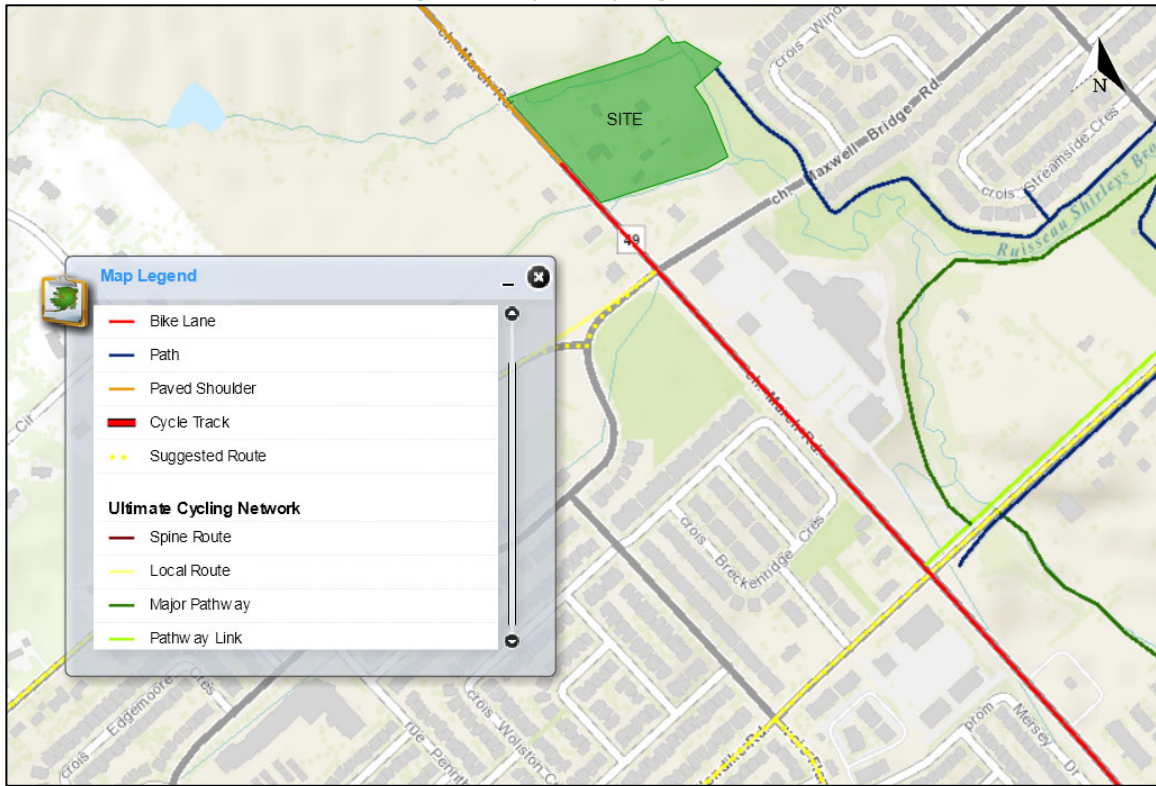
Figure 3: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: May 15, 2020



Figure 4: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: May 15, 2020

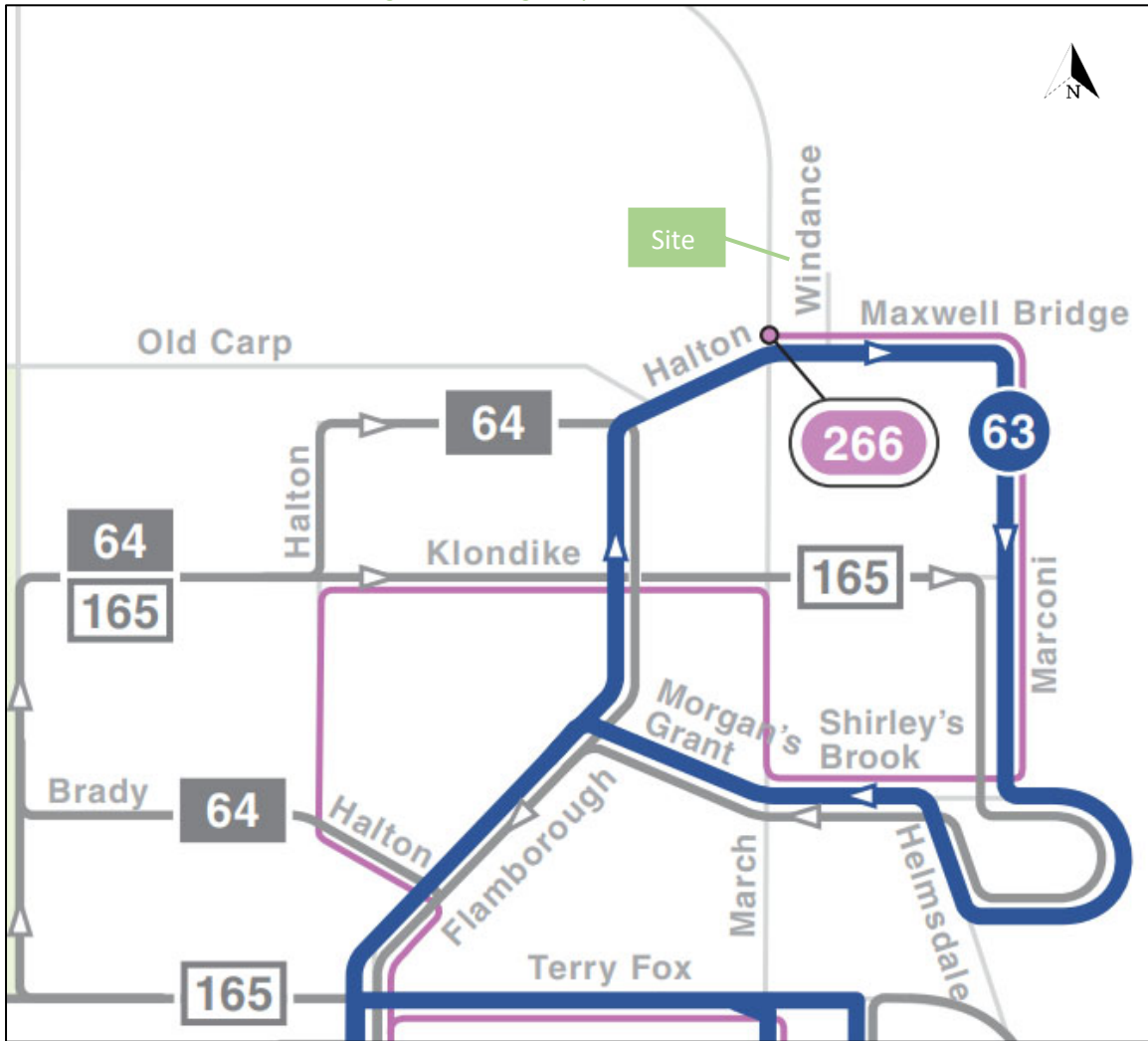
### 2.2.5 Existing Transit

Routes #63 and #165 are the only routes present within the Study Area. Route #63 has two stops on Maxwell Bridge Road, east of March Road and route #165 has two stops on Klondike Road to the east of March Road and two stops on Klondike Road to the west of March Road. The frequencies of these routes within the proximity of the proposed site currently are:

- Route #63— every 15 minutes in peak periods and every 30minutes in off-peak periods.
- Route #165— every hour in the midday and evening

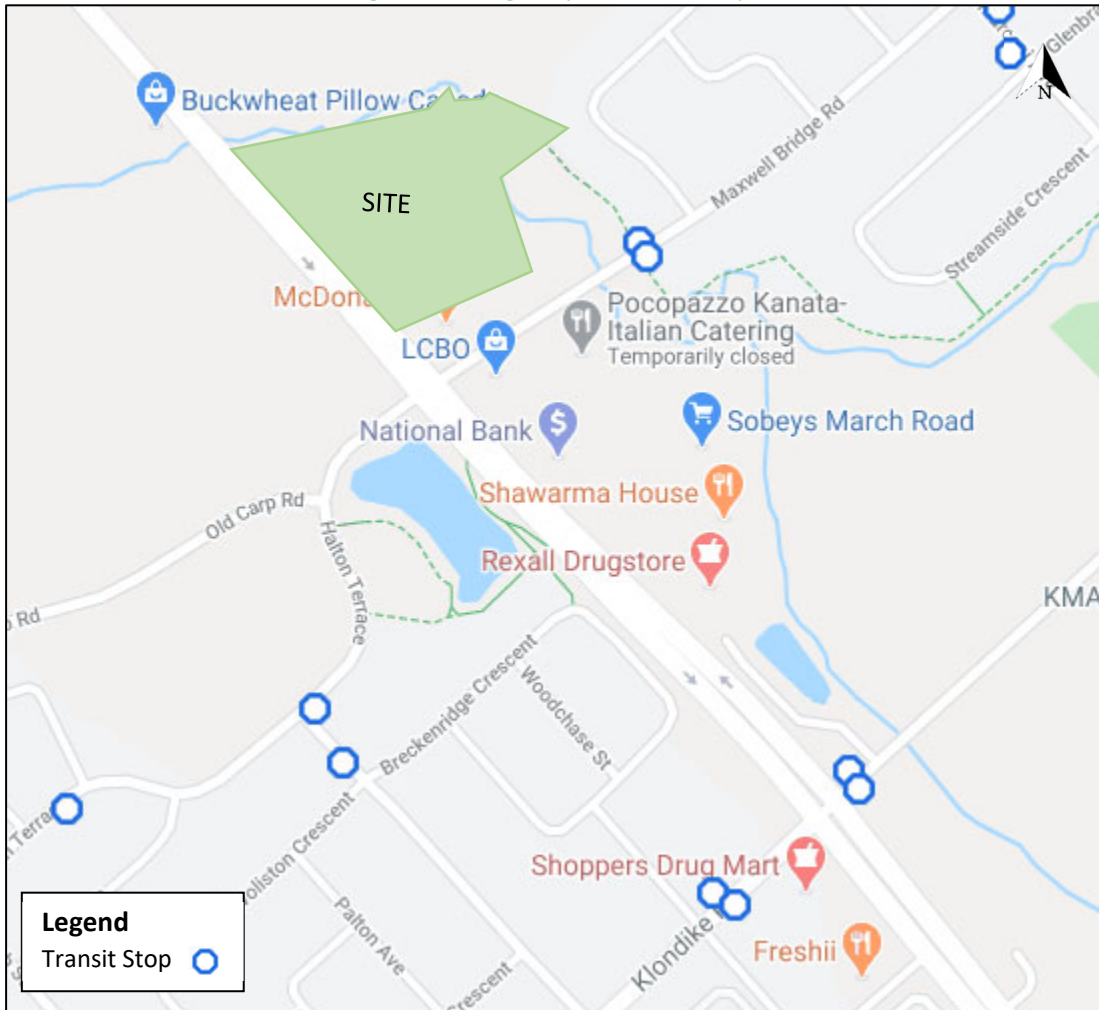
Figure 5 illustrates the transit system map and Figure 6 illustrates the transit stops in the Study Area.

Figure 5: Existing Study Area Transit Service



Source: <https://www.octranspo.com/en/> Accessed: May 15, 2020

Figure 6: Existing Study Area Transit Stops



Source: <http://plan.octranspo.com/plan> Accessed: May 15, 2020

2.2.6 Existing Area Traffic Management Measures

Within the Study Area, traffic management measures are present on Maxwell Bridge Road approximately 200 metres east of March Road and on Halton Terrace beginning approximately 150 metres west of March Road. Both locations are designated as traffic calming zones using signage and pavement markings and is implemented via flexible in-road traffic calming signs

2.2.7 Existing Peak Hour Travel Demand

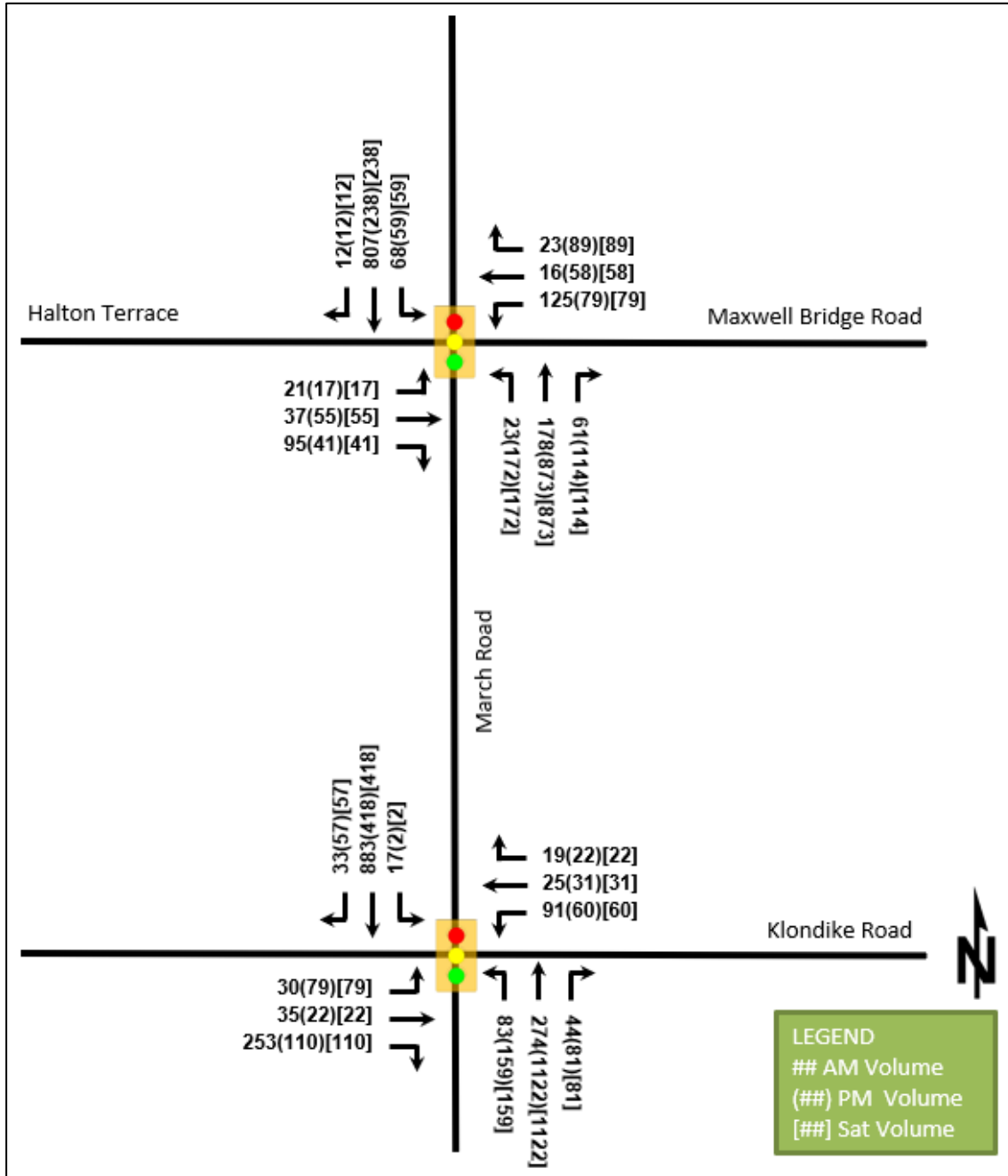
Existing turning movement counts were acquired for the existing Study Area intersection for both the AM and PM peak hours. No Saturday peak hour turning movement counts for the Study Area intersections are available and as a result of the current “lockdown” measures due to the COVID-19 pandemic, no counts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

Table 1: Intersection Count Date

Intersection	Count Date	Data Source
March Road at Halton Terrace / Maxwell Bridge Road	Wednesday, March 4, 2020	City of Ottawa
March Road at Klondike Road	Wednesday, March 4, 2020	City of Ottawa

Figure 7 illustrates the 2020 existing horizon traffic. As shown above, the turning movement count data has been collected in 2020 and as such, a background growth rate is not necessary in order to reflect the 2020 horizon. Detailed turning movement count data and signal timing information is included in Appendix E.

Figure 7: 2020 Existing Horizon Traffic Volumes and Traffic Controls



Additionally, the collected intersection counts also provided existing pedestrian and cyclist demands at the two Study Area intersections for both AM and PM peak periods. As discussed above, PM peak counts will also be used as Saturday peak hour counts. Figure 8 illustrates the existing pedestrian volumes and Figure 9 illustrates the existing cyclist volumes at the Study Area intersections

Figure 8: Existing Pedestrian Volumes

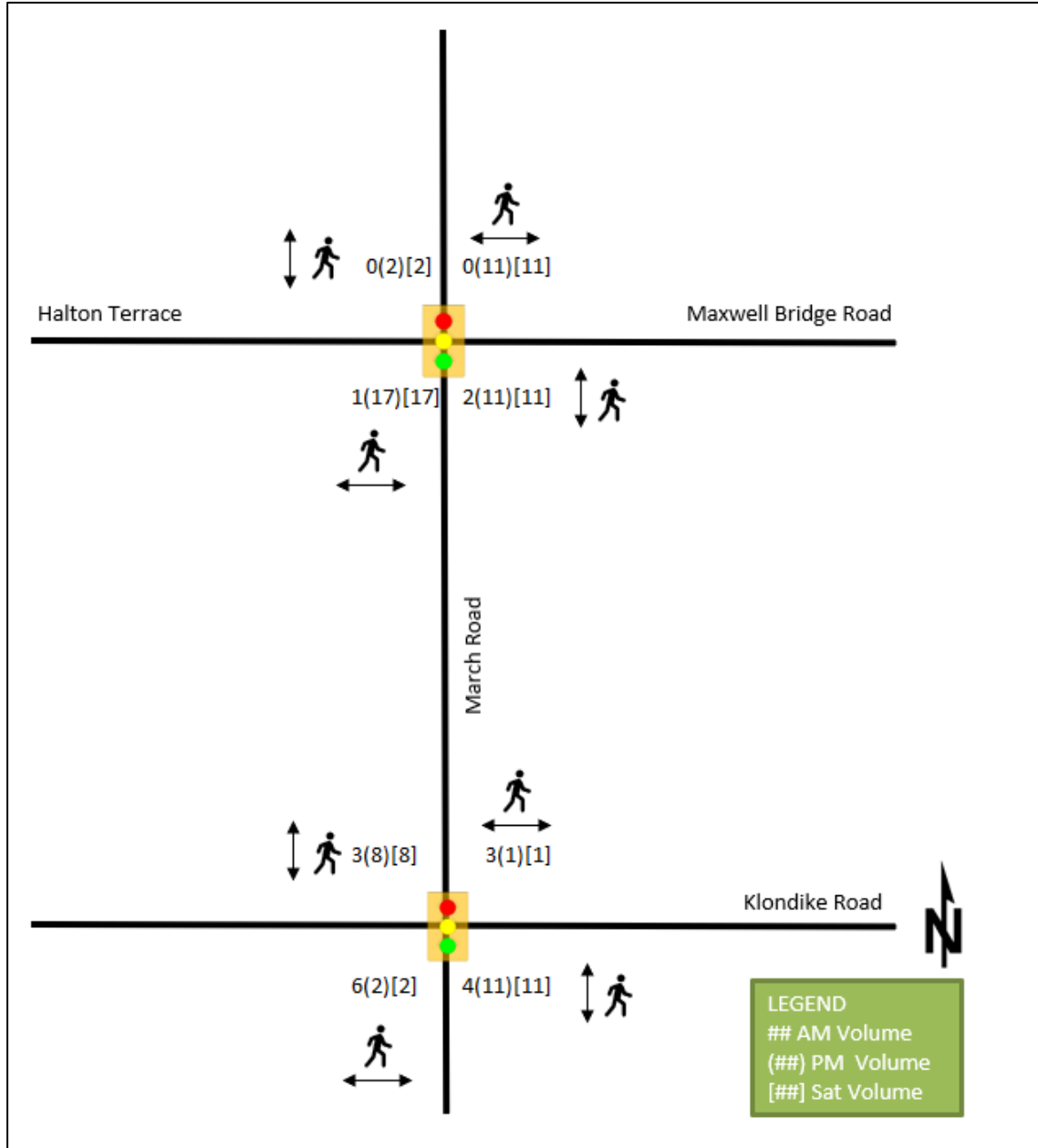


Figure 9: Existing Cycling Volumes



2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa for five years (2014-2018) prior to the commencement of this TIA for the surrounding Study Area road network. Figure 10 shows the location of collisions within the Study Area, Table 2 illustrates the collisions at the intersections and road segments within the Study Area, and Table 3 summarizes the collision types and conditions of the 85 collisions recorded in the Study Area. Collision data is included in Appendix F.

Figure 10: Study Area Representation of Collision Locations

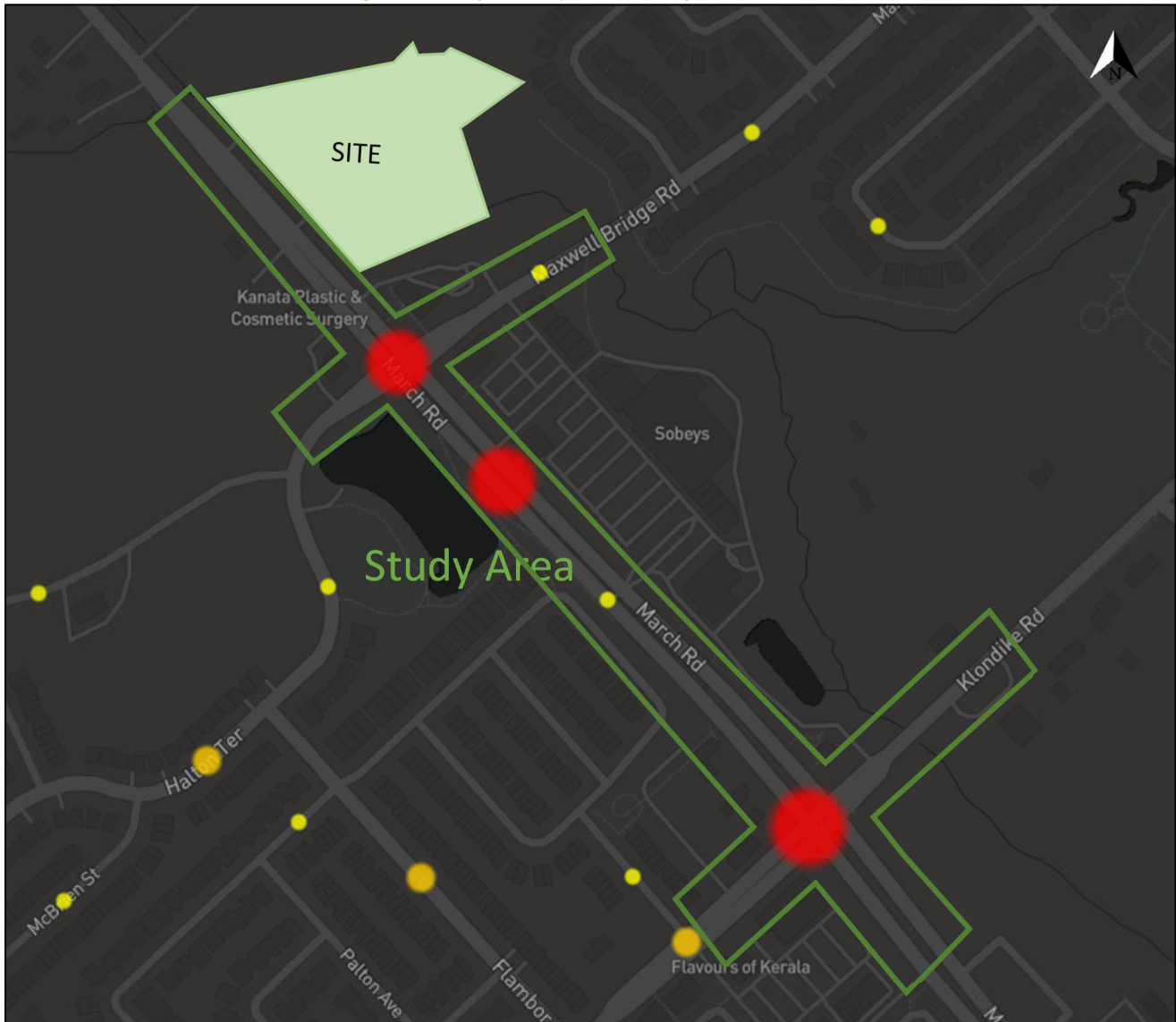


Table 2: Summary of Collision Locations

Intersection / Segment	Number	%
		<b>85</b>
Halton Terrace / Maxwell Bridge Road @ March Road	12	14%
250 N of Klondike Road @ March Road	1	1%
Halton Terrace btwn continuation of Halton Terrace & Old Carp Road	2	2%
March Road btwn Halton Terrace / Maxwell Bridge Road & Klondike Road	24	28%
March Road btwn Halton Terrace / Maxwell Bridge Road & Maxwell Road	7	8%
Maxwell Bridge Road btwn March Road & Windance Crescent	1	1%
Klondike Road @ March Road	32	39%
March Road btwn Klondike Road & Morgan's Grant Way	6	7%



Table 3: Collision Summary

		Number	%
<b>Total Collisions</b>		<b>85</b>	<b>100%</b>
<b>Classification</b>	Fatality	0	0%
	Non-Fatal Injury	19	22%
	Property Damage Only	66	78%
<b>Initial Impact Type</b>	Approaching	0	0%
	Angle	7	8%
	Rear end	26	31%
	Sideswipe	13	15%
	Turning Movement	10	12%
	SMV Unattended Vehicle	1	1%
	SMV Other	27	32%
	Other	1	1%
	<b>Road Surface Condition</b>	Dry	28
Wet		8	19%
Loose Snow		5	12%
Slush		3	6%
Packed Snow		1	1%
Ice		2	7%
Loose sand or gravel		0	0%
<b>Pedestrian Involved</b>		<b>1</b>	<b>1%</b>
<b>Cyclists Involved</b>		<b>0</b>	<b>0%</b>

Overall, no fatal collisions were documented in the Study Area and only one collision involving a pedestrian and no collisions involving a cyclist have been documented. Of the 85 collisions recorded in the Study Area, 22% resulted in a non-fatal injury and the remaining 78% resulted in property damage only. The impact types are distributed throughout the various categories with the largest number of collisions, at 32%, found in the SMV Other impact type category. Weather/road conditions are considered a contributing factor for 45% of the collisions in the Study Area.

## 2.3 Planned Conditions

### 2.3.1 Changes to the Area Transportation Network

The subject development is just outside the Kanata North CDP Urban Expansion Area, however March Road north of Maxwell Bridge Road / Halton Terrace is within the Kanata North CDP area. As such, this portion of March Road is subject to the planning policies outlined in the CDP. The CDP proposes that March Road remain an Arterial Road with a median Bus Rapid (BRT) facility, following the results of the Environmental Assessment (EA) completed for March Road. The widening of March Road, and the extension of a Bus Rapid Transit facility within the Study Area is considered in the City of Ottawa TMP Ultimate Network. Both interim and ultimate widening scenarios of March Road have been proposed in the Kanata North CDP and can be seen in Appendix G. The interim scenario is the widening of March Road to four lanes and the ultimate scenario considers the widening of March Road to accommodate the extension of the Median BRT system. As the timing of both of these improvements to March Road is unknown and neither transportation infrastructure upgrade is included in the City of Ottawa's 2031 Affordable Network, it has been assumed that they will occur beyond the proposed development's future analysis horizons. This assumption has been confirmed by the City of Ottawa as part of the comments provided on the Forecasting Report for the proposed development. These comments can be found in Appendix H.



The Ottawa Official Plan, Ottawa Transportation Master Plan, Ottawa Pedestrian Plan, and the Ottawa Cycling Plan have also been used to identify changes to the area transportation network. The resulting changes to the road, pedestrian, and cycling network in the Study Area due to these plans are outlined below:

- As part of the 2031 Affordable Road Network, Klondike Road between March Road and Sandhill Road will be urbanized from a rural to an urban road cross-section. The original timing of this improvement was between 2014 to 2019. As these changes do not appear to be implemented, the timing of this is currently unknown.
- As part of the 2031 Affordable Network, March Road between Carling Avenue and Maxwell Bridge Road will be considered a Transit Signal Priority corridor (Isolated Measures). As a result, transit signal priority and queue jump lanes will be implemented. The exact timing of this is not clear.
- As part of the 2031 Ultimate Cycling Network, within the Study Area March Road will be considered a spine route, and both Klondike Road to the west of March Road, and Halton Terrace will be considered local routes. The exact timing of these have not been made clear.

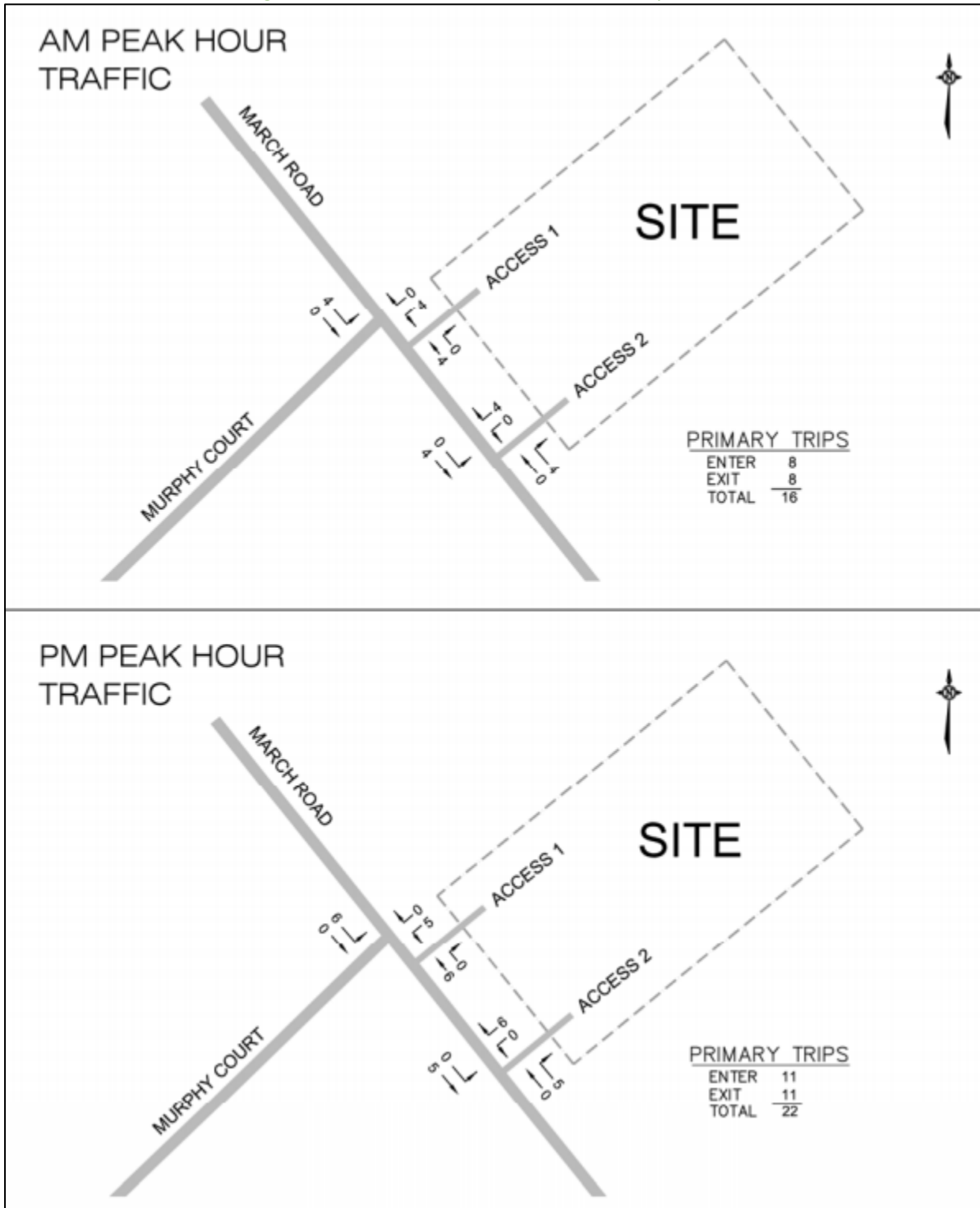
Additionally, it is assumed that as part of the proposed development, the existing pedestrian facilities and bike lanes which terminate north of Maxwell Bridge Road / Halton Terrace will be extended along the frontage of the proposed development along the east side of March Road upon full-build out of the development. It is expected that the existing pedestrian facilities and bike lanes which terminate north of Maxwell Bridge Road / Halton Terrace will be extended along the frontage of the proposed development along the west side of March Road in conjunction with the development of the southwestern quadrant of the Kanata North Community Design Plan. As discussed below, this is anticipated to occur in 2026.

### 2.3.2 Other Study Area Developments

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

- 1055 Klondike Road – A residential subdivision made up of 12 semi-detached dwellings, 46 townhouse units, 56 apartment units, and additional space designated for development. At this time a Transportation Impact Assessment (TIA) is not available. As this development is expected to have an impact on the Study Area, if the TIA is made available prior to completion of this study, the traffic impact of this development will be considered on the Study Area.
- 1156 / 1170 March Road – A gasoline service centre with eight fuelling pumps and a convenience store. The originally anticipated full-build out year was 2017. As this construction on this development does not appear to have begun yet, it will be assumed to be built-out before the future horizon year of 2022 to ensure it is considered. The anticipated primary trip generation from this site can be seen in Figure 11 and is an excerpt from the Mr. Gas Service Centre-1156 March Road Transportation Brief prepared by D.J. Halpenny & Associates Ltd.

Figure 11: 1156 March Road Site Generated Primary Volumes

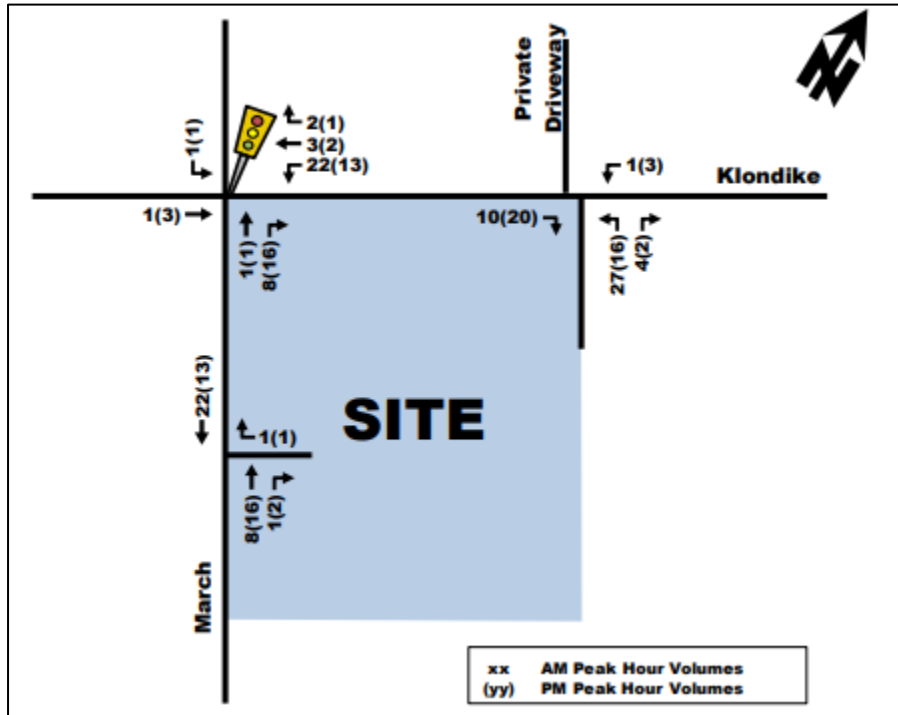


Source: 1156 March Road TIA Strategy Report (D.J. Halpenny & Associates Ltd., 2016)

- 788 March Road – A two-phase residential development proposing 95 residential units upon the completion of the first phase (2021) and an additional 101 residential units upon build-out of the second phase (2023). A total of approximately 270 vehicle parking spaces are proposed. The anticipated trip generation from this site for Phase 1 and Phase 2 can be seen in Figure 12 and Figure 13 respectively, and

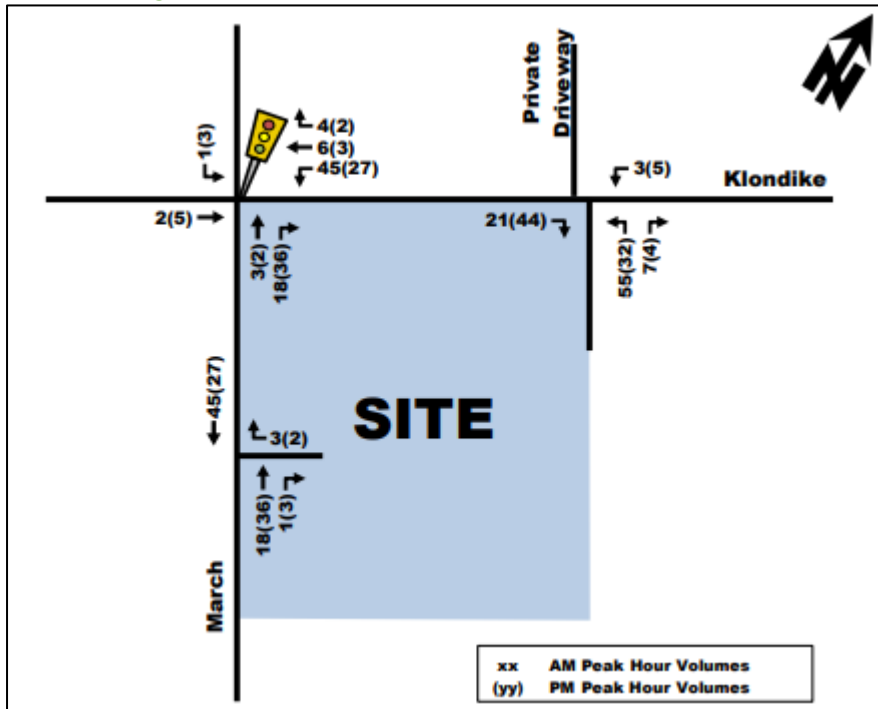
are excerpts from the 788 March Road Draft Transportation Impact Assessment prepared by Parsons. A final version of the report has not been made available.

Figure 12: 788 March Road Site Generated Volumes-Phase 1



Source: 788 March Road TIA Strategy Report (Parsons, 2018)

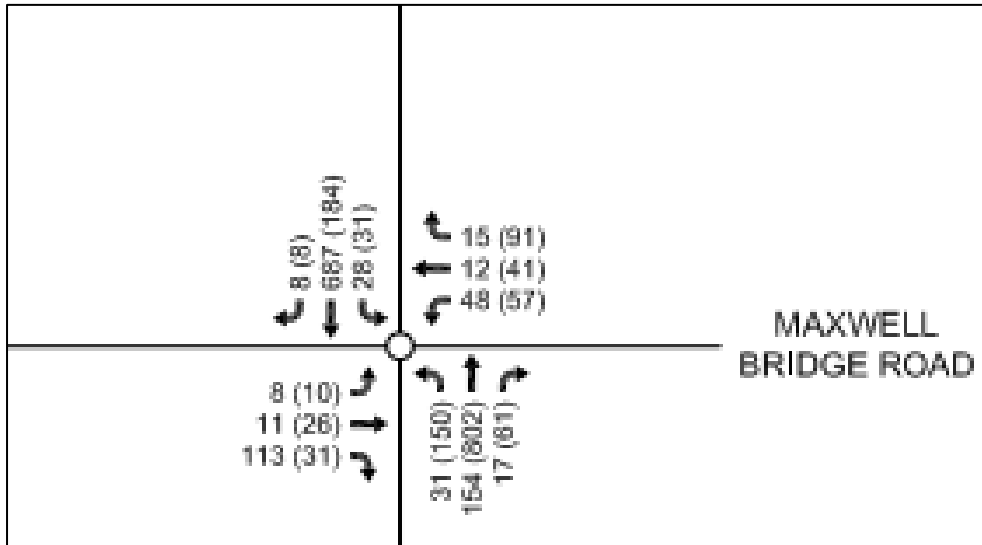
Figure 13: 788 March Road Site Generated Volumes-Phase 1 & 2



Source: 788 March Road TIA Strategy Report (Parsons, 2018)

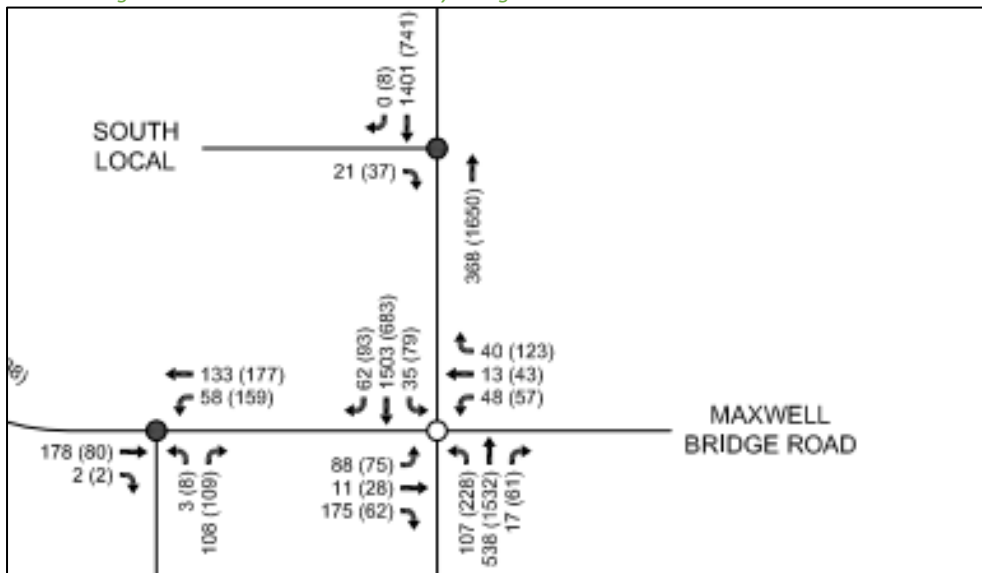
The Kanata North Community Design Plan outlines the proposed community-wide land-use framework for the Kanata North Urban Expansion Area. Various proposed developments are considered as part of the design plan and have been broken into four quadrants (northeastern, southeastern, southwestern, and northwestern). The Kanata North Community Design Plan -TMP – prepared by Novatech identifies the site-generated traffic of all four quadrants on the surrounding area road network and assumes a full build-out year of 2026. Excerpts from the TMP can be seen in Figure 14 and Figure 15 depicting the 2026 Future Background Volumes and the 2026 Future Total Volumes, respectively.

Figure 14: Kanata North Community Design Plan - 2026 Future Background Volumes



Source: Kanata North Community Design Plan - TMP (Novatech, 2016)

Figure 15: Kanata North Community Design Plan - 2026 Future Total Volumes



Source: Kanata North Community Design Plan - TMP (Novatech, 2016)

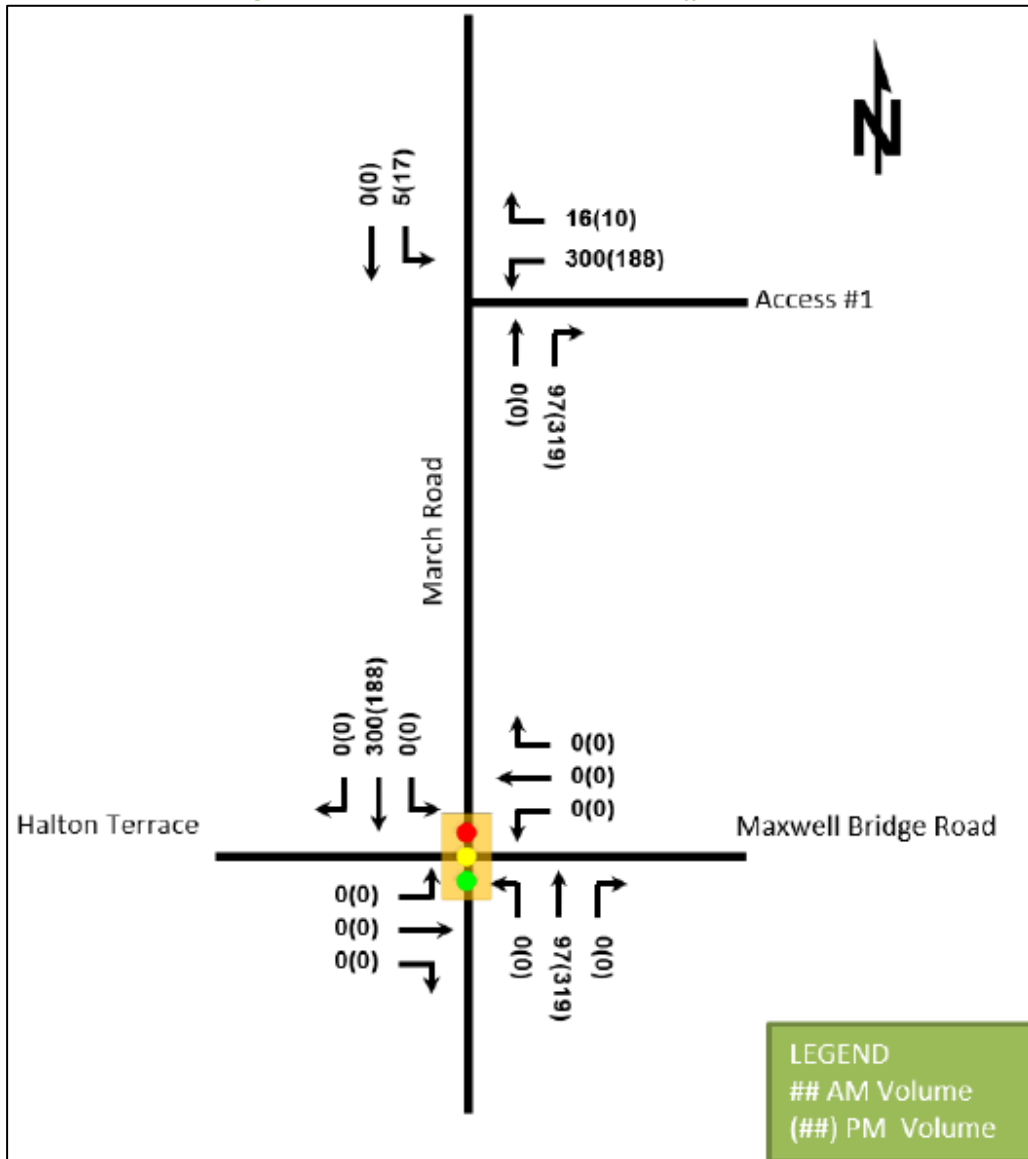
At this time, active development applications are available for all quadrants with the exception of the southwestern quadrant. As such, the contribution of the southwestern quadrant can only be considered based on the site generated volumes from the Kanata North Community Design Plan -TMP as shown in Figure 14 and Figure 15, and is therefore assumed to be built-out in 2026. This will produce a conservative analysis. Additionally, the

proponent has indicated that they intend to work with the land developers of the southwestern quadrant to ensure the South Local Road will form the west leg of the Site Access #1 intersection. Further details will be provided in Section 11.3.

The other development quadrants are explored in further detail below:

- 936 March Road - Considered the southeast portion of the Kanata North Urban Expansion Area Proposed to include approximately 800 residential units split between townhomes and detached units. The full build-out of this development is expected by 2023. The anticipated trip generation from this site can be seen in Figure 16 and is an excerpt from the 936 March Road Transportation Impact Study prepared by CGH Transportation.

Figure 16: 936 March Road Site Generated Traffic Volumes

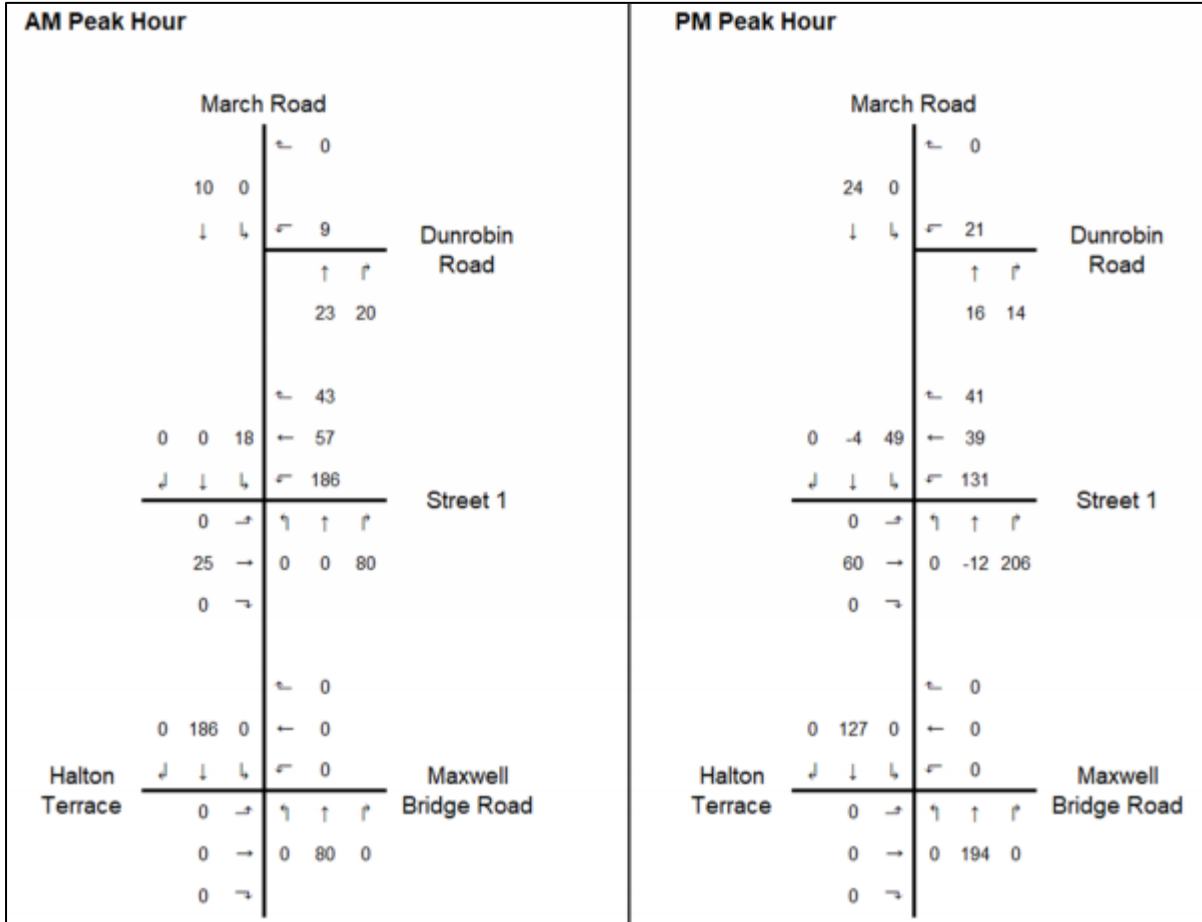


Source: 936 March Road (CGH Transportation, 2018)

- 1020 / 1070 March Road – Considered the northeast portion of the Kanata North Urban Expansion Area. A subdivision proposed to include 297 single family homes, 315 townhouses, 116 apartment units, and

elementary school and 80, 000 ft<sup>2</sup> of specialty retail. Full build-out of this development is expected by 2031. No phasing information is available. The anticipated trip generation from this site can be seen in Figure 17 and is an excerpt from 1020 and 1070 March Road Transportation Impact Assessment-Strategy Report prepared by Stantec.

Figure 17:1020 / 1070 March Road Site Generated Volumes



Source: 1020 and 1070 March Road TIA Strategy Report (Stantec, 2019)

- 1053 / 1075 / 1145 March Road – Considered the northwest portion of the Kanata North Urban Expansion Area. Proposed to include 295 single detached dwellings, 314 townhouse dwellings, 216 multi-unit dwellings. Full build-out of this development is expected by 2026. Site generated volumes diagrams are not available as part of the TIA, however the report indicates that the volumes presented in the Kanata North Community Design Plan – TMP prepared by Novatech can be used to determine a conservative estimate of the traffic generated by the proposed development at 1053 / 1075 / 1145 March Road. The 2026 future background volumes and the 2026 future total volumes seen in Figure 14 and Figure 15 will therefore be used to calculate the site generated traffic.

### 3 Study Area and Time Periods

#### 3.1 Study Area

The Study Area will include the intersections of March Road at Halton Terrace / Maxwell Bridge Road and March Road at Klondike Road. March Road will be examined as a Boundary Road.

### 3.2 Time Periods

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

### 3.3 Horizon Years

The anticipated build-out year is 2022. As a result, the full build-out plus five years horizon year is 2027.

## 4 Exemption Review

Table 4 summarizes the exemptions for this TIA.

*Table 4: Exemption Review*

Module	Element	Explanation	Exempt/Required
<b>Design Review Component</b>			
<b>4.1 Development Design</b>	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt
<b>4.2 Parking</b>	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
<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	Required
<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	Exempt
<b>4.8 Network Concept</b>		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Required

## 5 Development-Generated Travel Demand

### 5.1 Trip Generation and Mode Shares

This TIA has been prepared using the vehicle trip rates from the ITE Trip Generation Manual (10<sup>th</sup> Edition). To estimate person trip generation, a factor of 1.28 has been applied to the ITE rates. Table 5 summarizes the person trip rates for the proposed land uses.

Table 5: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
Hardware / Paint Store	816	AM	1.08	1.38
		PM	2.68	3.43
		Sat	2.25	2.88
Fast Casual Restaurant	930	AM	2.07	2.65
		PM	14.13	18.09
		Sat	34.02	43.55
Fast-Food Restaurant w Drive-Through	934	AM	40.19	51.44
		PM	32.67	41.82
		Sat	54.86	70.22
Coffee/Donut Shop w Drive-Through	937	AM	88.99	113.91
		PM	43.38	55.53
		Sat	87.70	112.26
Gasoline/Service Station w Convenience Market	945	AM	12.47	N/A
		PM	13.99	N/A
		Sat	19.35	N/A

Using the above Person Trip rates, the total person trip generation has been estimated. As the gasoline / service station with a convenience market is likely to generate only vehicle trips, the ITE vehicle trip rate will be used and all resulting trips will be allocated to the auto driver mode share in order to produce a conservative analysis. Table 6 below illustrates the total person trip generation by land use.

Table 6: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Hardware / Paint Store	20,256 sq.ft	15	13	28	32	37	69	32	26	58
Fast Casual Restaurant	3,601 sq.ft	7	3	10	36	29	65	86	71	157
Fast-Food Restaurant w Drive-Through	2,359 sq.ft	62	59	121	51	48	99	85	81	166
Coffee/Donut Shop w Drive-Through	2,058 sq.ft	119	115	234	57	57	114	115	116	231
Gasoline/Service Station w Convenience Market	10 pumping stations	64	61	125	71	69	140	96	97	193
<b>Total Person Trips</b>		<b>267</b>	<b>251</b>	<b>518</b>	<b>247</b>	<b>240</b>	<b>487</b>	<b>414</b>	<b>391</b>	<b>805</b>

Using the most recent National Capital Region Origin-Destination (OD Survey), the existing mode shares for the Kanata / Stittsville and Rural West TRANS districts have been summarized in Table 7. The proposed development is just within the Kanata / Stittsville district however, as requested by the City of Ottawa as part of the Forecasting Report review process, shown in Appendix H, the Rural West mode shares have been used instead to generate the site trips for the proposed development.

Table 7: Mode Share

Travel Mode	Kanata / Stittsville	Rural West
Auto Driver	65%	75%
Auto Passenger	15%	15%
Transit	10%	5%
Cycling	1%	1%
Walking	9%	4%
<b>Total</b>	<b>100%</b>	<b>100%</b>



Using the above mode shares and person trip rates, the person trips by mode have been forecasted during the peak hours. Where applicable, pass-by trips have been accounted for. These rates have been selected using ITE Trip Generation Manual 10th Edition Volume 1 Table E.32 for both the Fast-food Restaurant with a Drive-through and the Coffee / Donut Shop with a Drive-through land uses and Table E. 37 for the Gasoline / Service Station with Convenience Market land use. The average pass-by trip percentages for both the AM peak and PM peak periods were taken from these tables. For other land uses a pass-by rate has not been applied as they are unlikely to attract pass-by trips during the peak hours. The rates used for each land-use have been summarized in Table 8, as per the ITE Trip Generation Manual.

Table 8: Land Use Pass-by Rates

Land Use	Pass-by Rate	
	AM	PM
<b>Fast-Food Restaurant w Drive-Through</b>	49%	50%
<b>Coffee/Donut Shop w Drive-Through</b>	49%	50%
<b>Gasoline/Service Station w Convenience Market</b>	62%	56%

As no pass-by rates were available for the Coffee/Donut Shop with a Drive-through land use (LUC 937), the pass-by rates of a similar land use (Fast-food Restaurant with Drive-through (LUC 934)) have been used. This is considered conservative as it is suspected that the pass-by rates of a Coffee/Donut Shop with a Drive-through would be higher. Additionally, as no Saturday peak pass-by rates are available, the PM peak pass-by rates have been used. The pass-by reduction by land use can be seen in Appendix I and the total pass-by reduction can be seen in Table 9 below.

Given the relatively small size of the proposed development as well as the mix of different land uses, no notable degree of internal capture is expected, and as such, no internal capture rates have been considered. This will produce a conservative estimate of new peak hour vehicle trips.

Using the above mode shares and person trip rates, the person trips by mode have been projected. Table 9 summarizes the trip generation by mode.

Table 9: Trip Generation Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
<b>Auto Driver</b>	75%	217	203	420	202	199	401	335	317	652
<i>Fast-Food Restaurant w Drive-Through Pass-by</i>	-	-24	-22	-45	-19	-18	-37	-32	-31	-63
<i>Coffee/Donut Shop w Drive-Through Pass-by</i>	-	-44	-43	-87	-22	-22	-44	-43	-44	-87
<i>Gasoline/Service Station w Convenience Market Pass-by</i>	-	-40	-38	-78	-40	-39	-79	-54	-55	-109
<i>Total Pass-by</i>	-	-108	-103	-211	-81	-79	-160	-129	-130	-259
<i>Net New</i>	-	109	100	209	121	120	241	206	187	393
<b>Auto Passenger</b>	15%	30	28	58	27	26	53	48	44	92
<b>Transit</b>	5%	10	10	20	10	8	18	16	15	31
<b>Cycling</b>	1%	2	2	4	2	1	3	3	3	6
<b>Walking</b>	4%	8	8	16	6	6	12	12	12	24
<b>Total</b>	100%	<b>267</b>	<b>251</b>	<b>518</b>	<b>247</b>	<b>240</b>	<b>487</b>	<b>414</b>	<b>391</b>	<b>805</b>

As shown above, 209 AM, 241 PM and 393 Saturday net new peak hour two-way vehicle trips are projected as a result of the proposed development.

### 5.2 Trip Distribution

To understand the travel patterns of the subject development, the OD survey has been reviewed to determine the existing travel patterns in both the Kanata / Stittsville and Rural West TRANS districts. As requested by the City of Ottawa as part of the Forecasting Report review process, shown in Appendix H, the Rural West trip distribution pattern will be applied to the new vehicle trips. Table 10 below summarizes the various distributions of the two TRANS districts.

*Table 10: OD Survey Existing Distribution*

To/From	% of Trips	
	Kanata / Stittsville	Rural West
North	15%	15%
South	30%	20%
East	50%	50%
West	5%	15%
Total	100%	100%

### 5.3 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the pass-by trips and trips generated by the site have been assigned to the Study Area road network.

To assign the pass-by trips to the accesses, a ratio of southbound trips as a portion of all traffic on March Road, and northbound trips as a portion of all traffic on March Road was developed. It was determined that 80% of the total traffic is southbound and 20% is northbound in the 2022 AM peak period and 24% of the total traffic is southbound and 76% is northbound in both the 2022 PM and 2022 Saturday peak periods. It was also determined that 72% of the total traffic is southbound and 28% is northbound in the 2027 AM peak period and 35% of the total traffic is southbound and 65% is northbound in both the 2027 PM and 2027 Saturday peak periods. Using these percents the traffic volumes have been logically distributed to the access points.

Figure 18 and Figure 19 illustrate the forecasted site pass-by trip volumes for 2022 and 2027, respectively. Figure 20 illustrates the 2022 new site traffic assignment by percentage, Figure 21 illustrates the 2027 new site traffic assignment by percentage, Figure 22 illustrates the 2022 new site generated volumes, Figure 23 illustrates the 2027 new site generated volumes, and Figure 24 and Figure 25 illustrate the 2022 and 2027 net new site generated volumes, respectively.

Figure 18: Forecasted Site Pass-by Trip Volumes-2022

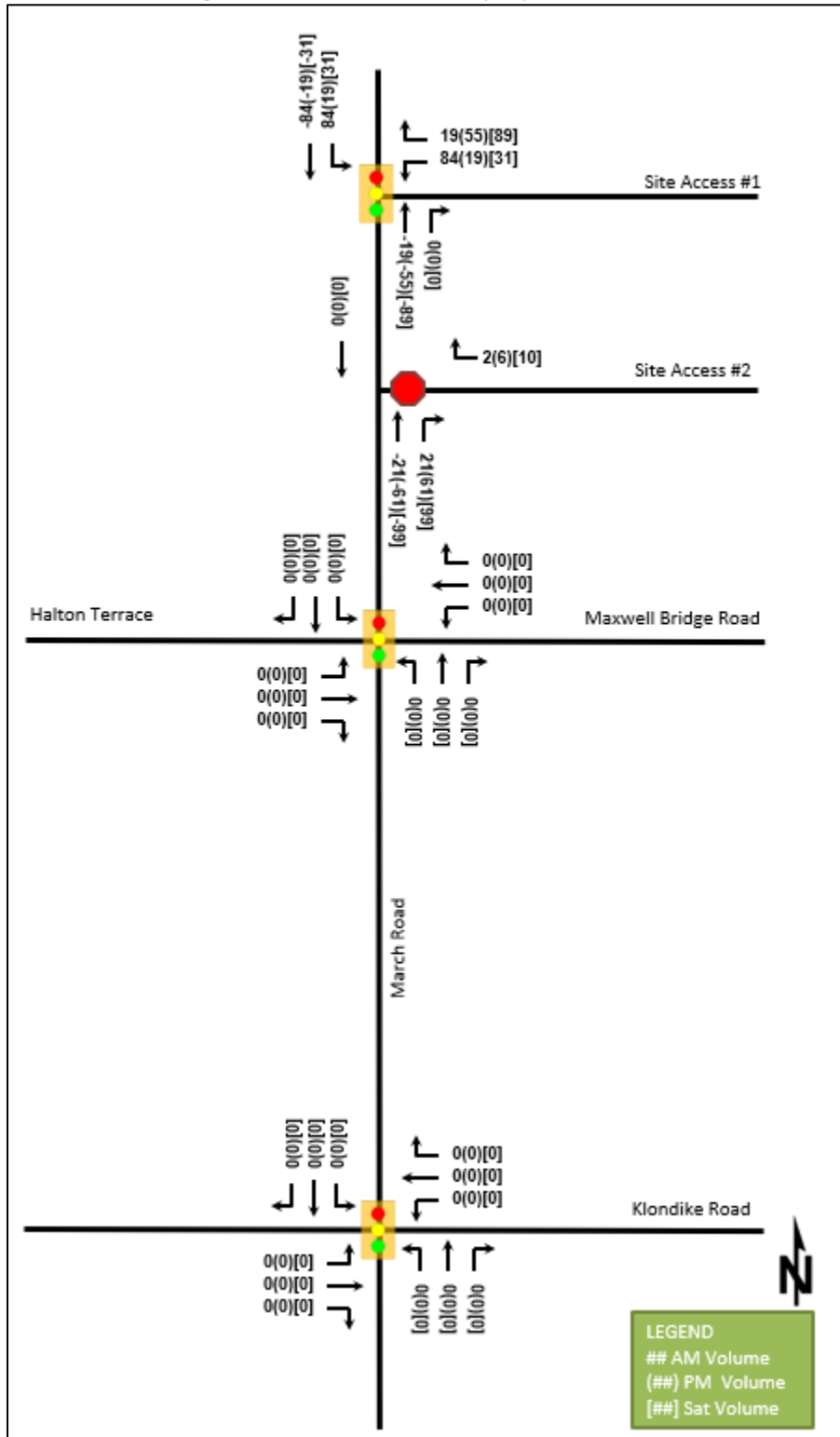


Figure 19: Forecasted Site Pass-by Trip Volumes-2027

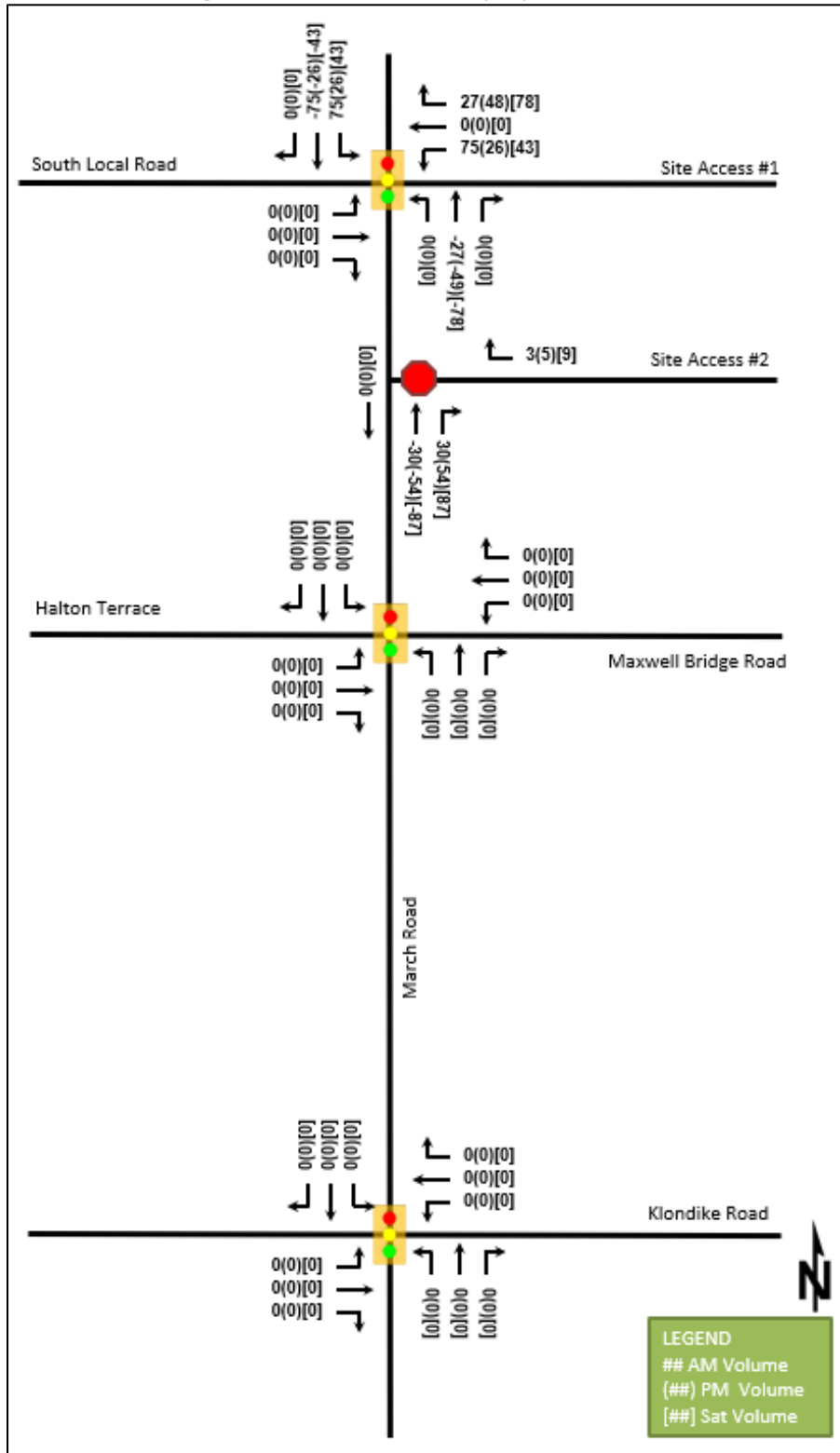


Figure 20: New Site Generation Assignment 2022 (%)

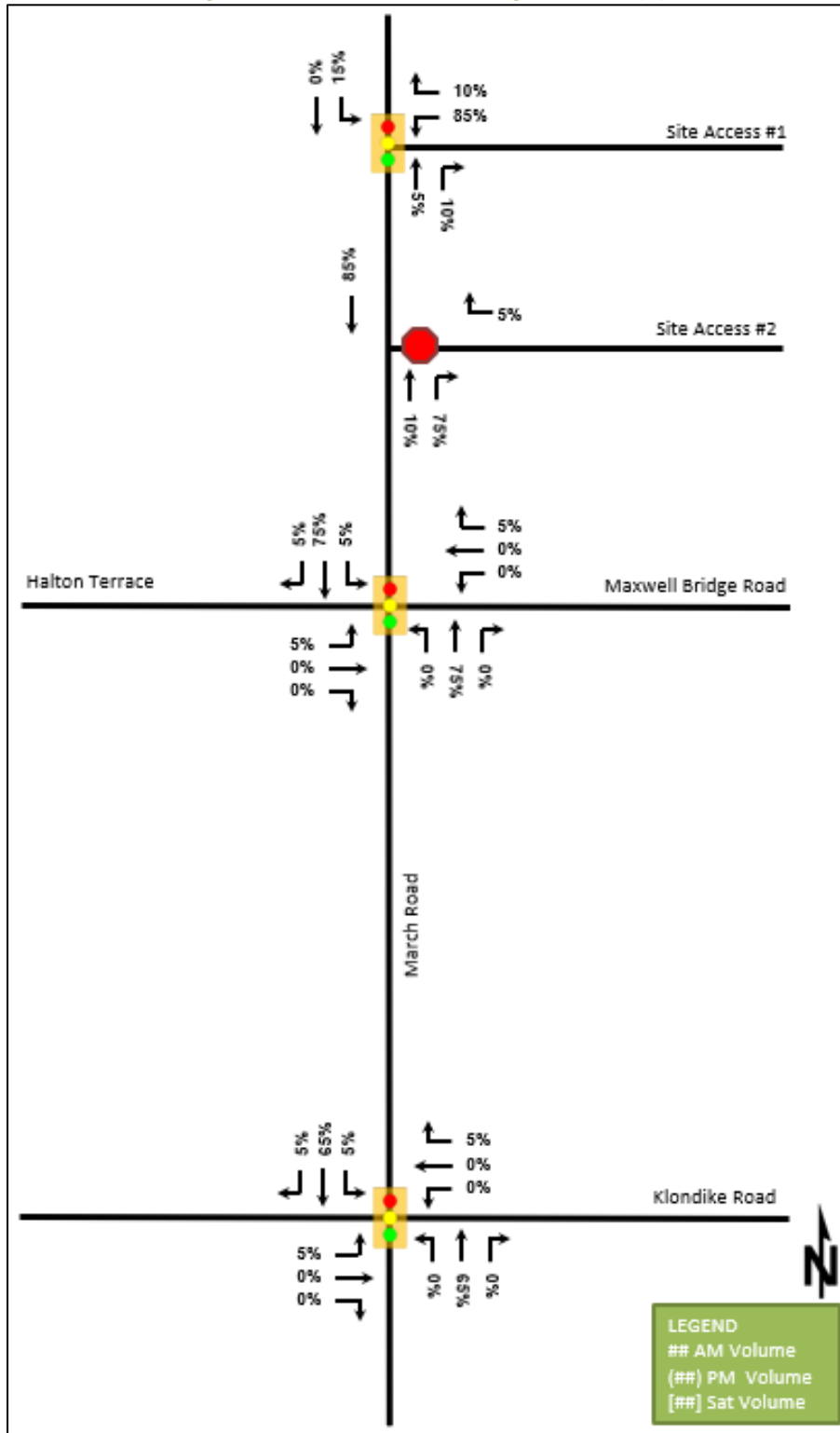


Figure 21: New Site Generation Assignment 2027 (%)

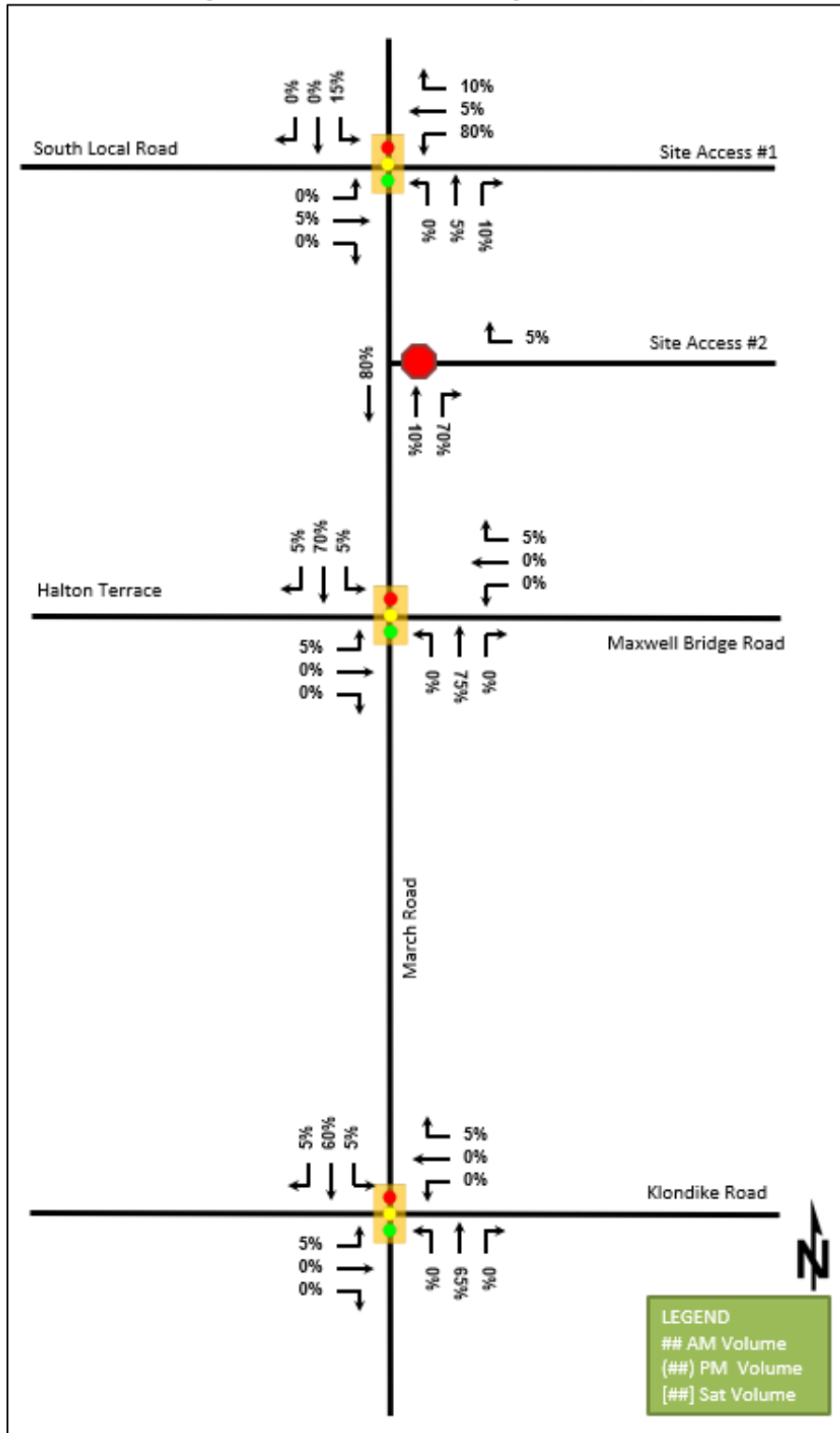


Figure 22: New Site Generation 2022 Auto Volumes

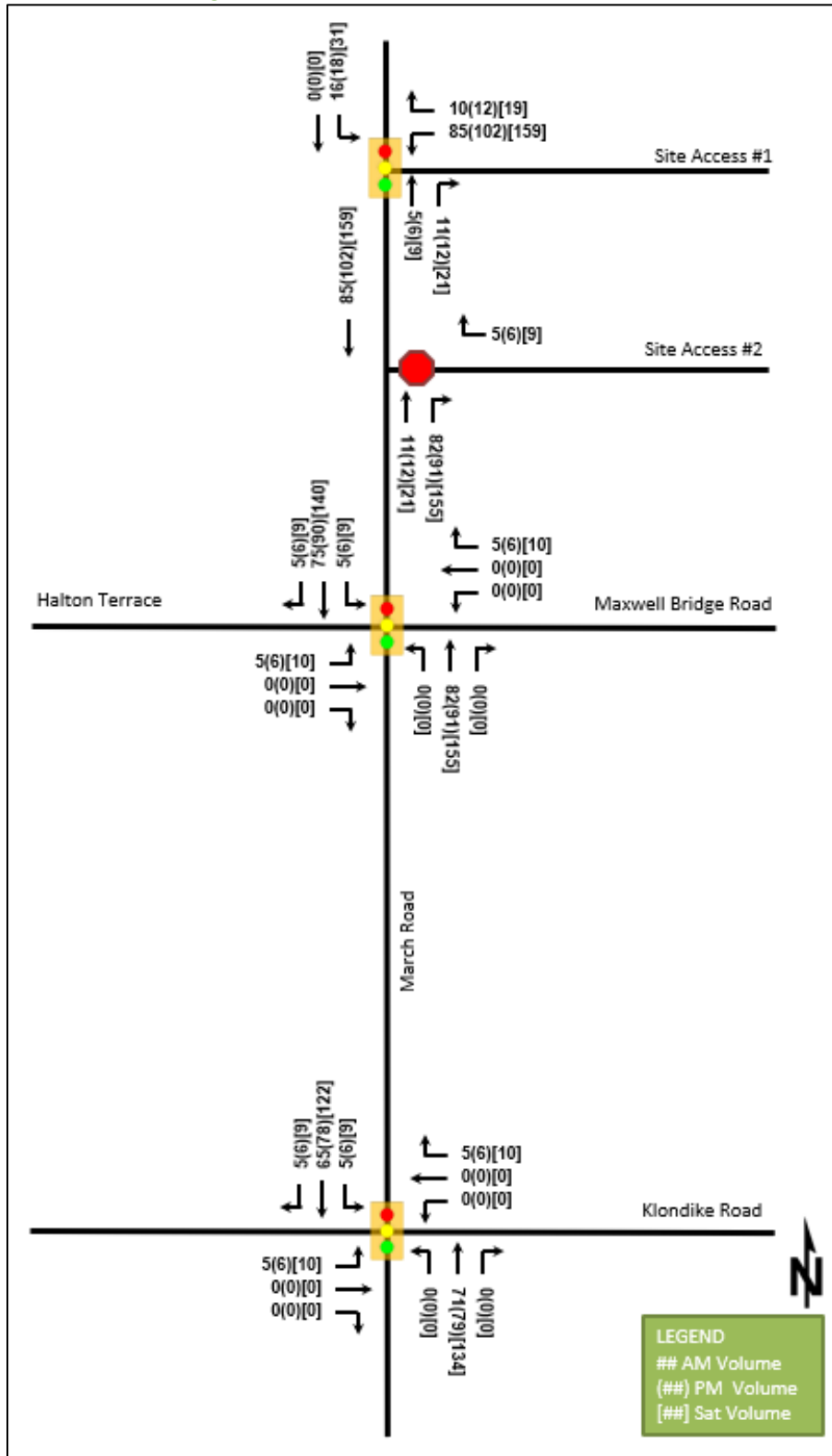


Figure 23: New Site Generation 2027 Auto Volumes

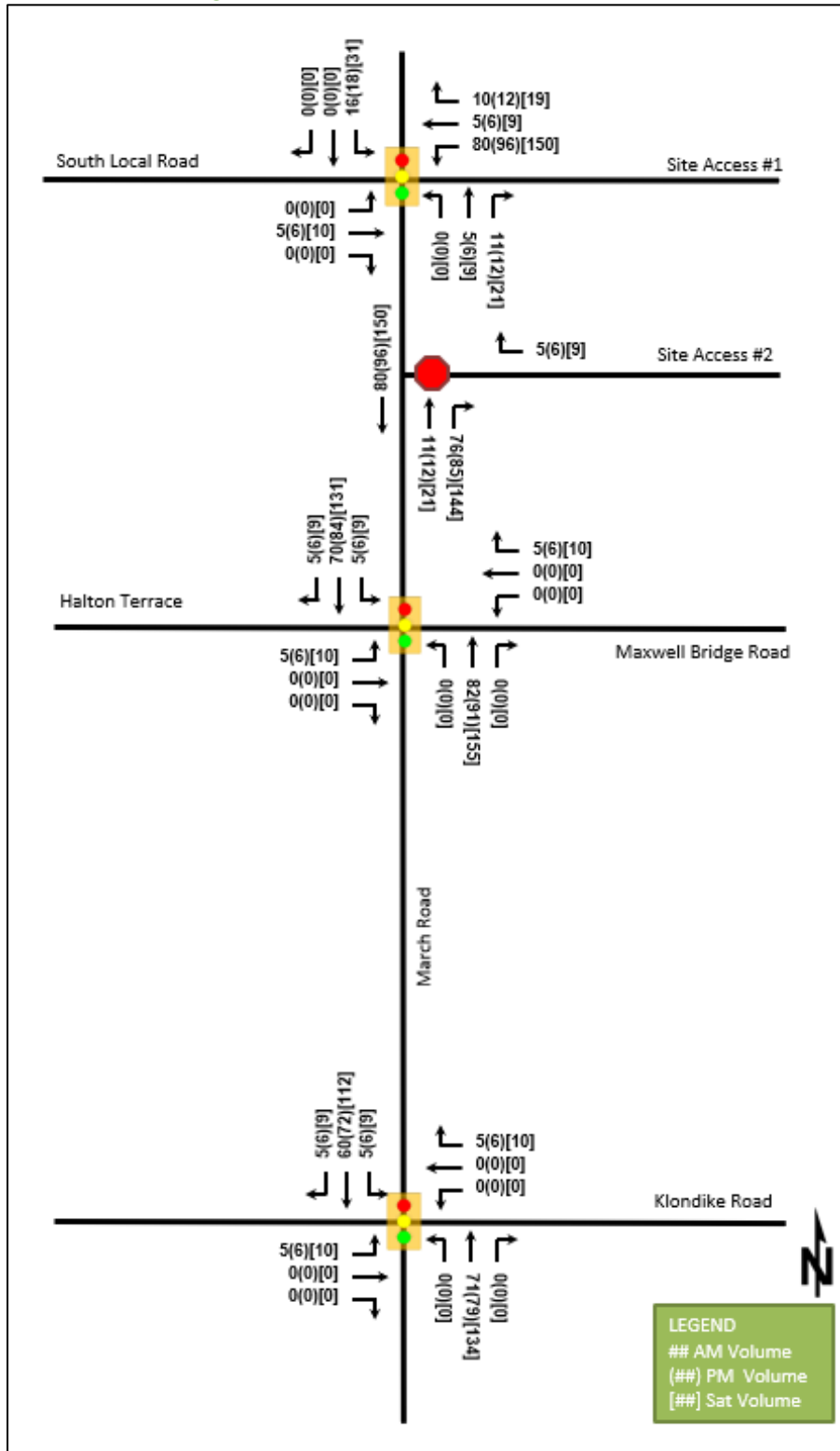




Figure 24: Net New Site Generation Auto Volumes 2022

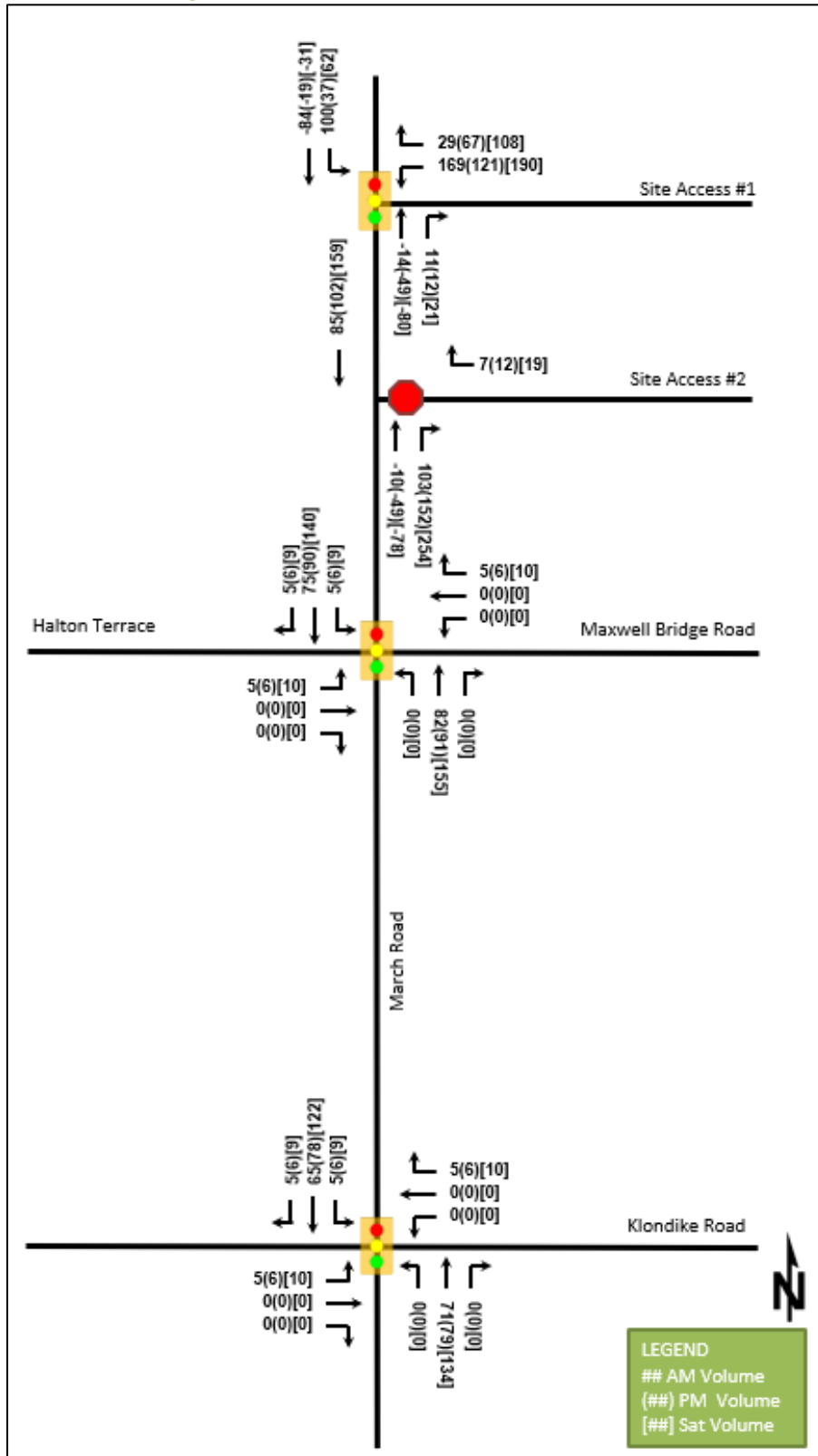
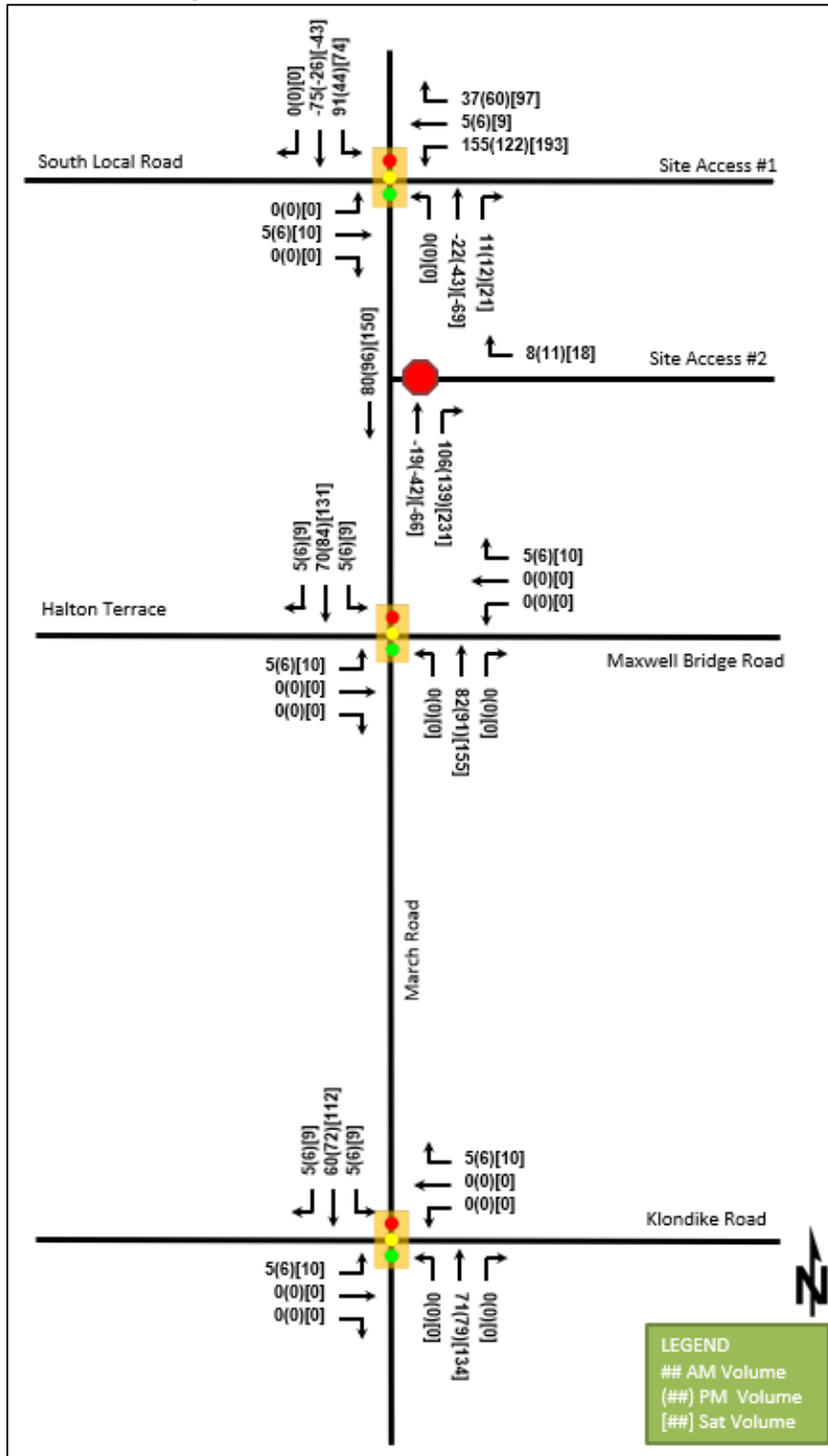


Figure 25: Net New Site Generation Auto Volumes 2027



## 6 Background Network Travel Demands

### 6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3.1. The Kanata North CDP has determined the required March Road interim and ultimate cross-sections. Both cross-sections, as shown in Appendix G, include two traffic lanes, cycling lanes, and sidewalks, both northbound and southbound. The ultimate cross-section also includes a centreline bus rapid transitway.

Additionally, Klondike Road between March Road and Sandhill Road will be urbanized and the implementation of a Transit Signal Priority corridor (isolated measures) on March Road between Carling Avenue and Maxwell Bridge Road are indicated by the City of Ottawa 2031 Affordable Road Network. This is assumed to occur beyond the proposed development's future analysis horizons.

The additional connectivity provided by the future bicycle spine route along March Road and the local routes along Klondike Road to the west of March Road and Halton Terrace will improve the active mode network but is not anticipated to significantly impact the modal shares used in the future trip generation.

### 6.2 Background Growth and Other Developments

An annual compound growth rate of 0.5% has been used to determine the background growth. The growth rate has been applied to the through volumes along March Road only. This growth rate is consistent with the Kanata North CDP TMP.

The background developments explicitly considered in the background conditions include the 1156/1170 March Road development, the 788 March Road development, the 936 March Road development, the 1053/1075/1145 March Road development, and the southwestern development in the Kanata North Community Design Plan. All of these developments are discussed in Section 2.3.2.

Figure 26 illustrates the 2022 background volumes and Figure 27 illustrates the 2027 background volumes

Figure 26: Background 2022 Volumes

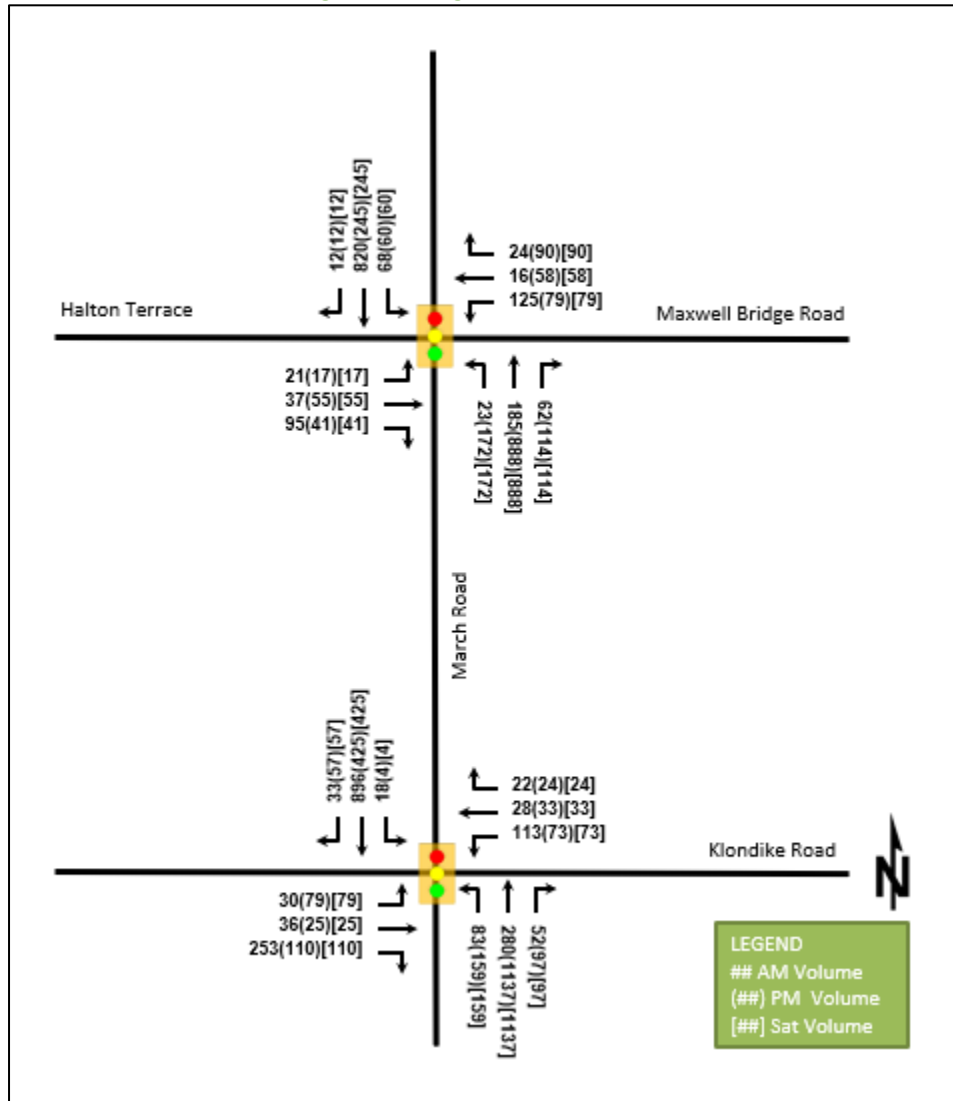
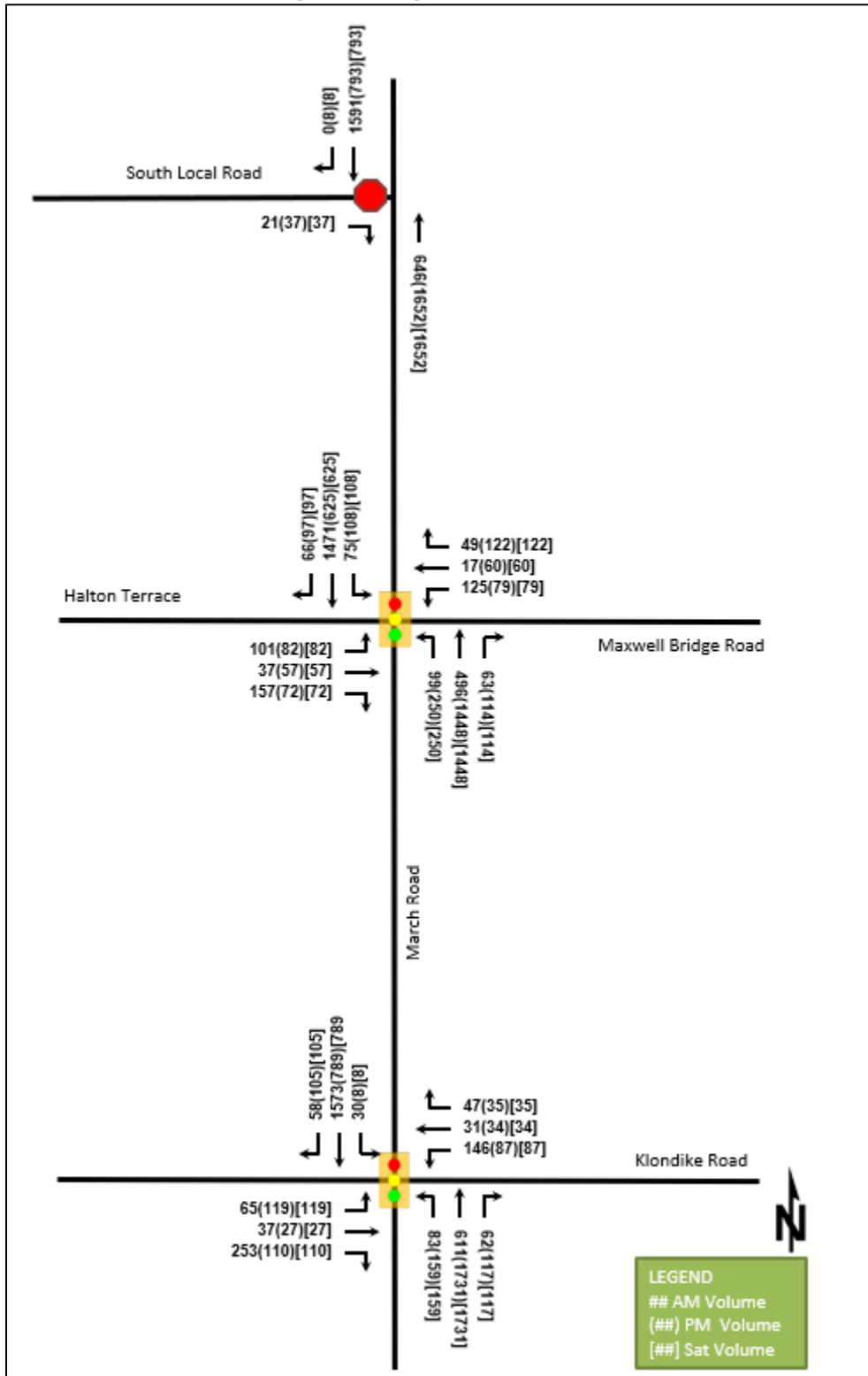


Figure 27: Background 2027 Volumes



## 7 Demand Rationalization

As documented in Section 16.2.1, the existing conditions within the Study Area are not indicative of any capacity issues. Changes in traffic volumes between existing and future conditions will come from the applied 0.5% background growth rate, the 1156/1170 March Road development, the 788 March Road development, the 936 March Road development, the 1053/1075/1145 March Road development, the southwestern development in the Kanata North Community Design Plan, and the net new auto trips from the proposed development within this report. The trip generation of this development is consistent with expected modal shares as can be seen in Section 5.1.

As part of the Forecasting Report comments, shown in Appendix H, the City of Ottawa has requested that additional analysis to determine “how many vehicles must be diverted from the peak periods to maintain an acceptable level of service on March Road” be performed. As such, a two-part sensitivity analysis will be conducted as part of the Synchro analysis performed in Section 16.2.5. The first sensitivity analysis will identify the volume required to be diverted from over-capacity movements in order to maintain a V/C ratio <1.0. The second sensitivity analysis will identify the volume required to be diverted from over-capacity movements in order to ensure no queues back up to the signalized intersection of March Road and Halton Terrace / Maxwell Bridge Road (approximately 200 metres) to the south or the future signalized intersection to the north as described in the Kanata North Community Design Plan (approximately 380 metres).

The future total 2022 volumes are illustrated in Figure 28 and the future total 2027 volumes are illustrated in Figure 29.

Figure 28: Future Total 2022 Volumes

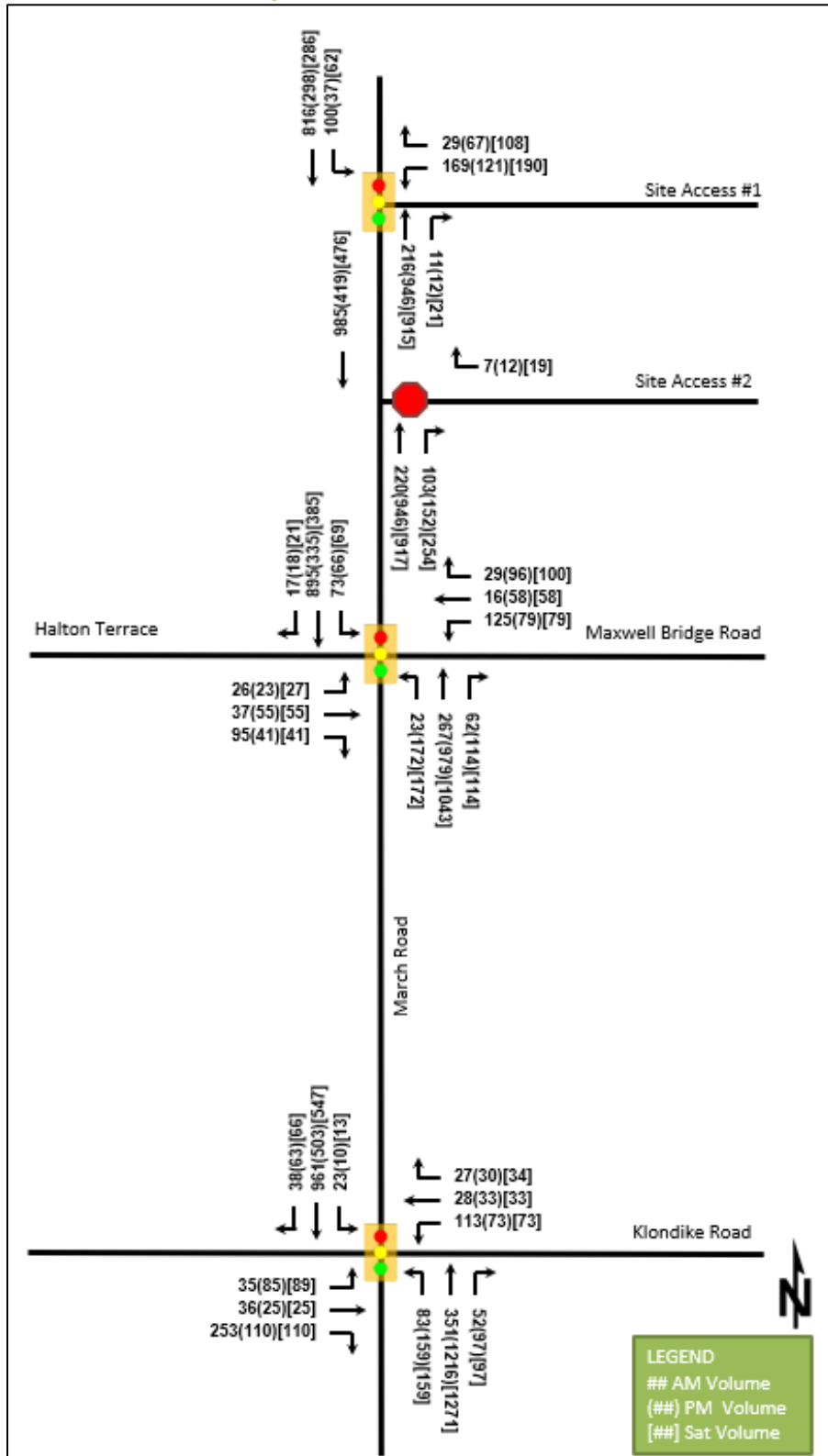
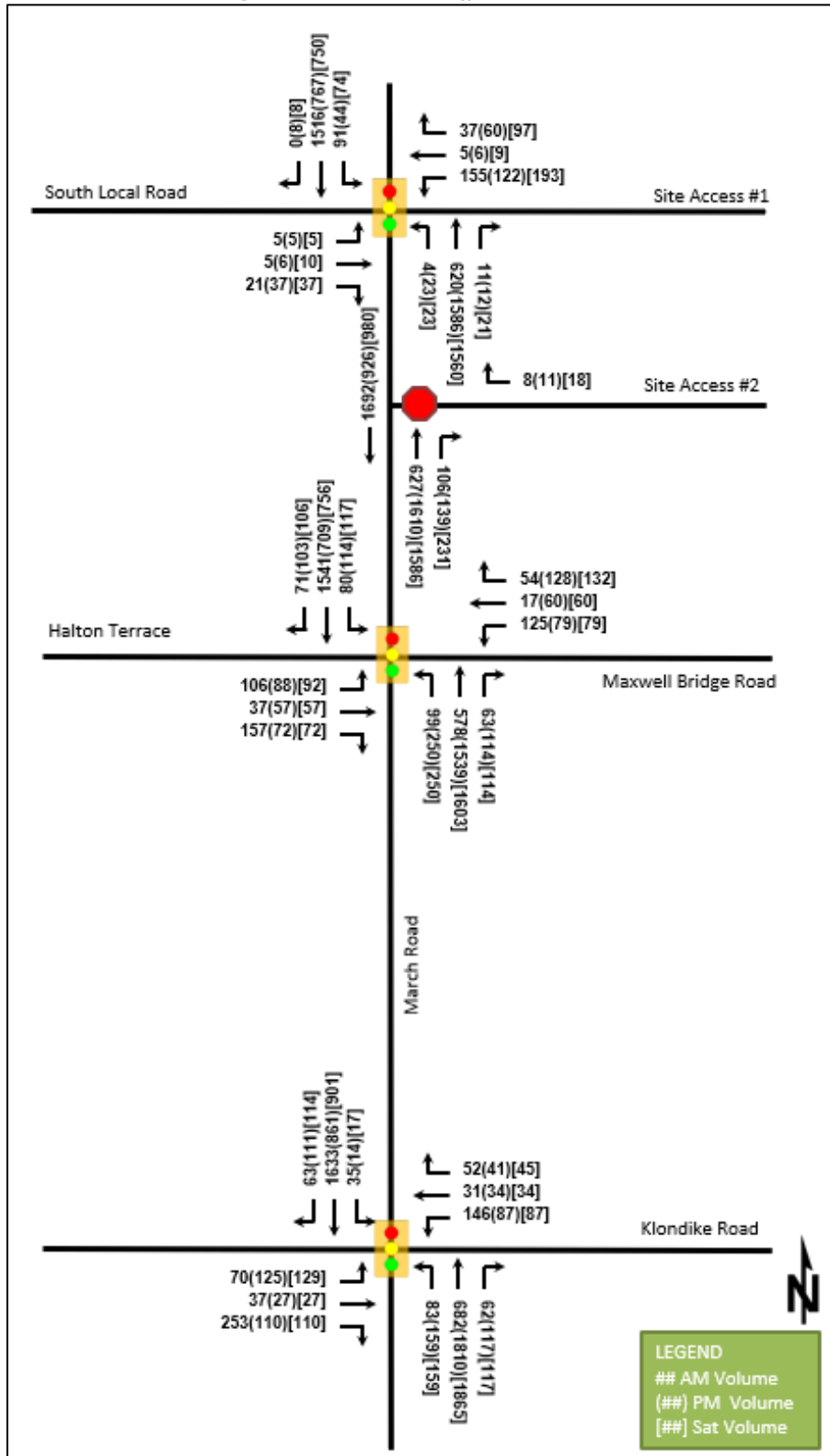


Figure 29: Future Total Traffic 2027 Volumes





## 8 Development Design

### 8.1 Design for Sustainable Modes

The proposed retail development will provide outdoor vehicle and bicycle parking.

The proposed development fronts directly onto future pedestrian and bicycle facilities on March Road. These facilities will provide access to the surrounding Study Area as well as the existing transit stops surrounding the proposed development.

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

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

- Locate building entrances in order to minimize walking distances to sidewalks and transit facilities.
- Locate building doors and entrances to ensure visibility of pedestrians from the building.
- Provide safe, direct, and attractive walking routes from the building entrances to nearby transit stops.
- Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible.
- Provide wayfinding signage for site access and egress.
- Provide lighting, landscaping, and benches along walking and cycling routes between building entrances and streets, sidewalks and trails.
- Provide a permanent bike repair station.

TDM Checklists for non-residential land uses can be found in Appendix J.

### 8.2 Circulation and Access

Both site accesses are expected to accommodate passenger vehicles accessing the proposed development. It is expected that loading trucks and garbage trucks will use both Site Access #1 and Site Access #2. Resulting turning templates have been completed and indicate adequate internal circulation within the site. These turning templates also show that further design considerations are required at the right-in right-out Site Access #2 intersection and will therefore be further reviewed as part of the RMA. Turning templates can be found in Appendix K.

### 8.3 New Street Networks

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

## 9 Parking

### 9.1 Parking Supply

The parking requirements and provisions for the proposed development are summarized in Table 11.

*Table 11: Parking Provisions*

Land Use	Parking Rate	Parking Required	Parking Provided
Gas Bar	0	0	164
Restaurant	10 / 100 m <sup>2</sup> GFA	43	
Retail Store	3.4 / 100 m <sup>2</sup> GFA	78	
<b>Total Vehicle Parking</b>		121	
Gas Bar (bicycle)	-	-	16
Restaurant (bicycle)	1 / 250 m <sup>2</sup> GFA	2	
Retail Store (bicycle)	1 / 250 m <sup>2</sup> GFA	10	
<b>Total Bicycle Parking</b>		12	

Based on the City of Ottawa Zoning By-laws, a total of 121 automobile parking spaces are required as a minimum and a minimum of 12 bicycle parking spaces are required. As can be seen in Table 11, automobile parking space requirements are met in excess of 43 parking spaces. The bicycle parking requirements are met in excess of four parking spaces.

These parking minimums are based on the most recent plan which shows Retail B / Restaurant 2 as a retail store. In the scenario that what is shown as Retail B on the most recent plan does proceed as a restaurant, the required vehicle parking would be 140 spaces and the required bicycle parking would be 11 spaces.

As such, regardless of the ultimate decision surrounding Retail B / Restaurant 2, both vehicle and bicycle parking spaces are provided in excess of what is required.

### 9.2 Spillover Parking

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

## 10 Boundary Street Design

March Road is noted as a boundary road for the site in both the 2022 and 2027 future horizons. March Road is not considered a Complete Street and no plans currently exist to upgrade March Road within the proposed development’s future analysis horizons. As discussed in Section 2.3.1., as part of the proposed development, the existing pedestrian facilities and bike lanes which terminate north of Maxwell Bridge Road / Halton Terrace will be extended along the frontage of the proposed development along the east side of March Road upon full-build out of the development. It is expected that the existing pedestrian facilities and bike lanes which terminate north of Maxwell Bridge Road / Halton Terrace will be extended along the frontage of the proposed development along the west side of March Road in conjunction with the development of the southwestern quadrant of the Kanata North Community Design Plan in time for the 2027 future horizon.

Additionally, future improvements on March Road north of Maxwell Bridge Road / Halton Terrace are expected in the form of an interim and ultimate scenario. The interim scenario is the widening of March Road to four lanes and the ultimate scenario considers the widening of March Road to accommodate the extension of the Median

BRT system as discussed in Section 2.3.1. These improvements have been proposed as part of the City of Ottawa’s TMP Ultimate Network and the Kanata North CDP. As the timing of both of these improvements to March Road is unknown and neither transportation infrastructure upgrade is included in the City of Ottawa’s 2031 Affordable Network, it has been assumed that they will occur beyond the proposed development’s future analysis horizons.

The Segment Multi-Modal Level of Service (MMLOS) is broken down into the Pedestrian Level of Service (PLOS), Bicycle Level of Service (BLOS), Transit Level of Service (TLOS) and Truck Level of Service (TkLOS) and are all recorded in Table 12. As the existing, future background and future total scenarios are all different, they have been evaluated in their own MMLOS worksheets. The results however are the same across all horizons with the exception of the 2027 FT Bicycle Level of Service. March Road has been evaluated against the target for a developing community. The MMLOS Worksheets for each horizon can be found in Appendix L.

Table 12: Boundary Street MMLOS

Road Segment	Horizon	MMLOS							
		PLOS		BLOS		TLOS		TkLOS	
		Actual	Target	Actual	Target	Actual	Target	Actual	Target
March Road	Existing								
	2022 FB								
	2022 FT	F	C	F	C	D	D	C	D
	2027 FB								
	2027 FT			E					

March Road will not meet its pedestrian LOS target due to small boulevard widths and high vehicle operating speeds and will not meet its bicycle LOS target due to mixed traffic conditions on some segments of March Road and high operating speeds. Both the Transit LOS and Truck LOS targets have been met.

Future widening and transit improvements to March Road as mentioned above, are anticipated to increase connectivity and improve the segment MMLOS along March Road. As such, no further improvements to March Road, beyond the extension of pedestrian and bicycle facilities along the frontage of the site, are recommended as a result of the boundary street MMLOS analysis.

## 11 Access Intersection Design

### 11.1 Location and Design of Access

The site is proposed to have two accesses. Both accesses are located along March Road; the first (Site Access #1) is a full-movement access located approximately 215 metres north of Maxwell Bridge Road, measured from intersection centreline to intersection centreline. As per the Transportation Association of Canada’s Geometric Design Guide for Canadian Roads (TAC), typical minimum intersection spacing along minor arterials is 200 metres. This segment of March Road can be considered a minor arterial road within the Study Area as it currently has a narrow cross-section, and south of the Study Area it provides access directly developments along March Road. Therefore, the distance between the intersection of March Road and Maxwell Bridge Road / Halton Terrace and Site Access #1 is acceptable. Additionally, this spacing is consistent with that of other signalized intersections along March Road such as the spacing between the intersection of March Road and Maxwell Bridge Road / Halton Terrace and the signalized access intersection to the south. As future infrastructure upgrades outside of the study horizons are implemented on March Road it will be upgraded to a major arterial road and at this time, signals at Access #1 to this site will be re-evaluated.

The second (Site Access #2) is an unsignalized right-in / right-out access located approximately 150 metres north of Maxwell Bridge Road, measured intersection centreline to intersection centreline.

### 11.2 Intersection Control

Using OTM Book 12 Justification 7, and the volume projections herein, the traffic control signal warrant for Access #1 at March Road has been examined in both the 2022 future total and 2027 future total horizons. It has been found that signals are not warranted using Justification 7. However, for a “new” intersection the warrant requires the volume threshold to reach 150% of the required volume. In this case the warrant was found to reach 133% of the threshold in the 2022 future total horizon and 149% of the threshold in the 2027 future horizon. As this is very close, this intersection will be further examined through the operational analysis to determine if traffic control signals would be appropriate based on the operational analysis.

The signalization warrants for Access #1 can be found in Appendix M.

Site Access #2 at March Road will be a right-in right-out access with stop-control on the minor approach.

### 11.3 Intersection Design

An RMA and functional design are anticipated for both site access intersections. For the purposes of this report however, the following assumptions surrounding the intersection design of both site accesses have been made:

Left-turn lane warrants for unsignalized intersections were examined at Site Access #1 for both 2022 and 2027 total future horizons using the MTO Geometric Design Standards for Ontario Highways, Section E. A southbound left-turn lane was found to be warranted for both future total horizons. The left-turn lane warrant nomographs can be found in Appendix N.

For the 2022 future total analysis horizon, the intersection of Site Access #1 and March Road has been assumed to be a three-legged intersection. The northbound approach will consist of a through and right-turn lane, the westbound approach will be made up of an auxiliary left-turn lane and a right-turn lane, and the southbound approach will consist of an auxiliary left-turn lane and a through lane. Additionally, pedestrian and cycling lanes are anticipated to be extended along the proposed development’s frontage on the east side of March Road.

For the 2027 future total analysis horizon, the intersection of Site Access #1 / South Local Road and March Road has been assumed to be a four-legged intersection. The South Local Road will form the west leg of the intersection and serves as an access to the southwestern development quadrant discussed in the Kanata North Community Design Plan. The South Local Road is anticipated to have both pedestrian and cycling facilities. The northbound approach will consist of a left-turn lane and a through lane, the westbound approach will be made up of an auxiliary left-turn lane and a shared through / right-turn lane, the southbound approach will consist of an auxiliary left-turn lane and a shared through / right-turn lane, and the eastbound approach will consist of a left-turn lane and a shared through / right-turn lane. Additionally, pedestrian and cycling lanes are anticipated to be extended along the proposed development’s frontage on the east side of March Road as well as on the west side of March Road in conjunction with the development of the southwestern quadrant of the Kanata North Community Design Plan.

The storage length of the westbound left-turn lane is based on the site plan and will be evaluated for adequacy based on the operational analysis of this intersection. The preliminary storage and taper lengths for the proposed southbound left-turn lane at Site Access #1 are summarized in Table 13 and further discussed below.

Table 13: 2022 and 2027 Site Access #1 at March Road SBL - Preliminary Design Criteria

Design Standard	Design Speed	Storage	Parallel Lane	Taper Ratio	Taper	Total Lane Length
TAC	90 km/h	15 m (min.)	95 m	27:1	95 m	205 m

Using Transportation Association of Canada’s Geometric Design Guide for Canadian Roads (TAC) the storage, parallel lane, and taper lengths were determined for a 90 km/h design speed. For the purposes of determining the taper length it was assumed that this left-turn lane would be constructed as a left-turn on the left side of the centreline with a 3.5 metre turning lane width. The parallel lane length was calculated based on the following formula (TAC Formula 2.5.1):

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

Where:

$$d_b = \text{Braking Distance (m)}$$

$$V = \text{Design Speed (km/h)}$$

$$a = \text{Deceleration rate (m/s}^2\text{)} = 3.4 \text{ m/s}^2$$

No intersections or driveways are currently planned within the parallel lane or taper length of the left-turn lane that will be negatively impacted by its implementation.

Using Transportation Association of Canada’s Geometric Design Guide for Canadian Roads (TAC) the runout lane is calculated to be 125 metres (30 metres + departure taper of 95 metres) with a design speed of 90 km/h. No intersections or driveways are located within 125 metres south of the Site Access #1 / South Local Road on March Road that will be negatively impacted by its implementation. Additionally, an RMA will be required at this intersection at which time the design of both the auxiliary and runout lane will be refined.

As such, the southbound left-turn lane at Site Access #1 should be 205 metres long with a storage lane of 15 metres, a parallel lane of 95 metres and a taper of 95 metres.

The proposed geometric intersection design at March Road and Site Access #2 remains the same for both the 2022 future total and the 2027 future total horizons. The TAC Geometric Standards suggest that a right turn lane is required where the right turn volume exceed 10% of the approach volume. At the subject intersection, the northbound right-turn volume exceeds 10% of the approach volume in the 2022 and 2027 horizon, and therefore a right turn lane has been considered for both future horizons. The right-turn storage and taper lengths have been considered for analysis only and will be further refined as part of the RMA. As such, the intersection configuration of Site Access #2 and March Road consists of two through and an auxiliary right-turn lane on the northbound approach, a channelized right-turn on the westbound approach and two through lanes on the southbound approach. Additionally, pedestrian and cycling lanes are anticipated to be extended along the proposed development’s frontage on the east side of March Road in the 2022 future horizon and on the both sides of March Road in the 2027 future horizon.

As illustrated on the proposed the site plan, the throat length of Site Access #1 is 15 metres and Site Access #2 is five metres however, due to how clear throat length is measured, the large radii curves for inbound trucks will allow for a greater effective throat length. Additionally, a northbound right turn lane in is proposed. The

combination of these two factors will allow inbound vehicles to be delayed entering the site without impeding the adjacent through traffic. According to Transportation Association of Canada’s Geometric Design Guide for Canadian Roads (TAC), Table 8.9.3, the suggested minimum clear throat length for major driveways, for a development of this size, would require a throat length based on each land use and is summarized in the Table 14 below.

*Table 14: Throat Length by Land Use*

Land Use*	Development Size (s.m.)	Required Clear Throat Length (m)
Hardware/Paint Store	1882	15
Fast Food Restaurant	219	40

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

The throat length for the fast food restaurant is longer than the available throat length, however, TAC assumes that each land use is a stand alone facility. For the fast food restaurant, the throat length is primarily driven by the need for storage space for vehicles that are queued waiting to use the drive-through facilities. As shown on the site plan, the fast food restaurant has been designed such that the vehicles will have adequate space to queue within the site. Therefore, the hardware / paint store throat length will govern. As stated above Access #1 has 15 metres of clear throat length. While Access #2 does not have the required clear throat length, the combination of the large radius curves and the northbound right turn lane into the site will provide adequate space for inbound vehicles to queue without impacting the adjacent street traffic.

The accesses and throat lengths will be further refined as part of the RMA process.

## 12 Transportation Demand Management

Transportation Demand Management measures are implemented to encourage the use of non-auto modes of travel. This is aimed at reducing the reliance on single occupant auto trips in the City of Ottawa. The proposed development adheres to the City’s TDM principles by facilitating connections to adjacent pedestrian, cycling, and transit facilities.

The following measures consistent with the TDM Checklists for non-residential land uses, included in Appendix J, could be implemented to ensure that the travel mode shares are achieved.

- Designate an internal coordinator, or contract with an external coordinator.
- Display local area maps with walking/cycling access routes and key destinations at major entrances.
- Display relevant transit schedules and route maps at entrances.
- Provide online links to OC Transpo and STO information.

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

## 13 Neighbourhood Traffic Management

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

## 14 Transit

In Section 5.1, the trip generation by mode was estimated, including the number of transit trips that will be generated by the proposed development. Table 15 summarizes the transit trip generation for both the 2022 and 2027 future horizons.

Table 15: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Transit	5%	10	10	20	10	8	18	16	15	31

Route #63 and #165 are expected to provide adequate transit capacity to support the increase in travel demand by the proposed development. It is recommended that OC Transpo provide additional transit capacity only as needed once the development is completed. It is expected that once the March Road BRT is constructed, that the transit trips generated but the proposed development would increase. This change in transit mode share has not been examined herein as the BRT is not included in the City of Ottawa TMP 2031 Affordable Network.

## 15 Review of Network Concept

March Road is expected to approach or exceed single lane capacity in the peak direction in the 2022 future background, 2022 future total, 2027 future background, and 2027 future total conditions. These volume projections are dependent on surrounding development growth being realized with the likely impact of these volumes being extended queues along March Road within the Study Area.

The planned future widening and BRT along March Road is expected to address the high volumes experienced and therefore at this time, no changes to the network concept are required to support the proposed development.

## 16 Intersection Design

### 16.1 Intersection Control

The intersection methods of control for March Road at Halton Terrace / Maxwell Bridge Road and March Road at Klondike Road will remain consistent with existing methods of control at both future horizons.

### 16.2 Intersection Design

To understand the intersection design, an MMLOS analysis of existing, 2022 future horizon, and 2027 future horizon demands is required. The existing and future segment MMLOS has been discussed in Section 10. The following sections will discuss the vehicle LOS at Study Area intersections. Synchro (Version 10) was used to model the Study Area intersections. This will be followed by a discussion of the intersection MMLOS for other modes.

As required by the City of Ottawa, the level of service at signalized intersections is based on the V / C ratio and the level of service at unsignalized intersections is based on the HCM criteria for average delay. The Heavy Vehicle percentage (HV %) has been calculated for each turning movement at the Study Area intersection. All Heavy Vehicle percentages calculated to be less than 2% were entered into the Synchro model as 2% in order to produce a conservative analysis. These calculations are shown in Appendix O. All parameters have been coded using the City of Ottawa’s TIA Guidelines and default parameters.

#### 16.2.1 Existing Conditions

The existing intersection volumes have been analyzed to establish a baseline condition and determine the impact of the subject development as well as the surrounding background developments on the Study Area road network. Table 16 summarizes the operational analysis of the 2020 existing conditions. Appendix P contains the 2020 Existing Conditions Synchro Sheets.

Table 16: 2020 Existing Intersection Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )
March Road at Halton Terrace / Maxwell Bridge Road Signalized	EBL	A	40	0.11	11	A	49	0.18	11	A	36	0.14	9
	EBT/R	A	18	0.44	25	A	40	0.48	32	A	28	0.42	25
	WBL	D	80	0.81	51	B	67	0.61	35	A	50	0.55	29
	WBT/R	A	22	0.16	13	B	40	0.64	41	A	26	0.56	30
	NBL	A	7	0.07	5	A	5	0.25	21	A	6	0.26	23
	NBT	A	11	0.10	19	A	11	0.43	82	A	6	0.41	51
	NBR	A	1	0.08	3	A	2	0.13	8	A	1	0.12	5
	SBL	A	6	0.10	12	A	6	0.17	8	A	7	0.19	10
	SBT	A	13	0.41	87	A	10	0.13	23	A	5	0.11	13
	SBR	A	0	0.01	0	A	0	0.01	0	A	0	0.01	<1
<b>Overall</b>	<b>B</b>	<b>18</b>	-	-	<b>B</b>	<b>16</b>	-	-	<b>B</b>	<b>11</b>	-	-	
March Road at Klondike Road Signalized	EBL	A	42	0.19	15	A	56	0.52	33	A	61	0.59	32
	EBT	A	41	0.13	17	A	42	0.08	12	A	42	0.12	12
	EBR	B	24	0.69	47	A	10	0.36	16	A	12	0.43	15
	WBL	B	74	0.66	42	A	73	0.56	31	A	52	0.44	26
	WBT/R	A	34	0.24	18	A	40	0.34	21	A	31	0.27	18
	NBL	A	63	0.42	20	A	63	0.57	34	A	53	0.53	29
	NBT/R	A	10	0.12	22	A	10	0.40	84	A	7	0.39	68
	SBL	A	65	0.24	13	A	60	0.03	3	A	50	0.02	3
	SBT/R	A	16	0.36	72	A	14	0.19	34	A	11	0.19	28
	<b>Overall</b>	<b>C</b>	<b>23</b>	-	-	<b>B</b>	<b>19</b>	-	-	<b>B</b>	<b>16</b>	-	-
<b>Notes:</b>	Saturation flow rate of 1800 veh/h/lane												
	PHF = 0.90												

As can be seen above, the Study Area intersections operate satisfactorily during the peak period hours and with V/C < 0.9, low delays and all LOS C or better.

16.2.2 2022 Future Background

The 2022 future background intersection volumes and other development traffic has been analyzed to allow a comparison between the future volumes with and without the proposed development. Table 17 summarizes the operational analysis of 2022 future background conditions. Appendix Q contains the 2022 Future Background Synchro sheets.



Table 17: 2022 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )
March Road at Halton Terrace / Maxwell Bridge Road Signalized	EBL	A	42	0.11	11	A	49	0.16	10	A	36	0.12	8
	EBT/R	A	19	0.43	24	A	39	0.46	29	A	27	0.40	22
	WBL	D	76	0.76	46	A	66	0.58	32	A	49	0.51	26
	WBT/R	A	23	0.16	12	B	37	0.61	37	A	23	0.52	26
	NBL	A	6	0.06	6	A	5	0.22	18	A	6	0.23	20
	NBT	A	10	0.09	17	A	10	0.39	70	A	6	0.37	44
	NBR	A	1	0.07	2	A	2	0.11	7	A	1	0.11	5
	SBL	A	6	0.08	10	A	5	0.14	7	A	6	0.15	8
	SBT	A	11	0.37	73	A	10	0.12	20	A	4	0.10	11
	SBR	A	0	0.01	0	A	0	0.01	0	A	0	0.01	<1
<b>Overall</b>	<b>B</b>	<b>17</b>	-	-	<b>B</b>	<b>15</b>	-	-	<b>B</b>	<b>10</b>	-	-	
March Road at Klondike Road Signalized	EBL	A	40	0.16	13	A	52	0.44	30	A	61	0.56	30
	EBT	A	40	0.12	15	A	42	0.08	13	A	43	0.13	12
	EBR	A	16	0.59	35	A	10	0.32	15	A	13	0.42	15
	WBL	B	73	0.68	46	A	73	0.58	33	A	57	0.51	28
	WBT/R	A	33	0.23	17	A	38	0.32	20	A	31	0.29	18
	NBL	A	63	0.39	19	A	63	0.55	31	A	53	0.51	27
	NBT/R	A	10	0.11	21	A	10	0.37	77	A	6	0.35	60
	SBL	A	65	0.23	13	A	61	0.05	5	A	50	0.05	4
	SBT/R	A	16	0.33	66	A	14	0.18	31	A	10	0.17	24
	<b>Overall</b>	<b>C</b>	<b>22</b>	-	-	<b>B</b>	<b>19</b>	-	-	<b>B</b>	<b>16</b>	-	-
<b>Notes:</b>	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												

With the addition of background growth and other development traffic to reflect the 2022 horizon, the existing intersections are anticipated to operate with similar operational characteristics to the existing conditions, with V/C < 0.9, low delays and all LOS C or better.

16.2.3 2027 Future Background

The 2027 future background intersection volumes and other development traffic has been analyzed to allow a comparison between the future volumes with and without the proposed development. The intersection of the South Local Road and March Road is considered as part of the 2027 future background horizon and has been analyzed as a right-in right-out unsignalized intersection as indicated in the Kanata North Community Design Plan. The South Local Road will form the west leg of the Site Access #1 / South Local Road and March Road intersection to be considered in the 2027 future total horizon. Table 18 summarizes the operational analysis of 2022 future background conditions. Appendix R contains the 2027 Future Background Synchro sheets.

Table 18: 2027 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )
March Road at Halton Terrace / Maxwell Bridge Road <i>Signalized</i>	EBL	A	51	0.49	36	E	135	0.94	#42	A	48	0.53	27
	EBT/R	A	15	0.51	26	A	37	0.56	34	A	20	0.42	24
	WBL	E	109	0.93	#51	B	73	0.64	33	A	42	0.43	25
	WBT/R	A	17	0.23	14	B	38	0.68	43	B	44	0.67	46
	NBL	A	17	0.49	18	A	7	0.44	28	A	12	0.50	47
	NBT	A	12	0.26	46	B	18	0.69	170	B	10	0.63	107
	NBR	A	1	0.07	3	A	3	0.12	10	A	2	0.11	6
	SBL	A	7	0.13	12	A	10	0.41	12	B	30	0.62	#44
	SBT	C	23	0.75	#216	A	12	0.31	56	A	6	0.27	34
	SBR	A	1	0.08	3	A	3	0.10	8	A	3	0.09	7
	<b>Overall</b>	<b>C</b>	<b>24</b>	-	-	<b>C</b>	<b>21</b>	-	-	<b>B</b>	<b>14</b>	-	-
March Road at Klondike Road <i>Signalized</i>	EBL	A	40	0.29	23	A	55	0.57	42	B	61	0.66	41
	EBT	A	35	0.10	15	A	40	0.08	13	A	39	0.11	12
	EBR	A	20	0.56	43	A	9	0.29	14	A	11	0.36	14
	WBL	C	73	0.74	55	B	73	0.62	37	A	50	0.47	31
	WBT/R	A	24	0.29	20	A	33	0.34	21	A	25	0.27	18
	NBL	A	63	0.39	19	A	63	0.55	31	A	53	0.51	27
	NBT/R	A	16	0.25	49	A	14	0.58	145	A	10	0.55	122
	SBL	A	67	0.33	17	A	61	0.10	7	A	51	0.09	7
	SBT/R	B	24	0.63	146	A	17	0.34	62	A	13	0.33	53
		<b>Overall</b>	<b>C</b>	<b>26</b>	-	-	<b>C</b>	<b>21</b>	-	-	<b>B</b>	<b>17</b>	-
March Road at South Local Road <i>Unsignalized</i>	EBR	E	37	0.16	6	C	15	0.10	3	C	15	0.10	3
	NBT	-	-	-	-	-	-	-	-	-	-	-	-
	SBT/R	-	-	-	-	-	-	-	-	-	-	-	-
<b>Notes:</b>	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# indicates the volume for the 95 <sup>th</sup> percentile cycle exceeds capacity												

With the addition of background growth and other development traffic to reflect the 2027 horizon, the existing intersections are anticipated to operate with similar operational characteristics to the existing conditions, with V/C < 0.9, low delays and all LOS C or better. Exceptions to this are the westbound left-turn and the eastbound left-turn at the intersection of March Road and Halton Terrace / Maxwell Bridge Road in the AM peak period and the PM peak period, respectively. All intersection movements, however, operate with a V/C < 1.0 and a LOS E or better.

At the intersection of March Road and Halton Terrace / Maxwell Bridge Road, the 95<sup>th</sup> percentile cycle exceeds capacity for the westbound left-turn and southbound through in the AM Peak period, the eastbound left-turn in the PM Peak period and the Southbound left-turn in the Saturday Peak period. Given the V/C < 1.0 for all four movements, it can be assumed that in practice the 95<sup>th</sup> percentile queue will rarely be exceeded.

16.2.4 2022 Future Total

The 2022 total future intersection volumes, including the site generated traffic and other development traffic, have been analyzed to understand the impact of the subject development in the Study Area intersections. Table 19 summarizes the operational analysis of the 2022 future total conditions. Appendix S contains the 2022 Future Total Synchro sheets.

Table 19: 2022 Future Total Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )
March Road at Halton Terrace / Maxwell Bridge Road Signalized	EBL	A	42	0.13	13	A	51	0.22	13	A	39	0.20	12
	EBT/R	A	19	0.43	24	A	39	0.46	29	A	27	0.40	22
	WBL	C	76	0.76	46	A	66	0.58	32	A	49	0.51	26
	WBT/R	A	22	0.18	13	B	37	0.62	38	A	30	0.59	33
	NBL	A	6	0.06	5	A	5	0.24	18	A	6	0.26	21
	NBT	A	10	0.14	23	A	10	0.43	80	A	6	0.43	54
	NBR	A	1	0.07	2	A	2	0.11	7	A	1	0.11	5
	SBL	A	6	0.10	10	A	5	0.17	8	A	7	0.21	11
	SBT	A	12	0.40	82	A	10	0.16	27	A	5	0.16	17
	SBR	A	<1	0.02	0	A	<1	0.02	0	A	1	0.02	1
<b>Overall</b>	<b>B</b>	<b>17</b>	-	-	-	<b>B</b>	<b>15</b>	-	-	<b>B</b>	<b>10</b>	-	-
March Road at Klondike Road Signalized	EBL	A	41	0.19	15	A	51	0.44	32	A	61	0.59	33
	EBT	A	40	0.12	15	A	42	0.08	13	A	42	0.12	12
	EBR	A	18	0.60	37	A	10	0.30	15	A	12	0.40	15
	WBL	B	73	0.68	46	A	73	0.58	33	A	54	0.47	28
	WBT/R	A	31	0.25	18	A	36	0.35	21	A	27	0.31	18
	NBL	A	63	0.39	19	A	63	0.55	31	A	53	0.51	27
	NBT/R	A	12	0.14	26	A	11	0.41	86	A	7	0.40	73
	SBL	A	66	0.27	15	A	62	0.12	8	A	52	0.13	9
	SBT/R	A	16	0.36	72	A	15	0.21	37	A	11	0.22	32
	<b>Overall</b>	<b>C</b>	<b>22</b>	-	-	-	<b>B</b>	<b>20</b>	-	-	<b>B</b>	<b>16</b>	-
March Road at Site Access #1 Unsignalized	WBL	<b>F</b>	<b>103</b>	<b>0.93</b>	<b>756</b>	<b>F</b>	<b>72</b>	<b>0.74</b>	<b>43</b>	<b>F</b>	<b>197</b>	<b>1.21</b>	<b>95</b>
	WBR	A	10	0.04	1	C	19	0.21	6	C	21	0.33	11
	NBT	-	-	-	-	-	-	-	-	-	-	-	-
	NBR	-	-	-	-	-	-	-	-	-	-	-	-
	SBL	A	8	0.08	2	B	10	0.05	1	B	10	0.09	2
	SBTR	-	-	-	-	-	-	-	-	-	-	-	-
<i>Mitigation 1 – Signalization</i>													
March Road at Site Access #1 Signalized	WBL	B	46	0.65	45	A	31	0.41	30	B	47	0.68	50
	WBR	A	12	0.11	7	A	10	0.21	10	A	9	0.32	13
	NBT	A	5	0.17	21	C	12	0.75	137	C	14	0.74	151
	NBR	A	3	0.01	2	A	2	0.01	1	A	2	0.02	2
	SBL	A	5	0.13	11	A	6	0.15	5	A	8	0.23	10
	SBTR	B	10	0.65	118	A	5	0.23	24	A	5	0.23	27
	<b>Overall</b>	<b>B</b>	<b>13</b>	-	-	-	<b>B</b>	<b>12</b>	-	-	<b>B</b>	<b>16</b>	-
March Road at Site Access #2 Unsignalized	WBR	A	9	0.01	<1	B	12	0.02	<1	B	12	0.04	1
	NBT	-	-	-	-	-	-	-	-	-	-	-	-
	NBR	-	-	-	-	-	-	-	-	-	-	-	-
	SBT	-	-	-	-	-	-	-	-	-	-	-	-
Notes:	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# indicates the volume for the 95 <sup>th</sup> percentile cycle exceeds capacity												

With the addition of site generated traffic, the existing intersections are anticipated to operate with similar operational characteristics as the 2022 future background conditions, and well within the City of Ottawa operational thresholds.

The intersection of Site Access #1 and March Road has been analyzed as a stop-controlled intersection. The westbound left-turn operates with a LOS of F in the AM, PM, and Saturday peak periods. As such, the signalization of Site Access #1 has been considered as a mitigation measure. The signal timing at this intersection was optimized

for the AM, PM, and Saturday peak periods based on the intersection configuration described in Section 11.3. An overall cycle length of 90 seconds was used for all Peak periods and the splits were optimized using the “Optimize Splits” Synchro function as well as by using manual optimization. New Yellow Times and All-Red Times were calculated using the methodology provided in OTM Book 12-Traffic Signals. The width of the intersecting roads have been assumed based on the existing lane widths at the intersection of March Road and Halton Terrace / Maxwell Bridge Road. As pedestrian facilities are proposed at Site Access #1 on the east side of March Road along the frontage of the proposed development, pedestrian phases were considered for the northbound and southbound through phases. Upon signalization, the intersection operates well, with V/C < 0.9, low delays and all LOS C or better. As such, signalization of Site Access #1 and March Road is recommended based on the operational analysis.

The intersection of Site Access #2 and March Road has been analyzed based on the intersection configuration described in Section 11.3 and operates well with no identified operational issues.

16.2.5 2027 Future Total

The 2027 future total intersection volumes, including the site generated traffic and other development traffic, have been analyzed to understand the impact of the subject development in the Study Area intersections. Table 20 summarizes the operational analysis of the 2027 future total conditions. Appendix T contains the 2027 Future Total Synchro sheets.

Table 20:2027 Future Total Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )
March Road at Halton Terrace / Maxwell Bridge Road Signalized	EBL	A	53	0.51	37	E	119	0.91	#42	A	49	0.58	29
	EBT/R	A	15	0.51	26	A	34	0.52	33	A	19	0.40	23
	WBL	E	109	0.93	#51	A	64	0.58	32	A	40	0.40	24
	WBT/R	A	16	0.24	15	B	35	0.65	42	B	46	0.69	49
	NBL	A	21	0.52	21	A	9	0.48	30	A	17	0.59	59
	NBT	A	13	0.30	55	C	21	0.75	201	B	12	0.70	135
	NBR	A	1	0.07	3	A	4	0.12	10	A	2	0.11	6
	SBL	A	7	0.15	12	A	15	0.47	19	D	78	0.90	#35
	SBT	C	24	0.79	#235	A	14	0.36	69	A	7	0.33	44
	SBR	A	2	0.08	4	A	3	0.11	9	A	3	0.10	9
	<b>Overall</b>	<b>C</b>	<b>24</b>	-	-	<b>C</b>	<b>22</b>	-	-	<b>B</b>	<b>17</b>	-	-
March Road at Klondike Road Signalized	EBL	A	41	0.32	25	B	57	0.61	44	B	61	0.68	43
	EBT	A	35	0.10	15	A	40	0.08	13	A	38	0.10	12
	EBR	A	20	0.56	43	A	9	0.29	14	A	10	0.34	14
	WBL	C	73	0.74	55	B	73	0.62	37	A	47	0.44	30
	WBT/R	A	23	0.31	20	A	31	0.36	22	A	22	0.28	18
	NBL	A	63	0.39	19	A	63	0.55	31	A	53	0.51	27
	NBT/R	A	16	0.28	56	B	17	0.63	157	B	14	0.63	145
	SBL	A	68	0.37	19	A	63	0.16	10	A	52	0.17	10
	SBT/R	B	24	0.66	155	A	17	0.37	69	A	15	0.38	63
	<b>Overall</b>	<b>C</b>	<b>26</b>	-	-	<b>C</b>	<b>22</b>	-	-	<b>B</b>	<b>19</b>	-	-
March Road at Site Access #1 / South Local Road Unsignalized	EBL	<b>F</b>	<b>252</b>	<b>0.26</b>	<b>8</b>	<b>F</b>	<b>736</b>	<b>0.63</b>	<b>9</b>	<b>F</b>	<b>2316</b>	<b>1.67</b>	<b>11</b>
	EBT/R	<b>F</b>	<b>62</b>	<b>0.30</b>	<b>10</b>	E	46	0.33	10	<b>F</b>	<b>88</b>	<b>0.55</b>	<b>18</b>
	WBL	<b>F</b>	<b>4094</b>	<b>9.12</b>	<b>153</b>	<b>F</b>	<b>4343</b>	<b>9.39</b>	<b>125</b>	<b>F</b>	<b>10007</b>	<b>21.44</b>	<b>196</b>
	WBT/R	D	30	0.22	9	<b>F</b>	<b>102</b>	<b>0.70</b>	<b>27</b>	<b>F</b>	<b>214</b>	<b>1.13</b>	<b>54</b>
	NBL	B	13	0.01	<1	A	9	0.03	1	A	9	0.03	1
	NBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL	A	9	0.10	3	B	15	0.11	11	C	16	0.18	27
	SBT/R	-	-	-	-	-	-	-	-	-	-	-	-

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )
<i>Mitigation 1 – Signalization</i>													
March Road at Site Access #1 / South Local Road Signalized	EBL	A	48	0.04	5	A	48	0.05	5	A	41	0.02	5
	EBT/R	A	25	0.16	10	A	22	0.26	12	A	18	0.15	12
	WBL	D	84	0.86	#68	B	59	0.65	#44	C	79	0.84	#79
	WBT/R	A	16	0.17	10	A	24	0.24	18	A	12	0.30	17
	NBL	A	11	0.06	2	A	5	0.06	4	A	10	0.06	6
	NBT/R	A	14	0.55	108	<b>F</b>	<b>132</b>	<b>1.24</b>	<b>#529</b>	<b>F</b>	<b>192</b>	<b>1.36</b>	<b>#638</b>
	SBL	A	5	0.19	9	C	75	0.72	#17	A	35	0.58	#24
	SBT/R	<b>F</b>	<b>96</b>	<b>1.15</b>	<b>#487</b>	A	10	0.60	107	A	11	0.60	127
<b>Overall</b>	<b>E</b>	<b>69</b>	-	-	<b>F</b>	<b>87</b>	-	-	<b>F</b>	<b>119</b>	-	-	
<i>Mitigation 2 – Two NBT and two SBT lanes</i>													
March Road at Site Access #1/ South Local Road Signalized	EBL	A	23	0.02	3	A	24	0.02	3	A	26	0.02	3
	EBT/R	A	13	0.08	6	A	11	0.14	8	A	12	0.13	9
	WBL	B	40	0.64	37	A	37	0.55	30	C	49	0.73	52
	WBT/R	A	11	0.13	8	A	22	0.24	15	A	24	0.32	24
	NBL	A	7	0.03	1	A	6	0.05	4	A	8	0.06	5
	NBT/R	A	6	0.29	32	B	10	0.66	108	C	14	0.72	142
	SBL	A	8	0.19	13	A	14	0.30	11	B	39	0.61	#35
	SBT/R	B	11	0.69	109	A	6	0.32	36	A	8	0.35	48
<b>Overall</b>	<b>B</b>	<b>12</b>	-	-	<b>A</b>	<b>10</b>	-	-	<b>B</b>	<b>16</b>	-	-	
<i>Sensitivity Analysis 1 – Volume Reduction to LOS E or Better</i>													
March Road at Site Access #1 / South Local Road Signalized	EBL	A	48	0.04	5	A	48	0.05	5	A	41	0.02	5
	EBT/R	A	25	0.16	10	A	22	0.26	12	A	18	0.15	12
	WBL	D	84	0.86	#68	B	59	0.65	#44	D	79	0.84	#79
	WBT/R	A	16	0.17	10	A	14	0.23	13	A	12	0.30	17
	NBL	A	11	0.06	2	A	5	0.06	4	A	10	0.06	6
	NBT/R	A	14	0.55	108	E	64	0.98	#370	E	81	0.97	#387
	SBL	A	5	0.19	9	B	62	0.67	#15	A	24	0.53	16
	SBT/R	E	38	0.99	#387	A	10	0.60	107	A	11	0.60	127
<b>Overall</b>	<b>C</b>	<b>33</b>	-	-	<b>D</b>	<b>43</b>	-	-	<b>D</b>	<b>51</b>	-	-	
<i>Sensitivity Analysis 2 – Volume Reduction to Acceptable Queue Length</i>													
March Road at Site Access #1 South Local Road Signalized	EBL	A	48	0.04	5	A	48	0.05	5	A	41	0.02	5
	EBT/R	A	25	0.16	10	A	22	0.26	12	A	18	0.15	12
	WBL	D	84	0.86	#68	B	59	0.65	#45	C	79	0.84	#79
	WBT/R	A	16	0.17	10	A	14	0.23	13	A	12	0.30	17
	NBL	A	10	0.05	2	A	5	0.06	4	A	10	0.06	6
	NBT/R	A	14	0.55	108	C	19	0.78	194	B	22	0.71	193
	SBL	A	5	0.19	9	A	7	0.19	7	A	7	0.22	10
	SBT/R	E	30	0.95	#363	A	10	0.60	107	A	11	0.60	127
<b>Overall</b>	<b>C</b>	<b>28</b>	-	-	<b>B</b>	<b>17</b>	-	-	<b>C</b>	<b>22</b>	-	-	
March Road at Site Access #2 Unsignalized	WBR	B	10	0.01	<1	C	17	0.03	<1	C	17	0.05	1
	NBT	-	-	-	-	-	-	-	-	-	-	-	-
	NBR	-	-	-	-	-	-	-	-	-	-	-	-
	SBT	-	-	-	-	-	-	-	-	-	-	-	-
Notes:	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# indicates the volume for the 95 <sup>th</sup> percentile cycle exceeds capacity												

With the addition of site generated traffic, the existing intersections are anticipated to operate with similar operational characteristics as the 2027 future background conditions, and well within the City of Ottawa operational thresholds.

The intersection of Site Access #1 / South Local Road and March Road has been analyzed as a stop-controlled intersection. Multiple movements in all three Peak periods operate with high delays, long queues and LOS F. As such, the signalization of Site Access #1 has been considered as a mitigation measure. The signal timing at this intersection was optimized for the AM, PM, and Saturday peak periods based on the intersection configuration described in Section 11.3. An overall cycle length of 130 seconds was used for all Peak periods and the splits were optimized using the “Optimize Splits” Synchro function as well as by using manual optimization. New Yellow Times and All-Red Times were calculated using the methodology provided in OTM Book 12-Traffic Signals. The width of the intersecting roads have been assumed based on the existing lane widths at the intersection of March Road and Halton Terrace / Maxwell Bridge Road. As pedestrian facilities are proposed at Site Access #1 on both sides of March Road along the frontage of the proposed development, as well as on the South Local Road, pedestrian phases were considered for all through phases. Additionally, in the AM peak period analysis the westbound and southbound left-turns have been coded as protective-permissive movements, in the PM Peak period analysis the westbound left-turn has been coded as a protective-permissive movement and in the Saturday Peak period analysis, the southbound left-turn has been coded as a protective-permissive movement. Upon signalization, the intersection operates well, with  $V/C < 0.9$ , low delays and all LOS D or better. The exceptions to this are the southbound through / right-turn movement in the AM Peak period, and the northbound through / right-turn movement in the PM and Saturday Peak periods which all operate with high delays, long queues,  $V/C > 1.0$  and LOS F. As such, signalization of Site Access #1 / South Local Road and March Road is recommended based on the operational analysis.

Additionally, Table 20 indicates that westbound left-turn at Site Access #1 exceeds the 95<sup>th</sup> percentile cycle capacity. Queues are also shown to extend to a maximum of 79 metres. This indicates that a storage length of 80 metres at a minimum is required for this movement.

In order to determine the impact of the future road widening along March Road from a two-lane to a four-lane cross section, this scenario was analyzed as an additional mitigation measure at the signalized intersection of Site Access #1 / South Local Road and March Road. The signalization of this intersection follows the same methodology as described above. The exception to this being the 90 second cycle lengths in the AM Peak and PM Peak periods, 100 second cycle length in the Saturday Peak period and no protected-permissive left-turn phases. As a result of this mitigation measure, the intersection operates well, with  $V/C < 0.9$ , low delays and all LOS C or better. As mentioned in Section 15, the results of this mitigation measure indicate that the planned future widening of March Road, will provide additional capacity in order to accommodate the high projected future volumes along March Road.

As discussed in Section 7, as the result of a comment received from the City of Ottawa requesting analysis to determine “how many vehicles must be diverted from the peak periods to maintain an acceptable level of service on March Road”, a two-part sensitivity analysis has been undertaken. In both scenarios, the volumes at the signalized intersection of Site Access #1 / South Local Road and March Road have been evaluated. The signalization of this intersection follows the same methodology as described above. The first sensitivity analysis performed identified the volume required to be diverted from over-capacity movements in order to maintain a  $V/C$  ratio  $< 1.0$ . The second sensitivity analysis performed identified the volume required to be diverted from over-capacity movements in order to ensure no queues backed up to the signalized intersection of March Road and Halton Terrace / Maxwell Bridge Road (approximately 200 metres) to the south or the future signalized intersection to the north as described in the Kanata North Community Design Plan (approximately 380 metres). Table 21 summarizes the results of the sensitivity analysis.

Table 21: Sensitivity Analysis Summary

Sensitivity Analysis	Peak Period (Movement)								
	AM (SBT)			PM (NBT)			Saturday (NBT)		
	Original	New	Reduction	Original	New	Reduction	Original	New	Reduction
V/C<1.0	1516	1300	216	1585	1250	335	1560	1100	460
Acceptable Queues		1250	266		1000	585		800	760

The intersection of Site Access #2 and March Road has been analyzed based on the intersection configuration described in Section 11.3 and operates well with no identified operational issues.

As shown through the above analysis, and through TIA’s for developments further to the north, the widening of March Road from two to four lanes is the best option for accommodating the projected increases in vehicular demand.

16.2.6 Intersection MMLOS

Intersection MMLOS is only undertaken at signalized intersections. The three signalized intersections considered in this study are March Road at Halton Terrace / Maxwell Bridge Road, March Road at Klondike Road, and March Road at Site Access #1 / South Local Road. While the signalization of Site Access #1 has been considered a mitigation measure in the operational analysis above, Site Access #1 / Local South Road at March Road will be considered a signalized intersection in this section.

Table 22 summarizes the MMLOS analysis for these three signalized intersections in the Study Area for the existing and future horizons. As no changes to the intersections of March Road and Halton Terrace / Maxwell Bridge Road and March Road and Klondike Road are anticipated, all horizons have been analyzed in one row. The signalized intersection of Site Access #1 has been evaluated based on the intersection configurations outlined based on Section 11.3. It has been assumed that no pocket bike lanes will be present at the Site Access #1 intersection. The analysis is based on the developing community policy area. The MMLOS worksheets have been provided in Appendix L.

Table 22: Study Area Intersection MMLOS Analysis—All Horizons

Intersection	Horizon	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
March Road & Halton Terrace / Maxwell Bridge Road	Existing	F	C	F	B	F(F)[F]	D	E	D	B(D)[C]	D
	2022 FB										
	2022 FT										
	2027 FB										
	2027 FT										
March Road & Klondike Road	Existing	F	C	F	B	F(F)[E]	D	C	D	B(B)[B]	D
	2022 FB										
	2022 FT										
	2027 FB										
	2027 FT										
March Road & Site Access #1 / South Local Road	2022 FT	D	C	D	B	F(D)[E]	D	F	D	B(C)[B]	D
	2027 FT	F		D		F(D)[F]		F		B(E)[E]	
Notes:	AM(PM)[Sat]										

The pedestrian and cycling LOS targets are not met at the network intersections due to crossing distances, permissive left and right-turns, and lack of cycling facilities in the Study Area. The bicycle LOS is not met as a result of mixed traffic conditions on some intersection legs as well as high operating speeds. The transit LOS generally fails to meet the targets at some intersections due to the intersection delays. Truck LOS is not met at most intersections due to the low number of receiving lanes. Auto LOS targets are generally met.

The future widening and transit improvements to March Road, are anticipated to increase connectivity and improve the segment MMLOS along March Road. As such, no further intersection improvements are recommended, beyond the extension of pedestrian and bicycle facilities along the frontage of the site, as a result of the intersection MMLOS analysis.



## 17 Conclusions

- A. The proposed development, located at 910 March Road, is a commercial development consisting of a 1,835 square metre hardware store, a 234 square metre restaurant with a drive-through, a 416 square metre retail store, and a 249 square metre gas bar attached to a 191 square metre Tim Hortons with a drive-through. Approximately 164 vehicle parking spaces and 16 bicycle parking spaces will be provided.
- B. The site is proposed to have two accesses. Both accesses are located along March Road; the first (Site Access #1) is a full-movement access located approximately 215 metres north of Maxwell Bridge Road, measured from intersection centreline to intersection centreline. The second (Site Access #2) is a right-in / right-out access located approximately 150 metres north of Maxwell Bridge Road, measured intersection centreline to intersection centreline.
- C. Both site access intersections are subject to a future RMA and functional design.
- D. The existing Study Area is currently served by bus routes #63, and 165.
- E. The previous five years of collision history at the existing Study Area intersections has been reviewed. No patterns emerged that indicated that mitigation measures or further monitoring was required.
- F. Using the ITE Trip Generation Manual, the retail trip rates were identified. The Rural West mode shares were used to determine the trip generation by mode and pass-by trips were accounted for.
- G. It was found that the proposed development can be anticipated to generate 209 AM, 241 PM, and 393 Saturday net new peak hour two-way vehicle trips.
- H. Minimum vehicle parking space requirements are met with an excess of 24-43 spaces and bicycle parking space requirements are met with an excess of four spaces.
- I. It was found that the road segments of March Road do not meet the majority of its MMLOS targets. As future changes to the road network are anticipated to improve the MMLOS of these segments, no resulting improvements to the boundary road is recommended.
- J. Both signalization warrants and left-turn lane warrants were evaluated at Site Access #1. Signalization was not warranted however a southbound left-turn lane was warranted for both future total horizons. Preliminary storage and taper lengths have been designed for the southbound left-turn lane for operational analysis purposes, however this design will be further refined in the RMA and functional design.
- K. A northbound right-turn at Site Access #2 was deemed to be warranted for both the 2022 and 20227 future total horizons. Appropriate storage and taper lengths were assumed for operational analysis purposes, however this design will be further refined in the RMA and functional design
- L. The existing Study Area intersections operate satisfactorily during the peak hours in the existing conditions operational analysis.
- M. The existing Study Area intersections operate satisfactorily during the peak hours in the 2022 future background operational analysis.
- N. The existing Study Area intersections operate satisfactorily during the peak hours in the 2022 future total operational analysis with similar operational characteristics as the 2022 future background conditions. Site Access #2 is shown to operate well. The following recommendation is the result of this analysis:
  - 1. Signalization of Site Access #1
- O. The existing Study Area intersections generally operate satisfactorily during the peak hours in the 2027 future background operational analysis.
- P. The Study Area intersections generally operate satisfactorily during the peak hours in the 2027 future total operational analysis with similar operational characteristics as the 2027 future background

conditions. Site Access #2 is shown to operate well. The following recommendations are the result of this analysis:

1. Signalization of Site Access #1
  2. The design of the westbound left-turn lane of Site Access #1 be further considered in the RMA and functional design and at a minimum should have a storage length of 80 metres.
  3. The design of the northbound right-turn lane of Site Access #2 be further considered in the RMA and functional design.
- Q. Additional findings of the 2027 future total operational analysis demonstrate that the future road widening of March Road will significantly improve the operation of Site Access #1 and is the best option for accommodating the projected increases in vehicular demand.
- R. As per the request of the City of Ottawa, a sensitivity analysis was undertaken to determine “how many vehicles must be diverted from the peak periods to maintain an acceptable level of service on March Road”. In order to achieve  $V/C < 1.0$  and acceptable queue lengths on March Road, a reduction of 266 vehicles to the southbound through movement, 585 vehicles to the northbound through movement and 760 vehicles to the northbound movement are required in the AM, PM, and Saturday Peak periods, respectively.
- S. The PLOS, BLOS, TLOS, and TkLOS were evaluated at all three signalized Study Area intersections. In most cases, the MMLOS targets were not met. No intersection alterations or mitigation measures are suggested as changes to these intersections as future improvements along March Road are expected to improve the intersection MMLOS at these locations.

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

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# Appendix A

TIA Screening Form and PM Certification Form



## **TIA Plan Reports**

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

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

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

### **CERTIFICATION**

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

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

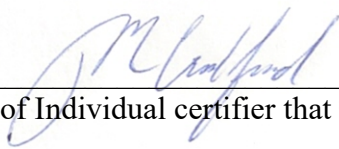
City Of Ottawa  
Infrastructure Services and Community  
Sustainability  
Planning and Growth Management  
110 Laurier Avenue West, 4th fl.  
Ottawa, ON K1P 1J1  
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Télécopieur: 613-560-6006

Dated at Newmarket this 22 day of April, 2020.  
(City)

Name: Mark Crockford  
(Please Print)

Professional Title: Professional Engineer

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

**Office Contact Information (Please Print)**

Address: 628 Haines Road

City / Postal Code: Newmarket / L3Y 6V5

Telephone / Extension: (905) 251-4070

E-Mail Address: Mark.Crockford@CGHTransportation.com



City of Ottawa 2017 TIA Guidelines  
Step 1 - Screening Form

Date: 15-Jan-21  
Project Number: 2020-11  
Project Reference: Wexford 910 March Road

1.1 Description of Proposed Development	
Municipal Address	910 March Road
Description of Location	CON 4 LOT 12
Land Use Classification	Development Reserve Zone [DR] and Rural Zone [RU]
Development Size	1,835 sq m hardware store, 234 sq m restaurant, 416 sq m restaurant, and a 249 sq m gas bar attached to a 191 sq m Tim Hortons
Accesses	Two: Both on March Road; one full-movement access (approximately 215 m north of Maxwell Bridge Rd) and one right-in / right-out approximately 150 m north of Maxwell Bridge Rd).
Phase of Development	Single Phase
Buildout Year	2022
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger	
Land Use Type	Gas station or convenience market
Development Size	249 G.F.A.
Trip Generation Trigger	Yes

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

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

# Appendix B

City of Ottawa Step 4 Comment-Response – Round 1

The following responses have been prepared in order to address the City of Ottawa Comments received on August 14, 2020 based on the Strategy Report for 910 March Road submitted on June 30, 2020.

September 22, 2020

2020-11 910 March Road Comment-Response		
Comment #	Comment	Response
Transportation Engineering Services		
1	Demand rationalization should discuss how travelers will respond to the congestion on March Road. Consider reasonable options for residents to modify their commute.	<p>Noted. In response to the congestion on March Road, the most reasonable option for travellers to modify their commute is to use Second Line and Terry Fox Drive as an alternate route to and from the highway.</p> <p>The most reasonable alternative, as described above, for those looking to access 910 March Road will require approximately a 15 km detour to/from the highway, in comparison to the 5 km travelled on March Road to/from the highway. This will result in a 10 km diversion on a 5 km trip and assumes that Terry Fox Drive is not congested.</p>
Development Design		
2	Look for an opportunity to connect to the major pathway located at the back of the development to connect to Maxwell Bridge Road. Illustrate where bicycle parking is located on site.	<p>Noted. Both parts of the comment have been passed on to the proponent.</p> <p>At this time, the potential for a connection to the major pathway located at the back of the development to connect to Maxwell Bridge Road is under review. A decision to include this connection will be represented in its inclusion or exclusion from the updated Site Plan.</p> <p>The location of bicycle parking will be illustrated on the updated Site Plan.</p>
3	Clearly indicate how pedestrians will enter and travel through the site to reach all buildings. Provide sidewalk along the frontage of March Road. If Access #1 is signalized, ensure that pedestrians can easily connect from this signalized intersection to all site planned buildings.	Noted. The comment has been passed on to the proponent. This will be indicated on the updated Site Plan.
4	Clearly show how trucks will back into the hardware store truck bay. Consider accommodating all truck movements into the site at one access in order to minimize access widths.	<p>Trucks backing into the hardware store truck bay are shown in Turning Template 003.</p> <p>Noted. The scenario where truck access to the site is limited to the northbound right-turn at Site Access #2 and truck egress from the site is limited to the westbound left-turn and westbound right-turn at Access #1 will be considered further and refined as part of the functional design and RMA.</p>
5	Demonstrate the potential queues on site with forecasted trips and indicate if there are any pinch points for accessing parking areas and drive throughs. Consider conditions with Access #1 signalized and with both accesses restricted to RIRO	<p>Noted. The implications of queues on site have been evaluated assuming the intersection of March Road and Access #1 is signalized. A right-in right-out is unlikely to cause significant queuing on the site and as such has not been evaluated. As the 2027 future total operational analysis has shown that the future road widening of Site Access #1 is the best option for accommodating the projected increases in vehicular demand, this is the scenario that has been considered.</p> <p>The AM peak period analysis shows a westbound left-turn lane 95th percentile queue of 38 metres and a westbound through/right-turn lane 95th percentile queue of 8 metres. The PM peak period analysis shows a westbound left-turn lane 95th percentile queue of 30 metres and a westbound through/right-turn lane 95th percentile queue of 15 metres. The Saturday peak period analysis shows a westbound left-turn lane 95th percentile queue of 52 metres and a westbound through/right-turn lane 95th percentile queue of 24 metres.</p> <p>The AM peak period analysis shows a westbound left-turn lane 50th percentile queue of 20 metres and a westbound through/right-turn lane 50th percentile queue of 1 metre. The PM peak period analysis shows a westbound left-turn lane 50th percentile queue of 15 metres and a westbound through/right-turn lane 50th percentile queue of 6 metres. The Saturday peak period analysis shows a westbound left-turn lane 50th percentile queue of 30 metres and a westbound through/right-turn lane 50th percentile queue of 11 metres.</p> <p>As the Saturday peak hour represents the longest queues, the potential queues on site for this peak hour have been chosen in order to present a conservative analysis and discussion.</p> <p>Attachment 1 shows the 95th percentile queues at Site Access #1 for the westbound movements. As shown, the westbound left-turn queue will spill into the westbound through/right-turn lane. As no "#" symbol was generated in the Synchro analysis for this queue, the volume for the 95th percentile cycle does not exceed capacity. As such, it can be assumed that the westbound left-turn queue will clear within one cycle length. This indicates that any blockage to the westbound through/right-turn lane will be minor and clear quickly. Queues are expected to extend to the north of the Tim Hortons as well as to the west as shown and are not expected to block any parking spaces or the drive-through exit.</p> <p>Attachment 2 shows the 50th percentile queues at Site Access #1 for the westbound movements. As shown, the westbound left-turn queue will slightly spill into the westbound through/right-turn lane. As no "#" symbol was generated in the Synchro analysis for this queue, the volume for the 95th percentile cycle does not exceed capacity. As such, it can be assumed that the westbound left-turn queue will clear within one cycle length. This indicates that any blockage to the westbound through/right-turn lane will be minor and clear quickly. Queues are not expected to block any parking spaces or the drive-through exit.</p> <p>50th percentile queues are a more accurate representation of the typical queue lengths that will occur. 95th percentile queues may occur occasionally and as such, Attachment 2 is expected to represent a more accurate representation of typical queues.</p>

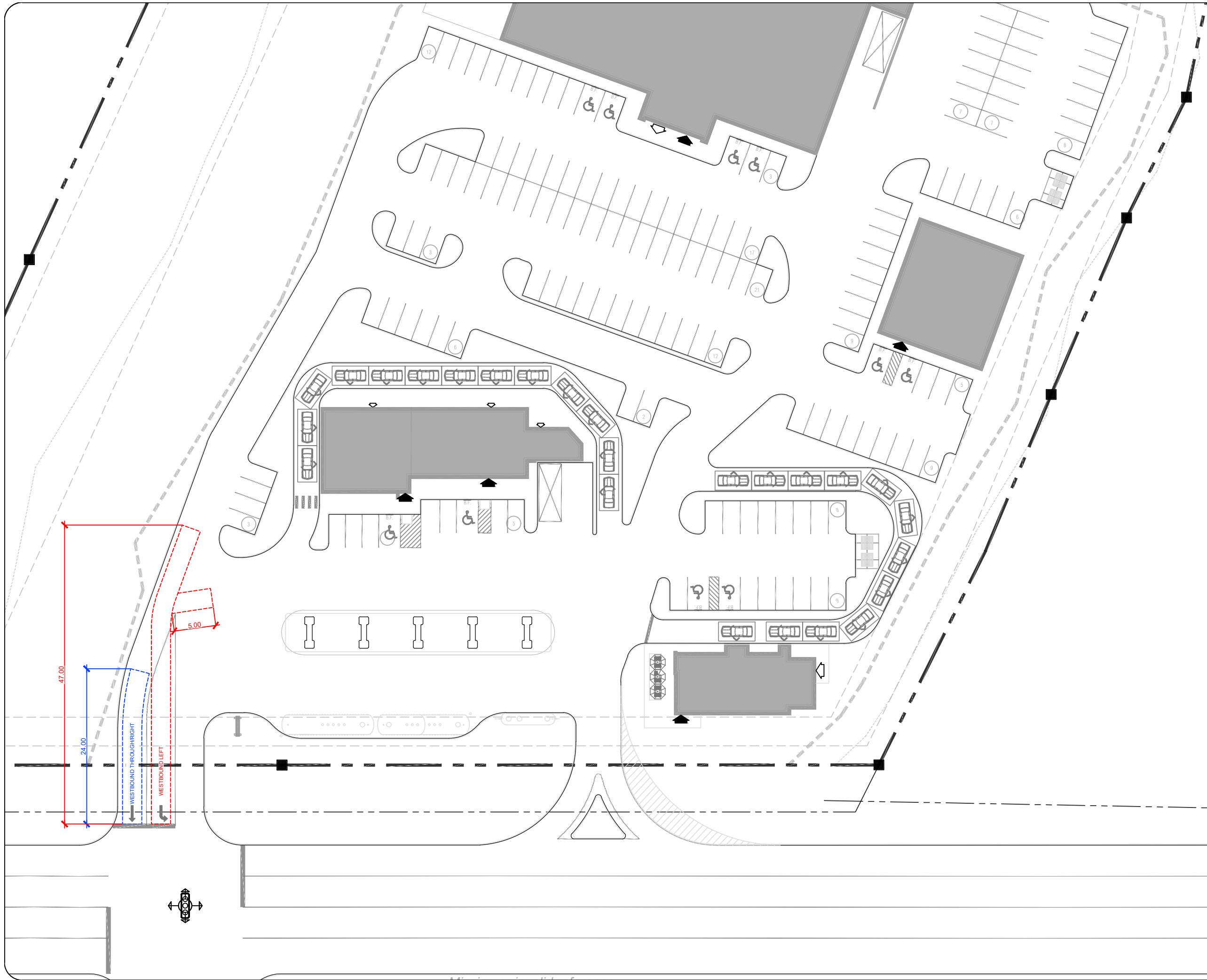


6	Provide the storage length from the drive through facilities to Access #2. Indicate if all design guidance has been followed from the City of Ottawa Urban Design Guidelines for Drive-Through Facilities	<p>Noted. The Tim Hortons drive through storage length is approximately 125 metres and the proposed restaurant 1's storage length is 135 metres. Both storage lengths have been measured from the pick-up window to March Road at Site Access #2. Additionally, the measured distance between March Road at Site Access #2 and the access point of each drive through's stacking lane is 50 metres for the Tim Hortons and 60 metres for restaurant 1.</p> <p>Noted. Design guidance from the City of Ottawa Urban Design Guidelines for Drive-Through Facilities have been followed.</p>
Boundary Street Design		
7	Given that the sensitivity analysis indicates significant vehicle reductions on March Road are required to maintain acceptable levels of service, it must be recognized that the implementation of the proposed traffic signal at Access #1 will have further impacts on the operation of peak period traffic flow. Indicate the alternative route for motorists exiting the site wishing to travel SB on March Road if both accesses are restricted to RIRO. Consider existing conditions, when the future traffic signal to the north is installed for 936 March Road development, when March Road is 4 lanes and the ultimate condition when median bus lanes are constructed	<p>The alternative route for motorists exiting the site wishing to travel SB on March Road if both accesses are restricted to RIRO are as follows:</p> <p>Existing Conditions - U-turn on March Road or if U-turns are prohibited then it would be the route described above in Comment #1.</p> <p>936 March Road signal - U-turn at 936 March Road or where permitted if U-turns are permitted south of 936 March Road.</p> <p>Four lane widening - Assuming the four-lane cross-section includes a median, U-turn at 936 March Road.</p> <p>BRT - U-turn at 936 March Road.</p>
8	If signalization of the access is accepted, the applicant would be responsible for the installation and operating costs of the proposed signalized access until warrants are met. Further analysis is required at this time to determine if signalization of Access #1 would be accepted when March Road is widened to 4 lanes. Consideration must be given to the queue lengths/storage requirements on March Road. This information is required prior to making the decision to accept signalization at this time.	<p>Noted.</p> <p>Based on the analysis provided in the Step 4, the northbound through / right-turn 95th percentile queues at Site Access #1 on March Road reach 32 metres in the AM peak period, 108 metres in the PM peak period, and 142 metres in the Saturday peak period. The southbound through 95th percentile queues at Maxwell Bridge Road reach 235 metres in the AM peak period, 69 metres in the PM peak period, and 44 metres in the Saturday peak period.</p> <p>Therefore, this analysis indicates that the southbound through queue at the intersection of March Road and Maxwell Bridge Road may back up to the Site Access #1 intersection in the AM peak period. As the 50th percentile queue is shown to be 136 metres, any queue backing up the Site Access #1 intersection is considered to be occasional and therefore acceptable.</p>
9	If traffic signalization of Access #1 is accepted, site plan agreement conditions would be required to ensure that traffic signals could be removed when March Road is widened to 4 lanes and if/when median bus lanes are provided.	<p>Noted. If/when median bus lanes are provided this signal would have to be removed however our analysis recommended a four lane cross-section through this intersection. Therefore, the signals do not need to be removed once March Road is widened to four lanes.</p> <p>Additionally, the BRT is not included in the 2031 BRT Affordable Network Plan and as such is well beyond the analysis horizons of the proposed development.</p>
10	Interconnect between the Access #1 traffic signal and neighbouring signalized intersections including the future traffic signal at 936 March Road may be required.	Noted.
11	Provide a functional drawing as part of the TIA submission illustrating the proposed right turn and left turn lanes. Clearly indicate how the NB lane drop and the NB RT lane will be accommodated in the design. Indicate if the road design must be revised for storage lengths if the intersection is signalized.	Noted. A functional design will be provided once the access configuration has been confirmed by the City.
12	Tapers and deceleration lengths for auxiliary lanes need to be adjusted for design speeds of 60 km/hr. In addition, the proposed signalized intersection on March Road at Access #1 would need to be a protected intersection and similar in design to neighbouring proposed intersections. Contact Ann Selfe (ann.selfe@ottawa.ca) for details	<p>Noted. Ann Selfe has been contacted for further details as indicated. The email correspondence has been attached for reference in Attachment 3. As shown in the attachment, Item 21 identifies a 60 km/h design speed to be implemented for the interim and ultimate March Road cross-sections. As discussed in Section 2.3.1 of the Step 4 report, both the interim and ultimate widening scenarios of March Road have been assumed to occur beyond the proposed development's future analysis horizons. This assumption has been confirmed by the City of Ottawa as part of comments provided on the Forecasting Report for the proposed development (Comment #6). These comments can be seen in Attachment 4. As such, a speed limit of 80 km/h on March Road will continue to be assumed in the analysis of future horizons.</p> <p>Access #1 will consider the protected intersection design as part of the functional design to be completed.</p>
Transportation Demand Management		
13	Indicate which features will be provided from the TDM-supportive Development Design and Infrastructure Checklist.	<p>The following features from the TDM-supportive Development Design and Infrastructure Checklist will be provided:</p> <ul style="list-style-type: none"> <li>- Locate building entrances in order to minimize walking distances to sidewalks and transit facilities.</li> <li>- Locate building doors and entrances to ensure visibility of pedestrians from the building.</li> <li>- Provide safe, direct, and attractive walking routes from the building entrances to nearby transit stops.</li> <li>- Ensure that walking routes to transit stops are secure, visible, and lighted wherever possible.</li> <li>- Provide wayfinding signage for site access and egress.</li> </ul> <p>The following features from the TDM Checklist will be provided:</p> <ul style="list-style-type: none"> <li>- Designate an internal coordinator, or contract with an external coordinator</li> <li>- Provide online links to OC Transpo information.</li> </ul>
Traffic Signal Operations		
14	Extensive work was put into the KNUEA TMP. Other area development TIA submissions already submitted will saturate March Road capacity between Halton intersection and 936 March Road intersection.	<p>The saturation of March Road is anticipated to occur beyond the 2022 anticipated build-out horizon of the subject development. The 2013 City of Ottawa TMP Map 10-Road Network 2031 Road Network Concept includes March Road as a widened arterial from Maxwell Bridge to Dunrobin Road. However the 2022 analysis has shown that the road network can support the subject development prior to the development of the KNUEA. Additionally, the 2027 analysis has shown that upon widening March Road, the proposed signalized intersection would operate with a maximum of a LOS of B among the various peak periods considered.</p>

15	Signalizing the access to 927 March Road and 910 March Road (Access #1) is of concern as it causes undo congestion on March Road and there would be further network ramifications	Based on the Step 4 analysis, this is not the case for 2022 and is only the case for 2027 prior to widening. The congestion on March Road in 2027 is due to other developments. As discussed in Comment #8, the southbound through queue at the intersection of March Road and Maxwell Bridge Road may back up to the Site Access #1 intersection in the AM peak period following the widening of March Road. As the 50th percentile queue is shown to be 136 metres, any queue backing up the Site Access #1 intersection is considered to be occasional and therefore acceptable. Additionally, signals can be programmed to prioritize north-south flow during peak hours.
16	Remove all proposed LT phasing at Access #1 intersection and adjust all clearances for March Road being designed for 60 km/hr. Resubmit synchro analysis.	As discussed in Comment #12, an 80 km/h speed limit on March Road will continue to be assumed in the analysis of future horizons. As indicated by Josiane, removal of all proposed LT phasing at the Access #1 has been analyzed as a sensitivity analysis scenario. The resulting Synchro reports and analysis table from this sensitivity analysis can be found in Attachment 5. Overall, movements in the AM and PM peak periods were slightly improved and some movements in the Saturday peak period were worsened. Of particular note, the southbound left-turn movement in the Saturday peak period was worsened from a LOS A to a LOS F. The Synchro files will be sent to the City of Ottawa as well.
Traffic Signal Design		
17	No comments to this TIA for this circulation. Traffic Signal Design & Specification reserves the right to make future comments based on subsequent submissions.	Noted.
18	Future considerations: a.If there are any proposed changes in the existing roadway geometry for the purpose of construction of a new Traffic Control Signal (TCS) or modifications to existing TCS(s) the City of Ottawa Traffic Signal Design & Specification Unit is required to complete a review for traffic signal plant re-design and provide the actual re-design to the proponent or consultant. b.If the proposed traffic signals are warranted/approved for installation or modifications to existing TCS are approved, and RMA approved, please forward an approved geometry detail design drawings (dwg digital format in NAD 83 coordinates) including base mapping, existing and new underground utilities/sewers, new/existing catch basins locations, AutoTurn-Radius Modeling for approved vehicles and approved pavement markings drawings in separate files for detail traffic plant design lay out. c.Please send all digital (CADD) design files to Peter.Grajcar@ottawa.ca 613-580-2424x23035.	Noted.
Street Lighting		
19	No comments with initial TIS for this circulation. Street Lighting reserves the right to make future comments based on subsequent submissions.	Noted.
20	Future considerations are as follows: a.If there are any proposed changes to the existing roadway geometry, the City of Ottawa Street Light Asset Management Group is required to provide a full street light design. Upon completion of proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed street light design and coordination with the Street Light maintenance provider and all necessary parties. Be advised that the applicant will be 100% responsible for all costs associated with any Street Light design as a result of the roadway geometry change. b.Alterations and/or repairs are required where the existing street light plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction process. All street light plant alterations and/or repairs must be performed by the City of Ottawa's Street Light maintenance provider. c.Be advised that the applicant will be 100% responsible for all costs associated with any relocations/modifications to the existing street light plant	Noted.
Transit Services		
21	Regarding Section 2.2.5 Existing Transit: the frequencies listed for routes 63 and 165 were reduced service levels due to the Covid-19 pandemic. Regular weekday service levels are: Route 63 every 15 minutes in peak periods and every 30 minutes off-peak; Route 165 hourly in the midday and evening (does not operate in peak periods).	Noted.
22	Regarding the Site Plan: please include a continuous, fully accessible sidewalk, connecting from the sidewalk along March Road to each of the buildings on site, to ensure uninterrupted pedestrian connectivity to/from nearby transit stops.	See comment 3.
Development Review - Transportation		
23	Turning movement diagram shows WB-20 traveling into on-coming traffic lanes at Access #1. This is undesirable if trucks are accessing the site during business hours. Similar to comment 4 above, perhaps access to WB-20 vehicles could be limited to the RI/RO access.	See comment 4.

# Attachment 1

Westbound 95<sup>th</sup> Percentile Queues at Site Access #1 and March Road



Notes:

01	Queue Representations	AL	20/09/22
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

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

CLIENT: Wexford  
 Commercial Developments Ltd.

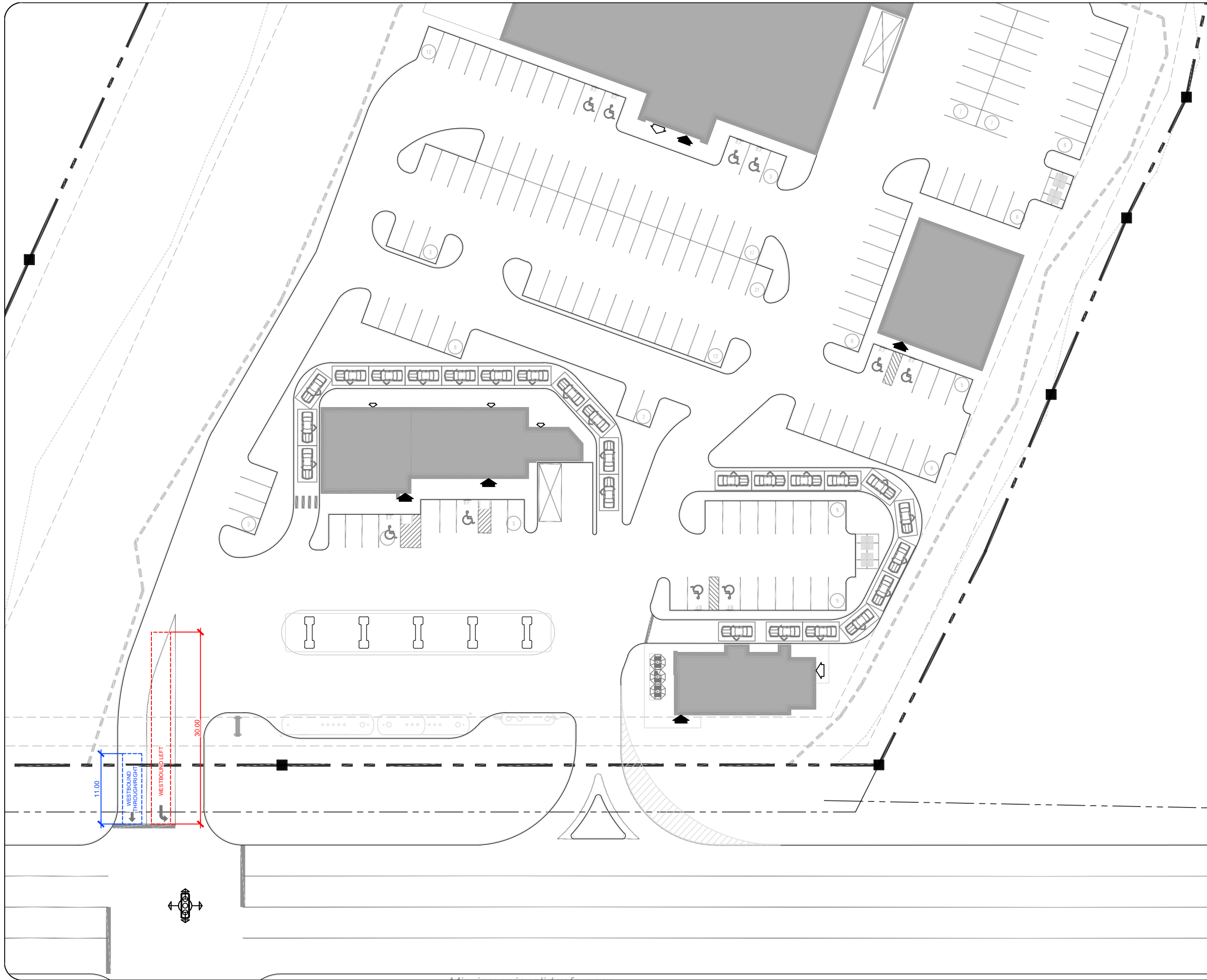
ARCHITECT: Greystone

SITE:  
 910 March Road  
 TITLE: SITE ACCESS #1  
 95th PERCENTILE QUEUE

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2020/09/22	AL	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2020-11	002	01	

# Attachment 2

Westbound 50<sup>th</sup> Percentile Queues at Site Access #1 and March Road



Notes:

01	Queue Representations	By:	20/09/22
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

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

CLIENT: Wexford  
 Commercial Developments Ltd.

ARCHITECT: Greystone

SITE:  
 910 March Road

TITLE:  
 SITE ACCESS #1  
 50th PERCENTILE QUEUE

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2020/09/22	AL	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2020-11	001	01	

# Attachment 3

Design Speed Email Correspondence

## Robin Marinac

---

**From:** Selfe, Ann <Ann.Selfe@ottawa.ca>  
**Sent:** September 14, 2020 9:05 AM  
**To:** Robin Marinac  
**Cc:** Gervais, Josiane; Mark Crockford  
**Subject:** RE: 910 March Road Applications Deemed Incomplete  
**Attachments:** march road tp plan.pdf

Hello Robin,

Please see attached report along with key recommendations. Item 21 provides guidance on interim and ultimate speed for March.

Have a good week,

**Ann Selfe, P.Eng.**

**Senior Project Manager, Transportation Engineering Services**

Transportation Services Department | Direction generale des transports

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☎ 613.580.2424 ext./poste 13185

---

**From:** Robin Marinac <robin.marinac@cghtransportation.com>  
**Sent:** September 01, 2020 3:11 PM  
**To:** Selfe, Ann <Ann.Selfe@ottawa.ca>  
**Cc:** Gervais, Josiane <josiane.gervais@ottawa.ca>; Mark Crockford <mark.crockford@cghtransportation.com>  
**Subject:** RE: 910 March Road Applications Deemed Incomplete

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Hi Ann,

Thank you for the additional information you provided us with. We agree that the Kanata North CDP recommends a 60 km/hour effective operating speed along March Road. As this recommendation is with respect to the extension of the median BRT system through the KNUEA lands, it falls beyond our study horizons. Are you aware of any other plans to reduce the existing speed limit of 80 km/hour prior to this?



Kind regards,  
Robin Marinac



Robin Marinac, EIT  
**CGH Transportation Inc.**  
P: 437-242-5183  
E: [robin.marinac@cghtransportation.com](mailto:robin.marinac@cghtransportation.com)

---

**From:** Selfe, Ann <[Ann.Selfe@ottawa.ca](mailto:Ann.Selfe@ottawa.ca)>  
**Sent:** August 27, 2020 9:58 AM  
**To:** Robin Marinac <[robin.marinac@cghtransportation.com](mailto:robin.marinac@cghtransportation.com)>  
**Cc:** Gervais, Josiane <[josiane.gervais@ottawa.ca](mailto:josiane.gervais@ottawa.ca)>; Mark Crockford <[mark.crockford@cghtransportation.com](mailto:mark.crockford@cghtransportation.com)>  
**Subject:** Re: 910 March Road Applications Deemed Incomplete

Hello Robin,

We are currently reviewing the standard for protected intersections as it relates to the placement of cycle track and cross ride at a signalized intersections, see attached concept. This review is internal to the City and we hope to have a recommendation shortly.

With regards to the speed along March Road I suggest you review the attached report and policy for further information as it relates to implementation.

Furthermore, I suggest you review the Kanata North CDP for the recommended speed along March Road.

Have a nice day,

**Ann Selfe, P.Eng.**

**Senior Project Manager, Transportation Engineering Services**

Transportation Services Department | Direction generale des transports

City of Ottawa | Ville d'Ottawa

110 Laurier Ave. West | 110, avenue Laurier Ouest

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☎ 613.580.2424 ext./poste 13185

<https://app06.ottawa.ca/calendar/ottawa/citycouncil/trc/2009/10-07/ACS2009-COS-PWS-0021.htm>

CITY OF OTTAWA SPEED LIMIT POLICY

Attachment 2. 40 KM/H RESIDENTIAL WARRANTS . In 2003, Council of the City of Ottawa approved the following 40 km/h posted maximum speed limit warrants which may be implemented on any street where one or more of the conditions shown in Warrant A are met.

app06.ottawa.ca

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**From:** Robin Marinac <[robin.marinac@cghtransportation.com](mailto:robin.marinac@cghtransportation.com)>

**Sent:** August 25, 2020 3:24 PM

**To:** Selfe, Ann <[Ann.Selfe@ottawa.ca](mailto:Ann.Selfe@ottawa.ca)>

**Cc:** Gervais, Josiane <[josiane.gervais@ottawa.ca](mailto:josiane.gervais@ottawa.ca)>; Mark Crockford <[mark.crockford@cghtransportation.com](mailto:mark.crockford@cghtransportation.com)>

**Subject:** RE: 910 March Road Applications Deemed Incomplete

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We are traffic consultants currently working to address comments on our Step 4 Traffic Impact Assessment for 910 March Road. Josiane recently provided us with the comments below and we would like to follow up with you regarding Comment #12 shown below.

As the current speed limit on March Road adjacent to 910 March Road is 80 km/hr, we are hoping you can provide us more information on the exact location and timing of any changes to the speed limit along March Road in this area. Given it has been expressed that a design speed of 60 km/hr will be implemented at some point in the future, is it then accurate to assume the speed limit will be reduced to 50 km/hr?

Additionally, we are hoping you can provide us with further details regarding the latter part of the comment which states that "the proposed signalized intersection on March Road at Access #1 would need to be a protected intersection and similar in design to neighbouring proposed intersections".

Kind regards,

Robin Marinac

15. The collector/collector intersections in the northwest and southwest quadrants of the KNUEA could be considered as possible candidates for roundabout control at the time the applications for Draft Plan of Subdivision are processed by the City.
16. The City's 2013 Transportation Master Plan Update includes policies and actions for providing safe and efficient roads by designing and building complete streets. Complete streets design elements have been considered for all roadways in the KNUEA. The Complete Streets design elements identified in this report should be considered and further refined at the Plan of Subdivision and Site Plan stage.
17. A 44.5m right-of-way width is recommended along March Road between the current urban area boundary and the northern limit of the KNUEA. This right-of-way width will provide for the ultimate extension of the median BRT system.
18. A median BRT station(s) will be identified along the corridor within the KNUEA, as development occurs and detailed BRT plans are developed. The identification of station location(s) will need to take into consideration the location of the most northerly planned station along the corridor (March/Klondike, as per the approved Kanata North Transitway EA) and the planned park and ride at March Road/North Collector (Streets 'C' and 'E', as per the Kanata North CDP process).
19. It is recommended that the opportunity to implement interim transit priority measures through the study area as part of the initial widening of March Road from two to four lanes be examined in preparation for the next City of Ottawa TMP update.
20. The proposed March Road cross sections are consistent with the recommendations of the 1994 March Road Reconstruction Environmental Study Report and are addressed by the Kanata North Transitway Environmental Project Report.
21. The interim and ultimate March Road cross sections have geometric features (such as landscaping in the medians and narrow lane widths) that reflect a design speed of 60 kilometres per hour.
22. The right-of-way to be protected along all collector roadways within the KNUEA will be 24m. Future collectors will be provided with a 24m right-of-way but will be built as local roads in the short term. Local roads will have 18m, 16.5m and 14m rights-of-way.
23. The 18m and 16.5m right-of-way widths allow for the provision of sidewalk along local roads leading directly to transit, school, park, institution or retail/commercial/employment land uses, as shown in the Parks and Pathways Plan (**Figure 33** of this report). The 14m right-of-way width will be used for single loaded roads adjacent to open space.
24. The KNCDP TMP Existing Conditions Report indicated that active transportation modal shares within the Transportation Area of Interest (TAI) are significantly lower than the target modal shares identified in the City's 2013 TMP. The walking and cycling facilities included in the Parks and Pathways Plan are anticipated to achieve the City's 2013 TMP targets for active transportation modal shares in the KNUEA.
25. The proposed pedestrian and cycling network provides connections to all land-uses within the subject lands, as well as the existing communities to the north and south. The

# Attachment 4

910 March Road Forecasting Report – City of Ottawa Comments

## **Robin Marinac**

---

**From:** Gervais, Josiane <josiane.gervais@ottawa.ca>  
**Sent:** June 17, 2020 12:12 PM  
**To:** Mark Crockford  
**Cc:** Robin Marinac  
**Subject:** RE: 2020-11 910 March Road Step 3 - TPM Comments

Hello Mark,

Please find comments below regarding the Forecasting Report for 910 March Rd.

### **Transportation Engineering Services**

1. Note that the development application for 936 March Road is subject to an RMA. The proposed works include one southbound left-turn lane, one northbound right-turn lane and paved shoulders on March Road. The RMA also accommodates for a future northbound left-turn lane.
2. Provide details as to the location of Access 1 relative to the proposed signalized intersection of March Road and Street A. Confirm that Access 1 is to be signalized, otherwise access onto March Road may need to be restricted.
3. A right in/right out access to March Rd, on the west side, is proposed approximately 225m north of Halton Terrace. Comment on the proposed accesses relative to the access across the street.
4. Consider adjusting the existing/future mode shares. The gas station/convenience market is unlikely to generate many transit trips and until the KNUEA is developed, this development is more likely to exhibit characteristics from the rural west TAZ.
5. Justify the difference between 2022 and 2027 trip projections. Additionally, if only 15% of trips are to from the north and 85% from the south (consistent with the KNUEA TMP), a maximum of 15% of trips can be pass-by trips. The remainder would be primary or diverted trips and should be explicitly accounted for on the study area's road network.
6. Since the timing of the widening of March Road is unknown, it should be assumed that March Road north of Maxwell Bridge/Halton Terrace has a two-lane cross-section. Indicate how many vehicles must be diverted from the peak periods to maintain an acceptable level of service on March Road.
7. Address comments prior to the submission of the strategy report.

### **Traffic Signal Operations**

8. Page 11 of the report should refer to  $v/c < 0.9$ .

### **Development Review – Transportation**

9. Include Figure 2: Concept Plan.
10. The site plan depicts a 4-way signalized intersection at Site Access #1, consider if site generated traffic would undertake the westbound through movement here. What is the west leg of the intersection connecting to?
11. An RMA is required for the traffic signal proposed at Access 1.

12. The right-in/right-out access at Access 2 must be supported by physical constraints, and RMA may be required.
13. As requested by TES, address comments prior to submission of Strategy Report.

Regards,

**Josiane Gervais, P.Eng.**

Project Manager, Infrastructure Approvals | GPRJ Approbation des demandes d'infrastructure  
Development Review Branch | Dir Examen des projets d'aménagement  
City of Ottawa | Ville d'Ottawa  
Tel | Tél. : 613-580- 2424 ext. | poste 21765  
web | Site Web : [www.ottawa.ca](http://www.ottawa.ca)

---

**From:** Mark Crockford <[mark.crockford@cghtransportation.com](mailto:mark.crockford@cghtransportation.com)>

**Sent:** June 03, 2020 7:59 PM

**To:** Gervais, Josiane <[josiane.gervais@ottawa.ca](mailto:josiane.gervais@ottawa.ca)>; Robin Marinac <[robin.marinac@cghtransportation.com](mailto:robin.marinac@cghtransportation.com)>

**Subject:** RE: 2020-11 910 March Road Step 2 - TPM Comments

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Hi Josiane,

Attached is our Step 3 Forecasting report for 910 March Road, including the comments below. Please let us know once you have had a chance to review.

Unfortunately this one has fallen a bit behind where we wanted to be so I'm hoping we can get your comments as quickly as possible so we can meet our clients anticipated submission deadline. Any help is greatly appreciated!

Thanks,  
Mark



Mark Crockford, P.Eng.

**CGH Transportation Inc.**

P:905-251-4070

E:[Mark.Crockford@CGHTransportation.com](mailto:Mark.Crockford@CGHTransportation.com)

---

**From:** Gervais, Josiane <[josiane.gervais@ottawa.ca](mailto:josiane.gervais@ottawa.ca)>

**Sent:** April 24, 2020 2:36 PM

**To:** Robin Marinac <[robin.marinac@cghtransportation.com](mailto:robin.marinac@cghtransportation.com)>

**Cc:** Mark Crockford <[mark.crockford@cghtransportation.com](mailto:mark.crockford@cghtransportation.com)>

**Subject:** RE: 2020-11 910 March Road Step 2 - TPM Comments

Hi Robin,

My comments on the Scoping Report for 910 March Road are as follows:

**Element 2.1.2 - Existing Conditions**

- Include Klondike Rd within area roadways & intersections.
- Provide existing peak hour travel demands for pedestrians and cyclists.

**Element 2.1.3 - Planned Conditions**

- Other developments within the study area – Include 1055 Klondike.

**Element 2.2.1 - Study Area**

- Include March Road/Klondike Rd

If the above comments can be incorporated within the next submission, please proceed to Step 3: Forecasting.

Regards,

**Josiane Gervais, P.Eng.**

Project Manager, Infrastructure Approvals | GPRJ Approbation des demandes d'infrastructure  
Development Review Branch | Dir Examen des projets d'aménagement  
City of Ottawa | Ville d'Ottawa  
Tel | Tél. : 613-580- 2424 ext. | poste 21765  
web | Site Web : [www.ottawa.ca](http://www.ottawa.ca)

---

**From:** Giampa, Mike <[Mike.Giampa@ottawa.ca](mailto:Mike.Giampa@ottawa.ca)>

**Sent:** April 24, 2020 7:31 AM

**To:** Robin Marinac <[robin.marinac@cghtransportation.com](mailto:robin.marinac@cghtransportation.com)>

**Cc:** Mark Crockford <[mark.crockford@cghtransportation.com](mailto:mark.crockford@cghtransportation.com)>; Gervais, Josiane <[josiane.gervais@ottawa.ca](mailto:josiane.gervais@ottawa.ca)>

**Subject:** RE: 2020-11 910 March Road Step 2

Hi Robin,

I've assigned this file to Josiane.

Thanks,

Mike

---

**From:** Robin Marinac <[robin.marinac@cghtransportation.com](mailto:robin.marinac@cghtransportation.com)>

**Sent:** April 22, 2020 2:16 PM

**To:** Giampa, Mike <[Mike.Giampa@ottawa.ca](mailto:Mike.Giampa@ottawa.ca)>

**Cc:** Mark Crockford <[mark.crockford@cghtransportation.com](mailto:mark.crockford@cghtransportation.com)>

**Subject:** 2020-11 910 March Road Step 2

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Attached is our Step 2 report for 910 March Road. Can you please point us in the direction of the assigned TPM so we can contact them with any questions we may have.

Kind regards,  
Robin Marinac



Robin Marinac, EIT  
**CGH Transportation Inc.**  
P: 437-242-5183  
E: [robin.marinac@cghtransportation.com](mailto:robin.marinac@cghtransportation.com)

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# Attachment 5

Sensitivity Analysis 3 – No Left-turn Phases

Table 1: 2027 FT Sensitivity Analysis 3

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )	LOS	Delay	V/C	Q (95 <sup>th</sup> )
<b>March Road at Site Access #1 / South Local Road Unsignalized</b>	EBL	F	252	0.26	8	F	736	0.63	9	F	2316	1.67	11
	EBT/R	F	62	0.30	10	E	46	0.33	10	F	88	0.55	18
	WBL	F	4094	9.12	153	F	4343	9.39	125	F	10007	21.44	196
	WBT/R	D	30	0.22	9	F	102	0.70	27	F	214	1.13	54
	NBL	B	13	0.01	<1	A	9	0.03	1	A	9	0.03	1
	NBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL	A	9	0.10	3	B	15	0.11	11	C	16	0.18	27
	SBT/R	-	-	-	-	-	-	-	-	-	-	-	-
<i>Mitigation 1 – Signalization</i>													
<b>March Road at Site Access #1 / South Local Road Signalized</b>	EBL	A	48	0.04	5	A	48	0.05	5	A	41	0.02	5
	EBT/R	A	25	0.16	10	A	22	0.26	12	A	18	0.15	12
	WBL	D	84	0.86	#68	B	59	0.65	#44	D	79	0.84	#79
	WBT/R	A	16	0.17	10	A	24	0.24	18	A	12	0.30	17
	NBL	A	11	0.06	2	A	5	0.06	4	A	10	0.06	6
	NBT/R	A	14	0.55	108	F	132	1.24	#529	F	192	1.36	#638
	SBL	A	5	0.19	9	C	75	0.72	#17	A	35	0.58	#24
	SBT/R	F	96	1.15	#487	A	10	0.60	107	A	11	0.60	127
<b>Overall</b>	<b>E</b>	<b>69</b>	-	-	<b>F</b>	<b>87</b>	-	-	<b>F</b>	<b>119</b>	-	-	
<i>Sensitivity Analysis 3 – Signalization with No Left-turn Phases</i>													
<b>March Road at Site Access #1 / South Local Road Signalized</b>	EBL	A	42	0.02	5	A	43	0.03	5	A	41	0.02	5
	EBT/R	A	20	0.10	9	A	18	0.18	11	A	18	0.15	12
	WBL	C	72	0.76	59	B	70	0.69	48	D	79	0.84	#79
	WBT/R	A	17	0.15	11	A	18	0.26	15	A	25	0.33	27
	NBL	A	9	0.07	2	A	5	0.06	4	A	6	0.06	5
	NBT/R	A	9	0.48	93	F	113	1.19	#592	F	138	1.25	#601
	SBL	A	7	0.19	14	C	87	0.77	#20	F	274	1.37	#44
	SBT/R	F	99	1.16	#561	A	9	0.58	122	A	11	0.60	127
<b>Overall</b>	<b>E</b>	<b>69</b>	-	-	<b>F</b>	<b>76</b>	-	-	<b>F</b>	<b>96</b>	-	-	
<b>Notes:</b>	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# indicates the volume for the 95 <sup>th</sup> percentile cycle exceeds capacity												

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Sensitivity 3  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Future Volume (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879			0.868			0.997				
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1534	0	1658	1515	0	1658	1740	0	1658	1745	0
Flt Permitted	0.730			0.740			0.043			0.375		
Satd. Flow (perm)	1274	1534	0	1291	1515	0	75	1740	0	654	1745	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			37			2				
Link Speed (k/h)		50			30			80				80
Link Distance (m)		86.4			104.3			66.1				51.2
Travel Time (s)		6.2			12.5			3.0				2.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	26	0	155	42	0	4	631	0	91	1516	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Sensitivity 3  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	32.7	32.7		32.7	32.7		29.6	29.6		29.6	29.6	
Total Split (s)	33.0	33.0		33.0	33.0		97.0	97.0		97.0	97.0	
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%		74.6%	74.6%	
Maximum Green (s)	27.3	27.3		27.3	27.3		91.4	91.4		91.4	91.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.4	2.4		2.4	2.4		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)	5.7	5.7		5.7	5.7		5.6	5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	19.6	19.6		19.6	19.6		92.8	92.8		92.8	92.8	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.75	0.75		0.75	0.75	
v/c Ratio	0.02	0.10		0.76	0.15		0.07	0.48		0.19	1.16	
Control Delay	42.0	20.1		72.2	16.6		9.0	8.3		6.5	99.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.7		0.0	0.0	
Total Delay	42.0	20.1		72.2	16.6		9.0	9.0		6.5	99.4	
LOS	D	C		E	B		A	A		A	F	
Approach Delay		23.6			60.4			9.0			94.2	
Approach LOS		C			E			A			F	
Queue Length 50th (m)	1.0	1.0		36.0	1.0		0.2	52.3		5.6	~433.0	
Queue Length 95th (m)	4.6	8.8		59.3	10.8		1.8	93.4		14.2	#561.3	
Internal Link Dist (m)		62.4			80.3			42.1			27.2	
Turn Bay Length (m)				15.0						110.0		
Base Capacity (vph)	281	355		285	363		56	1304		490	1308	
Starvation Cap Reductn	0	0		0	0		0	351		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	0.02	0.07		0.54	0.12		0.07	0.66		0.19	1.16	

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	123.7
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.16
Intersection Signal Delay:	68.7
Intersection LOS:	E
Intersection Capacity Utilization:	109.4%
ICU Level of Service:	H
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	

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

Splits and Phases: 3: March Road & South Local Road/Site Access #1



Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Sensitivity 3  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Future Volume (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.871			0.864			0.999			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1520	0	1658	1508	0	1658	1743	0	1658	1742	0
Flt Permitted	0.714			0.729			0.309			0.043		
Satd. Flow (perm)	1246	1520	0	1272	1508	0	539	1743	0	75	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			53			1			1	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		91.5			103.7			66.1			81.0	
Travel Time (s)		6.6			12.4			3.0			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	43	0	122	66	0	23	1598	0	44	775	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Sensitivity 3  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	32.7	32.7		32.7	32.7		29.6	29.6		29.6	29.6	
Total Split (s)	33.0	33.0		33.0	33.0		97.0	97.0		97.0	97.0	
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%		74.6%	74.6%	
Maximum Green (s)	27.3	27.3		27.3	27.3		91.4	91.4		91.4	91.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.4	2.4		2.4	2.4		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)	5.7	5.7		5.7	5.7		5.6	5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	16.9	16.9		16.9	16.9		93.4	93.4		93.4	93.4	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.77	0.77		0.77	0.77	
v/c Ratio	0.03	0.18		0.69	0.26		0.06	1.19		0.77	0.58	
Control Delay	43.2	17.9		69.5	18.1		4.9	112.9		87.1	8.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1		0.0	0.0	
Total Delay	43.2	17.9		69.5	18.1		4.9	113.0		87.1	8.8	
LOS	D	B		E	B		A	F		F	A	
Approach Delay		20.6			51.5			111.5			13.0	
Approach LOS		C			D			F			B	
Queue Length 50th (m)	1.0	1.2		27.6	2.7		1.1	~455.2		4.9	64.5	
Queue Length 95th (m)	4.8	11.2		47.6	15.0		4.2	#591.9		#20.4	122.2	
Internal Link Dist (m)		67.5			79.7			42.1			57.0	
Turn Bay Length (m)				15.0						110.0		
Base Capacity (vph)	280	370		285	379		414	1339		57	1338	
Starvation Cap Reductn	0	0		0	0		0	33		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	0.02	0.12		0.43	0.17		0.06	1.22		0.77	0.58	

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	121.6
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.19
Intersection Signal Delay:	75.5
Intersection LOS:	E
Intersection Capacity Utilization:	112.1%
ICU Level of Service:	H
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	

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

Splits and Phases: 3: March Road & South Local Road/Site Access #1





Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT Sat Sensitivity 3  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Future Volume (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.882			0.863			0.998			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1539	0	1658	1506	0	1658	1742	0	1658	1742	0
Flt Permitted	0.666			0.726			0.298			0.043		
Satd. Flow (perm)	1162	1539	0	1267	1506	0	520	1742	0	75	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			56			1			1	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		75.3			120.5			66.1			61.1	
Travel Time (s)		5.4			14.5			3.0			2.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	47	0	193	106	0	23	1581	0	74	758	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT Sat Sensitivity 3  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	32.7	32.7		32.7	32.7		29.6	29.6		29.6	29.6	
Total Split (s)	33.0	33.0		33.0	33.0		97.0	97.0		97.0	97.0	
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%		74.6%	74.6%	
Maximum Green (s)	27.3	27.3		27.3	27.3		91.4	91.4		91.4	91.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.4	2.4		2.4	2.4		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)	5.7	5.7		5.7	5.7		5.6	5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	23.0	23.0		23.0	23.0		91.9	91.9		91.9	91.9	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.73	0.73		0.73	0.73	
v/c Ratio	0.02	0.15		0.84	0.33		0.06	1.25		1.37	0.60	
Control Delay	41.4	18.0		79.0	24.9		6.3	137.9		273.7	11.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1		0.0	0.0	
Total Delay	41.4	18.0		79.0	24.9		6.3	138.0		273.7	11.3	
LOS	D	B		E	C		A	F		F	B	
Approach Delay		20.3			59.8			136.1			34.6	
Approach LOS		C			E			F			C	
Queue Length 50th (m)	1.0	2.1		46.5	10.6		1.5	~503.0		~24.6	85.8	
Queue Length 95th (m)	4.6	12.3		#79.3	26.9		4.6	#600.5		#43.6	126.9	
Internal Link Dist (m)		51.3			96.5			42.1			37.1	
Turn Bay Length (m)				15.0						110.0		
Base Capacity (vph)	251	362		274	369		378	1269		54	1269	
Starvation Cap Reductn	0	0		0	0		0	35		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	0.02	0.13		0.70	0.29		0.06	1.28		1.37	0.60	

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	126.2
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.37
Intersection Signal Delay:	95.5
Intersection LOS:	F
Intersection Capacity Utilization:	115.4%
ICU Level of Service:	H
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	

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

Splits and Phases: 3: March Road & South Local Road/Site Access #1



# Appendix C

City of Ottawa Step 4 Comment-Response – Round 2

The following responses have been prepared in order to address the City of Ottawa Comments received on October 26, 2020 as part of discussion regarding the Strategy Report for 910 March Road submitted on June 30, 2020.

October 26, 2020		2020-11 910 March Road Comment-Response		Additional Comments	
Comment #	City of Ottawa Comment	CGH Response	City Of Ottawa Response	CGH Response	
		Development Design			
2	Look for an opportunity to connect to the major pathway located at the back of the development to connect to Maxwell Bridge Road. Illustrate where bicycle parking is located on site.	<p>Noted. Both parts of the comment have been passed on to the proponent.</p> <p>At this time, the potential for a connection to the major pathway located at the back of the development to connect to Maxwell Bridge Road is under review. A decision to include this connection will be represented in its inclusion or exclusion from the updated Site Plan.</p> <p>The location of bicycle parking will be illustrated on the updated Site Plan.</p>	Comment 2 is still outstanding until responded to with resubmission.	<p>Noted.</p> <p>A connection to the major pathway located at the back of the development will not be provided.</p> <p>The location of the 16 provided bicycle parking spaces is illustrated on the updated Site Plan.</p>	
3	Clearly indicate how pedestrians will enter and travel through the site to reach all buildings. Provide sidewalk along the frontage of March Road. If Access #1 is signalized, ensure that pedestrians can easily connect from this signalized intersection to all site planned buildings.	<p>Noted. The comment has been passed on to the proponent. This will be indicated on the updated Site Plan.</p>	Comment 3 is also outstanding until addressed with resubmission.	<p>Noted.</p> <p>Pedestrian facilities are shown on the updated Site Plan. Pedestrian facility connections to existing sidewalks on March Road are shown along the frontage of the site with a pedestrian facility at Site Access #2 providing connection into the site. On site, sidewalks and marked pedestrian crossing areas are shown which allow for connections to proposed buildings as well as parking areas. Sidewalks are provided north of Restaurant 1, east of the Tim Hortons / Gas Bar, west of Restaurant 2, and west of Retail A.</p>	
4	Clearly show how trucks will back into the hardware store truck bay. Consider accommodating all truck movements into the site at one access in order to minimize access widths.	<p>Trucks backing into the hardware store truck bay are shown in Turning Template 003.</p> <p>Noted. The scenario where truck access to the site is limited to the northbound right-turn at Site Access #2 and truck egress from the site is limited to the westbound left-turn and westbound right-turn at Access #1 will be considered further and refined as part of the functional design and RMA.</p>	Comment 4 is still outstanding until addressed in the RMA.	<p>Noted. Will be considered as part of the RMA</p>	
5	Demonstrate the potential queues on site with forecasted trips and indicate if there are any pinch points for accessing parking areas and drive throughs. Consider conditions with Access #1 signalized and with both accesses restricted to RIRO	<p>Noted. The implications of queues on site have been evaluated assuming the intersection of March Road and Access #1 is signalized. A right-in right-out is unlikely to cause significant queuing on the site and as such has not been evaluated. As the 2027 future total operational analysis has shown that the future road widening of Site Access #1 is the best option for accommodating the projected increases in vehicular demand, this is the scenario that has been considered.</p> <p>The AM peak period analysis shows a westbound left-turn lane 95th percentile queue of 38 metres and a westbound through/right-turn lane 95th percentile queue of 8 metres. The PM peak period analysis shows a westbound left-turn lane 95th percentile queue of 30 metres and a westbound through/right-turn lane 95th percentile queue of 15 metres. The Saturday peak period analysis shows a westbound left-turn lane 95th percentile queue of 52 metres and a westbound through/right-turn lane 95th percentile queue of 24 metres.</p> <p>The AM peak period analysis shows a westbound left-turn lane 50th percentile queue of 20 metres and a westbound through/right-turn lane 50th percentile queue of 1 metre. The PM peak period analysis shows a westbound left-turn lane 50th percentile queue of 15 metres and a westbound through/right-turn lane 50th percentile queue of 6 metres. The Saturday peak period analysis shows a westbound left-turn lane 50th percentile queue of 30 metres and a westbound through/right-turn lane 50th percentile queue of 11 metres.</p> <p>As the Saturday peak hour represents the longest queues, the potential queues on site for this peak hour have been chosen in order to present a conservative analysis and discussion.</p> <p>Attachment 1 shows the 95th percentile queues at Site Access #1 for the westbound movements. As shown, the westbound left-turn queue will spill into the westbound through/right-turn lane. As no "#" symbol was generated in the Synchro analysis for this queue, the volume for the 95th percentile cycle does not exceed capacity. As such, it can be assumed that the westbound left-turn queue will clear within one cycle length. This indicates that any blockage to the westbound through/right-turn lane will be minor and clear quickly. Queues are expected to extend to the north of the Tim Hortons as well as to the west as shown and are not expected to block any parking spaces or the drive-through exit.</p> <p>Attachment 2 shows the 50th percentile queues at Site Access #1 for the westbound movements. As shown, the westbound left-turn queue will</p>	<p>Comment 5 does not adequately address the impact of queuing and the multiple points of vehicle access to the queue at the proposed signalized access. Consider implementing a median at this access to control vehicle movements on site. These conflict points are on the site and not on City ROW but could lead to delay for motorists entering at this access thereby affecting operation on March Road.</p> <p>As a follow-up to the comment 5 response above, the numerous destinations on site may lead to potential conflicts and issues with on-site circulation. Consider changes to the site plan that could reduce the number of conflicts and provide additional space for stacking where needed, such as changing the location of the buildings on site to allow for additional throat length, or having raised medians along the drive aisles to reduce the</p>	<p>Noted. While the idea of a median has been put forth by the City to control vehicle movements and queuing on site, a median is likely to create problem for truck circulation within the site.</p> <p>As suggested, the location of the Tim Hortons and Gas Bar has been shifted east in order to increase access throat length. A second drive through lane has been added to the Tim Hortons. Both these changes will provide additional space for queuing as needed.</p> <p>Additionally, the parking area configurations have been adjusted to reduce the number of conflicts by reducing the number of parking laneways in the parking area west of Retail A from two to three, and aligning the entrances to the parking areas for</p>	

		<p>slightly spill into the westbound through/right-turn lane. As no "#" symbol was generated in the Synchro analysis for this queue, the volume for the 95th percentile cycle does not exceed capacity. As such, it can be assumed that the westbound left-turn queue will clear within one cycle length. This indicates that any blockage to the westbound through/right-turn lane will be minor and clear quickly. Queues are not expected to block any parking spaces or the drive-through exit.</p> <p>50th percentile queues are a more accurate representation of the typical queue lengths that will occur. 95th percentile queues may occur occasionally and as such, Attachment 2 is expected to represent a more accurate representation of typical queues.</p>	permitted movement options on site.	Restaurant B and Retail A.  These changes are shown on the updated plan.
6	Provide the storage length from the drive through facilities to Access #2. Indicate if all design guidance has been followed from the City of Ottawa Urban Design Guidelines for Drive-Through Facilities	<p>Noted. The Tim Hortons drive through storage length is approximately 125 metres and the proposed restaurant 1's storage length is 135 metres. Both storage lengths have been measured from the pick-up window to March Road at Site Access #2. Additionally, the measured distance between March Road at Site Access #2 and the access point of each drive through's stacking lane is 50 metres for the Tim Hortons and 60 metres for restaurant 1.</p> <p>Noted. Design guidance from the City of Ottawa Urban Design Guidelines for Drive-Through Facilities have been followed.</p>	Comment 6 looks like the measurements double up on the storage lengths for the drive throughs. Ensure that the storage areas are not used by two drive through facilities at the same time.	<p>Noted. Stacking lanes are intended to provide the majority of queuing accommodation. In the event that queues extend beyond the stacking lanes provided, it is expected that the storage areas will not be shared by both drive through facilities at the same time given the different expected peaks as a result of their uses (i.e. a peak in queuing is expected in the AM peak hour at the Tim Hortons drive through but not at the restaurant drive through).</p> <p>Additionally, the Tim Hortons drive through facility has been altered to now have two drive through lanes. This will increase the maximum number of queued vehicles at the drive through from 13 to 18 vehicles.</p>
Boundary Street Design				
8	If signalization of the access is accepted, the applicant would be responsible for the installation and operating costs of the proposed signalized access until warrants are met. Further analysis is required at this time to determine if signalization of Access #1 would be accepted when March Road is widened to 4 lanes. Consideration must be given to the queue lengths/storage requirements on March Road. This information is required prior to making the decision to accept signalization at this time.	<p>Noted.</p> <p>Based on the analysis provided in the Step 4, the northbound through / right-turn 95th percentile queues at Site Access #1 on March Road reach 32 metres in the AM peak period, 108 metres in the PM peak period, and 142 metres in the Saturday peak period. The southbound through 95th percentile queues at Maxwell Bridge Road reach 235 metres in the AM peak period, 69 metres in the PM peak period, and 44 metres in the Saturday peak period.</p> <p>Therefore, this analysis indicates that the southbound through queue at the intersection of March Road and Maxwell Bridge Road may back up to the Site Access #1 intersection in the AM peak period. As the 50th percentile queue is shown to be 136 metres, any queue backing up the Site Access #1 intersection is considered to be occasional and therefore acceptable.</p>	Comment 8 and 9 – the applicant will be responsible for funding the widening of March Road through the Access 1 intersection to accommodate projected volumes (potentially 4 lanes through the intersection) if the access at this intersection is to support left turns in and out of the site.	
9	If traffic signalization of Access #1 is accepted, site plan agreement conditions would be required to ensure that traffic signals could be removed when March Road is widened to 4 lanes and if/when median bus lanes are provided.	<p>Noted. If/when median bus lanes are provided this signal would have to be removed however our analysis recommended a four lane cross-section through this intersection. Therefore, the signals do not need to be removed once March Road is widened to four lanes.</p> <p>Additionally, the BRT is not included in the 2031 BRT Affordable Network Plan and as such is well beyond the analysis horizons of the proposed development.</p>	The signalization of the access appears to be the best solution for access to this site and if site plan conditions and funding (including on-going maintenance costs) are provided by the applicant, TES will consider the solution to be viable with the following comments. The applicant must be aware that although the BRT on March Road is not listed on the Affordable Network of the TMP, when and if this infrastructure is constructed, the full movement access to the site will not be supported.	Noted. The intersection configuration will be further refined as part of the RMA process.
12	Tapers and deceleration lengths for auxiliary lanes need to be adjusted for design speeds of 60 km/hr. In addition, the proposed signalized intersection on March Road at Access #1 would need to be a protected intersection and similar in design to neighbouring proposed intersections. Contact Ann Selfe (ann.selfe@ottawa.ca) for details	<p>Noted. Ann Selfe has been contacted for further details as indicated. The email correspondence has been attached for reference in Attachment 3. As shown in the attachment, Item 21 identifies a 60 km/h design speed to be implemented for the interim and ultimate March Road cross-sections. As discussed in Section 2.3.1 of the Step 4 report, both the interim and ultimate widening scenarios of March Road have been assumed to occur beyond the proposed development's future analysis horizons. This assumption has been confirmed by the City of Ottawa as part of comments provided on the Forecasting Report for the proposed development (Comment #6). These comments can be seen in Attachment 4. As such, a speed limit of 80 km/h on March Road will continue to be assumed in the analysis of future horizons.</p> <p>Access #1 will consider the protected intersection design as part of the functional design to be completed.</p>	Previously, we indicated that the proposed signalized intersection would need to be a protected intersection. However, this may not be a requirement. A final decision will be part of this site plan and the 927 March Road subdivision needs and will be finalized through the RMA process.	Noted. This will be explored further as part of the RMA and will be evaluated based on the needs of 910 March Road.

17		New	Synchro results reveal only the (westbound) site traffic will experience failing vehicle movements (capacity and queueing) if it remains unsignalized under 2027 conditions. Once this location is signalized (to mitigate the failing site traffic), March becomes the road which fails and experiences excess queueing and blocking of upstream intersections	As shown in Table 19 of the TIA, at full build out of the development, March Road does not fail at the signalized intersection of March Road and Site Access #1. The significant increase in traffic along March Road between the 2022 and 2027 future horizons are not a result of the proposed development and as such, any issues on March Road in the 2027 future total analysis are not a reflection of the proposed development or signalization of this access.
18		New	Indicate if there is any benefit to the March Road network with the proposed signalization of this site access	Without the signalization of this site access, high delays on the minor approaches would alter the risk tolerance of drivers at this intersection and encourage them to look for smaller gaps than they might usually perceive as safe to make turns into and out of the site. This will lead to an increase in sideswipe collisions at the Site Access.
Transit Services				
21	Regarding Section 2.2.5 Existing Transit: the frequencies listed for routes 63 and 165 were reduced service levels due to the Covid-19 pandemic. Regular weekday service levels are: Route 63 every 15 minutes in peak periods and every 30 minutes off-peak; Route 165 hourly in the midday and evening (does not operate in peak periods).	Noted.	No comments on this response to comments from the first circulation. Transit Services reserves the right to make future comments based on subsequent submissions.	Noted.
22	Regarding the Site Plan: please include a continuous, fully accessible sidewalk, connecting from the sidewalk along March Road to each of the buildings on site, to ensure uninterrupted pedestrian connectivity to/from nearby transit stops.	See comment 3.		
Development Review - Transportation				
23	Turning movement diagram shows WB-20 traveling into on-coming traffic lanes at Access #1. This is undesirable if trucks are accessing the site during business hours. Similar to comment 4 above, perhaps access to WB-20 vehicles could be limited to the RI/RO access.	See comment 4.	Comment 4, Turning Template provided shows the truck leaving from the truck bay, it does not appear to show how it reversed into the area. Update figure to show this movement.	Shown in TT 002 and 003.



# Appendix D

Previous Plan – Restaurant 2







# Appendix E

Traffic Data

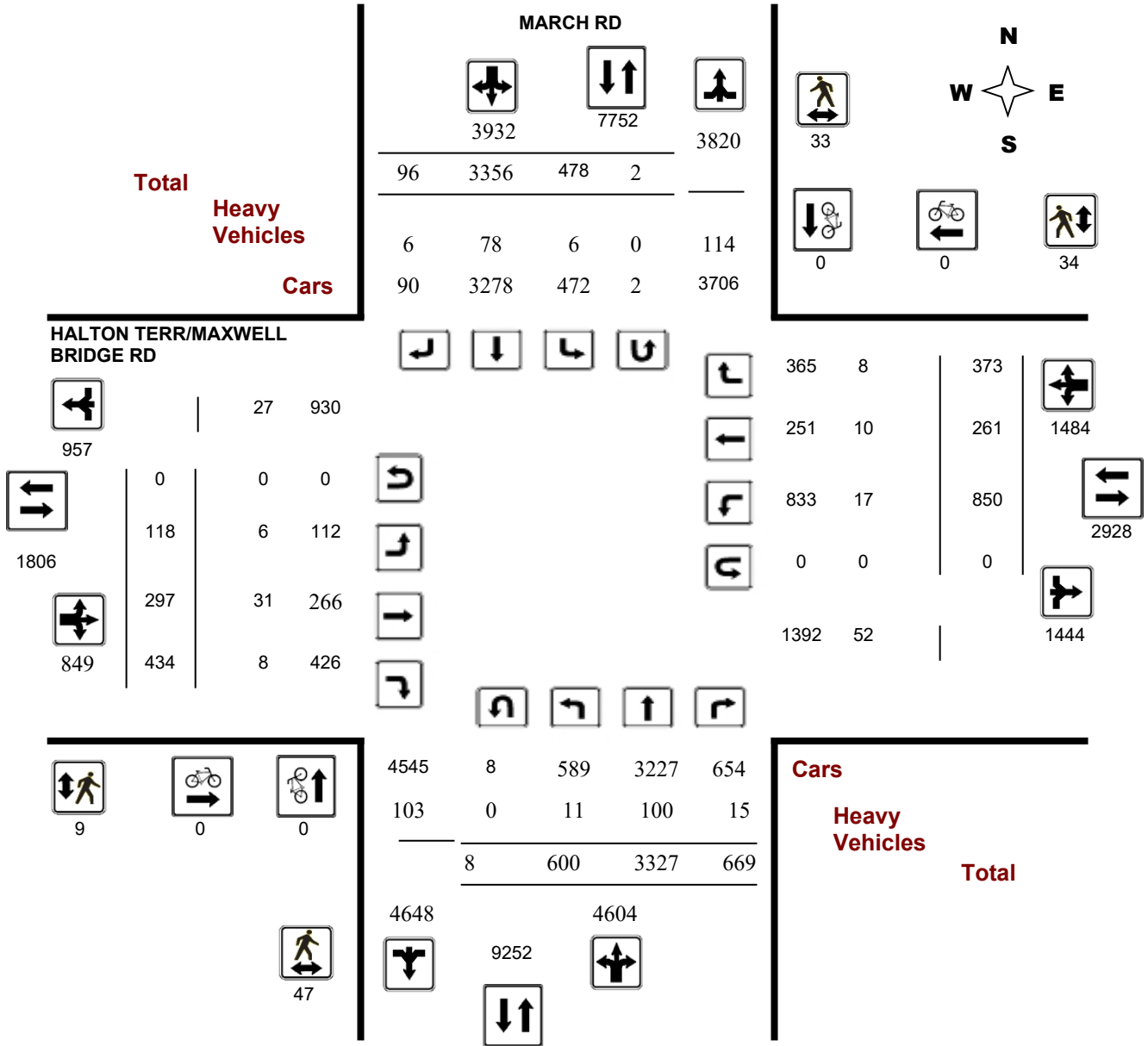
**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39372

**Start Time:** 07:00

**Device:** Miovision

### Full Study Diagram



5472187 - WED JAN 22, 2020 - 8HRS - LORETTA

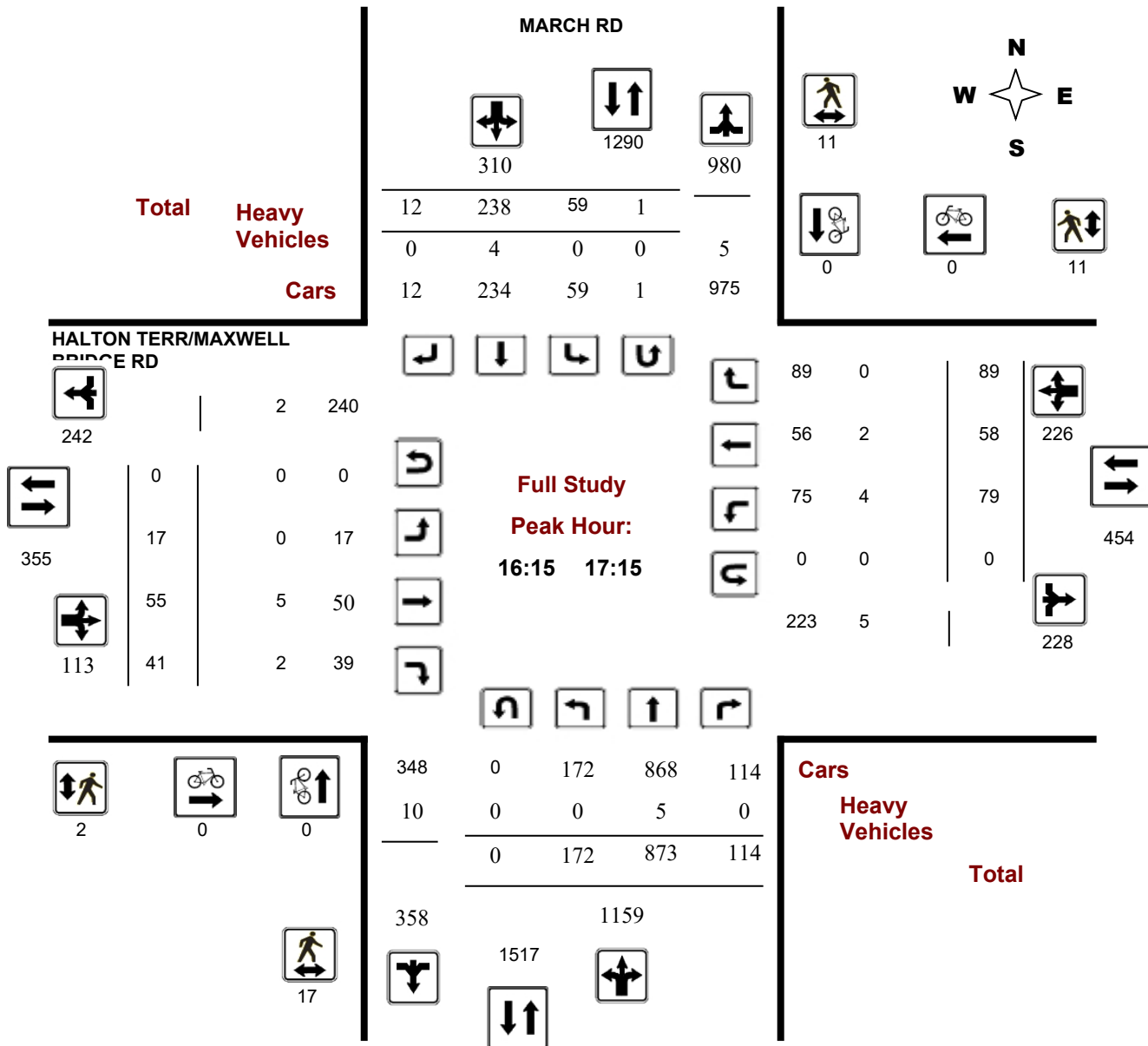
**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39372

**Start Time:** 07:00

**Device:** Miovision

### Full Study Peak Hour Diagram



5472187 - WED JAN 22, 2020 - 8HRS - LORETTA



# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

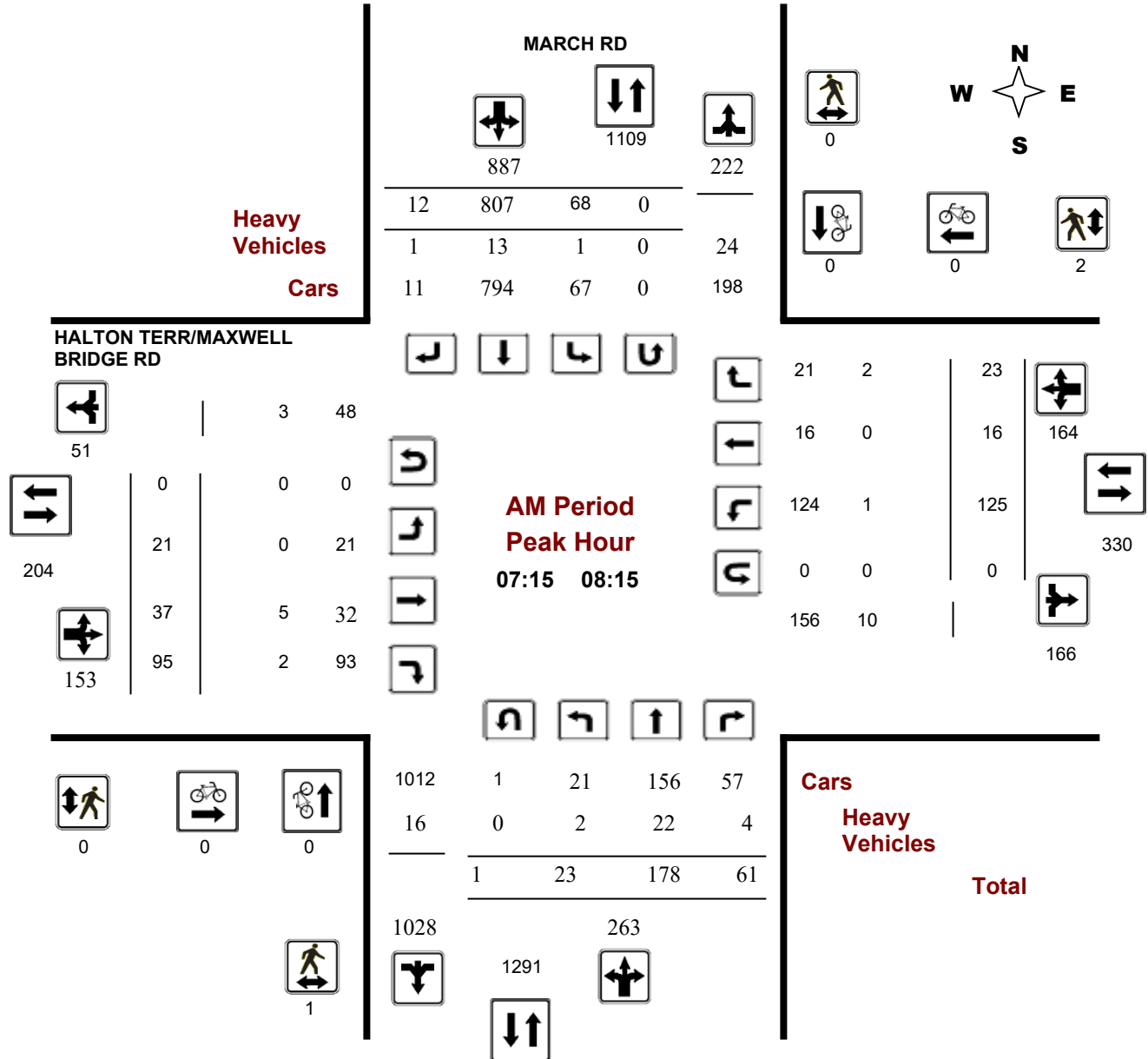
### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**Start Time:** 07:00

**WO No:** 39372

**Device:** Miovision



**Comments** 5472187 - WED JAN 22, 2020 - 8HRS - LORETTA



# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

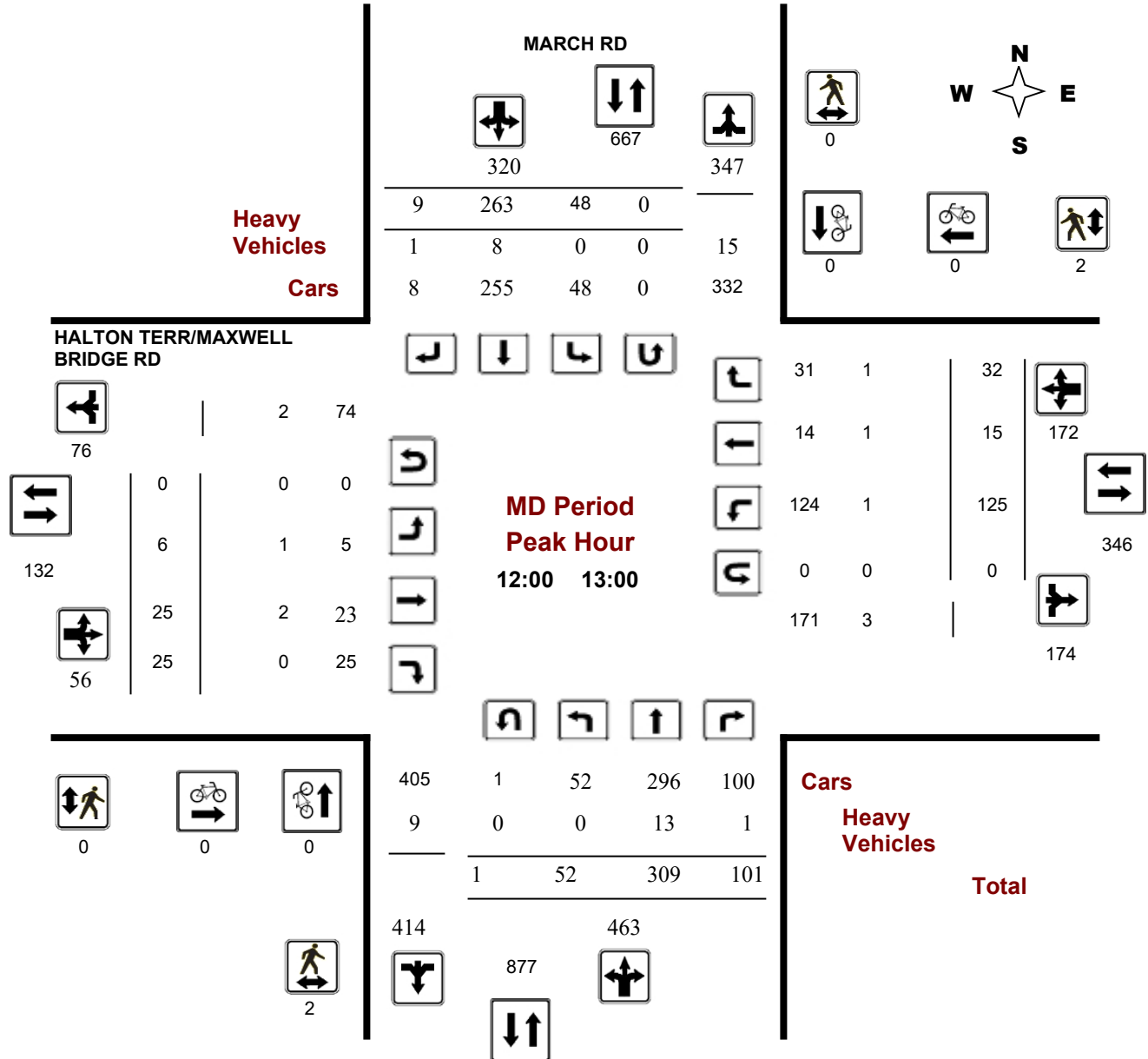
### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**Start Time:** 07:00

**WO No:** 39372

**Device:** Miovision



**Comments** 5472187 - WED JAN 22, 2020 - 8HRS - LORETTA



## Turning Movement Count - Peak Hour Diagram

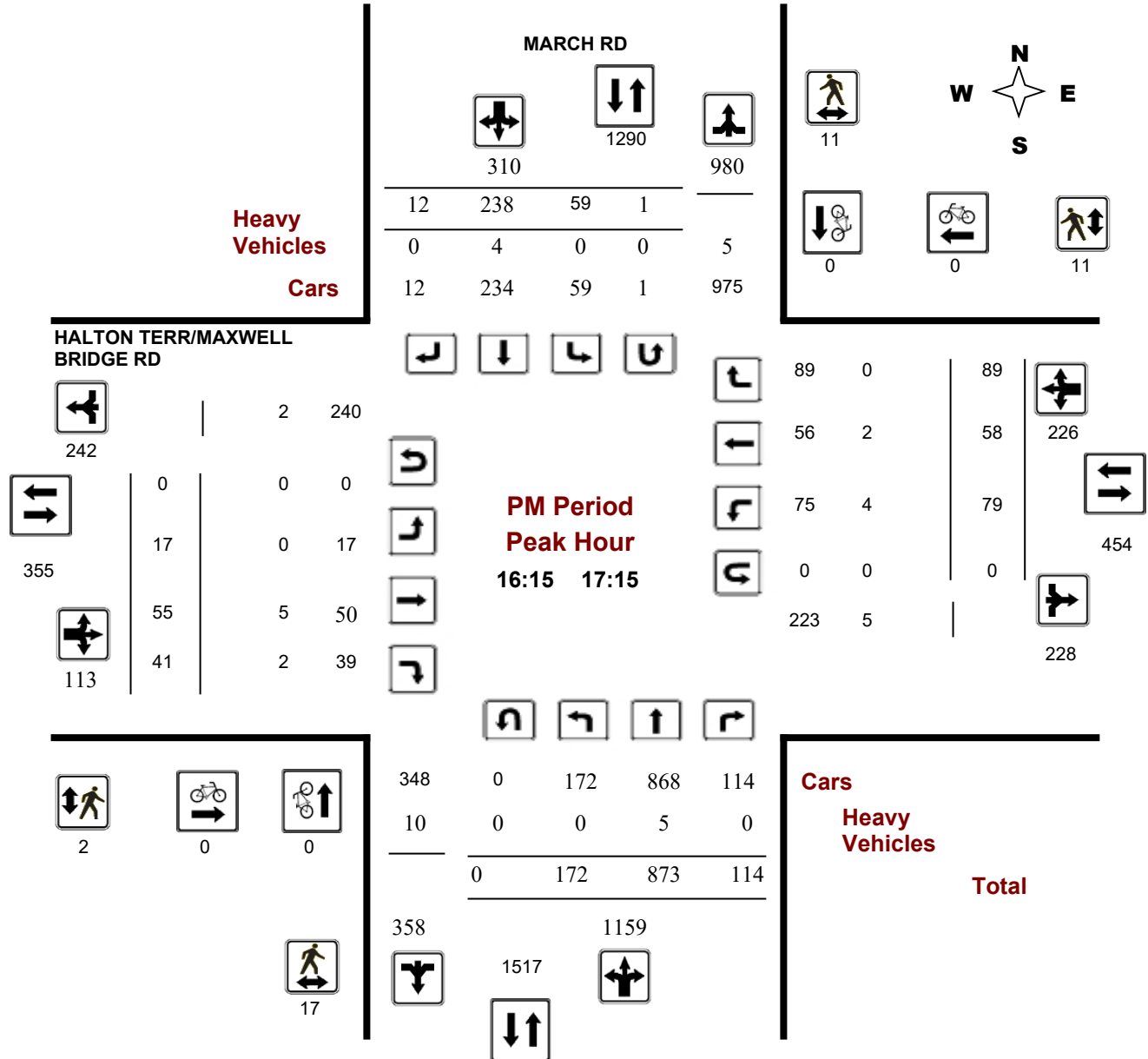
### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**Start Time:** 07:00

**WO No:** 39372

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39372

**Start Time:** 07:00

**Device:** Miovision

### Full Study Summary (8 HR Standard)

**Survey Date:** Wednesday, March 04, 2020

**Total Observed U-Turns**  
 Northbound: 8      Southbound: 2  
 Eastbound: 0      Westbound: 0

**AADT Factor**  
 1.00

Period	MARCH RD										HALTON TERR/MAXWELL BRIDGE RD										
	Northbound					Southbound					Eastbound					Westbound					Grand Total
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT			
07:00 08:00	21	180	50	251	56	785	10	851	1102	18	36	90	144	122	16	23	161	305	1407		
08:00 09:00	35	152	76	263	78	758	10	846	1109	21	32	83	136	141	24	19	184	320	1429		
09:00 10:00	28	208	62	298	69	517	13	599	897	21	42	87	150	120	28	29	177	327	1224		
11:30 12:30	58	268	85	411	52	283	9	344	755	3	24	28	55	115	18	27	160	215	970		
12:30 13:30	47	287	86	420	43	266	7	316	736	8	21	34	63	109	15	28	152	215	951		
15:00 16:00	96	608	104	808	58	265	19	342	1150	18	41	36	95	59	50	73	182	277	1427		
16:00 17:00	156	867	101	1124	63	246	11	320	1444	18	51	39	108	70	52	88	210	318	1762		
17:00 18:00	159	757	105	1021	59	236	17	312	1333	11	50	37	98	114	58	86	258	356	1689		
<b>Sub Total</b>	600	3327	669	4596	478	3356	96	3930	8526	118	297	434	849	850	261	373	1484	2333	10859		
<b>U Turns</b>				8				2	10				0				0	0	10		
<b>Total</b>	600	3327	669	4604	478	3356	96	3932	8536	118	297	434	849	850	261	373	1484	2333	10869		
<b>EQ 12Hr</b>	834	4625	930	6400	664	4665	133	5465	11865	164	413	603	1180	1182	363	518	2063	3243	15108		
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	<b>1.39</b>				
<b>AVG 12Hr</b>	786	4358	876	6031	626	4396	126	5151	11865	155	389	569	1112	1114	342	489	1944	3243	15108		
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	<b>1</b>				
<b>AVG 24Hr</b>	1030	5709	1148	7901	820	5759	165	6748	14649	202	510	745	1457	1459	448	640	2547	4004	18653		
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

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39372

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute Increments

#### MARCH RD

#### HALTON TERR/MAXWELL BRIDGE 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	6	45	14	65	9	179	0	188	15	2	8	19	29	36	4	6	46	15	328
07:15 07:30	8	54	12	74	14	224	1	239	17	5	6	27	38	29	4	3	36	17	387
07:30 07:45	4	54	16	75	12	183	5	200	7	8	10	25	43	25	3	4	32	7	350
07:45 08:00	3	27	8	38	21	199	4	224	7	3	12	19	34	32	5	10	47	7	343
08:00 08:15	8	43	25	76	21	201	2	224	12	5	9	24	38	39	4	6	49	12	387
08:15 08:30	6	32	18	56	20	182	1	203	5	5	8	18	31	37	3	5	45	5	335
08:30 08:45	11	42	22	76	15	189	3	207	9	7	7	27	41	26	6	5	37	9	361
08:45 09:00	10	35	11	56	22	186	4	212	6	4	8	14	26	39	11	3	53	6	347
09:00 09:15	7	52	23	82	23	166	8	197	16	8	18	37	63	40	10	9	59	16	401
09:15 09:30	8	54	17	79	17	126	1	144	10	7	9	33	49	30	10	10	50	10	322
09:30 09:45	7	55	11	74	17	125	2	144	5	4	6	13	23	27	3	4	34	5	275
09:45 10:00	6	47	11	65	12	100	2	114	4	2	9	4	15	23	5	6	34	4	228
11:30 11:45	17	55	19	92	14	77	4	95	5	1	6	10	17	35	5	8	48	5	252
11:45 12:00	15	57	20	94	10	70	1	81	10	2	6	10	18	25	6	3	34	10	227
12:00 12:15	16	84	26	126	12	70	3	85	3	0	4	3	7	30	2	8	40	3	258
12:15 12:30	10	72	20	103	16	66	1	83	3	0	8	5	13	25	5	8	38	3	237
12:30 12:45	15	79	28	122	8	56	2	66	7	3	6	8	17	37	5	9	51	7	256
12:45 13:00	11	74	27	112	12	71	3	86	10	3	7	9	19	33	3	7	43	10	260
13:00 13:15	11	83	10	104	8	71	1	80	4	1	6	13	20	18	2	6	26	4	230
13:15 13:30	10	51	21	82	15	68	1	85	6	1	2	4	7	21	5	6	32	6	206
15:00 15:15	13	130	25	168	10	63	4	77	1	2	5	7	14	15	9	19	43	1	302
15:15 15:30	29	129	33	191	13	56	6	75	9	2	11	8	21	16	15	15	46	9	333
15:30 15:45	24	163	16	203	13	65	4	82	10	7	9	5	21	13	16	23	52	10	358
15:45 16:00	30	186	30	246	22	81	5	108	9	7	16	16	39	15	10	16	41	9	434
16:00 16:15	27	202	22	251	17	62	3	82	7	4	12	11	27	17	9	25	51	7	411
16:15 16:30	40	251	17	308	16	64	1	81	3	6	13	11	30	14	11	18	43	3	462
16:30 16:45	43	214	32	289	10	50	4	65	1	2	11	8	21	20	14	27	61	1	436
16:45 17:00	46	200	30	276	20	70	3	93	3	6	15	9	30	19	18	18	55	3	454
17:00 17:15	43	208	35	286	13	54	4	71	2	3	16	13	32	26	15	26	67	2	456
17:15 17:30	32	217	18	267	17	65	1	83	1	3	10	5	18	30	14	21	65	1	433
17:30 17:45	37	173	26	236	21	50	3	74	9	5	15	7	27	37	11	27	75	9	412
17:45 18:00	47	159	26	232	8	67	9	84	0	0	9	12	21	21	18	12	51	0	388
Total:	600	3327	669	4604	478	3356	96	3932	216	118	297	434	849	850	261	373	1484	216	10,869

Note: U-Turns are included in Totals.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39372

**Start Time:** 07:00

**Device:** Miovision

### Full Study Cyclist Volume

Time Period	MARCH RD			HALTON TERR/MAXWELL BRIDGE RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	0	0	0	0	0	0	0
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	0	0	0	0	0	0
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	0	0	0
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39372

**Start Time:** 07:00

**Device:** Miovision

### Full Study Pedestrian Volume

#### MARCH RD

#### HALTON TERR/MAXWELL BRIDGE 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	1	1	0	0	0	1
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	0	1	0	1	1	2
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	1	1	1
08:45 09:00	1	2	3	0	1	1	4
09:00 09:15	1	0	1	0	0	0	1
09:15 09:30	0	1	1	1	1	2	3
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	1	0	1	1
11:30 11:45	2	0	2	0	1	1	3
11:45 12:00	2	0	2	0	0	0	2
12:00 12:15	0	0	0	0	2	2	2
12:15 12:30	1	0	1	0	0	0	1
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	2	0	2	0	0	0	2
13:15 13:30	2	0	2	0	0	0	2
15:00 15:15	0	5	5	0	4	4	9
15:15 15:30	4	2	6	0	6	6	12
15:30 15:45	1	0	1	0	0	0	1
15:45 16:00	0	1	1	1	0	1	2
16:00 16:15	3	5	8	1	1	2	10
16:15 16:30	6	0	6	1	6	7	13
16:30 16:45	4	8	12	0	1	1	13
16:45 17:00	6	2	8	1	2	3	11
17:00 17:15	1	1	2	0	2	2	4
17:15 17:30	3	1	4	0	1	1	5
17:30 17:45	3	4	7	0	3	3	10
17:45 18:00	3	0	3	3	0	3	6
<b>Total .....</b>	<b>47</b>	<b>33</b>	<b>80</b>	<b>9</b>	<b>34</b>	<b>43</b>	<b>123</b>

5472187 - WED JAN 22, 2020 - 8HRS - LORETTA



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39372

**Start Time:** 07:00

**Device:** Miovision

### Full Study Heavy Vehicles

**MARCH RD**

**HALTON TERR/MAXWELL BRIDGE 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	5	3	9	0	6	0	6	15	0	2	0	2	0	0	0	0	2	17
07:15	07:30	2	9	2	13	1	3	0	4	17	0	1	2	3	0	0	2	2	5	22
07:30	07:45	0	3	1	4	0	3	0	3	7	0	1	0	1	0	0	0	0	1	8
07:45	08:00	0	2	0	2	0	4	1	5	7	0	1	0	1	1	0	0	1	2	9
08:00	08:15	0	8	1	9	0	3	0	3	12	0	2	0	2	0	0	0	0	2	14
08:15	08:30	0	2	0	2	1	2	0	3	5	0	1	0	1	0	0	0	0	1	6
08:30	08:45	0	5	1	6	0	3	0	3	9	0	0	0	0	0	1	0	1	1	10
08:45	09:00	0	2	0	2	1	3	0	4	6	0	1	0	1	1	1	0	2	3	9
09:00	09:15	2	6	0	8	0	7	1	8	16	1	2	2	5	0	1	1	2	7	23
09:15	09:30	1	6	1	8	0	2	0	2	10	1	2	2	5	0	0	1	1	6	16
09:30	09:45	0	2	0	2	0	3	0	3	5	0	0	0	0	0	0	0	0	0	5
09:45	10:00	0	2	0	2	0	2	0	2	4	0	2	0	2	0	0	0	0	2	6
11:30	11:45	0	2	0	2	2	1	0	3	5	0	1	0	1	0	1	1	2	3	8
11:45	12:00	0	7	1	8	0	2	0	2	10	0	0	0	0	1	0	0	1	1	11
12:00	12:15	0	0	0	0	0	3	0	3	3	0	0	0	0	0	0	0	0	0	3
12:15	12:30	0	2	0	2	0	1	0	1	3	0	1	0	1	1	0	0	1	2	5
12:30	12:45	0	4	1	5	0	2	0	2	7	0	1	0	1	0	1	1	2	3	10
12:45	13:00	0	7	0	7	0	2	1	3	10	1	0	0	1	0	0	0	0	1	11
13:00	13:15	1	1	0	2	0	2	0	2	4	1	1	0	2	0	0	0	0	2	6
13:15	13:30	1	2	0	3	0	2	1	3	6	0	1	0	1	0	0	0	0	1	7
15:00	15:15	0	0	0	0	0	1	0	1	1	0	0	0	0	2	0	0	2	2	3
15:15	15:30	0	3	1	4	0	5	0	5	9	0	1	0	1	0	1	0	1	2	11
15:30	15:45	1	5	1	7	0	3	0	3	10	1	1	0	2	1	1	0	2	4	14
15:45	16:00	1	2	1	4	1	2	2	5	9	0	1	0	1	0	0	0	0	1	10
16:00	16:15	1	3	0	4	0	3	0	3	7	1	1	0	2	1	1	2	4	6	13
16:15	16:30	0	3	0	3	0	0	0	0	3	0	1	0	1	2	2	0	4	5	8
16:30	16:45	0	0	0	0	0	1	0	1	1	0	2	1	3	0	0	0	0	3	4
16:45	17:00	0	0	0	0	0	3	0	3	3	0	1	0	1	1	0	0	1	2	5
17:00	17:15	0	2	0	2	0	0	0	0	2	0	1	1	2	1	0	0	1	3	5
17:15	17:30	0	1	0	1	0	0	0	0	1	0	1	0	1	1	0	0	1	2	3
17:30	17:45	0	4	1	5	0	4	0	4	9	0	0	0	0	3	0	0	3	3	12
17:45	18:00	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	2	2
Total:	None	11	100	15	126	6	78	6	90	216	6	31	8	45	17	10	8	35	80	296



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39372

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute U-Turn Total

MARCH RD

HALTON TERR/MAXWELL BRIDGE

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	RD 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	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	1	0	0	0	1
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	1	0	0	0	1
09:45	10:00	1	0	0	0	1
11:30	11:45	1	0	0	0	1
11:45	12:00	2	0	0	0	2
12:00	12:15	0	0	0	0	0
12:15	12:30	1	0	0	0	1
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	1	0	0	1
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	1	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	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		8	2	0	0	10





Turning Movement Count - 15 Minute Summary Report

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, August 10, 2016

Total Observed U-Turns

Northbound: 25 Southbound: 0
Eastbound: 2 Westbound: 0

MARCH RD

HALTON TERR/MAXWELL BRIDGE RD

Table with columns for Time Period, Northbound (LT, ST, RT, N TOT), Southbound (LT, ST, RT, S TOT, STR TOT), Eastbound (LT, ST, RT, E TOT), Westbound (LT, ST, RT, W TOT, STR TOT), and Grand Total. Rows represent 15-minute intervals from 07:00 to 17:45.

Note: U-Turns are included in Totals.

Comment:



# Transportation Services - Traffic Services

## Turning Movement Count - Cyclist Volume Report

**Work Order**  
**36161**

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

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

**Start Time:** 07:00

Time Period	MARCH RD			HALTON TERR/MAXWELL BRIDGE RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	0	0	<b>0</b>	1	1	<b>2</b>	<b>2</b>
08:00 09:00	0	0	<b>0</b>	4	1	<b>5</b>	<b>5</b>
09:00 10:00	0	0	<b>0</b>	0	1	<b>1</b>	<b>1</b>
11:30 12:30	1	4	<b>5</b>	7	1	<b>8</b>	<b>13</b>
12:30 13:30	2	0	<b>2</b>	1	0	<b>1</b>	<b>3</b>
15:00 16:00	0	0	<b>0</b>	5	1	<b>6</b>	<b>6</b>
16:00 17:00	2	0	<b>2</b>	4	0	<b>4</b>	<b>6</b>
17:00 18:00	1	0	<b>1</b>	2	2	<b>4</b>	<b>5</b>
<b>Total .....</b>	<b>6</b>	<b>4</b>	<b>10</b>	<b>24</b>	<b>7</b>	<b>31</b>	<b>41</b>

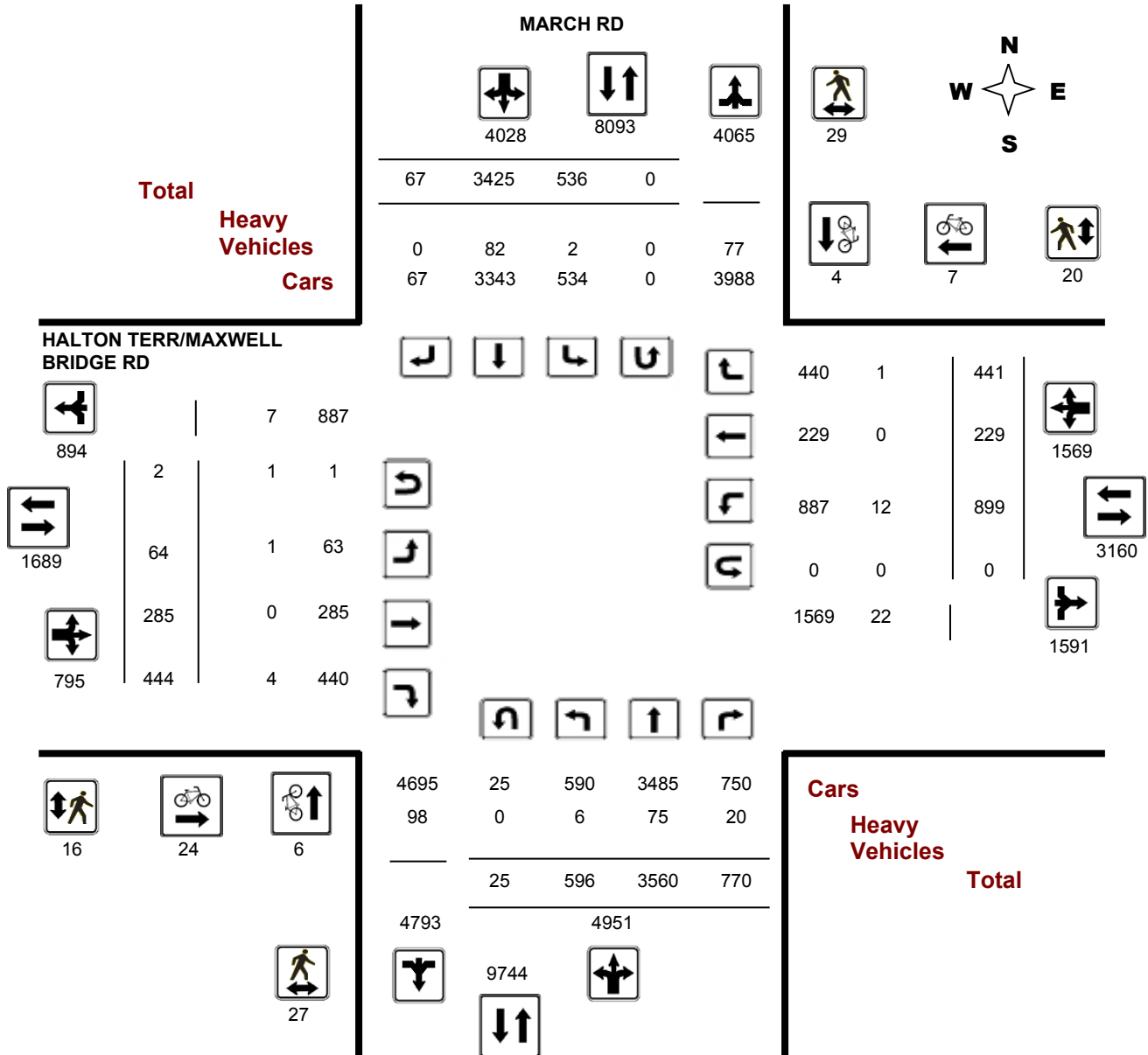
**Comment:**

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

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

**WO#:** 36161  
**Device:** Miovision





# Transportation Services - Traffic Services

W.O.  
36161

## Turning Movement Count - Heavy Vehicle Report

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

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

Time Period	MARCH RD								HALTON TERR/MAXWELL BRIDGE RD										Grand Total
	Northbound				Southbound				Eastbound					Westbound					
	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 08:00	3	12	4	19	0	14	0	14	33	0	0	0	0	0	0	0	0	0	33
08:00 09:00	2	17	2	21	0	13	0	13	34	1	0	1	3	1	0	1	2	5	39
09:00 10:00	0	11	0	11	0	11	0	11	22	0	0	2	2	0	0	0	0	2	24
11:30 12:30	1	5	6	12	1	11	0	12	24	0	0	0	0	2	0	0	2	2	26
12:30 13:30	0	7	2	9	0	11	0	11	20	0	0	1	1	0	0	0	0	1	21
15:00 16:00	0	8	4	12	1	9	0	10	22	0	0	0	0	3	0	0	3	3	25
16:00 17:00	0	11	1	12	0	8	0	8	20	0	0	0	0	3	0	0	3	3	23
17:00 18:00	0	4	1	5	0	5	0	5	10	0	0	0	0	3	0	0	3	3	13
<b>Sub Total</b>	<b>6</b>	<b>75</b>	<b>20</b>	<b>101</b>	<b>2</b>	<b>82</b>	<b>0</b>	<b>84</b>	<b>185</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>6</b>	<b>12</b>	<b>0</b>	<b>1</b>	<b>13</b>	<b>19</b>	<b>204</b>
<b>U-Turns (Heavy Vehicles)</b>				<b>0</b>				<b>0</b>	<b>0</b>				<b>1</b>				<b>0</b>	<b>1</b>	<b>1</b>
<b>Total</b>	<b>6</b>	<b>75</b>	<b>20</b>	<b>0</b>	<b>2</b>	<b>82</b>	<b>0</b>	<b>84</b>	<b>185</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>7</b>	<b>12</b>	<b>0</b>	<b>1</b>	<b>13</b>	<b>20</b>	<b>205</b>

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

Work Order

36161

## Turning Movement Count - Pedestrian Volume Report

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Count Date: Wednesday, August 10, 2016

Start Time: 07:00

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	2	2	4
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	1	0	1	0	1	1	2
07:45 08:00	1	0	1	0	0	0	1
<b>07:00 08:00</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>7</b>
08:00 08:15	0	2	2	0	1	1	3
08:15 08:30	1	3	4	0	0	0	4
08:30 08:45	0	1	1	0	0	0	1
08:45 09:00	1	0	1	0	0	0	1
<b>08:00 09:00</b>	<b>2</b>	<b>6</b>	<b>8</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>9</b>
09:00 09:15	1	2	3	3	2	5	8
09:15 09:30	3	1	4	0	2	2	6
09:30 09:45	0	0	0	1	3	4	4
09:45 10:00	4	1	5	1	0	1	6
<b>09:00 10:00</b>	<b>8</b>	<b>4</b>	<b>12</b>	<b>5</b>	<b>7</b>	<b>12</b>	<b>24</b>
11:30 11:45	2	1	3	2	0	2	5
11:45 12:00	0	1	1	0	1	1	2
12:00 12:15	0	1	1	0	0	0	1
12:15 12:30	1	2	3	2	0	2	5
<b>11:30 12:30</b>	<b>3</b>	<b>5</b>	<b>8</b>	<b>4</b>	<b>1</b>	<b>5</b>	<b>13</b>
12:30 12:45	0	0	0	0	1	1	1
12:45 13:00	2	6	8	5	2	7	15
13:00 13:15	3	1	4	0	0	0	4
13:15 13:30	0	1	1	0	1	1	2
<b>12:30 13:30</b>	<b>5</b>	<b>8</b>	<b>13</b>	<b>5</b>	<b>4</b>	<b>9</b>	<b>22</b>
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	1	0	1	0	0	0	1
<b>15:00 16:00</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
16:00 16:15	0	3	3	0	0	0	3
16:15 16:30	0	1	1	1	0	1	2
16:30 16:45	0	1	1	0	1	1	2
16:45 17:00	0	0	0	0	1	1	1
<b>16:00 17:00</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>8</b>
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	1	1	1
17:30 17:45	2	1	3	1	0	1	4
17:45 18:00	2	0	2	0	1	1	3
<b>17:00 18:00</b>	<b>4</b>	<b>1</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>8</b>
<b>Total</b> .....	<b>27</b>	<b>29</b>	<b>56</b>	<b>16</b>	<b>20</b>	<b>36</b>	<b>92</b>

Comment:



Turning Movement Count - Full Study Summary Report

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, August 10, 2016

**Total Observed U-Turns**  
 Northbound: 25      Southbound: 0  
 Eastbound: 2      Westbound: 0

**AADT Factor**  
.90

Full Study

Period	MARCH RD								HALTON TERR/MAXWELL BRIDGE RD										Grand Total	
	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		
07:00 08:00	22	146	38	206	67	709	1	777	983	4	26	62	92	139	2	2	143	235	1218	
08:00 09:00	37	214	68	319	90	672	7	769	1088	9	38	107	154	166	16	9	191	345	1433	
09:00 10:00	26	248	55	329	63	512	4	579	908	5	23	71	99	102	16	21	139	238	1146	
11:30 12:30	67	364	128	559	62	326	17	405	964	8	25	36	69	110	26	44	180	249	1213	
12:30 13:30	62	342	110	514	66	329	8	403	917	1	34	48	83	124	21	73	218	301	1218	
15:00 16:00	79	607	109	795	61	319	7	387	1182	9	34	36	79	69	42	94	205	284	1466	
16:00 17:00	137	812	125	1074	67	276	15	358	1432	15	38	38	91	94	51	94	239	330	1762	
17:00 18:00	166	827	137	1130	60	282	8	350	1480	13	67	46	126	95	55	104	254	380	1860	
<b>Sub Total</b>	596	3560	770	4926	536	3425	67	4028	8954	64	285	444	793	899	229	441	1569	2362	11316	
<b>U Turns</b>				25				0	25				2				0	2	27	
<b>Total</b>	596	3560	770	4951	536	3425	67	4028	8979	64	285	444	795	899	229	441	1569	2364	11343	
<b>EQ 12Hr</b>	828	4948	1070	6882	745	4761	93	5599	12481	89	396	617	1105	1250	318	613	2181	3286	15767	
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													<b>1.39</b>							
<b>AVG 12Hr</b>	746	4454	963	6194	671	4285	84	5039	11233	80	357	555	995	1125	286	552	1963	2958	14191	
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													<b>.90</b>							
<b>AVG 24Hr</b>	977	5834	1262	8114	878	5613	110	6601	14715	105	467	728	1303	1473	375	723	2571	3874	18589	
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													<b>1.31</b>							

Comments:

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

## Turning Movement Count - Full Study Peak Hour Diagram

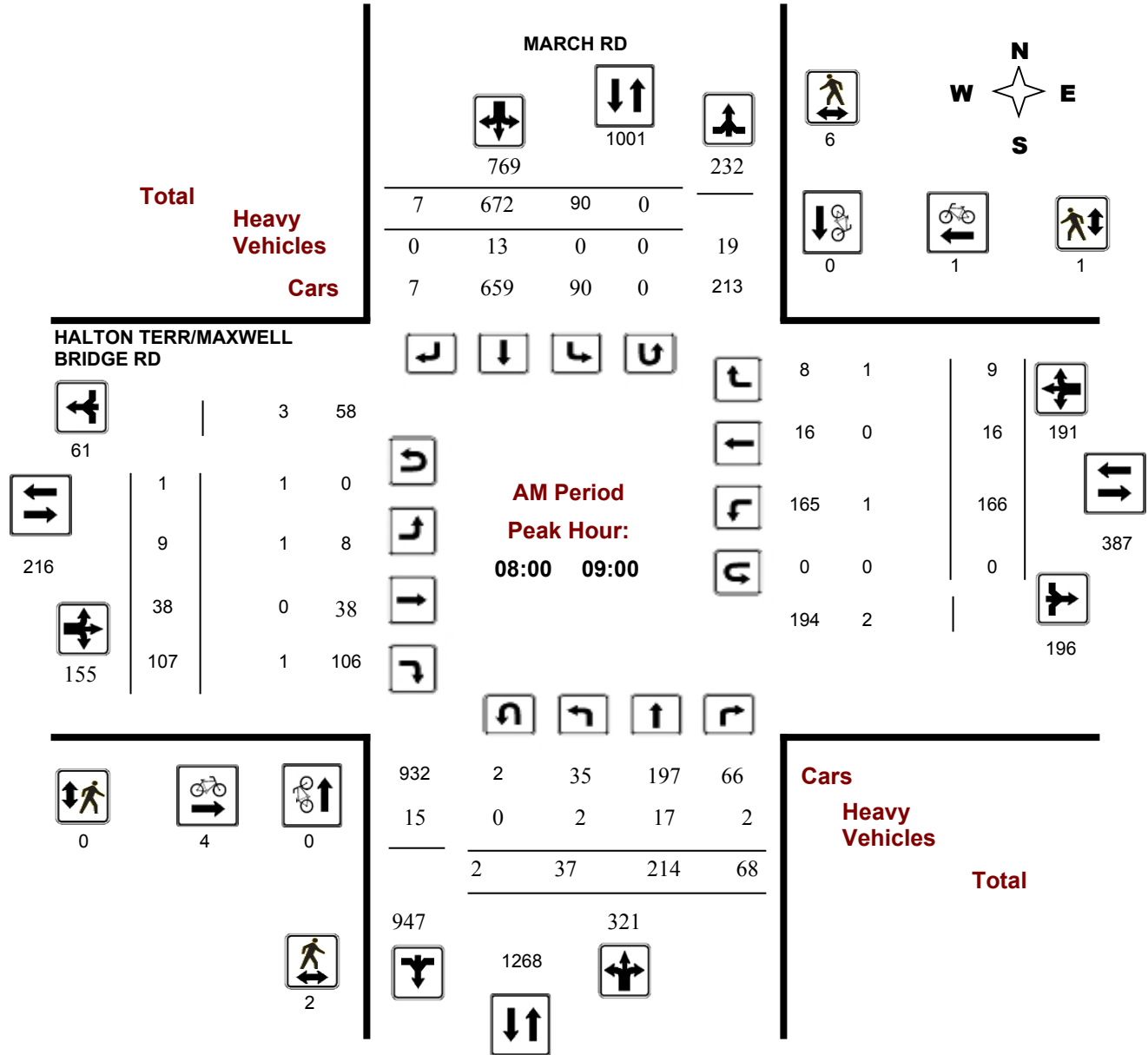
### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

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

**Start Time:** 07:00

**WO No:** 36161

**Device:** Miovision



## Turning Movement Count - Full Study Peak Hour Diagram

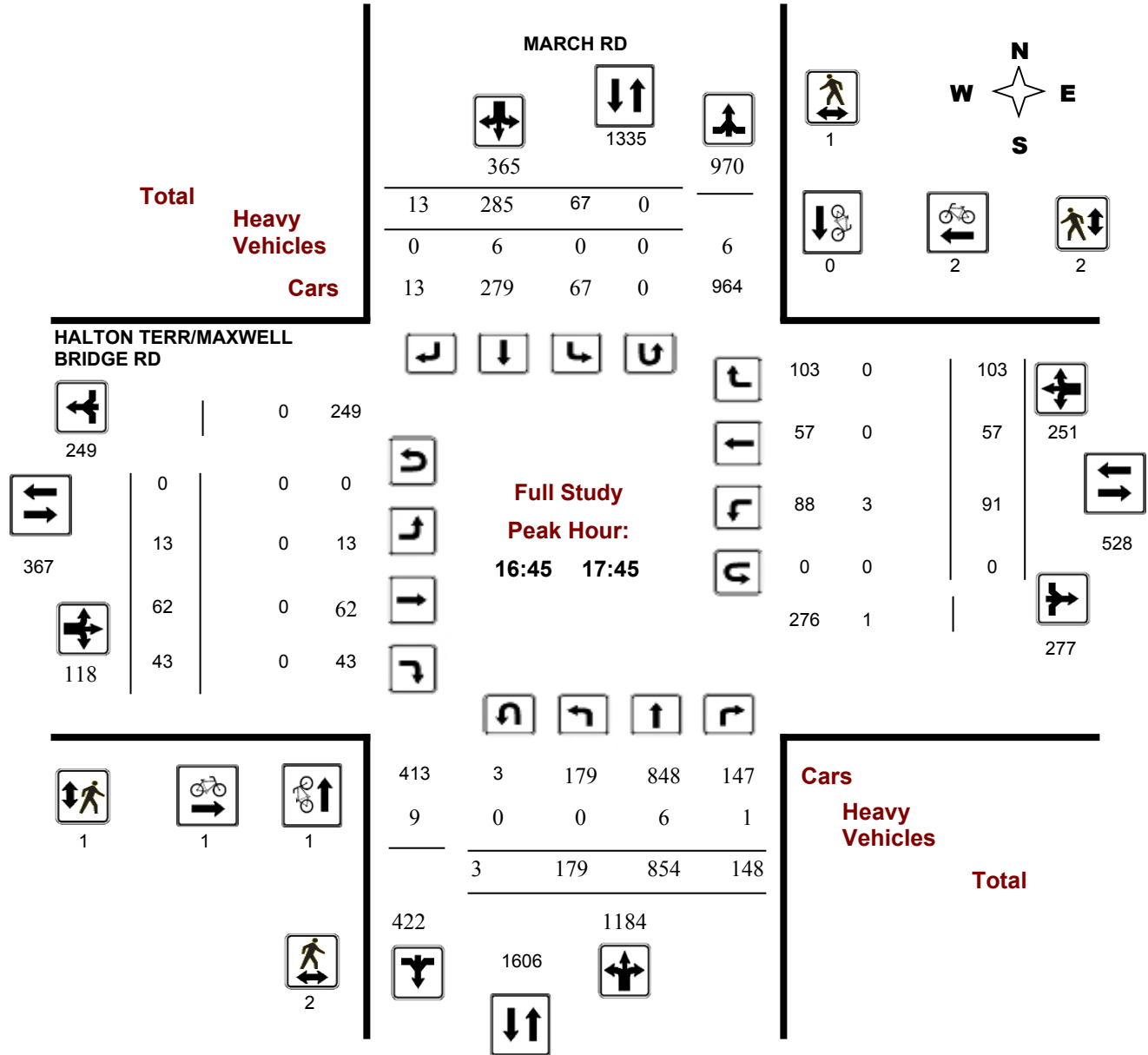
### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

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

**Start Time:** 07:00

**WO No:** 36161

**Device:** Miovision



**Comments**



## Turning Movement Count - Full Study Peak Hour Diagram

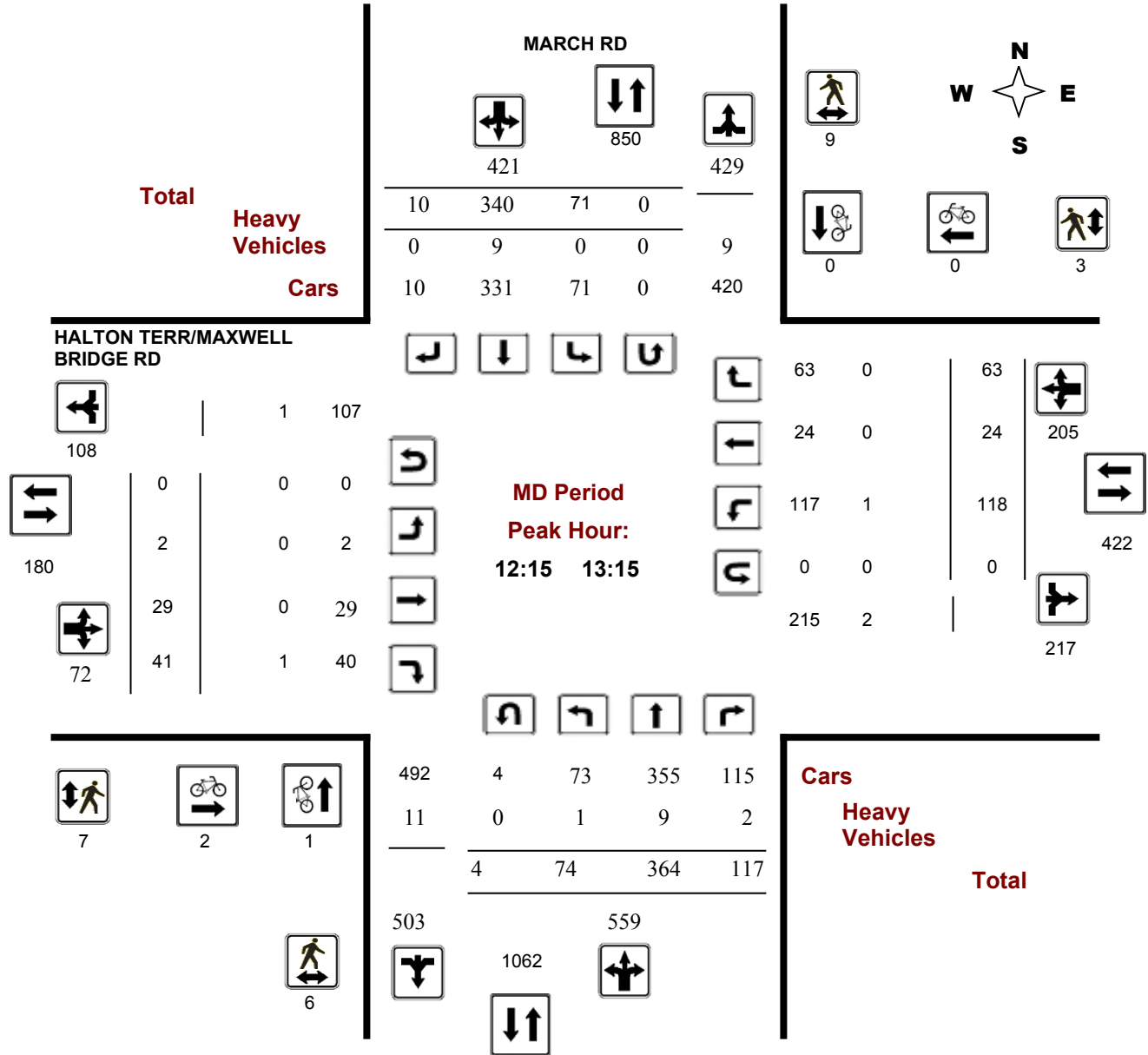
### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

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

**Start Time:** 07:00

**WO No:** 36161

**Device:** Miovision



## Turning Movement Count - Full Study Peak Hour Diagram

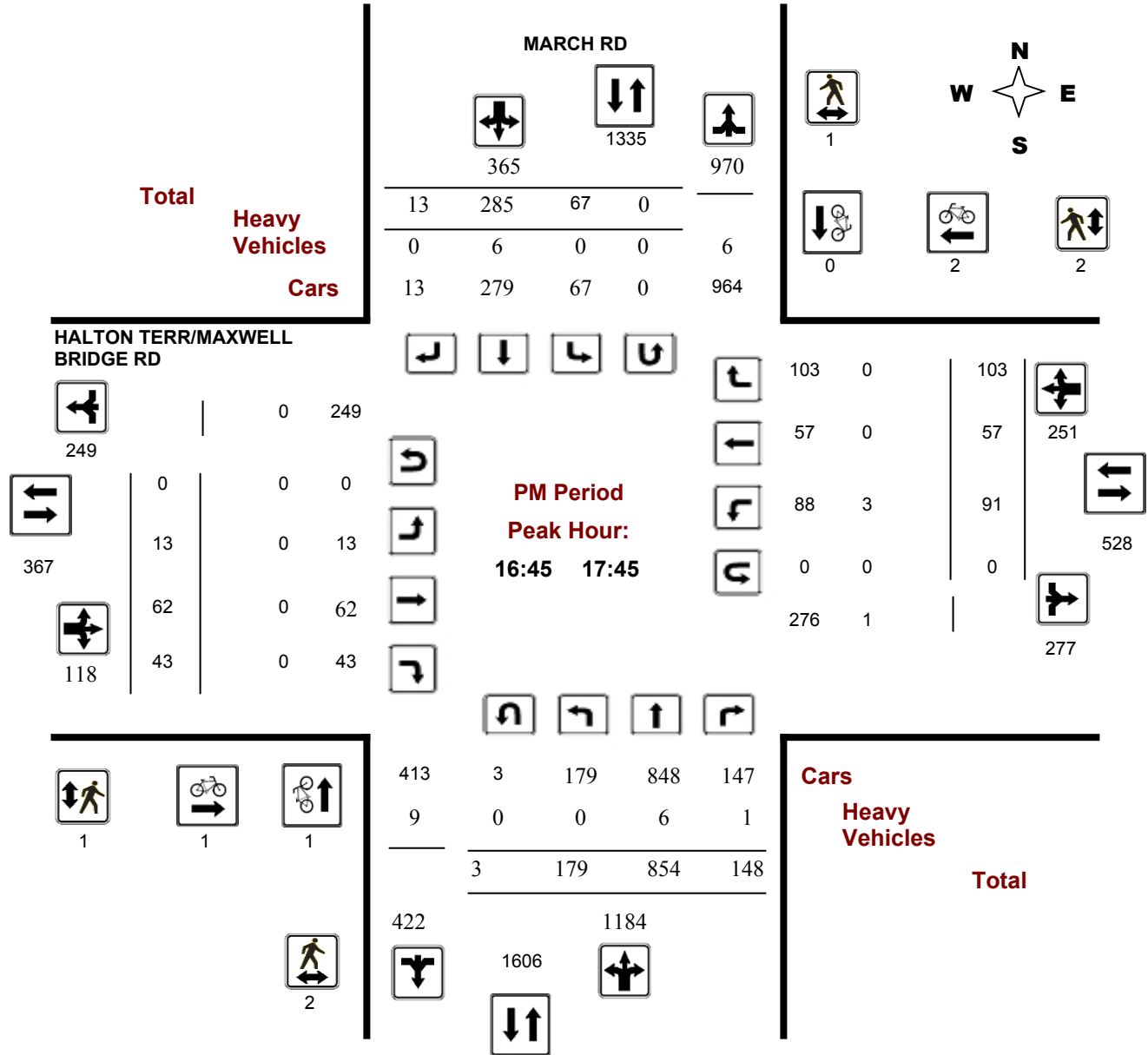
### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

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

**Start Time:** 07:00

**WO No:** 36161

**Device:** Miovision



## Turning Movement Count - 15 Min U-Turn Total Report

### HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

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

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	1	0	0	0	1
08:00	08:15	1	0	0	0	1
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	1	0	1
08:45	09:00	1	0	0	0	1
09:00	09:15	0	0	0	0	0
09:15	09:30	4	0	0	0	4
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	1	0	1	0	2
12:15	12:30	1	0	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	1	0	0	0	1
13:15	13:30	2	0	0	0	2
15:00	15:15	0	0	0	0	0
15:15	15:30	1	0	0	0	1
15:30	15:45	3	0	0	0	3
15:45	16:00	1	0	0	0	1
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	1	0	0	0	1
17:00	17:15	1	0	0	0	1
17:15	17:30	0	0	0	0	0
17:30	17:45	1	0	0	0	1
17:45	18:00	1	0	0	0	1
Total		25	0	2	0	27

## Turning Movement Count - Study Results

### KLONDIKE RD @ MARCH RD

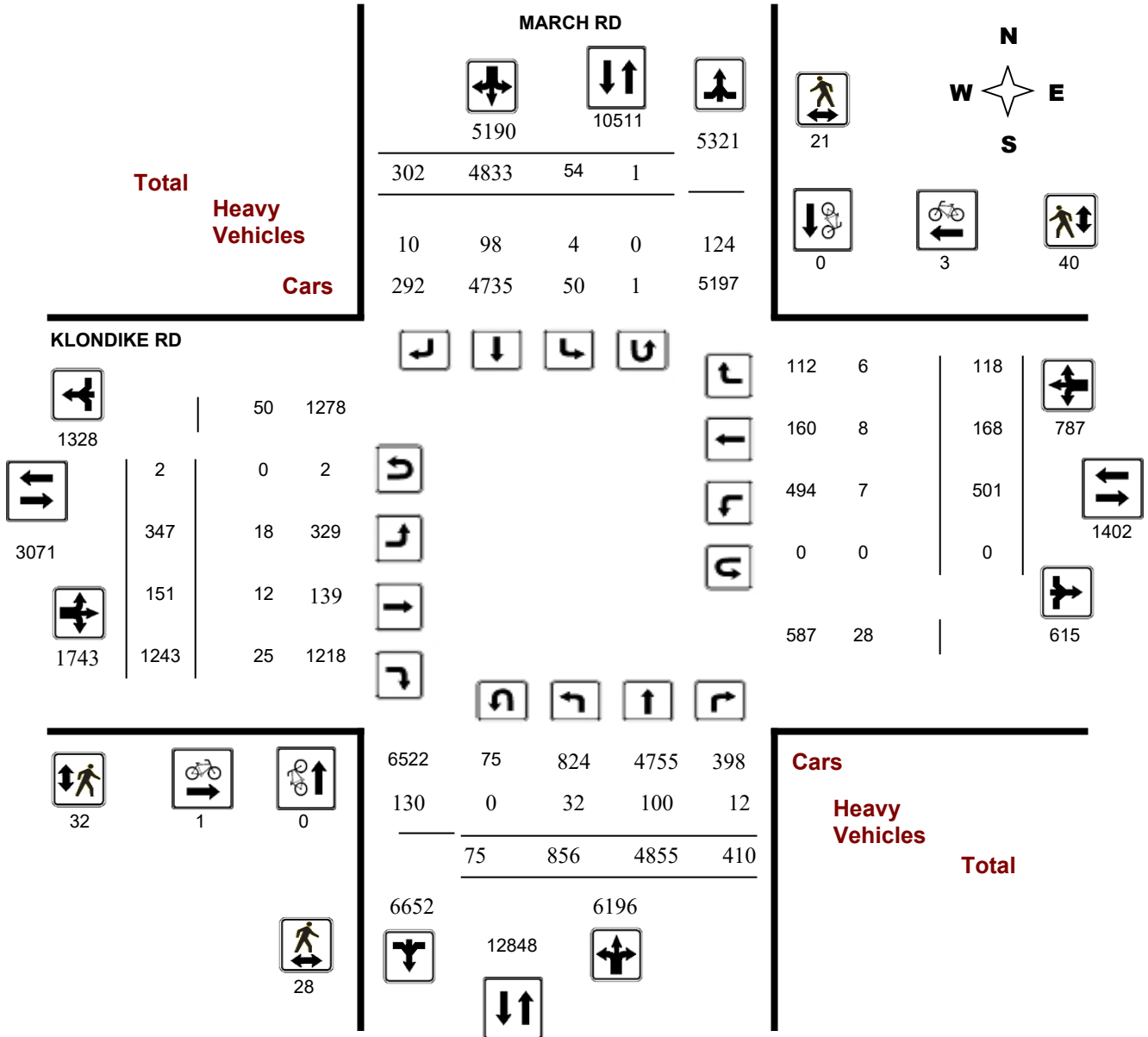
**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39371

**Start Time:** 07:00

**Device:** Miovision

### Full Study Diagram



## Turning Movement Count - Study Results

### KLONDIKE RD @ MARCH RD

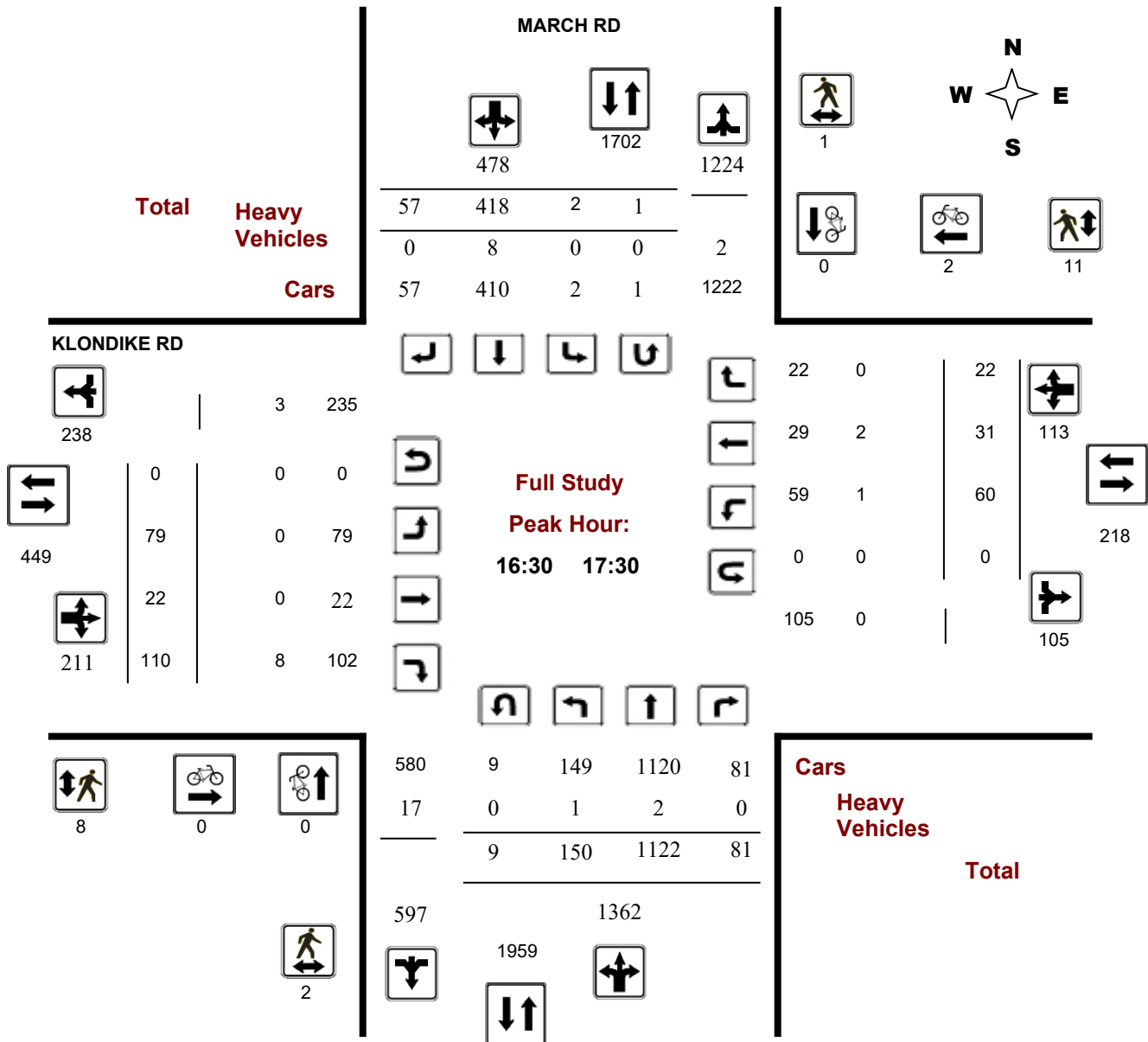
**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39371

**Start Time:** 07:00

**Device:** Miovision

### Full Study Peak Hour Diagram





# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

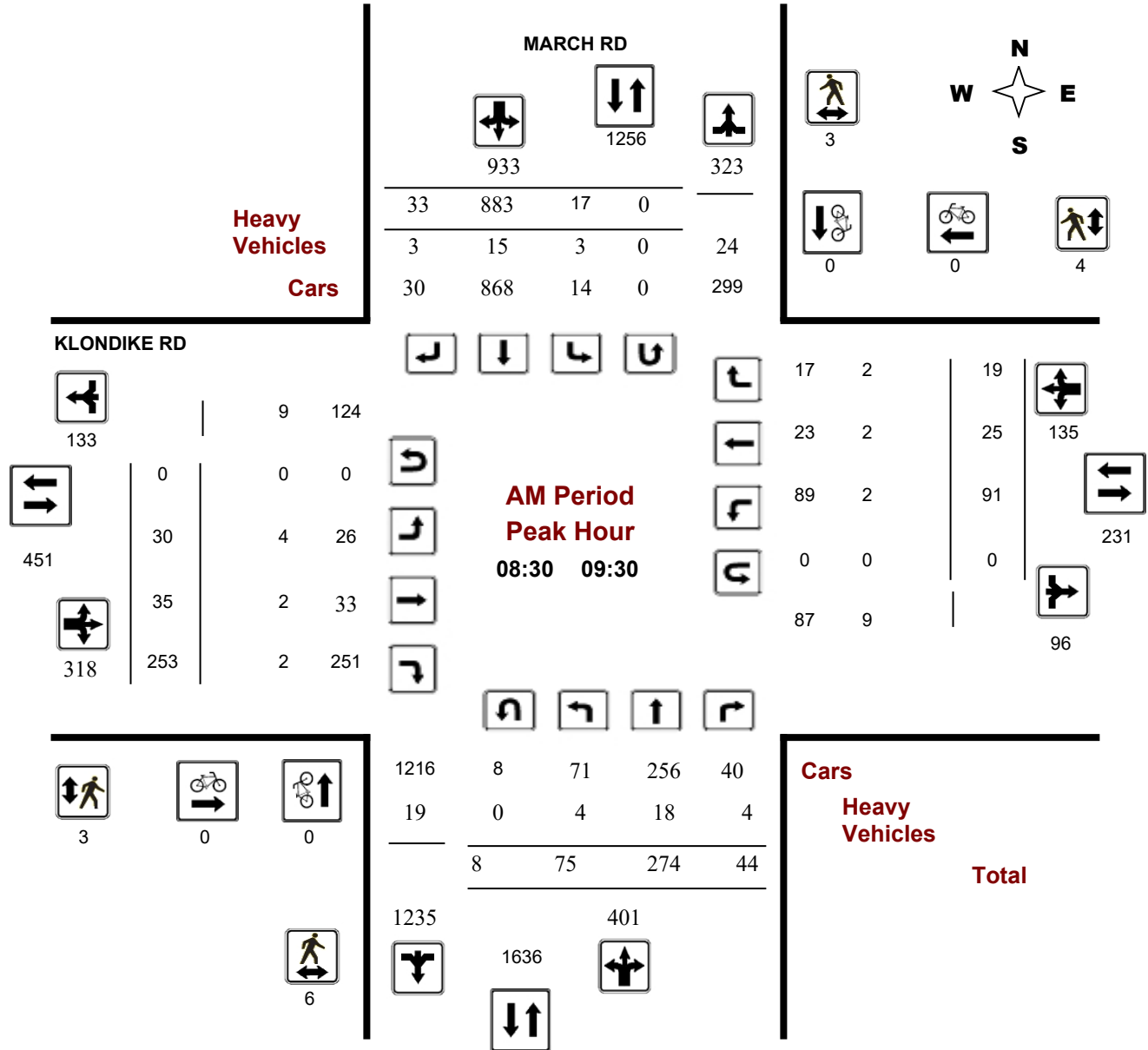
### KLONDIKE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**Start Time:** 07:00

**WO No:** 39371

**Device:** Miovision



**Comments** 5472186 - WED JAN 22, 2020 - 8HRS - LORETTA



# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

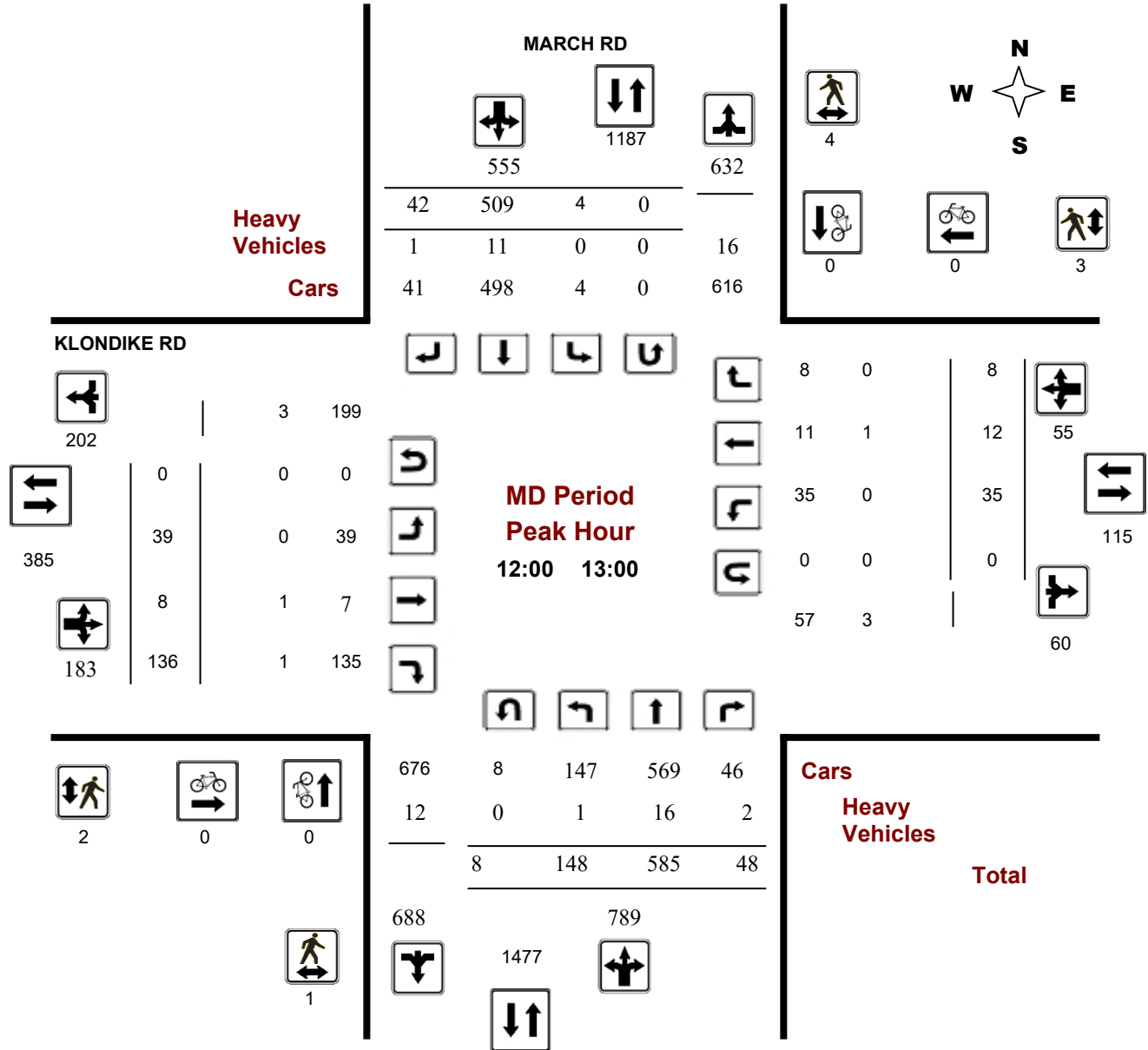
### KLONDIKE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**Start Time:** 07:00

**WO No:** 39371

**Device:** Miovision



**Comments** 5472186 - WED JAN 22, 2020 - 8HRS - LORETTA



# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

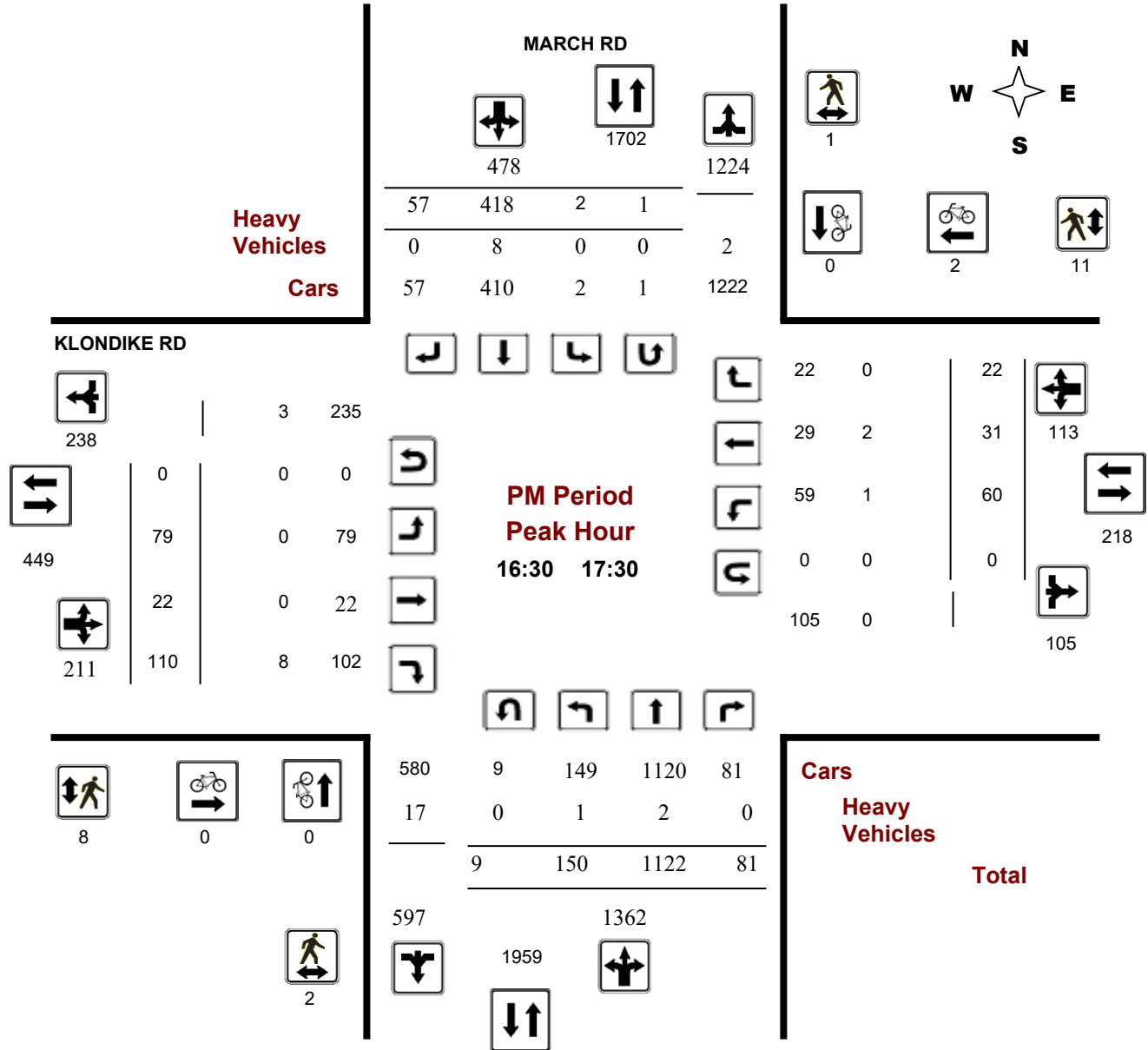
### KLONDIKE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**Start Time:** 07:00

**WO No:** 39371

**Device:** Miovision



**Comments** 5472186 - WED JAN 22, 2020 - 8HRS - LORETTA





# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### KLONDIKE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39371

**Start Time:** 07:00

**Device:** Miovision

### Full Study Summary (8 HR Standard)

**Survey Date:** Wednesday, March 04, 2020

**Total Observed U-Turns**

**AADT Factor**

Northbound: 75      Southbound: 1  
 Eastbound: 2      Westbound: 0

1.00

Period	MARCH RD										KLONDIKE RD										
	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	42	268	31	341	1329	6	966	16	988	1329	11	12	217	240	1329	79	9	10	98	338	
08:00 09:00	65	232	38	335	1328	8	954	31	993	1328	22	27	221	270	1328	49	21	8	78	348	1676
09:00 10:00	70	320	40	430	1190	13	720	27	760	1190	27	18	211	256	1190	100	18	15	133	389	1579
11:30 12:30	129	567	42	738	1266	3	485	40	528	1266	32	10	125	167	1266	43	13	4	60	227	1493
12:30 13:30	134	473	42	649	1184	1	492	42	535	1184	50	12	159	221	1184	32	13	10	55	276	1460
15:00 16:00	126	804	58	988	1424	11	391	34	436	1424	62	28	100	190	1424	62	26	32	120	310	1734
16:00 17:00	152	1123	74	1349	1792	5	383	55	443	1792	65	20	112	197	1792	76	36	24	136	333	2125
17:00 18:00	138	1068	85	1291	1797	7	442	57	506	1797	78	24	98	200	1797	60	32	15	107	307	2104
<b>Sub Total</b>	856	4855	410	6121	11310	54	4833	302	5189	11310	347	151	1243	1741	11310	501	168	118	787	2528	13838
<b>U Turns</b>				75	76				1	76				2	76				0	2	78
<b>Total</b>	856	4855	410	6196	11386	54	4833	302	5190	11386	347	151	1243	1743	11386	501	168	118	787	2530	13916
<b>EQ 12Hr</b>	1190	6748	570	8612	15827	75	6718	420	7214	15827	482	210	1728	2423	15827	696	234	164	1094	3517	19343
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	<b>1.39</b>				
<b>AVG 12Hr</b>	1121	6360	537	8117	15827	71	6331	396	6799	15827	455	198	1628	2283	15827	656	220	155	1031	3517	19343
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	<b>1</b>				
<b>AVG 24Hr</b>	1469	8332	704	10633	19540	93	8294	518	8907	19540	595	259	2133	2991	19540	860	288	202	1351	4342	23882
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

### KLONDIKE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39371

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute Increments

#### MARCH RD

#### KLONDIKE 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	3	66	8	84	3	229	6	238	13	2	0	59	61	21	1	2	24	13	407
07:15 07:30	15	76	5	99	0	276	3	279	16	6	5	53	64	17	1	3	21	16	463
07:30 07:45	9	68	9	89	0	225	3	228	6	1	2	46	49	21	4	5	30	6	396
07:45 08:00	15	58	9	84	3	236	4	243	11	2	5	59	66	20	3	0	23	11	416
08:00 08:15	14	60	7	84	0	265	7	272	14	2	4	45	51	21	5	1	27	14	434
08:15 08:30	13	52	9	79	3	230	5	238	7	4	5	51	60	8	4	2	14	7	391
08:30 08:45	23	73	10	110	3	223	8	234	8	3	7	62	72	13	1	0	14	8	430
08:45 09:00	15	47	12	74	2	236	11	249	11	13	11	63	87	7	11	5	23	11	433
09:00 09:15	19	72	14	106	10	235	7	252	18	9	12	69	90	31	6	10	47	18	495
09:15 09:30	18	82	8	111	2	189	7	198	10	5	5	59	69	40	7	4	51	10	429
09:30 09:45	20	85	8	115	0	169	5	174	6	3	1	42	46	12	2	1	15	6	350
09:45 10:00	13	81	10	106	1	127	8	136	2	10	0	41	51	17	3	0	20	2	313
11:30 11:45	23	123	9	158	0	129	11	140	9	8	3	26	37	10	4	0	14	9	349
11:45 12:00	23	128	7	160	0	108	15	123	8	9	1	35	45	12	4	2	18	8	346
12:00 12:15	51	179	16	251	1	131	2	134	6	8	2	28	38	11	2	0	13	6	436
12:15 12:30	32	137	10	180	2	117	12	131	8	7	4	36	47	10	3	2	15	8	373
12:30 12:45	38	143	7	189	0	128	12	140	7	11	1	38	50	11	4	4	19	7	398
12:45 13:00	27	126	15	169	1	133	16	150	10	13	1	34	48	3	3	2	8	10	375
13:00 13:15	28	108	8	146	0	126	6	132	5	10	3	53	66	8	2	2	12	5	356
13:15 13:30	41	96	12	151	0	105	8	113	7	16	7	34	57	10	4	2	16	7	337
15:00 15:15	19	164	13	197	2	101	9	112	5	17	3	18	40	10	5	3	18	5	367
15:15 15:30	32	209	15	257	3	89	9	101	13	15	8	23	46	13	9	3	25	13	429
15:30 15:45	37	201	19	257	5	84	5	94	13	14	10	27	51	15	4	5	24	13	426
15:45 16:00	38	230	11	282	1	117	11	129	7	16	7	32	55	24	8	21	53	7	519
16:00 16:15	38	262	21	323	3	96	11	110	7	14	4	31	49	31	11	4	46	7	528
16:15 16:30	39	307	12	361	1	100	10	111	7	16	5	25	46	13	8	6	27	7	545
16:30 16:45	38	283	24	346	0	87	18	106	2	18	5	24	47	15	14	7	36	2	535
16:45 17:00	37	271	17	327	1	100	16	117	4	17	6	32	55	17	3	7	27	4	526
17:00 17:15	26	279	19	325	0	109	8	117	2	21	5	21	47	13	7	2	22	2	511
17:15 17:30	49	289	21	364	1	122	15	138	3	23	6	33	62	15	7	6	28	3	592
17:30 17:45	36	266	22	324	2	102	17	121	10	13	5	21	39	19	8	3	30	10	514
17:45 18:00	27	234	23	288	4	109	17	130	1	21	8	23	52	13	10	4	27	1	497
<b>Total:</b>	<b>856</b>	<b>4855</b>	<b>410</b>	<b>6196</b>	<b>54</b>	<b>4833</b>	<b>302</b>	<b>5190</b>	<b>256</b>	<b>347</b>	<b>151</b>	<b>1243</b>	<b>1743</b>	<b>501</b>	<b>168</b>	<b>118</b>	<b>787</b>	<b>256</b>	<b>13,916</b>

Note: U-Turns are included in Totals.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### KLONDIKE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39371

**Start Time:** 07:00

**Device:** Miovision

### Full Study Cyclist Volume

Time Period	MARCH RD			KLONDIKE RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	0	0	0	0	0	0	0
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	0	0	0	0	0	0
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	1	1	1
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	1	0	1	1
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	1	1	1
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	1	1	1
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>4</b>



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### KLONDIKE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39371

**Start Time:** 07:00

**Device:** Miovision

### Full Study Pedestrian Volume

#### MARCH RD

#### KLONDIKE RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	0	1	0	1	1	2
07:15 07:30	1	0	1	0	2	2	3
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	3	0	3	0	0	0	3
08:15 08:30	1	0	1	0	0	0	1
08:30 08:45	0	0	0	1	0	1	1
08:45 09:00	3	0	3	1	2	3	6
09:00 09:15	1	2	3	1	0	1	4
09:15 09:30	2	1	3	0	2	2	5
09:30 09:45	0	2	2	1	0	1	3
09:45 10:00	0	0	0	1	0	1	1
11:30 11:45	0	1	1	0	0	0	1
11:45 12:00	1	2	3	3	0	3	6
12:00 12:15	0	0	0	0	1	1	1
12:15 12:30	1	1	2	0	1	1	3
12:30 12:45	0	1	1	1	1	2	3
12:45 13:00	0	2	2	1	0	1	3
13:00 13:15	1	0	1	1	3	4	5
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	2	1	3	2	4	6	9
15:15 15:30	2	3	5	2	1	3	8
15:30 15:45	1	1	2	1	2	3	5
15:45 16:00	2	0	2	0	1	1	3
16:00 16:15	2	2	4	1	1	2	6
16:15 16:30	0	1	1	0	1	1	2
16:30 16:45	0	0	0	1	2	3	3
16:45 17:00	1	1	2	2	1	3	5
17:00 17:15	1	0	1	2	5	7	8
17:15 17:30	0	0	0	3	3	6	6
17:30 17:45	1	0	1	3	6	9	10
17:45 18:00	1	0	1	4	0	4	5
<b>Total</b>	<b>28</b>	<b>21</b>	<b>49</b>	<b>32</b>	<b>40</b>	<b>72</b>	<b>121</b>

5472186 - WED JAN 22, 2020 - 8HRS - LORETTA



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### KLONDIKE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39371

**Start Time:** 07:00

**Device:** Miovision

### Full Study Heavy Vehicles

#### MARCH RD

#### KLONDIKE RD

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	5	0	5	0	6	2	8	13	0	0	0	0	0	0	0	0	0	13
07:15 07:30	2	10	0	12	0	3	1	4	16	3	2	0	5	0	0	2	2	7	23
07:30 07:45	1	2	0	3	0	3	0	3	6	0	1	0	1	0	0	0	0	1	7
07:45 08:00	3	3	1	7	0	4	0	4	11	0	0	0	0	0	0	0	0	0	11
08:00 08:15	3	7	0	10	0	4	0	4	14	1	1	0	2	0	0	0	0	2	16
08:15 08:30	2	2	1	5	0	2	0	2	7	0	0	0	0	0	0	0	0	0	7
08:30 08:45	1	4	0	5	0	2	1	3	8	1	0	2	3	0	0	0	0	3	11
08:45 09:00	2	1	2	5	0	4	2	6	11	1	1	0	2	0	0	0	0	2	13
09:00 09:15	1	6	2	9	2	7	0	9	18	2	0	0	2	1	1	2	4	6	24
09:15 09:30	0	7	0	7	1	2	0	3	10	0	1	0	1	1	1	0	2	3	13
09:30 09:45	1	1	0	2	0	4	0	4	6	0	0	0	0	0	0	0	0	0	6
09:45 10:00	0	1	0	1	0	1	0	1	2	1	0	0	1	0	0	0	0	1	3
11:30 11:45	0	7	0	7	0	1	1	2	9	1	0	1	2	0	0	0	0	2	11
11:45 12:00	0	3	0	3	0	4	1	5	8	1	0	0	1	0	0	0	0	1	9
12:00 12:15	1	0	2	3	0	3	0	3	6	0	0	0	0	0	0	0	0	0	6
12:15 12:30	0	4	0	4	0	4	0	4	8	0	1	0	1	0	0	0	0	1	9
12:30 12:45	0	5	0	5	0	2	0	2	7	0	0	1	1	0	1	0	1	2	9
12:45 13:00	0	7	0	7	0	2	1	3	10	0	0	0	0	0	0	0	0	0	10
13:00 13:15	1	1	0	2	0	3	0	3	5	0	0	2	2	0	0	0	0	2	7
13:15 13:30	2	3	0	5	0	2	0	2	7	0	1	1	2	0	0	0	0	2	9
15:00 15:15	2	0	0	2	0	3	0	3	5	0	0	2	2	0	1	0	1	3	8
15:15 15:30	3	4	1	8	0	5	0	5	13	2	0	1	3	0	0	0	0	3	16
15:30 15:45	1	7	0	8	0	5	0	5	13	0	1	2	3	0	0	0	0	3	16
15:45 16:00	1	1	2	4	1	2	0	3	7	2	3	1	6	0	1	2	3	9	16
16:00 16:15	1	2	0	3	0	3	1	4	7	1	0	1	2	4	1	0	5	7	14
16:15 16:30	3	1	1	5	0	2	0	2	7	1	0	1	2	0	0	0	0	2	9
16:30 16:45	0	0	0	0	0	2	0	2	2	0	0	3	3	0	1	0	1	4	6
16:45 17:00	0	0	0	0	0	4	0	4	4	0	0	4	4	0	0	0	0	4	8
17:00 17:15	0	1	0	1	0	1	0	1	2	0	0	0	0	1	0	0	1	1	3
17:15 17:30	1	1	0	2	0	1	0	1	3	0	0	1	1	0	1	0	1	2	5
17:30 17:45	0	4	0	4	0	6	0	6	10	1	0	1	2	0	0	0	0	2	12
17:45 18:00	0	0	0	0	0	1	0	1	1	0	0	1	1	0	0	0	0	1	2
Total: None	32	100	12	144	4	98	10	112	256	18	12	25	55	7	8	6	21	76	332



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### KLONDIKE RD @ MARCH RD

**Survey Date:** Wednesday, March 04, 2020

**WO No:** 39371

**Start Time:** 07:00

**Device:** Miovision

### Full Study 15 Minute U-Turn Total

MARCH RD

KLONDIKE RD

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	7	0	0	0	7
07:15	07:30	3	0	0	0	3
07:30	07:45	3	0	0	0	3
07:45	08:00	2	0	0	0	2
08:00	08:15	3	0	0	0	3
08:15	08:30	5	0	0	0	5
08:30	08:45	4	0	0	0	4
08:45	09:00	0	0	0	0	0
09:00	09:15	1	0	0	0	1
09:15	09:30	3	0	0	0	3
09:30	09:45	2	0	0	0	2
09:45	10:00	2	0	0	0	2
11:30	11:45	3	0	0	0	3
11:45	12:00	2	0	0	0	2
12:00	12:15	5	0	0	0	5
12:15	12:30	1	0	0	0	1
12:30	12:45	1	0	0	0	1
12:45	13:00	1	0	0	0	1
13:00	13:15	2	0	0	0	2
13:15	13:30	2	0	0	0	2
15:00	15:15	1	0	2	0	3
15:15	15:30	1	0	0	0	1
15:30	15:45	0	0	0	0	0
15:45	16:00	3	0	0	0	3
16:00	16:15	2	0	0	0	2
16:15	16:30	3	0	0	0	3
16:30	16:45	1	1	0	0	2
16:45	17:00	2	0	0	0	2
17:00	17:15	1	0	0	0	1
17:15	17:30	5	0	0	0	5
17:30	17:45	0	0	0	0	0
17:45	18:00	4	0	0	0	4
Total		75	1	2	0	78

# Appendix F

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-07-29	2014	19:40	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	07 - SMV other	01 - Dry
2015-12-13	2015	17:23	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	01 - Clear	07 - Dark	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	01 - Dry
2016-09-30	2016	19:32	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	01 - Clear	05 - Dusk	01 - Traffic signal	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2016-11-24	2016	6:47	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	03 - Snow	03 - Dawn	01 - Traffic signal	02 - Non-fatal injury	05 - Turning movement	06 - Ice
2016-02-28	2016	19:57	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	04 - Freezing Rain	07 - Dark	01 - Traffic signal	03 - P.D. only	05 - Turning movement	06 - Ice
2016-12-23	2016	10:59	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	02 - Wet
2016-12-05	2016	8:23	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	03 - Snow	01 - Daylight	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	03 - Loose snow
2017-06-22	2017	10:59	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	99 - Other	01 - Dry
2017-11-28	2017	22:03	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	02 - Rain	07 - Dark	01 - Traffic signal	02 - Non-fatal injury	07 - SMV other	02 - Wet
2017-04-19	2017	14:14	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD	02 - Rain	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	02 - Angle	02 - Wet
2018-11-15	2018	17:20	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD (0011852)	01 - Clear	07 - Dark	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	01 - Dry
2018-12-05	2018	18:26	HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD (0011852)	03 - Snow	07 - Dark	01 - Traffic signal	03 - P.D. only	05 - Turning movement	03 - Loose snow

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2015-10-16	2015	18:19	250 N OF KLONDIKE RD @ MARCH RD	01 - Clear	05 - Dusk	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2016-01-18	2016	12:14	HALTON TER btwn Continuation of HALTON TER & OLD CARP RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	04 - Slush
2016-01-18	2016	13:16	HALTON TER btwn Continuation of HALTON TER & OLD CARP RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	04 - Slush

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-05-01	2014	20:55	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2014-05-20	2014	1:30	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2014-06-23	2014	0:02	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2014-11-11	2014	17:44	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2014-12-18	2014	21:15	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-06-20	2015	3:14	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-01-20	2015	9:37	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2015-09-04	2015	21:33	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-06-17	2015	13:38	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	01 - Dry
2015-09-02	2015	9:15	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2016-10-19	2016	9:08	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2016-05-06	2016	6:56	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2016-04-22	2016	13:53	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2016-04-24	2016	11:02	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	05 - Turning movement	01 - Dry
2016-12-11	2016	21:53	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2018-01-24	2018	15:03	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD ( _3ZA3CG)	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	05 - Packed snow

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2017-06-06	2017	14:15	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	02 - Wet
2017-11-27	2017	17:36	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD	01 - Clear	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	02 - Wet
2017-02-08	2017	4:35	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD	04 - Freezing Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	04 - Slush
2017-04-06	2017	21:59	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	03 - Rear end	02 - Wet
2017-02-21	2017	11:58	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2018-02-01	2018	17:05	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD ( _3ZA2GD)	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	03 - Rear end	03 - Loose snow
2018-12-05	2018	16:50	MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD ( _3ZA2GD)	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-09-22	2014	20:59	MARCH RD btwn OLD CARP RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2014-02-13	2014	22:55	MARCH RD btwn OLD CARP RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2014-05-09	2014	12:22	MARCH RD btwn OLD CARP RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2014-08-20	2014	21:27	MARCH RD btwn OLD CARP RD & KLONDIKE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-03-07	2015	12:22	MARCH RD btwn OLD CARP RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2015-11-12	2015	20:22	MARCH RD btwn OLD CARP RD & KLONDIKE RD	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2015-01-16	2015	16:33	MARCH RD btwn OLD CARP RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2015-07-07	2015	14:51	MARCH RD btwn OLD CARP RD & KLONDIKE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
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2014-05-13	2014	9:44	MAXWELL BRIDGE RD btwn MARCH RD & WINDANCE CRES	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
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Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-01-06	2014	7:19	KLONDIKE RD @ MARCH RD	02 - Rain	03 - Dawn	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	02 - Wet
2014-02-25	2014	9:15	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2014-03-27	2014	13:27	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	02 - Wet
2014-09-26	2014	13:45	KLONDIKE RD @ MARCH RD	02 - Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2014-12-31	2014	14:20	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2015-01-07	2015	10:00	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	07 - SMV other	06 - Ice
2015-07-05	2015	12:12	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2015-12-23	2015	16:18	KLONDIKE RD @ MARCH RD	02 - Rain	05 - Dusk	01 - Traffic signal	03 - P.D. only	05 - Turning movement	02 - Wet
2015-12-08	2015	6:46	KLONDIKE RD @ MARCH RD	01 - Clear	07 - Dark	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2016-01-05	2016	10:48	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2016-02-16	2016	9:08	KLONDIKE RD @ MARCH RD	03 - Snow	01 - Daylight	01 - Traffic signal	03 - P.D. only	07 - SMV other	03 - Loose snow
2016-09-10	2016	14:55	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2016-12-13	2016	10:43	KLONDIKE RD @ MARCH RD	03 - Snow	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	06 - Ice
2016-12-17	2016	10:39	KLONDIKE RD @ MARCH RD	03 - Snow	01 - Daylight	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	03 - Loose snow
2017-07-28	2017	12:51	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	02 - Angle	01 - Dry
2017-07-23	2017	13:00	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2017-08-17	2017	6:14	KLONDIKE RD @ MARCH RD	01 - Clear	03 - Dawn	01 - Traffic signal	02 - Non-fatal injury	07 - SMV other	01 - Dry
2017-10-28	2017	11:01	KLONDIKE RD @ MARCH RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2017-11-26	2017	6:56	KLONDIKE RD @ MARCH RD	01 - Clear	03 - Dawn	01 - Traffic signal	02 - Non-fatal injury	07 - SMV other	06 - Ice
2017-12-07	2017	13:37	KLONDIKE RD @ MARCH RD	03 - Snow	01 - Daylight	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	03 - Loose snow
2017-01-03	2017	21:32	KLONDIKE RD @ MARCH RD	03 - Snow	07 - Dark	01 - Traffic signal	03 - P.D. only	03 - Rear end	03 - Loose snow
2017-02-13	2017	10:42	KLONDIKE RD @ MARCH RD	03 - Snow	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	04 - Slush
2017-12-18	2017	22:19	KLONDIKE RD @ MARCH RD	03 - Snow	07 - Dark	01 - Traffic signal	03 - P.D. only	03 - Rear end	03 - Loose snow
2018-02-02	2018	20:40	KLONDIKE RD @ MARCH RD (0003096)	01 - Clear	07 - Dark	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	02 - Wet
2018-03-04	2018	16:30	KLONDIKE RD @ MARCH RD (0003096)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2018-04-17	2018	9:39	KLONDIKE RD @ MARCH RD (0003096)	02 - Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2018-05-04	2018	18:25	KLONDIKE RD @ MARCH RD (0003096)	06 - Strong wind	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2018-07-18	2018	8:07	KLONDIKE RD @ MARCH RD (0003096)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2018-07-20	2018	6:26	KLONDIKE RD @ MARCH RD (0003096)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	07 - SMV other	01 - Dry
2018-08-23	2018	12:45	KLONDIKE RD @ MARCH RD (0003096)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-08-29	2018	13:00	KLONDIKE RD @ MARCH RD (0003096)	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2018-09-28	2018	10:57	KLONDIKE RD @ MARCH RD (0003096)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-01-04	2014	13:35	MARCH RD btwn KLONDIKE RD & MORGAN'S GRANT WAY	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	02 - Wet
2015-09-22	2015	8:44	MARCH RD btwn KLONDIKE RD & MORGAN'S GRANT WAY	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2016-02-11	2016	7:32	MARCH RD btwn KLONDIKE RD & MORGAN'S GRANT WAY	03 - Snow	01 - Daylight	10 - No control	02 - Non-fatal injury	04 - Sideswipe	04 - Slush
2017-07-28	2017	9:20	MARCH RD btwn KLONDIKE RD & MORGAN'S GRANT WAY	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2017-09-07	2017	19:47	MARCH RD btwn KLONDIKE RD & MORGAN'S GRANT WAY	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2018-12-03	2018	9:24	MARCH RD btwn KLONDIKE RD & MORGAN'S GRANT WAY ( _3ZA2EW)	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice

LOCATION & GEOID	TOTAL_CYCLIST_ COLLISIONS	TOTAL_PEDESTRIAN_ COLLISIONS
HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD (0011852)	0	1
250 N OF KLONDIKE RD @ MARCH RD (0013528)	0	0
HALTON TER btwn Continuation of HALTON TER & OLD CARP RD ( _ 49PV3H)	0	0
MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & KLONDIKE RD ( _ 3ZA3CG)	0	0
MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD ( _ 3ZA2GD)	0	0
MAXWELL BRIDGE RD btwn MARCH RD & WINDANCE CRES ( _ 5J15LI)	0	0
KLONDIKE RD @ MARCH RD	0	1
MARCH RD btwn KLONDIKE RD & MORGAN'S GRANT WAY	0	0

# Traffic Signal Timing

City of Ottawa, Transportation Services Department

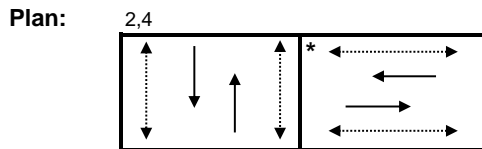
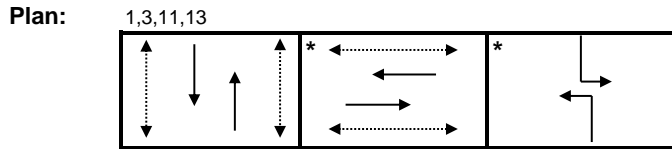
## Traffic Signal Operations Unit

<b>Intersection:</b>	<b>Main:</b> March	<b>Side:</b> Maxwell Bridge
<b>Controller:</b>	<b>MS-3200</b>	<b>TSD:</b> 5963
<b>Author:</b>	Sarah Saade	<b>Date:</b> 25-Jul-2018

### Existing Timing Plans<sup>†</sup>

	Plan				Ped Minimum Time				
	AM Peak 1	Off Peak 2	PM Peak 3	Night 4	AM Peak 11	PM Peak 13	Walk	DW	A+R
<b>Cycle</b>	110	95	120	95	120	120			
<b>Offset</b>	90	11	50	X	99	50			
NB Thru	56	56	66	56	52	55	7	21	4.6+2.0
SB Thru	56	56	66	56	52	55	7	21	4.6+2.0
EB Thru	39	39	39	39	48	45	7	25	3.3+3.3
WB Thru	39	39	39	39	48	45	7	25	3.3+3.3
NB Left	15	-	15	-	20	20	-	-	4.6+1.8
SB Left	15	-	15	-	20	20	-	-	4.6+1.8

### Phasing Sequence<sup>‡</sup>



### Schedule

Weekday		Weekend	
Time	Plan	Time	Plan
0:10	4	0:10	4
6:20	1	8:00	2
7:30	11	22:30	4
9:50	2		
15:00	3		
16:30	13		
18:30	3		
19:00	2		
23:00	4		

### Notes

- †: Time for each direction includes amber and all red intervals
- ‡: Start of first phase should be used as reference point for offset
- Asterisk (\*) Indicates actuated phase
- (fp): Fully Protected Left Turn
- ◄.....► Pedestrian signal

Cost is \$56.50 (\$50 + HST)

# Traffic Signal Timing

City of Ottawa, Transportation Services Department

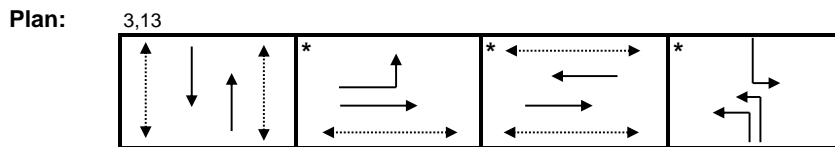
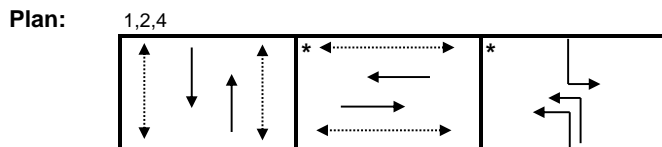
## Traffic Signal Operations Unit

<b>Intersection:</b>	Main: March	Side: Klondike
<b>Controller:</b>	MS-3200	<b>TSD:</b> 6742
<b>Author:</b>	Matthew Anderson	<b>Date:</b> 08-May-2020

### Existing Timing Plans†

	Plan					Ped Minimum Time		
	AM Peak 1	Off Peak 2	PM Peak 3	Night 4	PM Heavy 13	Walk	DW	A+R
<b>Cycle</b>	130	110	120	110	130			
<b>Offset</b>	64	16	8	X	20			
NB Thru	58	49	43	47	51	7	19	4.6+1.8
SB Thru	58	49	43	47	51	7	19	4.6+1.8
EB Left	12	-	12	-	12	-	-	3.3+3.3
EB Thru	57	45	57	46	57	7	30	3.3+3.8
WB Thru	45	45	45	46	45	7	30	3.3+3.8
NB Left (fp)	15	16	20	17	22	-	-	4.6+2.0
SB Left (fp)	15	16	20	17	22	-	-	4.6+2.0

### Phasing Sequence‡



### Schedule

#### Weekday

Time	Plan
0:10	4
6:30	1
9:30	2
15:00	3
16:30	13
18:00	3
18:30	2
23:00	4

#### Weekend

Time	Plan
0:10	4
8:00	2
22:30	4

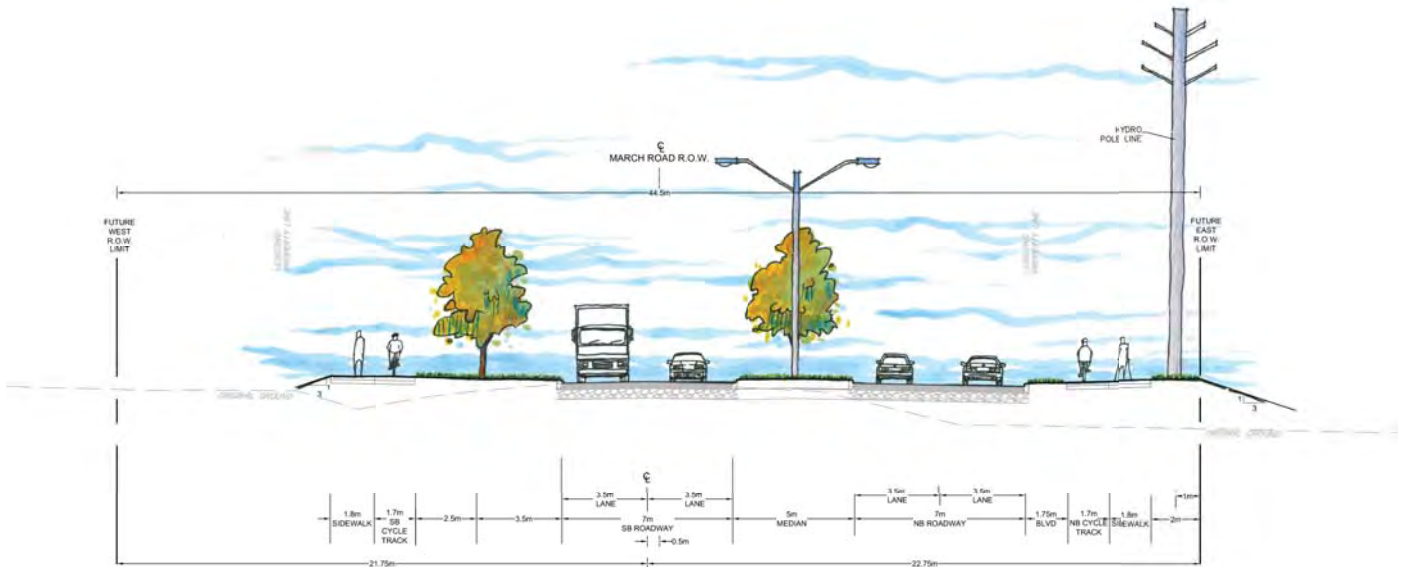
### Notes

- †: Time for each direction includes amber and all red intervals
- ‡: Start of first phase should be used as reference point for offset
- Asterisk (\*) Indicates actuated phase
- (fp): Fully Protected Left Turn
- ◄.....► Pedestrian signal

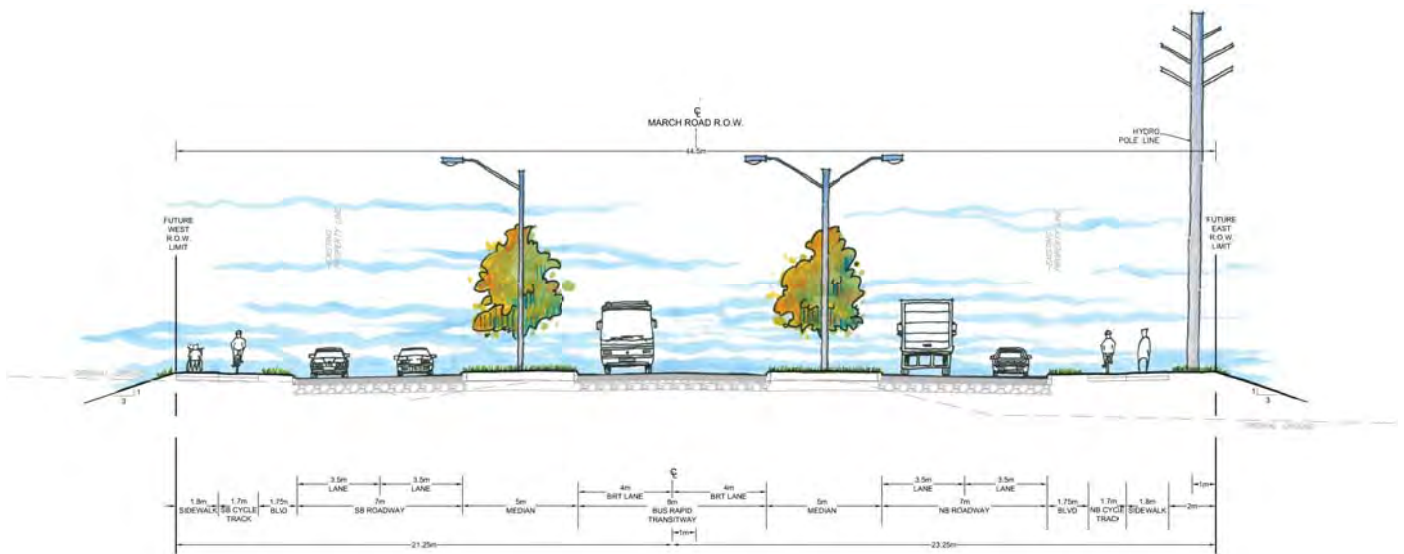
Cost is \$58.78 (\$52.02 + HST)

# Appendix G

March Road Widening Scenarios



**FIGURE 27** | Cross-Section for March Road - Interim



**FIGURE 28** | Cross-Section for March Road - Ultimate

# Appendix H

City of Ottawa Forecasting Report Comments

## **Robin Marinac**

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**From:** Gervais, Josiane <josiane.gervais@ottawa.ca>  
**Sent:** June 17, 2020 12:12 PM  
**To:** Mark Crockford  
**Cc:** Robin Marinac  
**Subject:** RE: 2020-11 910 March Road Step 3 - TPM Comments

Hello Mark,

Please find comments below regarding the Forecasting Report for 910 March Rd.

### **Transportation Engineering Services**

1. Note that the development application for 936 March Road is subject to an RMA. The proposed works include one southbound left-turn lane, one northbound right-turn lane and paved shoulders on March Road. The RMA also accommodates for a future northbound left-turn lane.
2. Provide details as to the location of Access 1 relative to the proposed signalized intersection of March Road and Street A. Confirm that Access 1 is to be signalized, otherwise access onto March Road may need to be restricted.
3. A right in/right out access to March Rd, on the west side, is proposed approximately 225m north of Halton Terrace. Comment on the proposed accesses relative to the access across the street.
4. Consider adjusting the existing/future mode shares. The gas station/convenience market is unlikely to generate many transit trips and until the KNUEA is developed, this development is more likely to exhibit characteristics from the rural west TAZ.
5. Justify the difference between 2022 and 2027 trip projections. Additionally, if only 15% of trips are to from the north and 85% from the south (consistent with the KNUEA TMP), a maximum of 15% of trips can be pass-by trips. The remainder would be primary or diverted trips and should be explicitly accounted for on the study area's road network.
6. Since the timing of the widening of March Road is unknown, it should be assumed that March Road north of Maxwell Bridge/Halton Terrace has a two-lane cross-section. Indicate how many vehicles must be diverted from the peak periods to maintain an acceptable level of service on March Road.
7. Address comments prior to the submission of the strategy report.

### **Traffic Signal Operations**

8. Page 11 of the report should refer to  $v/c < 0.9$ .

### **Development Review – Transportation**

9. Include Figure 2: Concept Plan.
10. The site plan depicts a 4-way signalized intersection at Site Access #1, consider if site generated traffic would undertake the westbound through movement here. What is the west leg of the intersection connecting to?
11. An RMA is required for the traffic signal proposed at Access 1.



12. The right-in/right-out access at Access 2 must be supported by physical constraints, and RMA may be required.

13. As requested by TES, address comments prior to submission of Strategy Report.

Regards,

**Josiane Gervais, P.Eng.**

Project Manager, Infrastructure Approvals | GPRJ Approbation des demandes d'infrastructure

Development Review Branch | Dir Examen des projets d'aménagement

City of Ottawa | Ville d'Ottawa

Tel | Tél. : 613-580- 2424 ext. | poste 21765

web | Site Web : [www.ottawa.ca](http://www.ottawa.ca)

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# Appendix I

Pass-by Reduction by Land Use



# Appendix J

TDM Checklists

**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 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 type="checkbox"/>
BASIC	6.1.2 Unbundle parking cost from lease rates at multi-tenant sites	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	6.1.3 Charge for short-term parking (hourly)	<input type="checkbox"/>

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
<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 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 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 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"/>



**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 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 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"/>

<b>TDM-supportive design &amp; infrastructure measures: Non-residential developments</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 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 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"/>

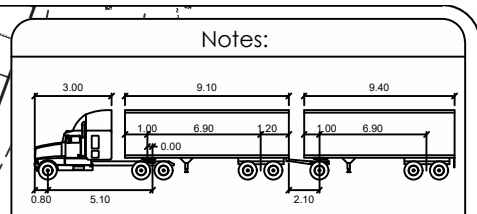
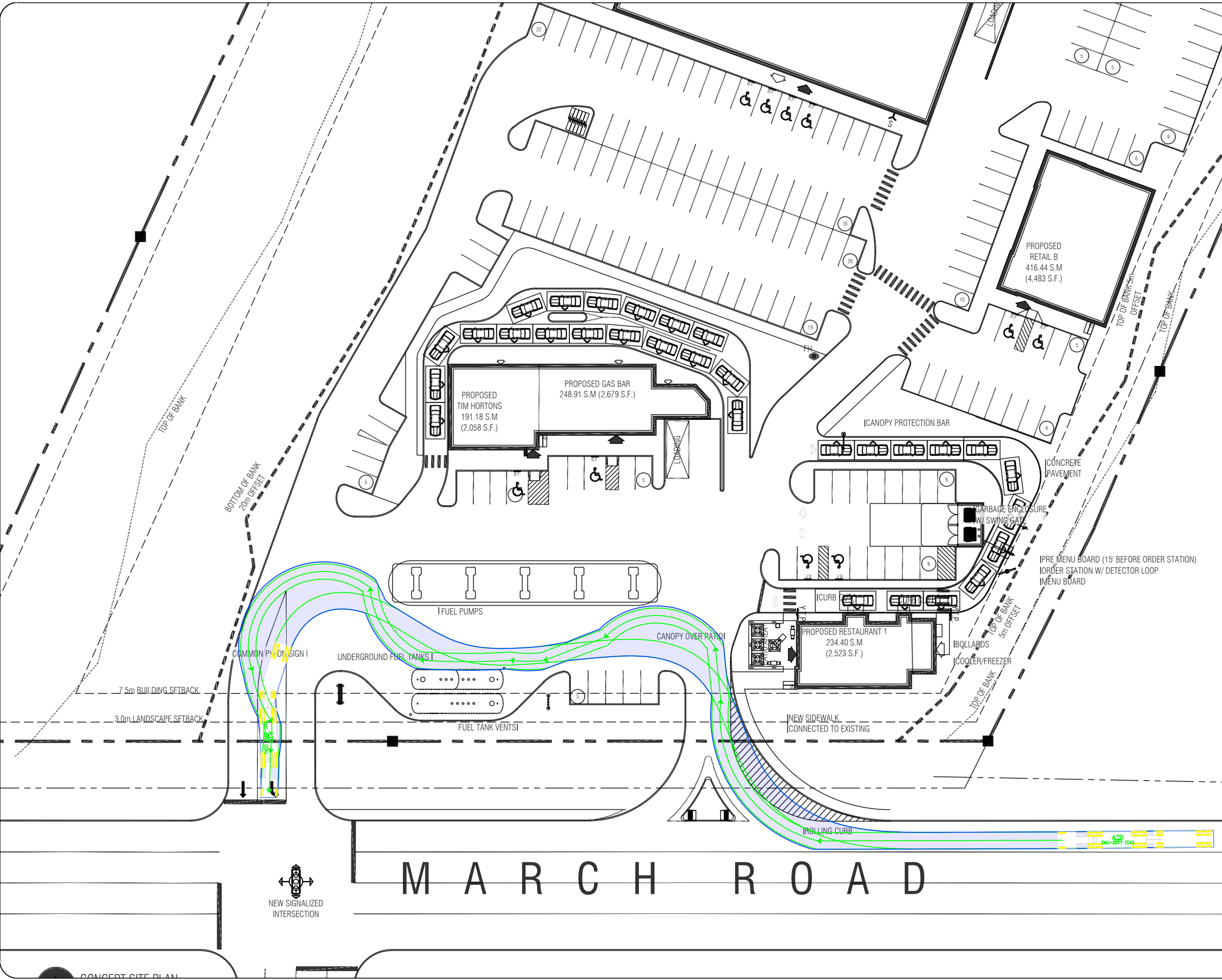
TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
<b>2. WALKING &amp; CYCLING: END-OF-TRIP FACILITIES</b>		
<b>2.1 Bicycle parking</b>		
REQUIRED	2.1.1 Provide bicycle parking in highly 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 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 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 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 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>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 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 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 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 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 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 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"/>

# Appendix K

Turning Templates



ATD

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 27.3
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

03	Revised Site Plan	AL	21/01/15
02	Revised Templates	AL	20/11/24
01	Initial Templates	JK	20/04/06
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

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

CLIENT: Wexford  
 Commercial Developments Ltd.

ARCHITECT: Greystone

SITE:  
 910 March Road

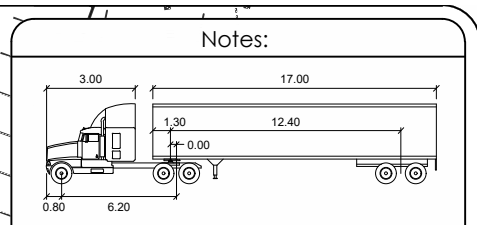
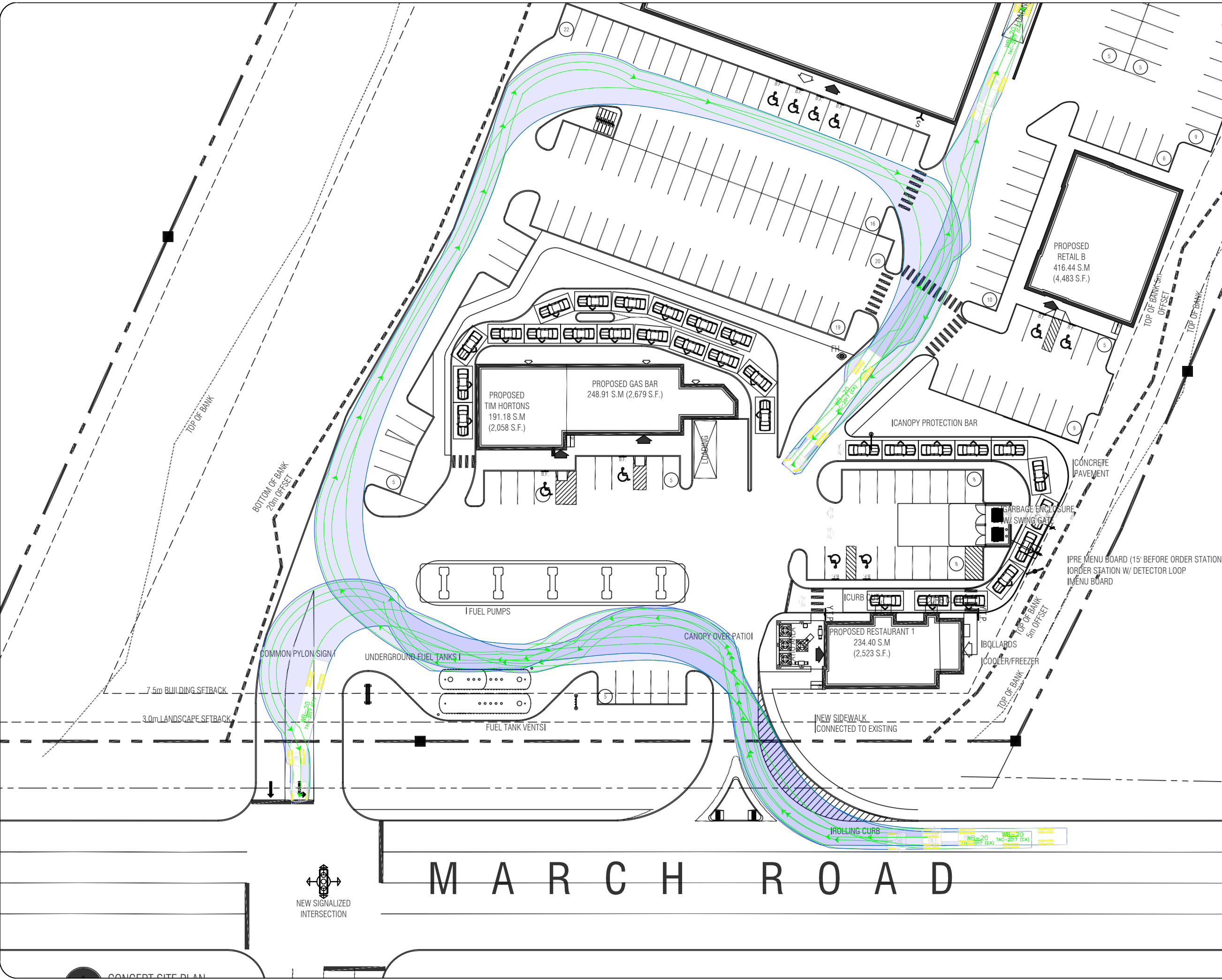
TITLE:  
 Fuel Truck Templates

SCALE AT A3: NTS	DATE: 2021/01/15	DRAWN: AL	CHECKED: MC
PROJECT NO: 2020-11	DRAWING NO: 001	REVISION: 03	



M A R C H R O A D





03	Revised Site Plan	AL	21/01/15
02	Revised Templates	AL	20/11/24
01	Initial Templates	JK	20/04/06
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

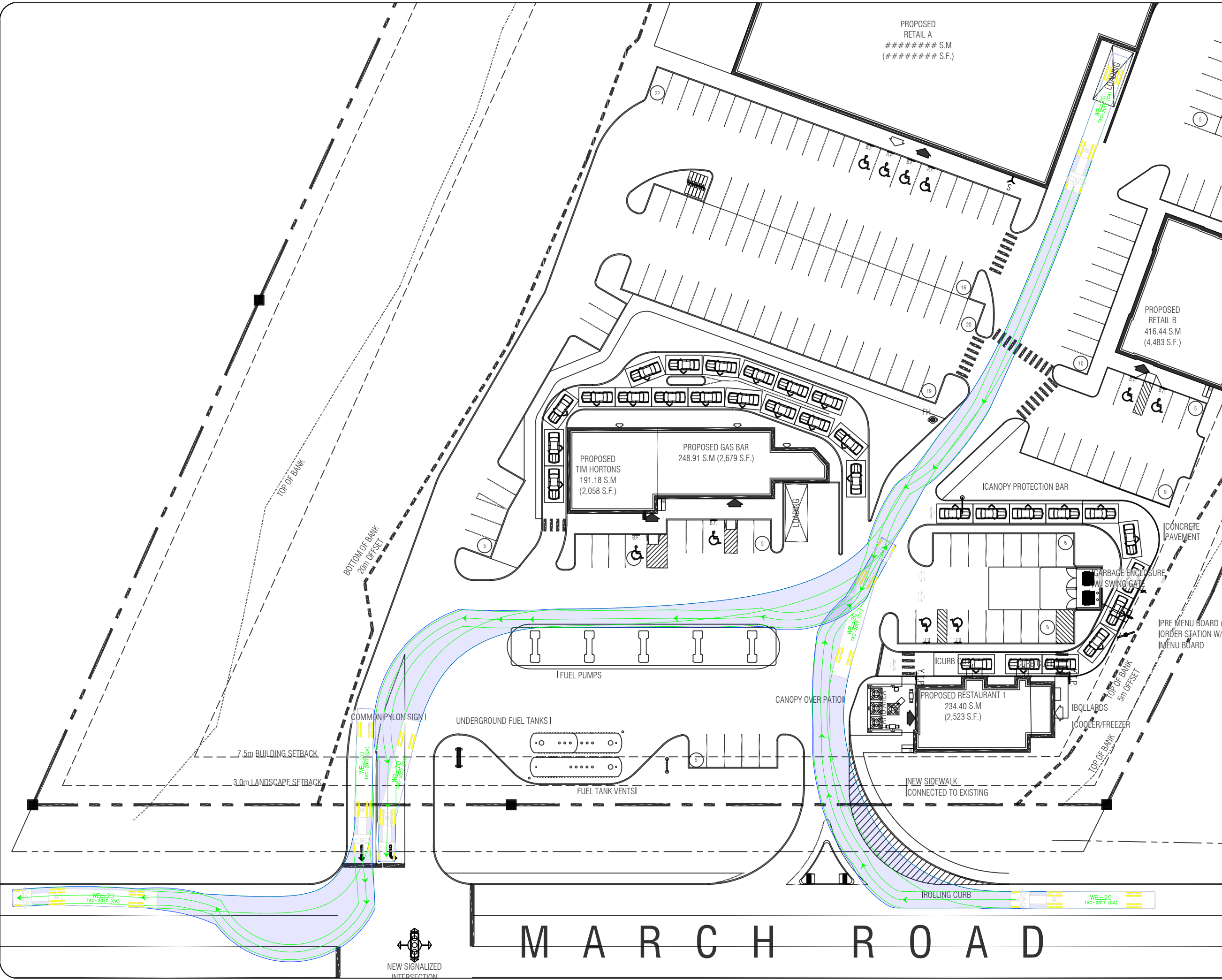
**CGH Transportation**  
13 Markham Ave  
Ottawa, ON  
K2G 3Z1  
(343) 999-9117

CLIENT: Wexford Commercial Developments Ltd.  
ARCHITECT: Greystone

SITE: 910 March Road  
TITLE: WB-20 Templates

SCALE AT A3: NTS	DATE: 2021/01/15	DRAWN: AL	CHECKED: MC
PROJECT NO: 2020-11	DRAWING NO: 002	REVISION: 03	





PROPOSED  
RETAIL A  
##### S.M  
(##### S.F.)

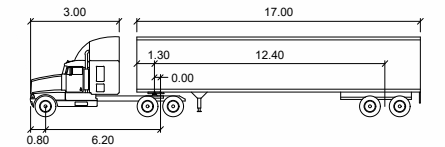
PROPOSED  
RETAIL B  
416.44 S.M  
(4,483 S.F.)

PROPOSED TIM HORTONS  
191.18 S.M  
(2,058 S.F.)

PROPOSED GAS BAR  
248.91 S.M (2,679 S.F.)

PROPOSED RESTAURANT 1  
234.40 S.M  
(2,523 S.F.)

Notes:



WB-20

	metres		metres
Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.2
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

03	Revised Site Plan	AL	21/01/15
02	Revised Templates	AL	20/11/24
01	Initial Templates	JK	20/04/06
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

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

CLIENT: Wexford  
Commercial Developments Ltd.

ARCHITECT: Greystone

SITE: 910 March Road			
TITLE: WB-20 Templates 2			
SCALE AT A3: NTS	DATE: 2021/01/15	DRAWN: AL	CHECKED: MC
PROJECT NO: 2020-11	DRAWING NO: 003	REVISION: 03	



M A R C H R O A D







# Appendix L

MMLOS Worksheets

**Multi-Modal Level of Service - Intersections Form**

Consultant  
Scenario  
Comments

CGH Transportation
2022 FT AM

Project  
Date

2020-11
29-Jun-20

INTERSECTIONS		March Road & Halton Terrace / Maxwell Bridge Road				March Road & Klondike Road				March Road & Site Access #1 / South Local Road			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	9	9	6	6	10+	10+	7	7			4	
	Median	No Median - 2.4 m	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	
	Conflicting Left Turns	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Protected	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	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	
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No			No	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	Conv'tl without Receiving Lane			No Channel	
	Corner Radius	15-25m	10-15m	10-15m	15-25m	10-15m	15-25m	10-15m	15-25m			5-10m	
	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	
	<b>PETSI Score</b>	<b>-31</b>	<b>-29</b>	<b>20</b>	<b>18</b>	<b>-35</b>	<b>-47</b>	<b>12</b>	<b>14</b>			<b>54</b>	
<b>Ped. Exposure to Traffic LoS</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>-</b>	<b>-</b>	<b>D</b>	<b>-</b>	
Cycle Length													
Effective Walk Time													
<b>Average Pedestrian Delay</b>													
<b>Pedestrian Delay LoS</b>													
<b>Level of Service</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>-</b>	<b>-</b>	<b>D</b>	<b>-</b>	
	<b>#N/A</b>				<b>#N/A</b>				<b>D</b>				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Pocket Bike Lane	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	Mixed Traffic
	Right Turn Lane Configuration	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	≤ 50 m			Not Applicable	≤ 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h			Not Applicable	≤ 25 km/h
	<b>Cyclist relative to RT motorists</b>	<b>D</b>	<b>D</b>	<b>F</b>	<b>F</b>	<b>Not Applicable</b>	<b>Not Applicable</b>	<b>F</b>	<b>D</b>	<b>-</b>	<b>Not Applicable</b>	<b>D</b>	<b>-</b>
	<b>Separated or Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>-</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>-</b>
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane 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	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h			≥ 60 km/h	≤ 40 km/h
	<b>Left Turning Cyclist</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>-</b>	<b>B</b>	<b>-</b>
<b>Level of Service</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>D</b>	<b>-</b>	
	<b>F</b>				<b>F</b>				<b>D</b>				
Transit	Average Signal Delay	≤ 20 sec	≤ 10 sec	> 40 sec	≤ 30 sec	≤ 20 sec	≤ 20 sec	> 40 sec	≤ 30 sec	≤ 10 sec	≤ 10 sec	> 40 sec	
	<b>Level of Service</b>	<b>C</b>	<b>B</b>	<b>F</b>	<b>D</b>	<b>C</b>	<b>C</b>	<b>F</b>	<b>D</b>	<b>B</b>	<b>B</b>	<b>F</b>	<b>-</b>
	<b>F</b>				<b>F</b>				<b>F</b>				
Truck	Effective Corner Radius	> 15 m	10 - 15 m	> 15 m	10 - 15 m	> 15 m	10 - 15 m	10 - 15 m	> 15 m			< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection	1	1	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2			1	1
<b>Level of Service</b>	<b>C</b>	<b>E</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>B</b>	<b>B</b>	<b>A</b>	<b>-</b>	<b>F</b>	<b>F</b>	<b>-</b>	
	<b>E</b>				<b>C</b>				<b>F</b>				
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.61 - 0.70				0.61 - 0.70			
	<b>Level of Service</b>	<b>B</b>				<b>B</b>				<b>B</b>			

**Multi-Modal Level of Service - Intersections Form**

Consultant  
Scenario  
Comments

CGH Transportation
2027 FT AM

Project  
Date

2020-11
29-Jun-20

INTERSECTIONS		March Road & Halton Terrace / Maxwell Bridge Road				March Road & Klondike Road				March Road & Site Access #1 / South Local Road			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	9	9	6	6	10+	10+	7	7	5	6	4	5
	Median	No Median - 2.4 m	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
	Conflicting Left Turns	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Protected	Protected	Permissive	Protected/ Permissive	Protected/ 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
	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
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	Conv'tl without Receiving Lane	No Channel	No Channel	No Channel	No Channel
	Corner Radius	15-25m	10-15m	10-15m	15-25m	10-15m	15-25m	10-15m	15-25m	5-10m	5-10m	5-10m	5-10m
	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
	<b>PETSI Score</b>	<b>-31</b>	<b>-29</b>	<b>20</b>	<b>18</b>	<b>-35</b>	<b>-47</b>	<b>12</b>	<b>14</b>	<b>38</b>	<b>21</b>	<b>54</b>	<b>38</b>
	<b>Ped. Exposure to Traffic LoS</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>E</b>	<b>F</b>	<b>D</b>	<b>E</b>
	Cycle Length												
Effective Walk Time													
<b>Average Pedestrian Delay</b>													
<b>Pedestrian Delay LoS</b>													
<b>Level of Service</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>E</b>	<b>F</b>	<b>D</b>	<b>E</b>	
	<b>#N/A</b>				<b>#N/A</b>				<b>F</b>				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Pocket Bike Lane	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	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	≤ 50 m		Not Applicable	≤ 50 m	
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h		Not Applicable	≤ 25 km/h	
	<b>Cyclist relative to RT motorists</b>	<b>D</b>	<b>D</b>	<b>F</b>	<b>F</b>	<b>Not Applicable</b>	<b>Not Applicable</b>	<b>F</b>	<b>D</b>	<b>Not Applicable</b>	<b>Not Applicable</b>	<b>D</b>	<b>Not Applicable</b>
	<b>Separated or Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Separated</b>
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≥ 60 km/h	≥ 60 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h
	<b>Left Turning Cyclist</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>C</b>	<b>B</b>	<b>B</b>
<b>Level of Service</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>D</b>	<b>C</b>	<b>C</b>	<b>D</b>	<b>B</b>	
	<b>F</b>				<b>F</b>				<b>D</b>				
Transit	Average Signal Delay	≤ 30 sec	≤ 20 sec	> 40 sec	≤ 30 sec	≤ 30 sec	≤ 30 sec	≤ 30 sec	> 40 sec	> 40 sec	≤ 20 sec	> 40 sec	≤ 30 sec
	<b>Level of Service</b>	<b>D</b>	<b>C</b>	<b>F</b>	<b>D</b>	<b>D</b>	<b>D</b>	<b>D</b>	<b>F</b>	<b>F</b>	<b>C</b>	<b>F</b>	<b>D</b>
	<b>F</b>				<b>F</b>				<b>F</b>				
Truck	Effective Corner Radius	> 15 m	10 - 15 m	> 15 m	10 - 15 m	> 15 m	10 - 15 m	10 - 15 m	> 15 m	< 10 m	< 10 m	< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection	1	1	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2	1	1	1	≥ 2
<b>Level of Service</b>	<b>C</b>	<b>E</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>B</b>	<b>B</b>	<b>A</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>D</b>	
	<b>E</b>				<b>C</b>				<b>F</b>				
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.61 - 0.70				0.61 - 0.70			
	<b>Level of Service</b>	<b>B</b>				<b>B</b>				<b>B</b>			

**Multi-Modal Level of Service - Intersections Form**

Consultant Scenario Comments	CGH Transportation
	2022 FT PM

Project Date	2020-11
	29-Jun-20

INTERSECTIONS		March Road & Halton Terrace / Maxwell Bridge Road				March Road & Klondike Road				March Road & Site Access #1 / South Local Road			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	9	9	6	6	10+	10+	7	7			4	
	Median	No Median - 2.4 m	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	
	Conflicting Left Turns	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Protected	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	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	
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No			No	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	Conv'tl without Receiving Lane			No Channel	
	Corner Radius	15-25m	10-15m	10-15m	15-25m	10-15m	15-25m	10-15m	15-25m			5-10m	
	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	
	<b>PETSI Score</b>	<b>-31</b>	<b>-29</b>	<b>20</b>	<b>18</b>	<b>-35</b>	<b>-47</b>	<b>12</b>	<b>14</b>			<b>54</b>	
<b>Ped. Exposure to Traffic LoS</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>-</b>	<b>-</b>	<b>D</b>	<b>-</b>	
Cycle Length													
Effective Walk Time													
<b>Average Pedestrian Delay</b>													
<b>Pedestrian Delay LoS</b>													
<b>Level of Service</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>-</b>	<b>-</b>	<b>D</b>	<b>-</b>	
	<b>#N/A</b>				<b>#N/A</b>				<b>D</b>				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Pocket Bike Lane	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	Mixed Traffic
	Right Turn Lane Configuration	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	≤ 50 m			Not Applicable	≤ 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h			Not Applicable	≤ 25 km/h
	<b>Cyclist relative to RT motorists</b>	<b>D</b>	<b>D</b>	<b>F</b>	<b>F</b>	<b>Not Applicable</b>	<b>Not Applicable</b>	<b>F</b>	<b>D</b>	<b>-</b>	<b>Not Applicable</b>	<b>D</b>	<b>-</b>
	<b>Separated or Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>-</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>-</b>
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane 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	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h			≥ 60 km/h	≤ 40 km/h
	<b>Left Turning Cyclist</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>-</b>	<b>B</b>	<b>-</b>
<b>Level of Service</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>D</b>	<b>-</b>	
	<b>F</b>				<b>F</b>				<b>D</b>				
Transit	Average Signal Delay	≤ 10 sec	≤ 10 sec	> 40 sec	> 40 sec	≤ 20 sec	≤ 20 sec	> 40 sec	≤ 30 sec	≤ 20 sec	≤ 10 sec	≤ 30 sec	
	<b>Level of Service</b>	<b>B</b>	<b>B</b>	<b>F</b>	<b>F</b>	<b>C</b>	<b>C</b>	<b>F</b>	<b>D</b>	<b>C</b>	<b>B</b>	<b>D</b>	<b>-</b>
	<b>F</b>				<b>F</b>				<b>D</b>				
Truck	Effective Corner Radius	> 15 m	10 - 15 m	> 15 m	10 - 15 m	> 15 m	10 - 15 m	10 - 15 m	> 15 m		< 10 m	< 10 m	
	Number of Receiving Lanes on Departure from Intersection	1	1	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2		1	1	
<b>Level of Service</b>	<b>C</b>	<b>E</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>B</b>	<b>B</b>	<b>A</b>	<b>-</b>	<b>F</b>	<b>F</b>	<b>-</b>	
	<b>E</b>				<b>C</b>				<b>F</b>				
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60				0.71 - 0.80			
	<b>Level of Service</b>	<b>B</b>				<b>A</b>				<b>C</b>			

**Multi-Modal Level of Service - Intersections Form**

Consultant	CGH Transportation
Scenario	2027 FT PM
Comments	

Project Date	2020-11 29-Jun-20
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INTERSECTIONS		March Road & Halton Terrace / Maxwell Bridge Road				March Road & Klondike Road				March Road & Site Access #1 / South Local Road			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	9	9	6	6	10+	10+	7	7	5	6	4	5
	Median	No Median - 2.4 m	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
	Conflicting Left Turns	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Protected	Protected	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
	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
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	Conv'tl without Receiving Lane	No Channel	No Channel	No Channel	No Channel
	Corner Radius	15-25m	10-15m	10-15m	15-25m	10-15m	15-25m	10-15m	15-25m	5-10m	5-10m	5-10m	5-10m
	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
	<b>PETSI Score</b>	<b>-31</b>	<b>-29</b>	<b>20</b>	<b>18</b>	<b>-35</b>	<b>-47</b>	<b>12</b>	<b>14</b>	<b>38</b>	<b>21</b>	<b>54</b>	<b>38</b>
<b>Ped. Exposure to Traffic LoS</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>E</b>	<b>F</b>	<b>D</b>	<b>E</b>	
Cycle Length													
Effective Walk Time													
<b>Average Pedestrian Delay</b>													
<b>Pedestrian Delay LoS</b>													
<b>Level of Service</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>E</b>	<b>F</b>	<b>D</b>	<b>E</b>	
	<b>#N/A</b>				<b>#N/A</b>				<b>F</b>				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Pocket Bike Lane	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	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	≤ 50 m		Not Applicable	≤ 50 m	
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h		Not Applicable	≤ 25 km/h	
	<b>Cyclist relative to RT motorists</b>	<b>D</b>	<b>D</b>	<b>F</b>	<b>F</b>	<b>Not Applicable</b>	<b>Not Applicable</b>	<b>F</b>	<b>D</b>	<b>Not Applicable</b>	<b>Not Applicable</b>	<b>D</b>	<b>Not Applicable</b>
	<b>Separated or Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Separated</b>
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≥ 60 km/h	≥ 60 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h
<b>Left Turning Cyclist</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>C</b>	<b>B</b>	<b>B</b>	
<b>Level of Service</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>D</b>	<b>C</b>	<b>C</b>	<b>D</b>	<b>B</b>	
	<b>F</b>				<b>F</b>				<b>D</b>				
Transit	Average Signal Delay	≤ 20 sec	≤ 20 sec	> 40 sec	> 40 sec	≤ 20 sec	≤ 20 sec	> 40 sec	≤ 40 sec	≤ 20 sec	> 40 sec	> 40 sec	≤ 30 sec
	<b>Level of Service</b>	<b>C</b>	<b>C</b>	<b>F</b>	<b>F</b>	<b>C</b>	<b>C</b>	<b>F</b>	<b>E</b>	<b>C</b>	<b>F</b>	<b>F</b>	<b>D</b>
	<b>F</b>				<b>F</b>				<b>F</b>				
Truck	Effective Corner Radius	> 15 m	10 - 15 m	> 15 m	10 - 15 m	> 15 m	10 - 15 m	10 - 15 m	> 15 m	< 10 m	< 10 m	< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection	1	1	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2	1	1	1	≥ 2
<b>Level of Service</b>	<b>C</b>	<b>E</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>B</b>	<b>B</b>	<b>A</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>D</b>	
	<b>E</b>				<b>C</b>				<b>F</b>				
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.61 - 0.70				0.91 - 1.00			
	<b>Level of Service</b>	<b>D</b>				<b>B</b>				<b>E</b>			



**Multi-Modal Level of Service - Intersections Form**

Consultant Scenario Comments	CGH Transportation
	2022 FT Sat

Project Date	2020-11
	29-Jun-20

INTERSECTIONS		March Road & Halton Terrace / Maxwell Bridge Road				March Road & Klondike Road				March Road & Site Access #1 / South Local Road			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	9	9	6	6	10+	10+	7	7			4	
	Median	No Median - 2.4 m	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	
	Conflicting Left Turns	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Protected	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	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	
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No			No	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	Conv'tl without Receiving Lane			No Channel	
	Corner Radius	15-25m	10-15m	10-15m	15-25m	10-15m	15-25m	10-15m	15-25m			5-10m	
	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	
	<b>PETSI Score</b>	<b>-31</b>	<b>-29</b>	<b>20</b>	<b>18</b>	<b>-35</b>	<b>-47</b>	<b>12</b>	<b>14</b>			<b>54</b>	
<b>Ped. Exposure to Traffic LoS</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>-</b>	<b>-</b>	<b>D</b>	<b>-</b>	
Cycle Length													
Effective Walk Time													
<b>Average Pedestrian Delay</b>													
<b>Pedestrian Delay LoS</b>													
<b>Level of Service</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>-</b>	<b>-</b>	<b>D</b>	<b>-</b>	
	<b>#N/A</b>				<b>#N/A</b>				<b>D</b>				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Pocket Bike Lane	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	Mixed Traffic
	Right Turn Lane Configuration	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	≤ 50 m			Not Applicable	≤ 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h			Not Applicable	≤ 25 km/h
	<b>Cyclist relative to RT motorists</b>	<b>D</b>	<b>D</b>	<b>F</b>	<b>F</b>	<b>Not Applicable</b>	<b>Not Applicable</b>	<b>F</b>	<b>D</b>	<b>-</b>	<b>Not Applicable</b>	<b>D</b>	<b>-</b>
	<b>Separated or Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>-</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>-</b>
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane 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	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h			≥ 60 km/h	≤ 40 km/h
	<b>Left Turning Cyclist</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>-</b>	<b>B</b>	<b>-</b>
<b>Level of Service</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>D</b>	<b>-</b>	
	<b>F</b>				<b>F</b>				<b>D</b>				
Transit	Average Signal Delay	≤ 10 sec	≤ 10 sec	≤ 40 sec	≤ 30 sec	≤ 20 sec	≤ 20 sec	> 40 sec	≤ 40 sec	≤ 10 sec	≤ 20 sec	≤ 40 sec	
	<b>Level of Service</b>	<b>B</b>	<b>B</b>	<b>E</b>	<b>D</b>	<b>C</b>	<b>C</b>	<b>F</b>	<b>E</b>	<b>B</b>	<b>C</b>	<b>E</b>	<b>-</b>
	<b>E</b>				<b>F</b>				<b>E</b>				
Truck	Effective Corner Radius	> 15 m	10 - 15 m	> 15 m	10 - 15 m	> 15 m	10 - 15 m	10 - 15 m	> 15 m			< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection	1	1	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2			1	1
<b>Level of Service</b>	<b>C</b>	<b>E</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>B</b>	<b>B</b>	<b>A</b>	<b>-</b>	<b>F</b>	<b>F</b>	<b>-</b>	
	<b>E</b>				<b>C</b>				<b>F</b>				
Auto	Volume to Capacity Ratio	0.0 - 0.60				0.0 - 0.60				0.61 - 0.70			
	<b>Level of Service</b>	<b>A</b>				<b>A</b>				<b>B</b>			

**Multi-Modal Level of Service - Intersections Form**

Consultant Scenario Comments	CGH Transportation
	2027 FT Sat

Project Date	2020-11
	29-Jun-20

INTERSECTIONS		March Road & Halton Terrace / Maxwell Bridge Road				March Road & Klondike Road				March Road & Site Access #1 / South Local Road			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	9	9	6	6	10+	10+	7	7	5	6	4	5
	Median	No Median - 2.4 m	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
	Conflicting Left Turns	Permissive	Permissive	Protected/ Permissive	Protected/ Permissive	Protected/ Permissive	Permissive	Protected	Protected	Permissive	Permissive	Protected/ 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
	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
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	Conv'tl without Receiving Lane	No Channel	No Channel	No Channel	No Channel
	Corner Radius	15-25m	10-15m	10-15m	15-25m	10-15m	15-25m	10-15m	15-25m	5-10m	5-10m	5-10m	5-10m
	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
	<b>PETSI Score</b>	<b>-31</b>	<b>-29</b>	<b>20</b>	<b>18</b>	<b>-35</b>	<b>-47</b>	<b>12</b>	<b>14</b>	<b>38</b>	<b>21</b>	<b>54</b>	<b>38</b>
<b>Ped. Exposure to Traffic LoS</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>E</b>	<b>F</b>	<b>D</b>	<b>E</b>	
Cycle Length													
Effective Walk Time													
<b>Average Pedestrian Delay</b>													
<b>Pedestrian Delay LoS</b>													
<b>Level of Service</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>#N/A</b>	<b>#N/A</b>	<b>F</b>	<b>F</b>	<b>E</b>	<b>F</b>	<b>D</b>	<b>E</b>	
	<b>#N/A</b>				<b>#N/A</b>				<b>F</b>				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Pocket Bike Lane	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	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	≤ 50 m		Not Applicable	≤ 50 m	
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h		Not Applicable	≤ 25 km/h	
	<b>Cyclist relative to RT motorists</b>	<b>D</b>	<b>D</b>	<b>F</b>	<b>F</b>	<b>Not Applicable</b>	<b>Not Applicable</b>	<b>F</b>	<b>D</b>	<b>Not Applicable</b>	<b>Not Applicable</b>	<b>D</b>	<b>Not Applicable</b>
	<b>Separated or Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Mixed Traffic</b>	<b>Separated</b>	<b>Separated</b>	<b>Mixed Traffic</b>	<b>Separated</b>
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≥ 60 km/h	≥ 60 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h
	<b>Left Turning Cyclist</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>F</b>	<b>F</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>C</b>	<b>B</b>	<b>B</b>
<b>Level of Service</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>D</b>	<b>C</b>	<b>C</b>	<b>D</b>	<b>B</b>	
	<b>F</b>				<b>F</b>				<b>D</b>				
Transit	Average Signal Delay	≤ 20 sec	≤ 20 sec	> 40 sec	≤ 40 sec	≤ 20 sec	≤ 20 sec	≤ 40 sec	≤ 40 sec	≤ 20 sec	> 40 sec	> 40 sec	≤ 20 sec
	<b>Level of Service</b>	<b>C</b>	<b>C</b>	<b>F</b>	<b>E</b>	<b>C</b>	<b>C</b>	<b>E</b>	<b>E</b>	<b>C</b>	<b>F</b>	<b>F</b>	<b>C</b>
	<b>F</b>				<b>E</b>				<b>F</b>				
Truck	Effective Corner Radius	> 15 m	10 - 15 m	> 15 m	10 - 15 m	> 15 m	10 - 15 m	10 - 15 m	> 15 m	< 10 m	< 10 m	< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection	1	1	≥ 2	≥ 2	1	≥ 2	≥ 2	≥ 2	1	1	1	≥ 2
<b>Level of Service</b>	<b>C</b>	<b>E</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>B</b>	<b>B</b>	<b>A</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>D</b>	
	<b>E</b>				<b>C</b>				<b>F</b>				
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.61 - 0.70				0.91 - 1.00			
	<b>Level of Service</b>	<b>C</b>				<b>B</b>				<b>E</b>			

## Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation	Project	2020-11
Scenario	Existing and 2022 FB	Date	June 22, 2020
Comments			

SEGMENTS		March Road	N of 125m N of Halton Terrace	S of 125m N of Halton Terrace	S of Klondike Rd
			1	2	3
Pedestrian	Sidewalk Width	F	no sidewalk	≥ 2 m	≥ 2 m
	Boulevard Width		n/a	< 0.5	< 0.5
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000
	Operating Speed		> 60 km/h	> 60 km/h	> 60 km/h
	On-Street Parking		no	no	no
	<b>Exposure to Traffic PLoS</b>		<b>F</b>	<b>F</b>	<b>F</b>
	Effective Sidewalk Width				
Pedestrian Volume					
<b>Crowding PLoS</b>	<b>-</b>	<b>-</b>	<b>-</b>		
<b>Level of Service</b>	<b>-</b>	<b>-</b>	<b>-</b>		
Bicycle	Type of Cycling Facility	F	Mixed Traffic	Curbside Bike Lane	Curbside Bike Lane
	Number of Travel Lanes		2-3 lanes total	≤ 1 each direction	≤ 1 each direction
	Operating Speed		≥ 60 km/h	> 70 km/h	> 70 km/h
	<b># of Lanes &amp; Operating Speed LoS</b>		<b>F</b>	<b>E</b>	<b>E</b>
	Bike Lane (+ Parking Lane) Width			≥ 1.8 m	≥ 1.8 m
	<b>Bike Lane Width LoS</b>		<b>-</b>	<b>A</b>	<b>A</b>
	Bike Lane Blockages			Rare	Rare
	<b>Blockage LoS</b>		<b>-</b>	<b>A</b>	<b>A</b>
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		
<b>Unsignalized Crossing - Lowest LoS</b>	<b>A</b>	<b>A</b>	<b>A</b>		
<b>Level of Service</b>	<b>F</b>	<b>E</b>	<b>E</b>		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
<b>Level of Service</b>	<b>D</b>	<b>D</b>	<b>D</b>		
Truck	Truck Lane Width	C	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m
	Travel Lanes per Direction		1	> 1	> 1
<b>Level of Service</b>	<b>C</b>	<b>A</b>	<b>A</b>		
Auto	<b>Level of Service</b>	<b>Not Applicable</b>			

## Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation	Project	2020-11
Scenario	2022 FT	Date	June 22, 2020
Comments			

SEGMENTS		March Road	N of 125m N of Halton Terrace	S of 125m N of Halton Terrace	S of Klondike Rd
			1	2	3
<b>Pedestrian</b>	Sidewalk Width	<b>F</b>	≥ 2 m	≥ 2 m	≥ 2 m
	Boulevard Width		< 0.5	< 0.5	< 0.5
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000
	Operating Speed		> 60 km/h	> 60 km/h	> 60 km/h
	On-Street Parking		no	no	no
	<b>Exposure to Traffic PLoS</b>		<b>F</b>	<b>F</b>	<b>F</b>
	Effective Sidewalk Width				
Pedestrian Volume					
<b>Crowding PLoS</b>		-	-	-	
<b>Level of Service</b>		-	-	-	
<b>Bicycle</b>	Type of Cycling Facility	<b>F</b>	Mixed Traffic	Curbside Bike Lane	Curbside Bike Lane
	Number of Travel Lanes		2-3 lanes total	≤ 1 each direction	≤ 1 each direction
	Operating Speed		≥ 60 km/h	> 70 km/h	> 70 km/h
	<b># of Lanes &amp; Operating Speed LoS</b>		<b>F</b>	<b>E</b>	<b>E</b>
	Bike Lane (+ Parking Lane) Width			≥ 1.8 m	≥ 1.8 m
	<b>Bike Lane Width LoS</b>		-	<b>A</b>	<b>A</b>
	Bike Lane Blockages			Rare	Rare
	<b>Blockage LoS</b>		-	<b>A</b>	<b>A</b>
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		
<b>Unsignalized Crossing - Lowest LoS</b>	<b>A</b>	<b>A</b>	<b>A</b>		
<b>Level of Service</b>	<b>F</b>	<b>E</b>	<b>E</b>		
<b>Transit</b>	Facility Type	<b>D</b>	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
<b>Level of Service</b>		<b>D</b>	<b>D</b>	<b>D</b>	
<b>Truck</b>	Truck Lane Width	<b>C</b>	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m
	Travel Lanes per Direction		1	> 1	> 1
<b>Level of Service</b>		<b>C</b>	<b>A</b>	<b>A</b>	
<b>Auto</b>	<b>Level of Service</b>	<b>Not Applicable</b>			

## Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation	Project	2020-11
Scenario	2027 FB	Date	June 22, 2020
Comments			

SEGMENTS		March Road	N of 125m N of Halton Terrace	S of 125m N of Halton Terrace	S of Klondike Rd
			1	2	3
<b>Pedestrian</b>	Sidewalk Width	<b>F</b>	≥ 2 m	≥ 2 m	≥ 2 m
	Boulevard Width		< 0.5	< 0.5	< 0.5
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000
	Operating Speed		> 60 km/h	> 60 km/h	> 60 km/h
	On-Street Parking		no	no	no
	<b>Exposure to Traffic PLoS</b>		<b>F</b>	<b>F</b>	<b>F</b>
	Effective Sidewalk Width				
Pedestrian Volume					
<b>Crowding PLoS</b>		-	-	-	
<b>Level of Service</b>		-	-	-	
<b>Bicycle</b>	Type of Cycling Facility	<b>F</b>	Mixed Traffic	Curbside Bike Lane	Curbside Bike Lane
	Number of Travel Lanes		2-3 lanes total	≤ 1 each direction	≤ 1 each direction
	Operating Speed		≥ 60 km/h	> 70 km/h	> 70 km/h
	<b># of Lanes &amp; Operating Speed LoS</b>		<b>F</b>	<b>E</b>	<b>E</b>
	Bike Lane (+ Parking Lane) Width			≥ 1.8 m	≥ 1.8 m
	<b>Bike Lane Width LoS</b>		-	<b>A</b>	<b>A</b>
	Bike Lane Blockages			Rare	Rare
	<b>Blockage LoS</b>		-	<b>A</b>	<b>A</b>
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		
<b>Unsignalized Crossing - Lowest LoS</b>	<b>A</b>	<b>A</b>	<b>A</b>		
<b>Level of Service</b>	<b>F</b>	<b>E</b>	<b>E</b>		
<b>Transit</b>	Facility Type	<b>D</b>	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
<b>Level of Service</b>		<b>D</b>	<b>D</b>	<b>D</b>	
<b>Truck</b>	Truck Lane Width	<b>C</b>	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m
	Travel Lanes per Direction		1	> 1	> 1
<b>Level of Service</b>		<b>C</b>	<b>A</b>	<b>A</b>	
<b>Auto</b>	<b>Level of Service</b>	<b>Not Applicable</b>			

## Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation	Project	2020-11
Scenario	2027 FT	Date	June 22, 2020
Comments			

SEGMENTS		March Road	N of 125m N of Halton Terrace	S of 125m N of Halton Terrace	S of Klondike Rd
			1	2	3
Pedestrian	Sidewalk Width	F	≥ 2 m	≥ 2 m	≥ 2 m
	Boulevard Width		< 0.5	< 0.5	< 0.5
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000
	Operating Speed		> 60 km/h	> 60 km/h	> 60 km/h
	On-Street Parking		no	no	no
	<b>Exposure to Traffic PLoS</b>		<b>F</b>	<b>F</b>	<b>F</b>
	Effective Sidewalk Width				
Pedestrian Volume					
<b>Crowding PLoS</b>	<b>-</b>	<b>-</b>	<b>-</b>		
<b>Level of Service</b>	<b>-</b>	<b>-</b>	<b>-</b>		
Bicycle	Type of Cycling Facility	E	Curbside Bike Lane	Curbside Bike Lane	Curbside Bike Lane
	Number of Travel Lanes		≤ 1 each direction	≤ 1 each direction	≤ 1 each direction
	Operating Speed		> 70 km/h	> 70 km/h	> 70 km/h
	<b># of Lanes &amp; Operating Speed LoS</b>		<b>E</b>	<b>E</b>	<b>E</b>
	Bike Lane (+ Parking Lane) Width		≥ 1.8 m	≥ 1.8 m	≥ 1.8 m
	<b>Bike Lane Width LoS</b>		<b>A</b>	<b>A</b>	<b>A</b>
	Bike Lane Blockages		Rare	Rare	Rare
	<b>Blockage LoS</b>		<b>A</b>	<b>A</b>	<b>A</b>
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		
<b>Unsignalized Crossing - Lowest LoS</b>	<b>A</b>	<b>A</b>	<b>A</b>		
<b>Level of Service</b>	<b>E</b>	<b>E</b>	<b>E</b>		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
<b>Level of Service</b>	<b>D</b>	<b>D</b>	<b>D</b>		
Truck	Truck Lane Width	C	≤ 3.5 m	≤ 3.5 m	≤ 3.5 m
	Travel Lanes per Direction		1	> 1	> 1
<b>Level of Service</b>	<b>C</b>	<b>A</b>	<b>A</b>		
Auto	<b>Level of Service</b>	<b>Not Applicable</b>			

# Appendix M

Signalization Warrants

Access #1 & March Road  
2022 FT

**Justification #7**

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	716	149%	133%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	160	133%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	609	127%	127%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	73	145%		

Notes

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



Access #1 & March Road  
2027 FT

**Justification #7**

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1287	268%	97%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	116	97%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	1171	244%	149%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	75	149%		

Notes

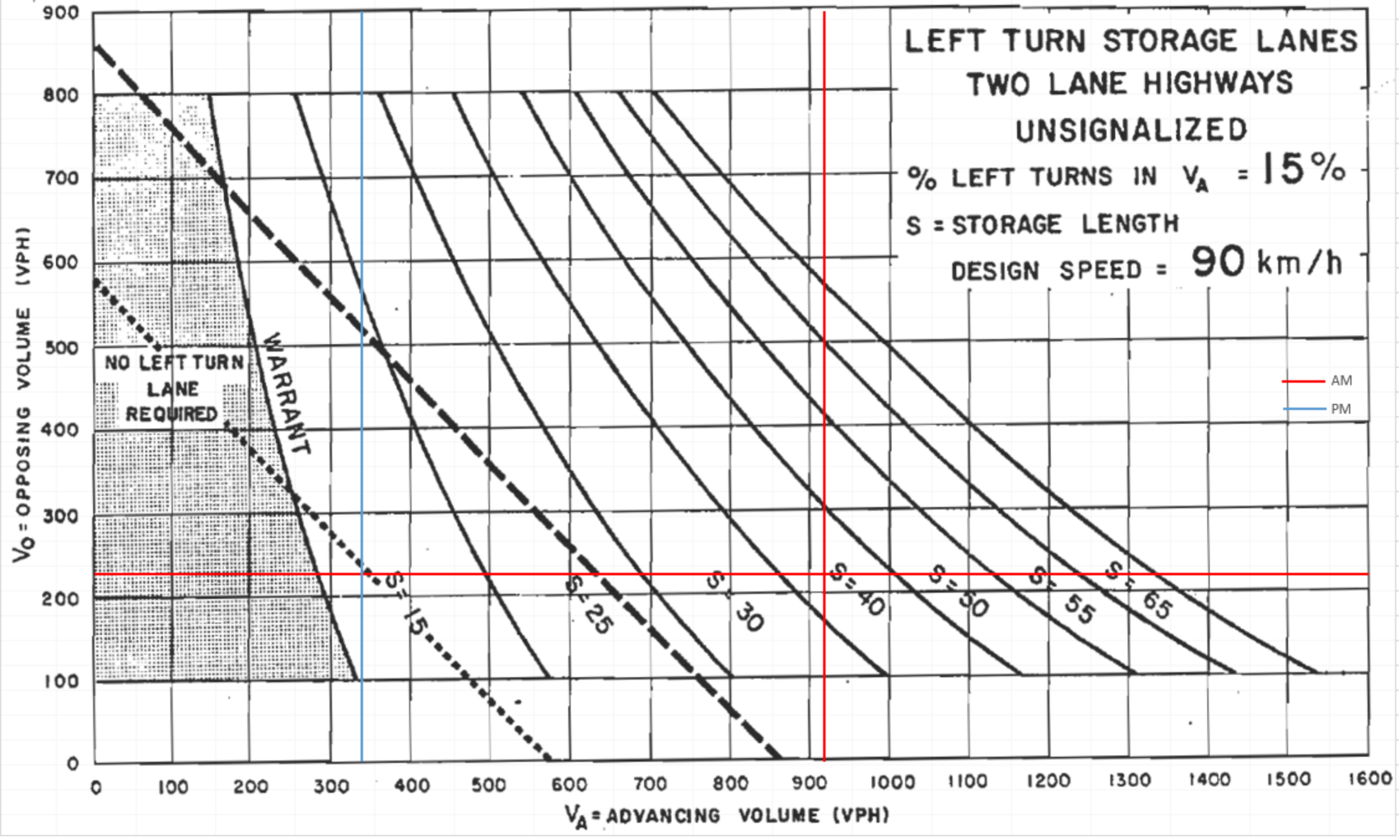
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

# Appendix N

Left-turn Lane Warrants

Design Speed	Southbound Left	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes			%Left Turn	Volume Advancing	Volume Opposing	
											SBL	SBT	SBR				
90 km/h																	
Access #1	2022 FT	AM	0	0	0	169	0	29	0	216	11	100	816	0	10.9%	916	227
		PM	0	0	0	121	0	67	0	946	12	37	298	0	11.0%	335	958

LEFT TURN STORAGE LANES  
 TWO LANE HIGHWAYS  
 UNSIGNALIZED  
 % LEFT TURNS IN  $V_A = 15\%$   
 S = STORAGE LENGTH  
 DESIGN SPEED = 90 km/h



Design Speed	Southbound Left												Yes				
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
90 km/h																	
Access #1	2027 FT	AM	5	5	21	155	5	37	4	620	11	91	1516	0	5.7%	1607	635
		PM	5	6	37	122	9	97	23	1586	12	44	767	8	5.4%	819	1621

LEFT TURN STORAGE LANES  
TWO LANE HIGHWAYS  
UNSIGNALIZED

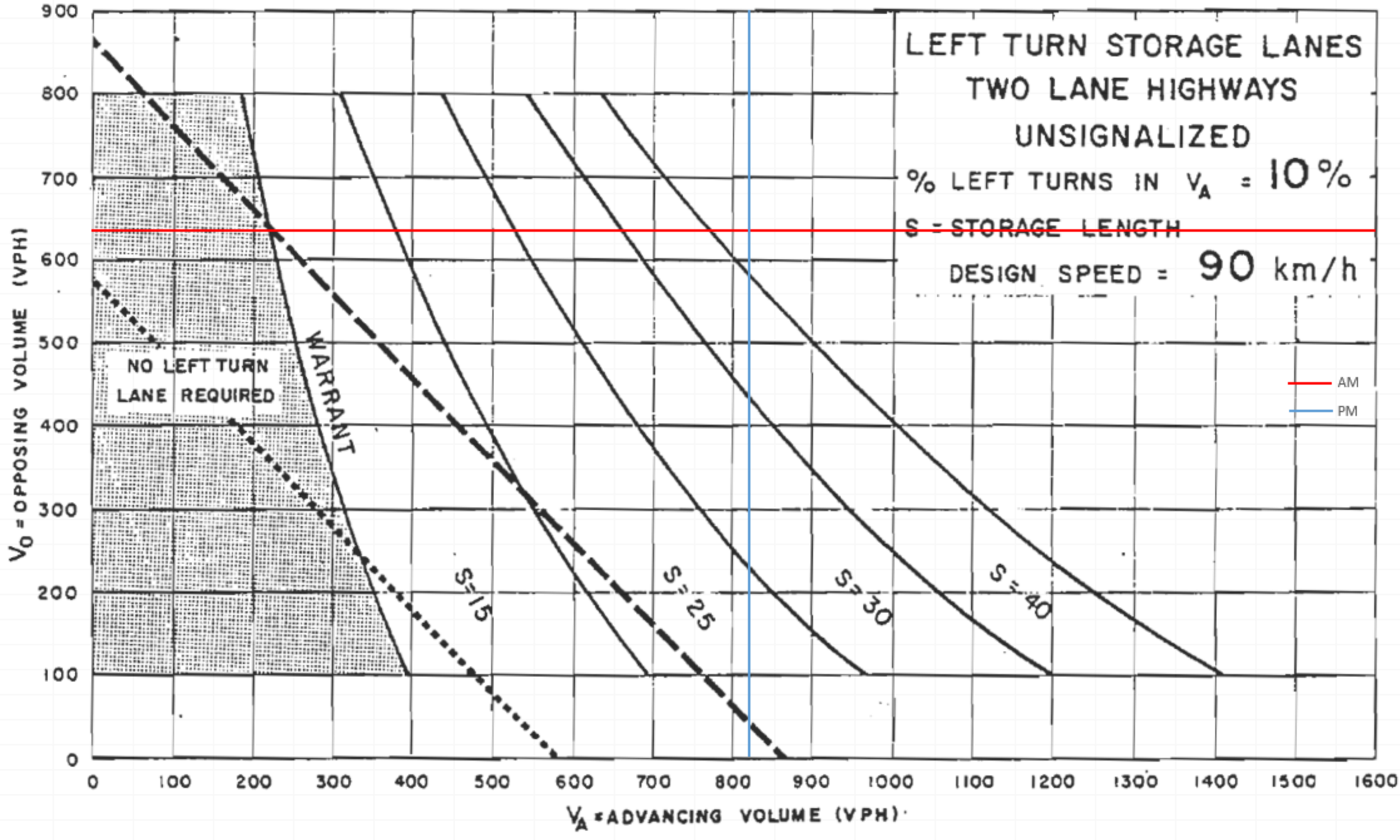
% LEFT TURNS IN  $V_A = 10\%$

S - STORAGE LENGTH

DESIGN SPEED = 90 km/h

$V_0$  = OPPOSING VOLUME (VPH)

$V_A$  = ADVANCING VOLUME (VPH)



# Appendix O

HV% Calculations

[1] March Road at Halton Terrace / Maxwell Bridge Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	2	22	4	1	13	1	0	5	2	1	0	2
Total Volume	23	178	61	68	807	12	21	37	95	125	16	23
HV%	9%	12%	7%	1%	2%	8%	0%	14%	2%	1%	0%	9%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	5	0	0	4	0	0	5	2	4	2	0
Total Volume	172	873	114	59	238	12	17	55	41	79	58	89
HV%	0%	1%	0%	0%	2%	0%	0%	9%	5%	5%	3%	0%

[2] March Road at Klondike Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	4	18	4	3	15	3	4	2	2	2	2	2
Total Volume	83	274	44	17	883	33	30	35	253	91	25	19
HV%	5%	7%	9%	18%	2%	9%	13%	6%	1%	2%	8%	11%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	1	2	0	0	8	0	0	0	0	1	2	0
Total Volume	159	1122	81	2	418	57	79	22	110	60	31	22
HV%	1%	0%	0%	0%	2%	0%	0%	0%	0%	2%	6%	0%



# Appendix P

2020 Existing Conditions Synchro Sheets

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2020 Existing-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	37	95	125	16	23	23	178	61	68	807	12
Future Volume (vph)	21	37	95	125	16	23	23	178	61	68	807	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99		1.00					0.98	1.00		
Frt		0.892			0.911				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1493	0	1658	1528	0	1551	3020	1414	1658	3316	1401
Flt Permitted	0.728			0.588			0.283			0.617		
Satd. Flow (perm)	1270	1493	0	1025	1528	0	462	3020	1380	1073	3316	1401
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		106			26				100			100
Link Speed (k/h)		40			40			80			80	
Link Distance (m)		143.7			356.2			324.9			267.2	
Travel Time (s)		12.9			32.1			14.6			12.0	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	14%	2%	2%	2%	9%	9%	12%	7%	2%	2%	8%
Adj. Flow (vph)	23	41	106	139	18	26	26	198	68	76	897	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	147	0	139	44	0	26	198	68	76	897	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2020 Existing-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	48.0	48.0		48.0	48.0		20.0	52.0	52.0	20.0	52.0	52.0
Total Split (%)	40.0%	40.0%		40.0%	40.0%		16.7%	43.3%	43.3%	16.7%	43.3%	43.3%
Maximum Green (s)	41.4	41.4		41.4	41.4		12.6	45.4	45.4	13.6	45.4	45.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	20.1	20.1		20.1	20.1		79.8	75.5	75.5	83.4	78.4	78.4
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.66	0.63	0.63	0.70	0.65	0.65
v/c Ratio	0.11	0.44		0.81	0.16		0.07	0.10	0.08	0.10	0.41	0.01
Control Delay	40.0	17.6		80.0	21.7		7.2	11.0	1.2	6.4	12.7	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	17.6		80.0	21.7		7.2	11.0	1.2	6.4	12.7	0.0
LOS	D	B		F	C		A	B	A	A	B	A
Approach Delay		20.6			66.0			8.4			12.1	
Approach LOS		C			E			A			B	
Queue Length 50th (m)	4.7	8.4		31.9	3.6		1.6	9.5	0.0	4.6	55.6	0.0
Queue Length 95th (m)	11.1	24.7		50.7	12.8		5.3	18.6	3.1	11.6	86.6	0.0
Internal Link Dist (m)		119.7			332.2			300.9			243.2	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	438	584		353	544		440	1900	905	841	2165	949
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	0.05	0.25		0.39	0.08		0.06	0.10	0.08	0.09	0.41	0.01

Intersection Summary

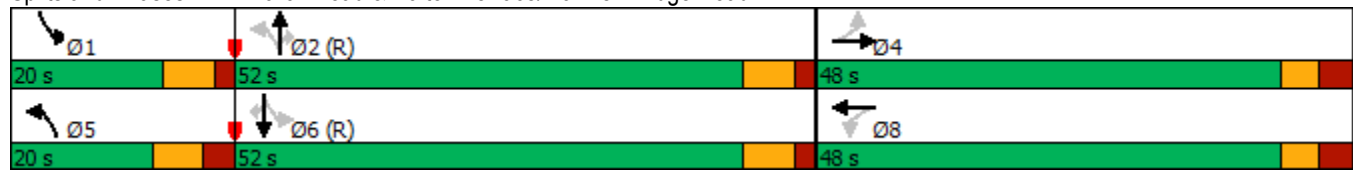
Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 99 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81  
 Intersection Signal Delay: 18.4  
 Intersection LOS: B

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2020 Existing-AM  
 910 March Road

Intersection Capacity Utilization 67.6%      ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2020 Existing-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	35	253	91	25	19	83	274	44	17	883	33
Future Volume (vph)	30	35	253	91	25	19	83	274	44	17	883	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.98	0.99	0.99		1.00	1.00		0.99	1.00	
Frt			0.850		0.936			0.979			0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1496	1679	1483	1658	1515	0	3124	4416	0	1433	4726	0
Flt Permitted	0.510			0.732			0.950			0.950		
Satd. Flow (perm)	801	1679	1456	1270	1515	0	3119	4416	0	1424	4726	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			186		21			28			5	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	3		6	6		3	3		4	4		3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	13%	6%	2%	2%	8%	11%	5%	7%	9%	18%	2%	9%
Adj. Flow (vph)	33	39	281	101	28	21	92	304	49	19	981	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	39	281	101	49	0	92	353	0	19	1018	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2020 Existing-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	4	8	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	5.0	
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	12.0	57.0	57.0	45.0	45.0		15.0	58.0		15.0	58.0	
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		11.5%	44.6%		11.5%	44.6%	
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		8.4	51.6		8.4	51.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	23.4	22.9	22.9	15.7	15.7		9.2	87.4		7.3	77.8	
Actuated g/C Ratio	0.18	0.18	0.18	0.12	0.12		0.07	0.67		0.06	0.60	
v/c Ratio	0.19	0.13	0.69	0.66	0.24		0.42	0.12		0.24	0.36	
Control Delay	42.0	41.1	24.4	73.6	34.4		63.2	9.7		64.9	15.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	42.0	41.1	24.4	73.6	34.4		63.2	9.7		64.9	15.5	
LOS	D	D	C	E	C		E	A		E	B	
Approach Delay		27.9			60.8			20.8			16.4	
Approach LOS		C			E			C			B	
Queue Length 50th (m)	6.8	8.1	21.0	25.1	6.5		11.8	9.5		4.8	50.9	
Queue Length 95th (m)	14.8	16.7	47.2	41.7	17.6		20.3	21.9		12.8	72.1	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	173	644	673	370	456		230	2976		95	2831	
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	0.19	0.06	0.42	0.27	0.11		0.40	0.12		0.20	0.36	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 64 (49%), 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: 22.8  
 Intersection LOS: C























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

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2020 Existing-AM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	35	253	91	25	19	83	274	44	17	883	33
Future Volume (veh/h)	30	35	253	91	25	19	83	274	44	17	883	33
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1593	1698	1765	1765	1647	1800	1714	1678	1800	1525	1760	1800
Adj Flow Rate, veh/h	33	39	0	101	28	21	92	304	49	19	981	37
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	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
Percent Heavy Veh, %	13	6	2	2	8	8	5	7	7	18	2	2
Cap, veh/h	218	352	311	230	113	85	136	2472	387	28	2828	107
Arrive On Green	0.03	0.21	0.00	0.13	0.13	0.13	0.04	0.62	0.62	0.02	0.60	0.60
Sat Flow, veh/h	1517	1698	1500	1345	869	652	3167	3994	625	1453	4753	179
Grp Volume(v), veh/h	33	39	0	101	0	49	92	230	123	19	661	357
Grp Sat Flow(s),veh/h/ln	1517	1698	1500	1345	0	1521	1584	1527	1565	1453	1602	1728
Q Serve(g_s), s	2.4	2.4	0.0	9.2	0.0	3.8	3.7	4.0	4.2	1.7	13.7	13.7
Cycle Q Clear(g_c), s	2.4	2.4	0.0	9.2	0.0	3.8	3.7	4.0	4.2	1.7	13.7	13.7
Prop In Lane	1.00		1.00	1.00		0.43	1.00		0.40	1.00		0.10
Lane Grp Cap(c), veh/h	218	352	311	230	0	198	136	1890	969	28	1906	1028
V/C Ratio(X)	0.15	0.11	0.00	0.44	0.00	0.25	0.68	0.12	0.13	0.68	0.35	0.35
Avail Cap(c_a), veh/h	240	652	576	447	0	443	205	1890	969	94	1906	1028
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	41.8	0.0	53.2	0.0	50.9	61.3	10.2	10.2	63.4	13.4	13.4
Incr Delay (d2), s/veh	0.3	0.1	0.0	1.3	0.0	0.6	5.8	0.1	0.3	25.8	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.2	0.0	3.5	0.0	1.6	1.7	1.7	1.9	0.9	6.2	6.8
LnGrp Delay(d),s/veh	46.0	41.9	0.0	54.5	0.0	51.5	67.1	10.3	10.5	89.2	13.9	14.4
LnGrp LOS	D	D		D		D	E	B	B	F	B	B
Approach Vol, veh/h		72			150			445			1037	
Approach Delay, s/veh		43.8			53.5			22.1			15.5	
Approach LOS		D			D			C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.1	86.9		34.1	12.2	83.8	10.1	24.0				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	8.4	* 52		49.9	8.4	* 52	5.4	37.9				
Max Q Clear Time (g_c+I1), s	3.7	6.2		4.4	5.7	15.7	4.4	11.2				
Green Ext Time (p_c), s	0.0	2.9		0.2	0.1	9.5	0.0	0.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			21.7									
HCM 2010 LOS			C									
<b>Notes</b>												



Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2020 Existing-PM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	55	41	79	58	89	172	873	114	59	238	12
Future Volume (vph)	17	55	41	79	58	89	172	873	114	59	238	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.98	0.99		1.00		0.96	1.00		0.98
Frt		0.936			0.909				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1532	0	1610	1557	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.487			0.687			0.553			0.278		
Satd. Flow (perm)	842	1532	0	1145	1557	0	962	3316	1419	483	3316	1447
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			68				127			100
Link Speed (k/h)		40			40			80				80
Link Distance (m)		143.7			356.2			324.9				267.2
Travel Time (s)		12.9			32.1			14.6				12.0
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	19	61	46	88	64	99	191	970	127	66	264	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	107	0	88	163	0	191	970	127	66	264	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings  
1: March Road & Halton Terrace/Maxwell Bridge Road

2020 Existing-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	45.0	45.0		45.0	45.0		20.0	55.0	55.0	20.0	55.0	55.0
Total Split (%)	37.5%	37.5%		37.5%	37.5%		16.7%	45.8%	45.8%	16.7%	45.8%	45.8%
Maximum Green (s)	38.4	38.4		38.4	38.4		12.6	48.4	48.4	13.6	48.4	48.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	15.1	15.1		15.1	15.1		88.3	81.0	81.0	81.7	74.8	74.8
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.74	0.68	0.68	0.68	0.62	0.62
v/c Ratio	0.18	0.48		0.61	0.64		0.25	0.43	0.13	0.17	0.13	0.01
Control Delay	48.5	39.8		66.7	39.5		5.4	11.0	2.0	5.7	10.4	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.5	39.8		66.7	39.5		5.4	11.0	2.0	5.7	10.4	0.0
LOS	D	D		E	D		A	B	A	A	B	A
Approach Delay		41.1			49.1			9.3			9.1	
Approach LOS		D			D			A			A	
Queue Length 50th (m)	4.1	16.3		20.0	21.3		10.3	53.1	0.0	3.2	12.2	0.0
Queue Length 95th (m)	10.8	32.0		35.3	41.3		21.4	82.2	7.7	8.2	22.6	0.0
Internal Link Dist (m)		119.7			332.2			300.9			243.2	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	269	512		366	544		797	2236	998	489	2067	939
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	0.07	0.21		0.24	0.30		0.24	0.43	0.13	0.13	0.13	0.01

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	50 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	16.2
Intersection LOS:	B

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2020 Existing-PM  
 910 March Road

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

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2020 Existing-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↑	↶	↵	↶		↶↶	↑↑↶		↵	↑↑↶	
Traffic Volume (vph)	79	22	110	60	31	22	159	1122	81	2	418	57
Future Volume (vph)	79	22	110	60	31	22	159	1122	81	2	418	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		0.99	1.00		1.00	1.00	
Frt			0.850		0.938			0.990			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1591	0	3216	4702	0	1658	4665	0
Flt Permitted	0.446			0.742			0.950			0.950		
Satd. Flow (perm)	778	1745	1462	1292	1591	0	3185	4702	0	1651	4665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			122		24			9			20	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	88	24	122	67	34	24	177	1247	90	2	464	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	24	122	67	58	0	177	1337	0	2	527	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2020 Existing-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	4	8	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	5.0	
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	12.0	57.0	57.0	45.0	45.0		22.0	51.0		22.0	51.0	
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		16.9%	39.2%		16.9%	39.2%	
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		15.4	44.6		15.4	44.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	22.0	21.5	21.5	12.1	12.1		12.5	92.4		5.8	75.9	
Actuated g/C Ratio	0.17	0.17	0.17	0.09	0.09		0.10	0.71		0.04	0.58	
v/c Ratio	0.52	0.08	0.36	0.56	0.34		0.57	0.40		0.03	0.19	
Control Delay	56.4	42.3	10.0	72.7	39.5		63.4	9.5		60.0	13.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	56.4	42.3	10.0	72.7	39.5		63.4	9.5		60.0	13.8	
LOS	E	D	B	E	D		E	A		E	B	
Approach Delay		30.8			57.3			15.8			14.0	
Approach LOS		C			E			B			B	
Queue Length 50th (m)	19.5	5.1	0.0	16.7	8.2		22.7	45.3		0.5	22.3	
Queue Length 95th (m)	33.1	12.2	15.5	30.8	20.9		33.6	83.9		3.3	33.9	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	169	669	636	376	480		383	3344		196	2733	
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	0.52	0.04	0.19	0.18	0.12		0.46	0.40		0.01	0.19	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 20 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.57  
 Intersection Signal Delay: 19.0  
 Intersection LOS: B























Intersection Capacity Utilization 58.3% ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2020 Existing-PM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	22	110	60	31	22	159	1122	81	2	418	57
Future Volume (veh/h)	79	22	110	60	31	22	159	1122	81	2	418	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1725	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	88	24	0	67	34	24	177	1247	90	2	464	63
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	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
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	189	309	262	169	78	55	233	3061	221	5	2575	343
Arrive On Green	0.04	0.17	0.00	0.08	0.08	0.08	0.07	0.67	0.67	0.00	0.60	0.60
Sat Flow, veh/h	1681	1765	1500	1372	939	663	3261	4584	331	1681	4299	573
Grp Volume(v), veh/h	88	24	0	67	0	58	177	874	463	2	345	182
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1372	0	1602	1630	1606	1703	1681	1606	1660
Q Serve(g_s), s	5.4	1.5	0.0	6.1	0.0	4.5	6.9	16.1	16.1	0.2	6.3	6.4
Cycle Q Clear(g_c), s	5.4	1.5	0.0	6.1	0.0	4.5	6.9	16.1	16.1	0.2	6.3	6.4
Prop In Lane	1.00		1.00	1.00		0.41	1.00		0.19	1.00		0.35
Lane Grp Cap(c), veh/h	189	309	262	169	0	132	233	2145	1137	5	1924	994
V/C Ratio(X)	0.46	0.08	0.00	0.40	0.00	0.44	0.76	0.41	0.41	0.44	0.18	0.18
Avail Cap(c_a), veh/h	189	677	576	455	0	467	386	2145	1137	199	1924	994
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.7	44.9	0.0	57.5	0.0	56.8	59.3	9.9	9.9	64.7	11.7	11.7
Incr Delay (d2), s/veh	1.8	0.1	0.0	1.5	0.0	2.3	5.0	0.6	1.1	56.3	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.7	0.0	2.4	0.0	2.1	3.3	7.2	7.8	0.1	2.8	3.1
LnGrp Delay(d),s/veh	53.5	45.0	0.0	59.0	0.0	59.0	64.3	10.4	10.9	121.0	11.9	12.1
LnGrp LOS	D	D		E		E	E	B	B	F	B	B
Approach Vol, veh/h		112			125			1514			529	
Approach Delay, s/veh		51.7			59.0			16.9			12.4	
Approach LOS		D			E			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.9	93.2		29.8	15.9	84.3	12.0	17.8				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	15.4	* 45		49.9	15.4	* 45	5.4	37.9				
Max Q Clear Time (g_c+1), s	2.2	18.1		3.5	8.9	8.4	7.4	8.1				
Green Ext Time (p_c), s	0.0	12.1		0.1	0.4	4.3	0.0	0.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			19.9									
HCM 2010 LOS			B									
<b>Notes</b>												

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2020 Existing-Sat  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	55	41	79	58	89	172	873	114	59	238	12
Future Volume (vph)	17	55	41	79	58	89	172	873	114	59	238	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00		0.96	1.00		0.98
Frt		0.936			0.909				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1535	0	1610	1559	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.578			0.688			0.589			0.278		
Satd. Flow (perm)	1001	1535	0	1151	1559	0	1025	3316	1427	483	3316	1449
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			86				127			41
Link Speed (k/h)		40			40			80				80
Link Distance (m)		143.7			356.2			324.9				267.2
Travel Time (s)		12.9			32.1			14.6				12.0
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	19	61	46	88	64	99	191	970	127	66	264	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	107	0	88	163	0	191	970	127	66	264	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0



Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2020 Existing-Sat  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		34.6	34.6	34.6	34.6	34.6	34.6
Total Split (s)	39.0	39.0		39.0	39.0		56.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	41.1%	41.1%		41.1%	41.1%		58.9%	58.9%	58.9%	58.9%	58.9%	58.9%
Maximum Green (s)	32.4	32.4		32.4	32.4		49.4	49.4	49.4	49.4	49.4	49.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.0	2.0	2.0	2.0	2.0
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)	6.6	6.6		6.6	6.6		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		21.0	21.0	21.0	21.0	21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	13.3	13.3		13.3	13.3		68.5	68.5	68.5	68.5	68.5	68.5
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.72	0.72	0.72	0.72	0.72	0.72
v/c Ratio	0.14	0.42		0.55	0.56		0.26	0.41	0.12	0.19	0.11	0.01
Control Delay	36.0	27.6		50.1	25.6		6.2	6.2	1.3	6.8	4.6	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	27.6		50.1	25.6		6.2	6.2	1.3	6.8	4.6	0.0
LOS	D	C		D	C		A	A	A	A	A	A
Approach Delay		28.9			34.2			5.7			4.8	
Approach LOS		C			C			A			A	
Queue Length 50th (m)	3.1	10.8		15.4	13.1		9.8	30.2	0.0	3.2	6.3	0.0
Queue Length 95th (m)	9.0	24.5		28.6	30.3		23.1	51.3	5.3	10.1	12.6	0.3
Internal Link Dist (m)		119.7			332.2			300.9			243.2	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	341	551		392	588		738	2390	1064	348	2390	1055
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	0.06	0.19		0.22	0.28		0.26	0.41	0.12	0.19	0.11	0.01

Intersection Summary

Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	95
Offset:	11 (12%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	10.6
Intersection LOS:	B

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2020 Existing-Sat  
 910 March Road

Intersection Capacity Utilization 70.3%      ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2020 Existing-Sat  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	22	110	60	31	22	159	1122	81	2	418	57
Future Volume (vph)	79	22	110	60	31	22	159	1122	81	2	418	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		0.99	1.00		1.00	1.00	
Frt			0.850		0.938			0.990			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1592	0	3216	4703	0	1658	4666	0
Flt Permitted	0.719			0.742			0.950			0.950		
Satd. Flow (perm)	1254	1745	1463	1293	1592	0	3190	4703	0	1652	4666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			122		24			12			26	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	88	24	122	67	34	24	177	1247	90	2	464	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	24	122	67	58	0	177	1337	0	2	527	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2020 Existing-Sat  
910 March Road



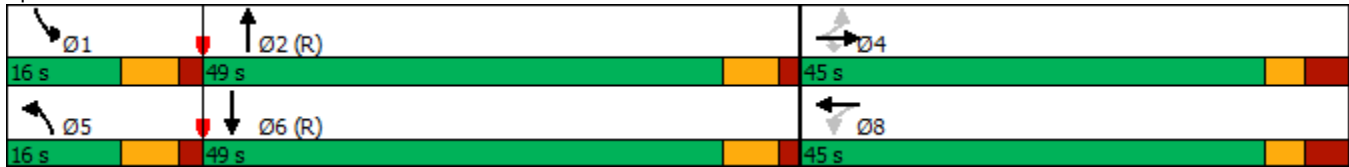
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	44.1	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	45.0	45.0	45.0	45.0	45.0		16.0	49.0		16.0	49.0	
Total Split (%)	40.9%	40.9%	40.9%	40.9%	40.9%		14.5%	44.5%		14.5%	44.5%	
Maximum Green (s)	37.9	37.9	37.9	37.9	37.9		9.4	42.6		9.4	42.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	7.1	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	13.1	13.1	13.1	13.1	13.1		11.3	80.8		5.7	65.4	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.10	0.73		0.05	0.59	
v/c Ratio	0.59	0.12	0.43	0.44	0.27		0.53	0.39		0.02	0.19	
Control Delay	60.8	42.0	12.3	52.3	30.6		52.5	6.8		50.0	10.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	60.8	42.0	12.3	52.3	30.6		52.5	6.8		50.0	10.7	
LOS	E	D	B	D	C		D	A		D	B	
Approach Delay		33.6			42.2			12.2			10.9	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	18.2	4.7	0.0	13.6	6.7		18.9	29.4		0.4	16.7	
Queue Length 95th (m)	32.4	11.7	15.3	25.9	17.7		28.9	67.6		2.9	27.6	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	432	601	584	445	564		339	3458		141	2786	
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	0.20	0.04	0.21	0.15	0.10		0.52	0.39		0.01	0.19	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.59  
 Intersection Signal Delay: 15.5  
 Intersection LOS: B

Intersection Capacity Utilization 58.3% ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2020 Existing-Sat  
910 March Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	22	110	60	31	22	159	1122	81	2	418	57
Future Volume (veh/h)	79	22	110	60	31	22	159	1122	81	2	418	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1725	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	88	24	0	67	34	24	177	1247	90	2	464	63
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	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
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	198	232	198	230	124	87	235	3130	226	5	2637	352
Arrive On Green	0.13	0.13	0.00	0.13	0.13	0.13	0.07	0.68	0.68	0.00	0.61	0.61
Sat Flow, veh/h	1335	1765	1500	1376	940	664	3261	4584	331	1681	4299	573
Grp Volume(v), veh/h	88	24	0	67	0	58	177	874	463	2	345	182
Grp Sat Flow(s),veh/h/ln	1335	1765	1500	1376	0	1604	1630	1606	1703	1681	1606	1660
Q Serve(g_s), s	7.0	1.3	0.0	5.0	0.0	3.6	5.9	13.0	13.0	0.1	5.1	5.3
Cycle Q Clear(g_c), s	10.6	1.3	0.0	6.3	0.0	3.6	5.9	13.0	13.0	0.1	5.1	5.3
Prop In Lane	1.00		1.00	1.00		0.41	1.00		0.19	1.00		0.35
Lane Grp Cap(c), veh/h	198	232	198	230	0	211	235	2193	1163	5	1970	1018
V/C Ratio(X)	0.45	0.10	0.00	0.29	0.00	0.27	0.75	0.40	0.40	0.44	0.17	0.18
Avail Cap(c_a), veh/h	482	608	517	523	0	553	279	2193	1163	144	1970	1018
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	42.0	0.0	44.8	0.0	43.0	50.1	7.6	7.6	54.8	9.2	9.2
Incr Delay (d2), s/veh	1.6	0.2	0.0	0.7	0.0	0.7	9.2	0.5	1.0	55.6	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.7	0.0	1.9	0.0	1.6	2.9	5.9	6.4	0.1	2.3	2.5
LnGrp Delay(d),s/veh	49.4	42.2	0.0	45.5	0.0	43.7	59.3	8.1	8.6	110.4	9.4	9.6
LnGrp LOS	D	D		D		D	E	A	A	F	A	A
Approach Vol, veh/h		112			125			1514			529	
Approach Delay, s/veh		47.8			44.7			14.3			9.9	
Approach LOS		D			D			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	81.5		21.6	14.5	73.9		21.6				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4		7.1				
Max Green Setting (Gmax), s	9.4	* 43		37.9	9.4	* 43		37.9				
Max Q Clear Time (g_c+1), s	2.1	15.0		12.6	7.9	7.3		8.3				
Green Ext Time (p_c), s	0.0	12.3		0.5	0.1	4.3		0.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			16.6									
HCM 2010 LOS			B									
<b>Notes</b>												

# Appendix Q

2022 Future Background Synchro Sheets

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FB-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	37	95	125	16	24	23	185	62	68	820	12
Future Volume (vph)	21	37	95	125	16	24	23	185	62	68	820	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99		1.00					0.98	1.00		
Frt		0.892			0.910				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1493	0	1658	1525	0	1551	3020	1414	1658	3316	1401
Flt Permitted	0.731			0.619			0.316			0.627		
Satd. Flow (perm)	1276	1493	0	1079	1525	0	516	3020	1380	1091	3316	1401
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			24				100			100
Link Speed (k/h)		40			40			80			80	
Link Distance (m)		143.7			356.2			324.9			267.2	
Travel Time (s)		12.9			32.1			14.6			12.0	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	14%	2%	2%	2%	9%	9%	12%	7%	2%	2%	8%
Adj. Flow (vph)	21	37	95	125	16	24	23	185	62	68	820	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	132	0	125	40	0	23	185	62	68	820	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FB-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	48.0	48.0		48.0	48.0		20.0	52.0	52.0	20.0	52.0	52.0
Total Split (%)	40.0%	40.0%		40.0%	40.0%		16.7%	43.3%	43.3%	16.7%	43.3%	43.3%
Maximum Green (s)	41.4	41.4		41.4	41.4		12.6	45.4	45.4	13.6	45.4	45.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	18.3	18.3		18.3	18.3		81.7	77.6	77.6	85.1	80.3	80.3
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.68	0.65	0.65	0.71	0.67	0.67
v/c Ratio	0.11	0.43		0.76	0.16		0.06	0.09	0.07	0.08	0.37	0.01
Control Delay	41.8	18.7		75.8	22.8		6.4	10.0	0.8	5.7	11.2	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	18.7		75.8	22.8		6.4	10.0	0.8	5.7	11.2	0.0
LOS	D	B		E	C		A	B	A	A	B	A
Approach Delay		21.9			62.9			7.6			10.7	
Approach LOS		C			E			A			B	
Queue Length 50th (m)	4.3	7.7		28.6	3.3		1.3	8.4	0.0	3.8	47.0	0.0
Queue Length 95th (m)	10.8	23.8		46.2	12.2		4.5	16.5	2.1	9.8	73.3	0.0
Internal Link Dist (m)		119.7			332.2			300.9			243.2	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	440	577		372	541		482	1952	927	869	2217	970
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	0.05	0.23		0.34	0.07		0.05	0.09	0.07	0.08	0.37	0.01

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 99 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

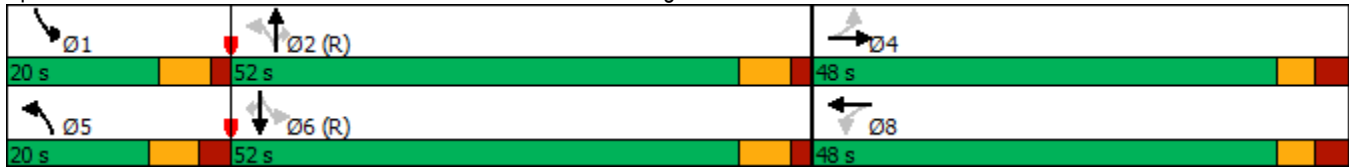
Maximum v/c Ratio: 0.76

Intersection Signal Delay: 17.0

Intersection LOS: B

Intersection Capacity Utilization 68.0%      ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FB-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	36	253	113	28	22	83	280	52	18	896	33
Future Volume (vph)	30	36	253	113	28	22	83	280	52	18	896	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.98	0.99	0.99		1.00	1.00		0.99	1.00	
Frt			0.850		0.934			0.977			0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1496	1679	1483	1658	1511	0	3124	4403	0	1433	4726	0
Flt Permitted	0.521			0.734			0.950			0.950		
Satd. Flow (perm)	818	1679	1456	1273	1511	0	3118	4403	0	1424	4726	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			197		22			34			5	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	3		6	6		3	3		4	4		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	2%	2%	8%	11%	5%	7%	9%	18%	2%	9%
Adj. Flow (vph)	30	36	253	113	28	22	83	280	52	18	896	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	36	253	113	50	0	83	332	0	18	929	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FB-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	4	8	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	5.0	
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	12.0	57.0	57.0	45.0	45.0		15.0	58.0		15.0	58.0	
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		11.5%	44.6%		11.5%	44.6%	
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		8.4	51.6		8.4	51.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag	Lead			Lag			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	24.6	24.1	24.1	16.9	16.9		8.8	86.2		7.2	77.0	
Actuated g/C Ratio	0.19	0.19	0.19	0.13	0.13		0.07	0.66		0.06	0.59	
v/c Ratio	0.16	0.12	0.59	0.68	0.23		0.39	0.11		0.23	0.33	
Control Delay	40.2	39.6	16.3	73.4	32.8		63.0	10.0		64.7	15.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.2	39.6	16.3	73.4	32.8		63.0	10.0		64.7	15.6	
LOS	D	D	B	E	C		E	A		E	B	
Approach Delay		21.2			60.9			20.6			16.5	
Approach LOS		C			E			C			B	
Queue Length 50th (m)	6.1	7.4	11.7	28.0	6.5		10.6	9.0		4.5	46.0	
Queue Length 95th (m)	13.3	15.4	34.6	45.6	17.3		18.8	20.8		12.5	66.0	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	183	644	680	371	456		224	2930		95	2799	
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	0.16	0.06	0.37	0.30	0.11		0.37	0.11		0.19	0.33	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 64 (49%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 22.2  
 Intersection LOS: C























Intersection Capacity Utilization 65.1% ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2022 FB-AM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	36	253	113	28	22	83	280	52	18	896	33
Future Volume (veh/h)	30	36	253	113	28	22	83	280	52	18	896	33
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1593	1698	1765	1765	1647	1800	1714	1677	1800	1525	1760	1800
Adj Flow Rate, veh/h	30	36	0	113	28	22	83	280	52	18	896	33
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	6	2	2	8	8	5	7	7	18	2	2
Cap, veh/h	224	362	320	240	116	91	126	2397	430	27	2820	104
Arrive On Green	0.03	0.21	0.00	0.14	0.14	0.14	0.04	0.61	0.61	0.02	0.59	0.59
Sat Flow, veh/h	1517	1698	1500	1349	850	668	3167	3904	700	1453	4758	175
Grp Volume(v), veh/h	30	36	0	113	0	50	83	217	115	18	603	326
Grp Sat Flow(s),veh/h/ln	1517	1698	1500	1349	0	1518	1584	1526	1551	1453	1602	1729
Q Serve(g_s), s	2.2	2.2	0.0	10.3	0.0	3.8	3.4	3.8	4.0	1.6	12.3	12.3
Cycle Q Clear(g_c), s	2.2	2.2	0.0	10.3	0.0	3.8	3.4	3.8	4.0	1.6	12.3	12.3
Prop In Lane	1.00		1.00	1.00		0.44	1.00		0.45	1.00		0.10
Lane Grp Cap(c), veh/h	224	362	320	240	0	208	126	1874	952	27	1899	1025
V/C Ratio(X)	0.13	0.10	0.00	0.47	0.00	0.24	0.66	0.12	0.12	0.67	0.32	0.32
Avail Cap(c_a), veh/h	248	652	576	449	0	443	205	1874	952	94	1899	1025
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.0	41.1	0.0	52.9	0.0	50.1	61.6	10.4	10.5	63.4	13.3	13.3
Incr Delay (d2), s/veh	0.3	0.1	0.0	1.4	0.0	0.6	5.8	0.1	0.3	25.6	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.1	0.0	3.9	0.0	1.6	1.6	1.6	1.8	0.8	5.6	6.1
LnGrp Delay(d),s/veh	45.2	41.2	0.0	54.3	0.0	50.7	67.4	10.6	10.7	89.0	13.7	14.1
LnGrp LOS	D	D		D		D	E	B	B	F	B	B
Approach Vol, veh/h		66			163			415			947	
Approach Delay, s/veh		43.1			53.2			22.0			15.3	
Approach LOS		D			D			C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	86.2		34.8	11.8	83.5	9.9	24.9				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	8.4	* 52		49.9	8.4	* 52	5.4	37.9				
Max Q Clear Time (g_c+I1), s	3.6	6.0		4.2	5.4	14.3	4.2	12.3				
Green Ext Time (p_c), s	0.0	2.7		0.2	0.1	8.5	0.0	0.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			22.1									
HCM 2010 LOS			C									
<b>Notes</b>												

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FB-PM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	55	41	79	58	90	172	888	114	60	245	12
Future Volume (vph)	17	55	41	79	58	90	172	888	114	60	245	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.98	0.99		1.00		0.96	1.00		0.98
Frt		0.936			0.909				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1532	0	1610	1557	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.528			0.695			0.567			0.309		
Satd. Flow (perm)	912	1532	0	1158	1557	0	986	3316	1419	537	3316	1447
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			68				114			100
Link Speed (k/h)		40			40			80				80
Link Distance (m)		143.7			356.2			324.9				267.2
Travel Time (s)		12.9			32.1			14.6				12.0
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	17	55	41	79	58	90	172	888	114	60	245	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	96	0	79	148	0	172	888	114	60	245	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FB-PM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	45.0	45.0		45.0	45.0		20.0	55.0	55.0	20.0	55.0	55.0
Total Split (%)	37.5%	37.5%		37.5%	37.5%		16.7%	45.8%	45.8%	16.7%	45.8%	45.8%
Maximum Green (s)	38.4	38.4		38.4	38.4		12.6	48.4	48.4	13.6	48.4	48.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	14.2	14.2		14.2	14.2		88.8	82.1	82.1	83.1	76.3	76.3
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.74	0.68	0.68	0.69	0.64	0.64
v/c Ratio	0.16	0.46		0.58	0.61		0.22	0.39	0.11	0.14	0.12	0.01
Control Delay	48.8	38.8		66.1	37.3		4.9	9.9	2.0	5.0	9.6	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	38.8		66.1	37.3		4.9	9.9	2.0	5.0	9.6	0.0
LOS	D	D		E	D		A	A	A	A	A	A
Approach Delay		40.3			47.3			8.4			8.4	
Approach LOS		D			D			A			A	
Queue Length 50th (m)	3.7	13.9		18.0	17.9		8.7	45.2	0.0	2.7	10.8	0.0
Queue Length 95th (m)	10.3	29.1		32.4	37.2		18.4	70.1	7.0	7.2	20.0	0.0
Internal Link Dist (m)		119.7			332.2			300.9			243.2	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	291	512		370	544		820	2267	1006	530	2109	956
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	0.06	0.19		0.21	0.27		0.21	0.39	0.11	0.11	0.12	0.01

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 50 (42%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.61  
 Intersection Signal Delay: 15.2  
 Intersection LOS: B



Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FB-PM  
 910 March Road

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

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FB-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	25	110	73	33	24	159	1137	97	4	425	57
Future Volume (vph)	79	25	110	73	33	24	159	1137	97	4	425	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		0.99	1.00		1.00	1.00	
Frt			0.850		0.937			0.988			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1590	0	3216	4690	0	1658	4665	0
Flt Permitted	0.474			0.741			0.950			0.950		
Satd. Flow (perm)	826	1745	1462	1290	1590	0	3183	4690	0	1650	4665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			110		24			12			20	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	79	25	110	73	33	24	159	1137	97	4	425	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	25	110	73	57	0	159	1234	0	4	482	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FB-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	4	8	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	5.0	
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	12.0	57.0	57.0	45.0	45.0		22.0	51.0		22.0	51.0	
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		16.9%	39.2%		16.9%	39.2%	
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		15.4	44.6		15.4	44.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	22.8	22.3	22.3	12.7	12.7		11.7	91.5		6.0	75.8	
Actuated g/C Ratio	0.18	0.17	0.17	0.10	0.10		0.09	0.70		0.05	0.58	
v/c Ratio	0.44	0.08	0.32	0.58	0.32		0.55	0.37		0.05	0.18	
Control Delay	51.6	41.7	9.8	72.9	38.2		63.4	9.6		60.5	13.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	51.6	41.7	9.8	72.9	38.2		63.4	9.6		60.5	13.7	
LOS	D	D	A	E	D		E	A		E	B	
Approach Delay		29.0			57.7			15.7			14.0	
Approach LOS		C			E			B			B	
Queue Length 50th (m)	17.3	5.3	0.0	18.2	7.9		20.4	41.3		1.0	20.0	
Queue Length 95th (m)	30.0	12.5	14.7	32.7	20.3		30.8	77.4		4.8	30.9	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	179	669	628	376	480		380	3303		196	2729	
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	0.04	0.18	0.19	0.12		0.42	0.37		0.02	0.18	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 20 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.58  
 Intersection Signal Delay: 19.1  
 Intersection LOS: B























Intersection Capacity Utilization 59.0% ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2022 FB-PM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	25	110	73	33	24	159	1137	97	4	425	57
Future Volume (veh/h)	79	25	110	73	33	24	159	1137	97	4	425	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1726	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	79	25	0	73	33	24	159	1137	97	4	425	57
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	196	316	268	174	80	58	214	2988	255	9	2587	340
Arrive On Green	0.04	0.18	0.00	0.09	0.09	0.09	0.07	0.66	0.66	0.01	0.60	0.60
Sat Flow, veh/h	1681	1765	1500	1371	927	674	3261	4519	385	1681	4307	566
Grp Volume(v), veh/h	79	25	0	73	0	57	159	808	426	4	315	167
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1371	0	1601	1630	1606	1693	1681	1606	1661
Q Serve(g_s), s	5.4	1.5	0.0	6.7	0.0	4.4	6.2	14.8	14.8	0.3	5.6	5.8
Cycle Q Clear(g_c), s	5.4	1.5	0.0	6.7	0.0	4.4	6.2	14.8	14.8	0.3	5.6	5.8
Prop In Lane	1.00		1.00	1.00		0.42	1.00		0.23	1.00		0.34
Lane Grp Cap(c), veh/h	196	316	268	174	0	139	214	2124	1119	9	1929	998
V/C Ratio(X)	0.40	0.08	0.00	0.42	0.00	0.41	0.74	0.38	0.38	0.46	0.16	0.17
Avail Cap(c_a), veh/h	196	677	576	455	0	467	386	2124	1119	199	1929	998
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.3	44.4	0.0	57.3	0.0	56.2	59.6	10.0	10.0	64.5	11.5	11.5
Incr Delay (d2), s/veh	1.3	0.1	0.0	1.6	0.0	1.9	5.0	0.5	1.0	33.5	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.8	0.0	2.6	0.0	2.0	3.0	6.7	7.2	0.2	2.5	2.7
LnGrp Delay(d),s/veh	51.6	44.5	0.0	58.9	0.0	58.2	64.6	10.5	11.0	98.0	11.7	11.9
LnGrp LOS	D	D		E		E	E	B	B	F	B	B
Approach Vol, veh/h		104			130			1393			486	
Approach Delay, s/veh		49.9			58.6			16.8			12.5	
Approach LOS		D			E			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	92.4		30.4	15.1	84.5	12.0	18.4				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	15.4	* 45		49.9	15.4	* 45	5.4	37.9				
Max Q Clear Time (g_c+I1), s	2.3	16.8		3.5	8.2	7.8	7.4	8.7				
Green Ext Time (p_c), s	0.0	11.2		0.1	0.3	3.9	0.0	0.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			20.0									
HCM 2010 LOS			C									
<b>Notes</b>												

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FB Sat  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	55	41	79	58	90	172	888	114	60	245	12
Future Volume (vph)	17	55	41	79	58	90	172	888	114	60	245	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00		0.96	1.00		0.98
Frt		0.936			0.909				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1535	0	1610	1559	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.622			0.695			0.600			0.309		
Satd. Flow (perm)	1077	1535	0	1163	1559	0	1045	3316	1427	537	3316	1449
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			89				114			41
Link Speed (k/h)		40			40			80				80
Link Distance (m)		143.7			356.2			324.9				267.2
Travel Time (s)		12.9			32.1			14.6				12.0
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	17	55	41	79	58	90	172	888	114	60	245	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	96	0	79	148	0	172	888	114	60	245	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings  
1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FB Sat  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		34.6	34.6	34.6	34.6	34.6	34.6
Total Split (s)	39.0	39.0		39.0	39.0		56.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	41.1%	41.1%		41.1%	41.1%		58.9%	58.9%	58.9%	58.9%	58.9%	58.9%
Maximum Green (s)	32.4	32.4		32.4	32.4		49.4	49.4	49.4	49.4	49.4	49.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.0	2.0	2.0	2.0	2.0
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)	6.6	6.6		6.6	6.6		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		21.0	21.0	21.0	21.0	21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	12.7	12.7		12.7	12.7		69.1	69.1	69.1	69.1	69.1	69.1
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.73	0.73	0.73	0.73	0.73	0.73
v/c Ratio	0.12	0.40		0.51	0.52		0.23	0.37	0.11	0.15	0.10	0.01
Control Delay	36.3	27.2		49.1	22.9		5.6	5.7	1.2	5.8	4.3	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	27.2		49.1	22.9		5.6	5.7	1.2	5.8	4.3	0.0
LOS	D	C		D	C		A	A	A	A	A	A
Approach Delay		28.5			32.0			5.2			4.4	
Approach LOS		C			C			A			A	
Queue Length 50th (m)	2.8	9.3		13.8	10.0		8.3	25.6	0.0	2.7	5.5	0.0
Queue Length 95th (m)	8.4	22.4		26.4	26.4		19.6	43.6	4.8	8.4	11.2	0.1
Internal Link Dist (m)		119.7			332.2			300.9			243.2	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	367	550		396	590		759	2411	1068	390	2411	1064
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	0.05	0.17		0.20	0.25		0.23	0.37	0.11	0.15	0.10	0.01

Intersection Summary

Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	95
Offset:	11 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.52
Intersection Signal Delay:	9.9
Intersection LOS:	A

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FB Sat  
 910 March Road

Intersection Capacity Utilization 70.7%      ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road





Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FB Sat  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	25	110	73	33	24	159	1137	97	4	425	57
Future Volume (vph)	79	25	110	73	33	24	159	1137	97	4	425	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		0.99	1.00		1.00	1.00	
Frt			0.850		0.937			0.988			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1590	0	3216	4691	0	1658	4666	0
Flt Permitted	0.720			0.741			0.950			0.950		
Satd. Flow (perm)	1255	1745	1463	1291	1590	0	3188	4691	0	1651	4666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			110		24			15			25	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	79	25	110	73	33	24	159	1137	97	4	425	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	25	110	73	57	0	159	1234	0	4	482	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FB Sat  
910 March Road



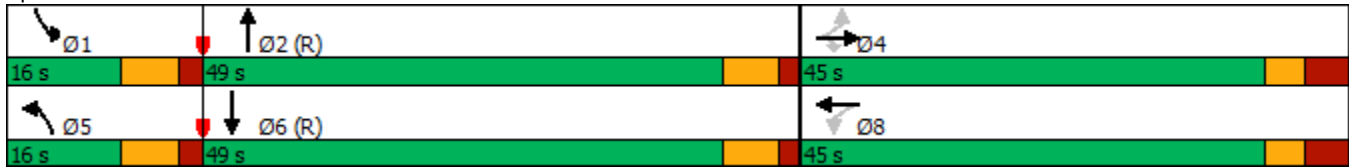
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	44.1	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	45.0	45.0	45.0	45.0	45.0		16.0	49.0		16.0	49.0	
Total Split (%)	40.9%	40.9%	40.9%	40.9%	40.9%		14.5%	44.5%		14.5%	44.5%	
Maximum Green (s)	37.9	37.9	37.9	37.9	37.9		9.4	42.6		9.4	42.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	7.1	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	12.3	12.3	12.3	12.3	12.3		10.7	81.5		5.9	66.8	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.10	0.74		0.05	0.61	
v/c Ratio	0.56	0.13	0.42	0.51	0.29		0.51	0.35		0.05	0.17	
Control Delay	60.6	43.0	13.0	56.9	31.3		52.5	6.3		50.2	9.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	60.6	43.0	13.0	56.9	31.3		52.5	6.3		50.2	9.9	
LOS	E	D	B	E	C		D	A		D	A	
Approach Delay		34.1			45.7			11.6			10.3	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	16.3	4.9	0.0	15.0	6.5		17.0	25.2		0.8	14.5	
Queue Length 95th (m)	30.2	12.3	14.9	28.0	17.5		26.5	59.7		4.4	24.2	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	432	601	576	444	563		323	3480		141	2845	
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	0.18	0.04	0.19	0.16	0.10		0.49	0.35		0.03	0.17	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.56  
 Intersection Signal Delay: 15.5  
 Intersection LOS: B























Intersection Capacity Utilization 59.0%      ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
 2: March Road & Klondike Road

2022 FB Sat  
 910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	25	110	73	33	24	159	1137	97	4	425	57
Future Volume (veh/h)	79	25	110	73	33	24	159	1137	97	4	425	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1726	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	79	25	0	73	33	24	159	1137	97	4	425	57
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	189	221	187	220	116	84	217	3105	265	9	2695	354
Arrive On Green	0.12	0.12	0.00	0.12	0.12	0.12	0.07	0.69	0.69	0.01	0.63	0.63
Sat Flow, veh/h	1336	1765	1500	1374	928	675	3261	4520	385	1681	4307	566
Grp Volume(v), veh/h	79	25	0	73	0	57	159	808	426	4	315	167
Grp Sat Flow(s),veh/h/ln	1336	1765	1500	1374	0	1603	1630	1606	1693	1681	1606	1661
Q Serve(g_s), s	6.3	1.4	0.0	5.5	0.0	3.5	5.3	11.6	11.6	0.3	4.5	4.6
Cycle Q Clear(g_c), s	9.8	1.4	0.0	6.9	0.0	3.5	5.3	11.6	11.6	0.3	4.5	4.6
Prop In Lane	1.00		1.00	1.00		0.42	1.00		0.23	1.00		0.34
Lane Grp Cap(c), veh/h	189	221	187	220	0	200	217	2207	1163	9	2009	1039
V/C Ratio(X)	0.42	0.11	0.00	0.33	0.00	0.28	0.73	0.37	0.37	0.46	0.16	0.16
Avail Cap(c_a), veh/h	483	608	517	522	0	552	279	2207	1163	144	2009	1039
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.1	42.7	0.0	45.8	0.0	43.7	50.4	7.2	7.2	54.6	8.5	8.6
Incr Delay (d2), s/veh	1.5	0.2	0.0	0.9	0.0	0.8	7.0	0.5	0.9	32.6	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.7	0.0	2.1	0.0	1.6	2.6	5.2	5.6	0.2	2.0	2.2
LnGrp Delay(d),s/veh	49.6	42.9	0.0	46.6	0.0	44.4	57.4	7.7	8.1	87.2	8.7	8.9
LnGrp LOS	D	D		D		D	E	A	A	F	A	A
Approach Vol, veh/h		104			130			1393			486	
Approach Delay, s/veh		48.0			45.7			13.5			9.4	
Approach LOS		D			D			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	82.0		20.8	13.9	75.2		20.8				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4		7.1				
Max Green Setting (Gmax), s	9.4	* 43		37.9	9.4	* 43		37.9				
Max Q Clear Time (g_c+I1), s	2.3	13.6		11.8	7.3	6.6		8.9				
Green Ext Time (p_c), s	0.0	11.4		0.4	0.1	3.9		0.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			16.2									
HCM 2010 LOS			B									
<b>Notes</b>												

# Appendix R

2027 Future Background Synchro Sheets

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FB-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	37	157	125	17	49	99	496	63	75	1471	66
Future Volume (vph)	101	37	157	125	17	49	99	496	63	75	1471	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99		1.00					0.98	1.00		
Frt		0.879			0.889				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1484	0	1658	1476	0	1551	3020	1414	1658	3316	1401
Flt Permitted	0.714			0.463			0.097			0.470		
Satd. Flow (perm)	1246	1484	0	807	1476	0	158	3020	1380	819	3316	1401
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		157			49				100			100
Link Speed (k/h)		40			40			80			80	
Link Distance (m)		143.7			356.2			324.9			209.0	
Travel Time (s)		12.9			32.1			14.6			9.4	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	14%	2%	2%	2%	9%	9%	12%	7%	2%	2%	8%
Adj. Flow (vph)	101	37	157	125	17	49	99	496	63	75	1471	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	194	0	125	66	0	99	496	63	75	1471	66
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FB-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	48.0	48.0		48.0	48.0		20.0	52.0	52.0	20.0	52.0	52.0
Total Split (%)	40.0%	40.0%		40.0%	40.0%		16.7%	43.3%	43.3%	16.7%	43.3%	43.3%
Maximum Green (s)	41.4	41.4		41.4	41.4		12.6	45.4	45.4	13.6	45.4	45.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	20.1	20.1		20.1	20.1		81.9	75.5	75.5	78.4	71.0	71.0
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.68	0.63	0.63	0.65	0.59	0.59
v/c Ratio	0.49	0.51		0.93	0.23		0.49	0.26	0.07	0.13	0.75	0.08
Control Delay	51.3	15.1		109.0	16.9		16.6	12.2	1.0	6.9	23.0	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	15.1		109.0	16.9		16.6	12.2	1.0	6.9	23.0	1.3
LOS	D	B		F	B		B	B	A	A	C	A
Approach Delay		27.5			77.1			11.8			21.4	
Approach LOS		C			E			B			C	
Queue Length 50th (m)	21.8	7.5		29.3	3.4		6.3	26.8	0.0	4.5	124.7	0.0
Queue Length 95th (m)	35.9	26.4		#51.0	14.3		18.1	45.8	2.5	11.6	#216.0	3.0
Internal Link Dist (m)		119.7			332.2			300.9			185.0	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	429	614		278	541		258	1900	905	673	1960	869
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	0.24	0.32		0.45	0.12		0.38	0.26	0.07	0.11	0.75	0.08

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 99 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.93  
 Intersection Signal Delay: 23.6  
 Intersection LOS: C

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FB-AM  
 910 March Road

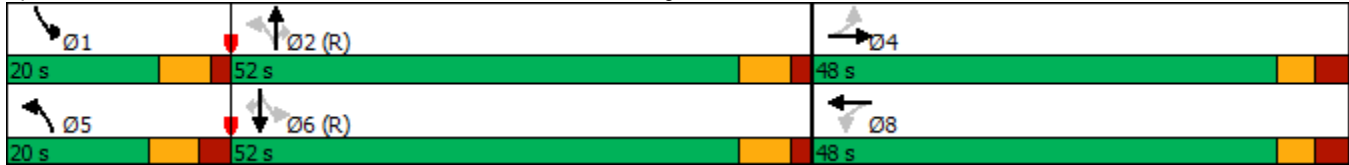
Intersection Capacity Utilization 92.5% ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road





Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FB-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	37	253	146	31	47	83	611	62	30	1573	58
Future Volume (vph)	65	37	253	146	31	47	83	611	62	30	1573	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.98	0.99	0.99		1.00	1.00		1.00	1.00	
Frt			0.850		0.910			0.986			0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1496	1679	1483	1658	1462	0	3124	4458	0	1433	4726	0
Flt Permitted	0.533			0.733			0.950			0.950		
Satd. Flow (perm)	837	1679	1456	1271	1462	0	3122	4458	0	1427	4726	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			156		47			15			5	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	3		6	6		3	3		4	4		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	2%	2%	8%	11%	5%	7%	9%	18%	2%	9%
Adj. Flow (vph)	65	37	253	146	31	47	83	611	62	30	1573	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	37	253	146	78	0	83	673	0	30	1631	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FB-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	4	8	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	5.0	
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	12.0	57.0	57.0	45.0	45.0		15.0	58.0		15.0	58.0	
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		11.5%	44.6%		11.5%	44.6%	
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		8.4	51.6		8.4	51.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag	Lead			Lag			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	30.4	29.9	29.9	20.3	20.3		8.8	76.9		8.2	71.2	
Actuated g/C Ratio	0.23	0.23	0.23	0.16	0.16		0.07	0.59		0.06	0.55	
v/c Ratio	0.29	0.10	0.56	0.74	0.29		0.39	0.25		0.33	0.63	
Control Delay	39.8	35.4	19.7	72.8	23.6		63.0	15.6		67.2	23.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	39.8	35.4	19.7	72.8	23.6		63.0	15.6		67.2	23.6	
LOS	D	D	B	E	C		E	B		E	C	
Approach Delay		25.0			55.6			20.8			24.4	
Approach LOS		C			E			C			C	
Queue Length 50th (m)	13.1	7.3	20.4	36.1	6.9		10.6	32.6		7.5	106.0	
Queue Length 95th (m)	23.2	15.0	42.9	55.3	19.8		18.8	49.4		17.2	145.9	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	223	644	655	370	459		224	2641		101	2590	
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	0.29	0.06	0.39	0.39	0.17		0.37	0.25		0.30	0.63	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 64 (49%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.74  
 Intersection Signal Delay: 25.9  
 Intersection LOS: C























Intersection Capacity Utilization 78.8% ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2027 FB-AM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	37	253	146	31	47	83	611	62	30	1573	58
Future Volume (veh/h)	65	37	253	146	31	47	83	611	62	30	1573	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1593	1698	1765	1765	1639	1800	1714	1679	1800	1525	1760	1800
Adj Flow Rate, veh/h	65	37	0	146	31	47	83	611	62	30	1573	58
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	6	2	2	8	8	5	7	7	18	2	2
Cap, veh/h	248	424	375	268	92	140	126	2413	243	37	2645	97
Arrive On Green	0.04	0.25	0.00	0.16	0.16	0.16	0.04	0.57	0.57	0.03	0.56	0.56
Sat Flow, veh/h	1517	1698	1500	1351	585	886	3167	4233	425	1453	4758	175
Grp Volume(v), veh/h	65	37	0	146	0	78	83	439	234	30	1059	572
Grp Sat Flow(s),veh/h/ln	1517	1698	1500	1351	0	1471	1584	1528	1603	1453	1602	1729
Q Serve(g_s), s	4.6	2.2	0.0	13.3	0.0	6.1	3.4	9.4	9.5	2.7	28.5	28.5
Cycle Q Clear(g_c), s	4.6	2.2	0.0	13.3	0.0	6.1	3.4	9.4	9.5	2.7	28.5	28.5
Prop In Lane	1.00		1.00	1.00		0.60	1.00		0.27	1.00		0.10
Lane Grp Cap(c), veh/h	248	424	375	268	0	232	126	1742	914	37	1781	961
V/C Ratio(X)	0.26	0.09	0.00	0.54	0.00	0.34	0.66	0.25	0.26	0.81	0.59	0.59
Avail Cap(c_a), veh/h	248	652	576	449	0	429	205	1742	914	94	1781	961
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.2	37.4	0.0	51.7	0.0	48.7	61.6	14.0	14.1	63.0	19.2	19.2
Incr Delay (d2), s/veh	0.6	0.1	0.0	1.7	0.0	0.8	5.8	0.3	0.7	32.7	1.5	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.0	0.0	5.1	0.0	2.5	1.6	4.1	4.4	1.4	12.9	14.2
LnGrp Delay(d),s/veh	42.7	37.5	0.0	53.4	0.0	49.6	67.4	14.4	14.7	95.7	20.6	21.9
LnGrp LOS	D	D		D		D	E	B	B	F	C	C
Approach Vol, veh/h		102			224			756			1661	
Approach Delay, s/veh		40.8			52.1			20.3			22.4	
Approach LOS		D			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.9	80.5		39.6	11.8	78.7	12.0	27.6				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	8.4	* 52		49.9	8.4	* 52	5.4	37.9				
Max Q Clear Time (g_c+I1), s	4.7	11.5		4.2	5.4	30.5	6.6	15.3				
Green Ext Time (p_c), s	0.0	5.9		0.2	0.1	13.2	0.0	1.1				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			24.9									
HCM 2010 LOS			C									
<b>Notes</b>												

Lanes, Volumes, Timings  
3: March Road & South Local Road

2027 FB-AM  
910 March Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↓	
Traffic Volume (vph)	0	21	0	646	1591	0
Future Volume (vph)	0	21	0	646	1591	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Fr <sub>t</sub>	0.865					
Fl <sub>t</sub> Protected						
Satd. Flow (prot)	0	1510	0	3316	1745	0
Fl <sub>t</sub> Permitted						
Satd. Flow (perm)	0	1510	0	3316	1745	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	96.7			209.0	77.4	
Travel Time (s)	7.0			9.4	3.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	21	0	646	1591	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	0	646	1591	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	98.4%
ICU Level of Service	F
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑	
Traffic Vol, veh/h	0	21	0	646	1591	0
Future Vol, veh/h	0	21	0	646	1591	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	21	0	646	1591	0

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	1591	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-
Pot Cap-1 Maneuver	0	132	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	132	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	37.4	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 132	-	-
HCM Lane V/C Ratio	- 0.159	-	-
HCM Control Delay (s)	- 37.4	-	-
HCM Lane LOS	- E	-	-
HCM 95th %tile Q(veh)	- 0.5	-	-

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FB-PM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	57	72	79	60	122	250	1448	114	108	625	97
Future Volume (vph)	82	57	72	79	60	122	250	1448	114	108	625	97
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.98		0.98	0.98		1.00		0.96			0.98
Frt		0.916			0.899				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1501	0	1610	1538	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.413			0.604			0.380			0.126		
Satd. Flow (perm)	714	1501	0	1008	1538	0	661	3316	1419	220	3316	1447
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		56			90				100			100
Link Speed (k/h)		40			40			80				80
Link Distance (m)		143.7			356.2			324.9				209.0
Travel Time (s)		12.9			32.1			14.6				9.4
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	82	57	72	79	60	122	250	1448	114	108	625	97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	129	0	79	182	0	250	1448	114	108	625	97
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FB-PM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	45.0	45.0		45.0	45.0		20.0	55.0	55.0	20.0	55.0	55.0
Total Split (%)	37.5%	37.5%		37.5%	37.5%		16.7%	45.8%	45.8%	16.7%	45.8%	45.8%
Maximum Green (s)	38.4	38.4		38.4	38.4		12.6	48.4	48.4	13.6	48.4	48.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	14.7	14.7		14.7	14.7		86.5	76.5	76.5	83.4	73.9	73.9
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.72	0.64	0.64	0.70	0.62	0.62
v/c Ratio	0.94	0.56		0.64	0.68		0.44	0.69	0.12	0.41	0.31	0.10
Control Delay	134.9	36.7		72.6	38.0		7.2	17.6	3.3	9.7	12.4	2.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	134.9	36.7		72.6	38.0		7.2	17.6	3.3	9.7	12.4	2.7
LOS	F	D		E	D		A	B	A	A	B	A
Approach Delay		74.9			48.5			15.2			10.9	
Approach LOS		E			D			B			B	
Queue Length 50th (m)	19.5	16.2		18.1	20.7		13.8	104.3	1.1	5.2	33.4	0.0
Queue Length 95th (m)	#41.9	33.8		32.7	42.6		27.5	169.5	9.7	12.1	56.1	7.5
Internal Link Dist (m)		119.7			332.2			300.9			185.0	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	228	518		322	553		597	2112	940	324	2041	929
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	0.36	0.25		0.25	0.33		0.42	0.69	0.12	0.33	0.31	0.10

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	50 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	20.9
Intersection LOS:	C



Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

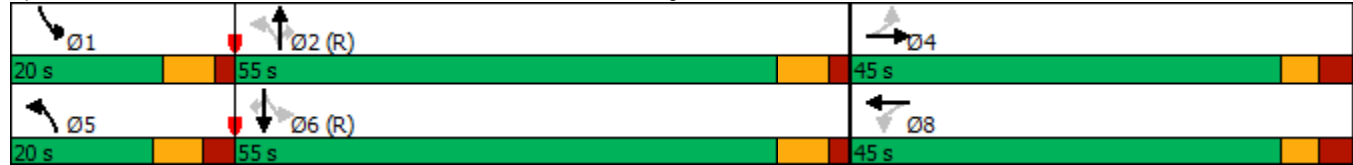
2027 FB-PM  
 910 March Road

Intersection Capacity Utilization 95.2% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FB-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	27	110	87	34	35	159	1731	117	8	789	105
Future Volume (vph)	119	27	110	87	34	35	159	1731	117	8	789	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		0.99	1.00		1.00	1.00	
Frt			0.850		0.924			0.991				0.982
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1571	0	3216	4707	0	1658	4665	0
Flt Permitted	0.486			0.740			0.950			0.950		
Satd. Flow (perm)	847	1745	1462	1289	1571	0	3183	4707	0	1654	4665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			110		35			9			20	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	119	27	110	87	34	35	159	1731	117	8	789	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	27	110	87	69	0	159	1848	0	8	894	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FB-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	4	8	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	5.0	
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	12.0	57.0	57.0	45.0	45.0		22.0	51.0		22.0	51.0	
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		16.9%	39.2%		16.9%	39.2%	
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		15.4	44.6		15.4	44.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	26.7	26.2	26.2	14.2	14.2		11.7	87.5		6.3	72.0	
Actuated g/C Ratio	0.21	0.20	0.20	0.11	0.11		0.09	0.67		0.05	0.55	
v/c Ratio	0.57	0.08	0.29	0.62	0.34		0.55	0.58		0.10	0.34	
Control Delay	55.4	40.3	9.0	73.2	32.7		63.4	13.7		61.4	16.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	55.4	40.3	9.0	73.2	32.7		63.4	13.7		61.4	16.9	
LOS	E	D	A	E	C		E	B		E	B	
Approach Delay		33.9			55.3			17.7			17.3	
Approach LOS		C			E			B			B	
Queue Length 50th (m)	26.3	5.7	0.0	21.6	8.1		20.4	78.8		2.0	43.3	
Queue Length 95th (m)	41.7	13.1	14.4	37.4	21.4		30.8	144.5		7.3	62.4	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	207	669	628	375	482		380	3171		196	2592	
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	0.57	0.04	0.18	0.23	0.14		0.42	0.58		0.04	0.34	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 20 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.62  
 Intersection Signal Delay: 20.6  
 Intersection LOS: C























Intersection Capacity Utilization 73.8% ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2027 FB-PM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	27	110	87	34	35	159	1731	117	8	789	105
Future Volume (veh/h)	119	27	110	87	34	35	159	1731	117	8	789	105
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1731	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	119	27	0	87	34	35	159	1731	117	8	789	105
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	199	334	284	188	76	78	214	2978	201	16	2540	336
Arrive On Green	0.04	0.19	0.00	0.10	0.10	0.10	0.07	0.65	0.65	0.01	0.59	0.59
Sat Flow, veh/h	1681	1765	1500	1370	780	803	3261	4608	311	1681	4303	569
Grp Volume(v), veh/h	119	27	0	87	0	69	159	1206	642	8	588	306
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1370	0	1584	1630	1606	1707	1681	1606	1661
Q Serve(g_s), s	5.4	1.6	0.0	8.0	0.0	5.3	6.2	27.6	27.7	0.6	11.9	12.1
Cycle Q Clear(g_c), s	5.4	1.6	0.0	8.0	0.0	5.3	6.2	27.6	27.7	0.6	11.9	12.1
Prop In Lane	1.00		1.00	1.00		0.51	1.00		0.18	1.00		0.34
Lane Grp Cap(c), veh/h	199	334	284	188	0	154	214	2076	1103	16	1896	980
V/C Ratio(X)	0.60	0.08	0.00	0.46	0.00	0.45	0.74	0.58	0.58	0.49	0.31	0.31
Avail Cap(c_a), veh/h	199	677	576	455	0	462	386	2076	1103	199	1896	980
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.9	43.4	0.0	56.6	0.0	55.4	59.6	13.0	13.0	64.1	13.4	13.4
Incr Delay (d2), s/veh	4.8	0.1	0.0	1.8	0.0	2.0	5.0	1.2	2.2	21.3	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.8	0.0	3.1	0.0	2.4	3.0	12.6	13.7	0.4	5.4	5.8
LnGrp Delay(d),s/veh	57.7	43.5	0.0	58.3	0.0	57.4	64.6	14.2	15.3	85.4	13.8	14.2
LnGrp LOS	E	D		E		E	E	B	B	F	B	B
Approach Vol, veh/h		146			156			2007			902	
Approach Delay, s/veh		55.0			57.9			18.6			14.6	
Approach LOS		E			E			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	90.4		31.7	15.1	83.1	12.0	19.7				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	15.4	* 45		49.9	15.4	* 45	5.4	37.9				
Max Q Clear Time (g_c+I1), s	2.6	29.7		3.6	8.2	14.1	7.4	10.0				
Green Ext Time (p_c), s	0.0	11.3		0.1	0.3	7.8	0.0	0.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			21.0									
HCM 2010 LOS			C									
<b>Notes</b>												

Lanes, Volumes, Timings  
 3: March Road & South Local Road

2027 FB-PM  
 910 March Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	37	0	1652	793	8
Future Volume (vph)	0	37	0	1652	793	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Fr <sub>t</sub>		0.865			0.999	
Fl <sub>t</sub> Protected						
Satd. Flow (prot)	0	1510	0	3316	1743	0
Fl <sub>t</sub> Permitted						
Satd. Flow (perm)	0	1510	0	3316	1743	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	109.6			209.0	71.2	
Travel Time (s)	7.9			9.4	3.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	37	0	1652	793	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	37	0	1652	801	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.6%
Analysis Period (min)	15
	ICU Level of Service A

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↘	
Traffic Vol, veh/h	0	37	0	1652	793	8
Future Vol, veh/h	0	37	0	1652	793	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	37	0	1652	793	8

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	797	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-
Pot Cap-1 Maneuver	0	386	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	386	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 386	-	-
HCM Lane V/C Ratio	- 0.096	-	-
HCM Control Delay (s)	- 15.3	-	-
HCM Lane LOS	- C	-	-
HCM 95th %tile Q(veh)	- 0.3	-	-

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FB Sat  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	57	72	79	60	122	250	1448	114	108	625	97
Future Volume (vph)	82	57	72	79	60	122	250	1448	114	108	625	97
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00		0.96	1.00		0.98
Frt		0.916			0.899				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1504	0	1610	1541	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.547			0.674			0.415			0.143		
Satd. Flow (perm)	947	1504	0	1128	1541	0	723	3316	1427	249	3316	1449
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			23				114			69
Link Speed (k/h)		40			40			80				80
Link Distance (m)		143.7			356.2			324.9				209.0
Travel Time (s)		12.9			32.1			14.6				9.4
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	82	57	72	79	60	122	250	1448	114	108	625	97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	129	0	79	182	0	250	1448	114	108	625	97
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0



Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FB Sat  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		34.6	34.6	34.6	34.6	34.6	34.6
Total Split (s)	39.0	39.0		39.0	39.0		56.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	41.1%	41.1%		41.1%	41.1%		58.9%	58.9%	58.9%	58.9%	58.9%	58.9%
Maximum Green (s)	32.4	32.4		32.4	32.4		49.4	49.4	49.4	49.4	49.4	49.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.0	2.0	2.0	2.0	2.0
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)	6.6	6.6		6.6	6.6		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		21.0	21.0	21.0	21.0	21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	15.6	15.6		15.6	15.6		66.2	66.2	66.2	66.2	66.2	66.2
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.70	0.70	0.70	0.70	0.70	0.70
v/c Ratio	0.53	0.42		0.43	0.67		0.50	0.63	0.11	0.62	0.27	0.09
Control Delay	47.6	20.4		41.5	44.0		12.1	10.0	1.6	30.1	6.3	2.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	20.4		41.5	44.0		12.1	10.0	1.6	30.1	6.3	2.6
LOS	D	C		D	D		B	B	A	C	A	A
Approach Delay		30.9			43.2			9.8			9.0	
Approach LOS		C			D			A			A	
Queue Length 50th (m)	14.0	9.2		13.2	27.7		18.2	64.2	0.0	9.1	19.2	1.4
Queue Length 95th (m)	26.6	23.5		24.9	45.5		46.6	106.7	5.7	#43.7	33.6	7.2
Internal Link Dist (m)		119.7			332.2			300.9			185.0	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	322	560		384	540		503	2310	1029	173	2310	1030
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	0.25	0.23		0.21	0.34		0.50	0.63	0.11	0.62	0.27	0.09

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 11 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.67  
 Intersection Signal Delay: 13.8  
 Intersection LOS: B

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

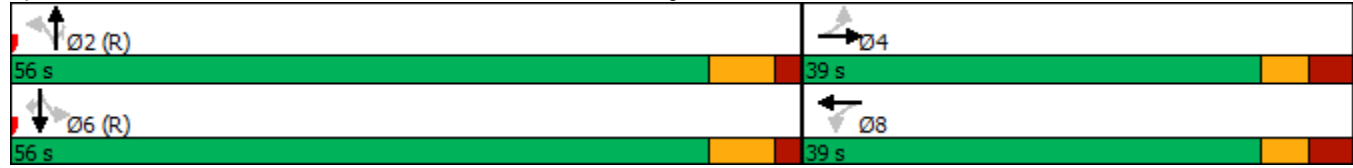
2027 FB Sat  
 910 March Road

Intersection Capacity Utilization 97.4% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FB Sat  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	27	110	87	34	35	159	1731	117	8	789	105
Future Volume (vph)	119	27	110	87	34	35	159	1731	117	8	789	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		1.00	1.00		1.00	1.00	
Frt			0.850		0.924			0.991			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1572	0	3216	4708	0	1658	4666	0
Flt Permitted	0.712			0.740			0.950			0.950		
Satd. Flow (perm)	1242	1745	1463	1289	1572	0	3200	4708	0	1655	4666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			110		35			11			25	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	119	27	110	87	34	35	159	1731	117	8	789	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	27	110	87	69	0	159	1848	0	8	894	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FB Sat  
910 March Road



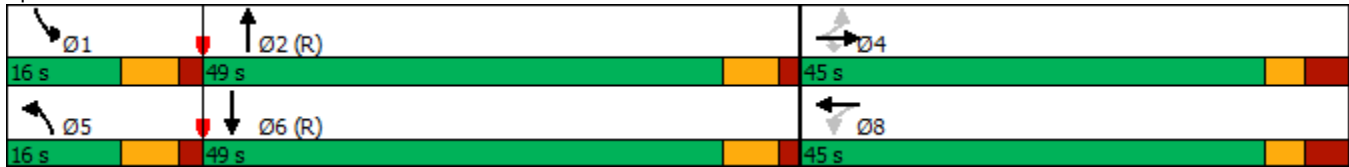
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	44.1	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	45.0	45.0	45.0	45.0	45.0		16.0	49.0		16.0	49.0	
Total Split (%)	40.9%	40.9%	40.9%	40.9%	40.9%		14.5%	44.5%		14.5%	44.5%	
Maximum Green (s)	37.9	37.9	37.9	37.9	37.9		9.4	42.6		9.4	42.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	7.1	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	16.0	16.0	16.0	16.0	16.0		10.7	77.7		6.2	63.2	
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.10	0.71		0.06	0.57	
v/c Ratio	0.66	0.11	0.36	0.47	0.27		0.51	0.55		0.09	0.33	
Control Delay	60.8	38.9	10.5	49.7	24.5		52.5	10.2		50.9	13.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	60.8	38.9	10.5	49.7	24.5		52.5	10.2		50.9	13.4	
LOS	E	D	B	D	C		D	B		D	B	
Approach Delay		36.9			38.5			13.5			13.7	
Approach LOS		D			D			B			B	
Queue Length 50th (m)	24.5	5.1	0.0	17.4	6.5		17.0	54.8		1.7	33.7	
Queue Length 95th (m)	40.7	12.1	14.1	30.7	17.7		26.5	122.1		6.7	52.6	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	427	601	576	444	564		323	3330		141	2690	
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	0.28	0.04	0.19	0.20	0.12		0.49	0.55		0.06	0.33	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.66  
 Intersection Signal Delay: 16.6  
 Intersection LOS: B























Intersection Capacity Utilization 73.8%      ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
 2: March Road & Klondike Road

2027 FB Sat  
 910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	27	110	87	34	35	159	1731	117	8	789	105
Future Volume (veh/h)	119	27	110	87	34	35	159	1731	117	8	789	105
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1731	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	119	27	0	87	34	35	159	1731	117	8	789	105
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	227	283	240	267	125	129	217	2982	201	17	2541	336
Arrive On Green	0.16	0.16	0.00	0.16	0.16	0.16	0.07	0.65	0.65	0.01	0.59	0.59
Sat Flow, veh/h	1322	1765	1500	1373	781	804	3261	4608	311	1681	4303	569
Grp Volume(v), veh/h	119	27	0	87	0	69	159	1206	642	8	588	306
Grp Sat Flow(s),veh/h/ln	1322	1765	1500	1373	0	1586	1630	1606	1707	1681	1606	1661
Q Serve(g_s), s	9.6	1.4	0.0	6.3	0.0	4.2	5.3	23.3	23.4	0.5	10.1	10.2
Cycle Q Clear(g_c), s	13.8	1.4	0.0	7.8	0.0	4.2	5.3	23.3	23.4	0.5	10.1	10.2
Prop In Lane	1.00		1.00	1.00		0.51	1.00		0.18	1.00		0.34
Lane Grp Cap(c), veh/h	227	283	240	267	0	254	217	2079	1105	17	1897	981
V/C Ratio(X)	0.52	0.10	0.00	0.33	0.00	0.27	0.73	0.58	0.58	0.48	0.31	0.31
Avail Cap(c_a), veh/h	471	608	517	521	0	546	279	2079	1105	144	1897	981
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.6	39.4	0.0	42.7	0.0	40.6	50.4	11.0	11.0	54.2	11.3	11.3
Incr Delay (d2), s/veh	1.9	0.1	0.0	0.7	0.0	0.6	7.0	1.2	2.2	20.2	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.7	0.0	2.5	0.0	1.9	2.6	10.6	11.6	0.3	4.5	4.9
LnGrp Delay(d),s/veh	48.5	39.5	0.0	43.4	0.0	41.1	57.4	12.1	13.2	74.4	11.7	12.1
LnGrp LOS	D	D		D		D	E	B	B	E	B	B
Approach Vol, veh/h		146			156			2007			902	
Approach Delay, s/veh		46.8			42.4			16.1			12.4	
Approach LOS		D			D			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.7	77.6		24.7	13.9	71.4		24.7				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4		7.1				
Max Green Setting (Gmax), s	9.4	* 43		37.9	9.4	* 43		37.9				
Max Q Clear Time (g_c+I1), s	2.5	25.4		15.8	7.3	12.2		9.8				
Green Ext Time (p_c), s	0.0	12.7		0.6	0.1	7.8		0.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			17.7									
HCM 2010 LOS			B									
<b>Notes</b>												

Lanes, Volumes, Timings  
3: March Road & South Local Road

2027 FB Sat  
910 March Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	37	0	1652	793	8
Future Volume (vph)	0	37	0	1652	793	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Fr <sub>t</sub>		0.865			0.999	
Fl <sub>t</sub> Protected						
Satd. Flow (prot)	0	1510	0	3316	1743	0
Fl <sub>t</sub> Permitted						
Satd. Flow (perm)	0	1510	0	3316	1743	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	145.1			209.0	73.9	
Travel Time (s)	10.4			9.4	3.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	37	0	1652	793	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	37	0	1652	801	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.6%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑	
Traffic Vol, veh/h	0	37	0	1652	793	8
Future Vol, veh/h	0	37	0	1652	793	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	37	0	1652	793	8

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	797	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-
Pot Cap-1 Maneuver	0	386	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	386	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 386	-	-
HCM Lane V/C Ratio	- 0.096	-	-
HCM Control Delay (s)	- 15.3	-	-
HCM Lane LOS	- C	-	-
HCM 95th %tile Q(veh)	- 0.3	-	-



# Appendix S

2022 Future Total Synchro Sheets

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FT-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	37	95	125	16	29	23	267	62	73	895	17
Future Volume (vph)	26	37	95	125	16	29	23	267	62	73	895	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99		1.00					0.98	1.00		
Frt		0.892			0.903				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1493	0	1658	1509	0	1551	3020	1414	1658	3316	1401
Flt Permitted	0.728			0.619			0.287			0.579		
Satd. Flow (perm)	1270	1493	0	1079	1509	0	469	3020	1380	1007	3316	1401
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			29				100			100
Link Speed (k/h)		40			40			80			80	
Link Distance (m)		143.7			356.2			324.9			142.9	
Travel Time (s)		12.9			32.1			14.6			6.4	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	14%	2%	2%	2%	9%	9%	12%	7%	2%	2%	8%
Adj. Flow (vph)	26	37	95	125	16	29	23	267	62	73	895	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	132	0	125	45	0	23	267	62	73	895	17
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FT-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	48.0	48.0		48.0	48.0		20.0	52.0	52.0	20.0	52.0	52.0
Total Split (%)	40.0%	40.0%		40.0%	40.0%		16.7%	43.3%	43.3%	16.7%	43.3%	43.3%
Maximum Green (s)	41.4	41.4		41.4	41.4		12.6	45.4	45.4	13.6	45.4	45.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	18.3	18.3		18.3	18.3		81.6	77.5	77.5	85.1	80.3	80.3
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.68	0.65	0.65	0.71	0.67	0.67
v/c Ratio	0.13	0.43		0.76	0.18		0.06	0.14	0.07	0.10	0.40	0.02
Control Delay	42.4	18.7		75.8	21.5		6.4	10.2	0.8	5.8	11.6	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	18.7		75.8	21.5		6.4	10.2	0.8	5.8	11.6	0.1
LOS	D	B		E	C		A	B	A	A	B	A
Approach Delay		22.6			61.4			8.3			11.0	
Approach LOS		C			E			A			B	
Queue Length 50th (m)	5.4	7.7		28.6	3.3		1.3	12.6	0.0	4.1	52.8	0.0
Queue Length 95th (m)	12.7	23.8		46.2	12.7		4.5	23.2	2.1	10.4	82.1	0.0
Internal Link Dist (m)		119.7			332.2			300.9			118.9	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	438	577		372	539		452	1949	926	816	2217	970
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	0.06	0.23		0.34	0.08		0.05	0.14	0.07	0.09	0.40	0.02

Intersection Summary

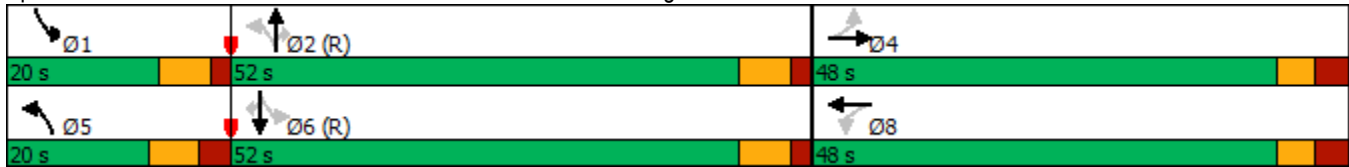
Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 99 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.76  
 Intersection Signal Delay: 16.7  
 Intersection LOS: B

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FT-AM  
 910 March Road

Intersection Capacity Utilization 70.2%      ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FT-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	36	253	113	28	27	83	351	52	23	961	38
Future Volume (vph)	35	36	253	113	28	27	83	351	52	23	961	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.98	0.99	0.99		1.00	1.00		0.99	1.00	
Frt			0.850		0.926			0.981			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1496	1679	1483	1658	1494	0	3124	4427	0	1433	4720	0
Flt Permitted	0.519			0.734			0.950			0.950		
Satd. Flow (perm)	815	1679	1456	1273	1494	0	3118	4427	0	1425	4720	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			188		27			25			5	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	3		6	6		3	3		4	4		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	2%	2%	8%	11%	5%	7%	9%	18%	2%	9%
Adj. Flow (vph)	35	36	253	113	28	27	83	351	52	23	961	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	36	253	113	55	0	83	403	0	23	999	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FT-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA		
Protected Phases	7	4			8		5	2		1	6		
Permitted Phases	4		4	8									
Detector Phase	7	4	4	8	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	5.0		
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4		
Total Split (s)	12.0	57.0	57.0	45.0	45.0		15.0	58.0		15.0	58.0		
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		11.5%	44.6%		11.5%	44.6%		
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		8.4	51.6		8.4	51.6		
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6		
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8		
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4		
Lead/Lag	Lead			Lag			Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes			Yes			Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max		
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0		
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0		
Pedestrian Calls (#/hr)		0	0	0	0			0			0		
Act Effct Green (s)	24.6	24.1	24.1	16.9	16.9		8.8	83.1		7.6	77.0		
Actuated g/C Ratio	0.19	0.19	0.19	0.13	0.13		0.07	0.64		0.06	0.59		
v/c Ratio	0.19	0.12	0.60	0.68	0.25		0.39	0.14		0.27	0.36		
Control Delay	41.0	39.6	17.9	73.4	30.7		63.0	11.7		65.9	15.9		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	41.0	39.6	17.9	73.4	30.7		63.0	11.7		65.9	15.9		
LOS	D	D	B	E	C		E	B		E	B		
Approach Delay		22.8			59.4			20.4			17.0		
Approach LOS		C			E			C			B		
Queue Length 50th (m)	7.2	7.4	13.7	28.0	6.5		10.6	16.1		5.8	50.4		
Queue Length 95th (m)	14.9	15.4	36.9	45.6	17.8		18.8	26.1		14.8	71.9		
Internal Link Dist (m)		93.7				322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0		100.0			45.0				
Base Capacity (vph)	182	644	674	371	454		224	2839		97	2796		
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	0.19	0.06	0.38	0.30	0.12		0.37	0.14		0.24	0.36		

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 64 (49%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 22.3  
 Intersection LOS: C























Intersection Capacity Utilization 65.1% ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2022 FT-AM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	36	253	113	28	27	83	351	52	23	961	38
Future Volume (veh/h)	35	36	253	113	28	27	83	351	52	23	961	38
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1593	1698	1765	1765	1644	1800	1714	1678	1800	1525	1760	1800
Adj Flow Rate, veh/h	35	36	0	113	28	27	83	351	52	23	961	38
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	6	2	2	8	8	5	7	7	18	2	2
Cap, veh/h	222	366	323	240	105	101	126	2459	355	32	2800	111
Arrive On Green	0.03	0.22	0.00	0.14	0.14	0.14	0.04	0.61	0.61	0.02	0.59	0.59
Sat Flow, veh/h	1517	1698	1500	1350	765	738	3167	4043	584	1453	4743	187
Grp Volume(v), veh/h	35	36	0	113	0	55	83	263	140	23	649	350
Grp Sat Flow(s),veh/h/ln	1517	1698	1500	1350	0	1503	1584	1527	1573	1453	1602	1727
Q Serve(g_s), s	2.5	2.2	0.0	10.3	0.0	4.3	3.4	4.8	5.0	2.0	13.5	13.6
Cycle Q Clear(g_c), s	2.5	2.2	0.0	10.3	0.0	4.3	3.4	4.8	5.0	2.0	13.5	13.6
Prop In Lane	1.00		1.00	1.00		0.49	1.00		0.37	1.00		0.11
Lane Grp Cap(c), veh/h	222	366	323	240	0	206	126	1858	957	32	1891	1019
V/C Ratio(X)	0.16	0.10	0.00	0.47	0.00	0.27	0.66	0.14	0.15	0.73	0.34	0.34
Avail Cap(c_a), veh/h	244	652	576	449	0	438	205	1858	957	94	1891	1019
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	40.9	0.0	52.8	0.0	50.2	61.6	10.9	10.9	63.2	13.7	13.7
Incr Delay (d2), s/veh	0.3	0.1	0.0	1.4	0.0	0.7	5.8	0.2	0.3	27.2	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	1.1	0.0	3.9	0.0	1.8	1.6	2.1	2.2	1.1	6.1	6.7
LnGrp Delay(d),s/veh	45.2	41.0	0.0	54.3	0.0	50.9	67.4	11.1	11.3	90.4	14.2	14.6
LnGrp LOS	D	D		D		D	E	B	B	F	B	B
Approach Vol, veh/h		71			168			486			1022	
Approach Delay, s/veh		43.1			53.2			20.7			16.0	
Approach LOS		D			D			C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.4	85.5		35.1	11.8	83.1	10.2	24.9				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	8.4	* 52		49.9	8.4	* 52	5.4	37.9				
Max Q Clear Time (g_c+I1), s	4.0	7.0		4.2	5.4	15.6	4.5	12.3				
Green Ext Time (p_c), s	0.0	3.3		0.2	0.1	9.2	0.0	0.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			22.0									
HCM 2010 LOS			C									
<b>Notes</b>												



Lanes, Volumes, Timings  
3: March Road & Site Access #1

2022 FT-AM  
910 March Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	169	29	216	11	100	816
Future Volume (vph)	169	29	216	11	100	816
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0	0.0		0.0	110.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				95.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1658	1483	1745	1483	1658	1745
Link Speed (k/h)	30		80			80
Link Distance (m)	104.3		66.1			114.5
Travel Time (s)	12.5		3.0			5.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	169	29	216	11	100	816
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	29	216	11	100	816
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.9%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	13.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	169	29	216	11	100	816
Future Vol, veh/h	169	29	216	11	100	816
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	0	1100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	169	29	216	11	100	816

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1232	216	0	0	227	0
Stage 1	216	-	-	-	-	-
Stage 2	1016	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	196	824	-	-	1341	-
Stage 1	820	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	181	824	-	-	1341	-
Mov Cap-2 Maneuver	181	-	-	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	324	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	89	0	0.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	181	824	1341	-
HCM Lane V/C Ratio	-	-	0.934	0.035	0.075	-
HCM Control Delay (s)	-	-	102.6	9.5	7.9	-
HCM Lane LOS	-	-	F	A	A	-
HCM 95th %tile Q(veh)	-	-	7.2	0.1	0.2	-

Lanes, Volumes, Timings  
4: March Road & Site Access #2

2022 FT-AM  
910 March Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↕
Traffic Volume (vph)	0	7	220	103	0	985
Future Volume (vph)	0	7	220	103	0	985
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		20.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	15.0				15.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1510	3316	1483	0	3316
Flt Permitted						
Satd. Flow (perm)	0	1510	3316	1483	0	3316
Link Speed (k/h)	30		80			80
Link Distance (m)	96.8		142.9			66.1
Travel Time (s)	11.6		6.4			3.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	7	220	103	0	985
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	220	103	0	985
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.1%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	7	220	103	0	985
Future Vol, veh/h	0	7	220	103	0	985
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	200	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	7	220	103	0	985

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	110	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	922	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	-	922	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	922
HCM Lane V/C Ratio	-	-	0.008
HCM Control Delay (s)	-	-	8.9
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FT-PM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	55	41	79	58	96	172	979	114	66	335	18
Future Volume (vph)	23	55	41	79	58	96	172	979	114	66	335	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.98	0.98		1.00		0.96	1.00		0.98
Frt		0.936			0.906				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1532	0	1610	1552	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.506			0.695			0.521			0.274		
Satd. Flow (perm)	874	1532	0	1158	1552	0	907	3316	1419	476	3316	1447
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			73				114			100
Link Speed (k/h)		40			40			80				80
Link Distance (m)		143.7			356.2			324.9				142.9
Travel Time (s)		12.9			32.1			14.6				6.4
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	23	55	41	79	58	96	172	979	114	66	335	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	96	0	79	154	0	172	979	114	66	335	18
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FT-PM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	45.0	45.0		45.0	45.0		20.0	55.0	55.0	20.0	55.0	55.0
Total Split (%)	37.5%	37.5%		37.5%	37.5%		16.7%	45.8%	45.8%	16.7%	45.8%	45.8%
Maximum Green (s)	38.4	38.4		38.4	38.4		12.6	48.4	48.4	13.6	48.4	48.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	14.2	14.2		14.2	14.2		88.7	81.9	81.9	83.2	76.3	76.3
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.74	0.68	0.68	0.69	0.64	0.64
v/c Ratio	0.22	0.46		0.58	0.62		0.24	0.43	0.11	0.17	0.16	0.02
Control Delay	51.3	38.8		66.1	37.2		5.0	10.4	2.0	5.3	9.9	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	38.8		66.1	37.2		5.0	10.4	2.0	5.3	9.9	0.1
LOS	D	D		E	D		A	B	A	A	A	A
Approach Delay		41.2			47.0			8.9			8.7	
Approach LOS		D			D			A			A	
Queue Length 50th (m)	5.0	13.9		18.0	18.1		8.7	52.1	0.0	3.0	15.2	0.0
Queue Length 95th (m)	12.6	29.1		32.4	37.8		18.4	80.1	7.0	7.7	27.0	0.0
Internal Link Dist (m)		119.7			332.2			300.9			118.9	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	279	512		370	546		768	2264	1005	491	2109	956
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	0.08	0.19		0.21	0.28		0.22	0.43	0.11	0.13	0.16	0.02

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 50 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 15.1

Intersection LOS: B

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FT-PM  
 910 March Road

Intersection Capacity Utilization 73.5%      ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FT-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	25	110	73	33	30	159	1216	97	10	503	63
Future Volume (vph)	85	25	110	73	33	30	159	1216	97	10	503	63
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		0.99	1.00		1.00	1.00	
Frt			0.850		0.929			0.989			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1579	0	3216	4695	0	1658	4671	0
Flt Permitted	0.471			0.741			0.950			0.950		
Satd. Flow (perm)	821	1745	1462	1290	1579	0	3186	4695	0	1650	4671	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			110		30			11			18	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	85	25	110	73	33	30	159	1216	97	10	503	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	25	110	73	63	0	159	1313	0	10	566	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FT-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	4	8	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	5.0	
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	12.0	57.0	57.0	45.0	45.0		22.0	51.0		22.0	51.0	
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		16.9%	39.2%		16.9%	39.2%	
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		15.4	44.6		15.4	44.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag	Lead			Lag			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	25.2	24.7	24.7	12.7	12.7		11.7	88.9		6.4	73.4	
Actuated g/C Ratio	0.19	0.19	0.19	0.10	0.10		0.09	0.68		0.05	0.56	
v/c Ratio	0.44	0.08	0.30	0.58	0.35		0.55	0.41		0.12	0.21	
Control Delay	50.8	41.6	9.5	72.9	35.9		63.4	10.5		61.9	14.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	50.8	41.6	9.5	72.9	35.9		63.4	10.5		61.9	14.6	
LOS	D	D	A	E	D		E	B		E	B	
Approach Delay		29.1				55.8		16.3			15.4	
Approach LOS		C				E		B			B	
Queue Length 50th (m)	18.7	5.3	0.0	18.2	7.9		20.4	45.0		2.5	24.2	
Queue Length 95th (m)	32.1	12.5	14.7	32.7	21.0		30.8	85.7		8.3	36.7	
Internal Link Dist (m)		93.7				322.6		237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	194	669	628	376	481		380	3213		196	2645	
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	0.04	0.18	0.19	0.13		0.42	0.41		0.05	0.21	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 20 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.58  
 Intersection Signal Delay: 19.5  
 Intersection LOS: B























Intersection Capacity Utilization 61.0% ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2022 FT-PM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	25	110	73	33	30	159	1216	97	10	503	63
Future Volume (veh/h)	85	25	110	73	33	30	159	1216	97	10	503	63
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1729	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	85	25	0	73	33	30	159	1216	97	10	503	63
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	191	317	269	175	72	66	214	2975	237	20	2607	321
Arrive On Green	0.04	0.18	0.00	0.09	0.09	0.09	0.07	0.65	0.65	0.01	0.60	0.60
Sat Flow, veh/h	1681	1765	1500	1371	833	757	3261	4546	363	1681	4343	536
Grp Volume(v), veh/h	85	25	0	73	0	63	159	859	454	10	370	196
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1371	0	1589	1630	1606	1697	1681	1606	1667
Q Serve(g_s), s	5.4	1.5	0.0	6.7	0.0	4.9	6.2	16.4	16.4	0.8	6.8	6.9
Cycle Q Clear(g_c), s	5.4	1.5	0.0	6.7	0.0	4.9	6.2	16.4	16.4	0.8	6.8	6.9
Prop In Lane	1.00		1.00	1.00		0.48	1.00		0.21	1.00		0.32
Lane Grp Cap(c), veh/h	191	317	269	175	0	138	214	2102	1111	20	1928	1000
V/C Ratio(X)	0.45	0.08	0.00	0.42	0.00	0.46	0.74	0.41	0.41	0.51	0.19	0.20
Avail Cap(c_a), veh/h	191	677	576	455	0	463	386	2102	1111	199	1928	1000
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.9	44.4	0.0	57.2	0.0	56.4	59.6	10.6	10.6	63.9	11.7	11.8
Incr Delay (d2), s/veh	1.6	0.1	0.0	1.6	0.0	2.3	5.0	0.6	1.1	19.0	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.8	0.0	2.6	0.0	2.2	3.0	7.4	8.0	0.5	3.0	3.3
LnGrp Delay(d),s/veh	52.6	44.5	0.0	58.8	0.0	58.7	64.6	11.2	11.7	82.9	12.0	12.2
LnGrp LOS	D	D		E		E	E	B	B	F	B	B
Approach Vol, veh/h		110			136			1472			576	
Approach Delay, s/veh		50.7			58.8			17.1			13.3	
Approach LOS		D			E			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	91.5		30.4	15.1	84.4	12.0	18.4				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	15.4	* 45		49.9	15.4	* 45	5.4	37.9				
Max Q Clear Time (g_c+I1), s	2.8	18.4		3.5	8.2	8.9	7.4	8.7				
Green Ext Time (p_c), s	0.0	11.8		0.1	0.3	4.6	0.0	0.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			20.2									
HCM 2010 LOS			C									
<b>Notes</b>												

Lanes, Volumes, Timings  
3: March Road & Site Access #1

2022 FT-PM  
910 March Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	121	67	946	12	37	298
Future Volume (vph)	121	67	946	12	37	298
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0	0.0		0.0	110.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				95.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1658	1483	1745	1483	1658	1745
Link Speed (k/h)	30		80			80
Link Distance (m)	103.7		66.1			184.8
Travel Time (s)	12.4		3.0			8.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	121	67	946	12	37	298
Shared Lane Traffic (%)						
Lane Group Flow (vph)	121	67	946	12	37	298
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	66.3%
	ICU Level of Service C
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	121	67	946	12	37	298
Future Vol, veh/h	121	67	946	12	37	298
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	0	1100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	67	946	12	37	298

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1318	946	0	0	958
Stage 1	946	-	-	-	-
Stage 2	372	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	173	317	-	-	718
Stage 1	377	-	-	-	-
Stage 2	697	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	164	317	-	-	718
Mov Cap-2 Maneuver	164	-	-	-	-
Stage 1	377	-	-	-	-
Stage 2	661	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	53.1	0	1.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	164	317	718	-
HCM Lane V/C Ratio	-	-	0.738	0.211	0.052	-
HCM Control Delay (s)	-	-	71.7	19.4	10.3	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	4.6	0.8	0.2	-

Lanes, Volumes, Timings  
4: March Road & Site Access #2

2022 FT-PM  
910 March Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↕
Traffic Volume (vph)	0	12	946	152	0	419
Future Volume (vph)	0	12	946	152	0	419
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		20.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	15.0				15.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1510	3316	1483	0	3316
Flt Permitted						
Satd. Flow (perm)	0	1510	3316	1483	0	3316
Link Speed (k/h)	30		80			80
Link Distance (m)	106.8		142.9			66.1
Travel Time (s)	12.8		6.4			3.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	12	946	152	0	419
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	12	946	152	0	419
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.6%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	12	946	152	0	419
Future Vol, veh/h	0	12	946	152	0	419
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	200	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	12	946	152	0	419

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	473	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	538	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	538	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	538
HCM Lane V/C Ratio	-	-	0.022
HCM Control Delay (s)	-	-	11.8
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.1

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FT Sat  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	55	41	79	58	100	172	1043	114	69	385	21
Future Volume (vph)	27	55	41	79	58	100	172	1043	114	69	385	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00		0.96	1.00		0.98
Frt		0.936			0.905				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1535	0	1610	1552	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.589			0.695			0.524			0.256		
Satd. Flow (perm)	1020	1535	0	1163	1552	0	913	3316	1427	445	3316	1449
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			71				114			41
Link Speed (k/h)		40			40			80				80
Link Distance (m)		143.7			356.2			324.9				142.9
Travel Time (s)		12.9			32.1			14.6				6.4
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	27	55	41	79	58	100	172	1043	114	69	385	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	96	0	79	158	0	172	1043	114	69	385	21
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0



Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FT Sat  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		34.6	34.6	34.6	34.6	34.6	34.6
Total Split (s)	39.0	39.0		39.0	39.0		56.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	41.1%	41.1%		41.1%	41.1%		58.9%	58.9%	58.9%	58.9%	58.9%	58.9%
Maximum Green (s)	32.4	32.4		32.4	32.4		49.4	49.4	49.4	49.4	49.4	49.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.0	2.0	2.0	2.0	2.0
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)	6.6	6.6		6.6	6.6		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		21.0	21.0	21.0	21.0	21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	12.7	12.7		12.7	12.7		69.1	69.1	69.1	69.1	69.1	69.1
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.73	0.73	0.73	0.73	0.73	0.73
v/c Ratio	0.20	0.40		0.51	0.59		0.26	0.43	0.11	0.21	0.16	0.02
Control Delay	38.6	27.2		49.1	30.2		6.1	6.2	1.2	6.9	4.5	0.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	27.2		49.1	30.2		6.1	6.2	1.2	6.9	4.5	0.7
LOS	D	C		D	C		A	A	A	A	A	A
Approach Delay		29.7			36.5			5.7				4.7
Approach LOS		C			D			A				A
Queue Length 50th (m)	4.5	9.3		13.8	15.0		8.5	32.1	0.0	3.3	9.2	0.0
Queue Length 95th (m)	11.7	22.4		26.4	32.5		20.6	54.2	4.8	10.5	17.2	1.0
Internal Link Dist (m)		119.7			332.2			300.9				118.9
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	347	550		396	576		663	2411	1068	323	2411	1064
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	0.08	0.17		0.20	0.27		0.26	0.43	0.11	0.21	0.16	0.02

Intersection Summary

Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	95
Offset:	11 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	10.2
Intersection LOS:	B

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2022 FT Sat  
 910 March Road

Intersection Capacity Utilization 80.2%      ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FT Sat  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	25	110	73	33	34	159	1271	97	13	547	66
Future Volume (vph)	89	25	110	73	33	34	159	1271	97	13	547	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		0.99	1.00		1.00	1.00	
Frt			0.850		0.924			0.989			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1572	0	3216	4697	0	1658	4677	0
Flt Permitted	0.713			0.741			0.950			0.950		
Satd. Flow (perm)	1243	1745	1463	1291	1572	0	3192	4697	0	1652	4677	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			110		34			13			22	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	89	25	110	73	33	34	159	1271	97	13	547	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	25	110	73	67	0	159	1368	0	13	613	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2022 FT Sat  
910 March Road



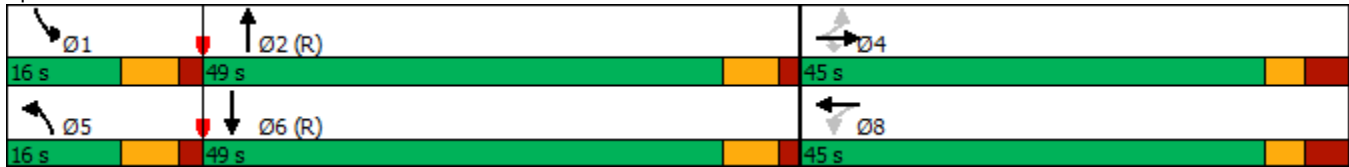
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	44.1	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	45.0	45.0	45.0	45.0	45.0		16.0	49.0		16.0	49.0	
Total Split (%)	40.9%	40.9%	40.9%	40.9%	40.9%		14.5%	44.5%		14.5%	44.5%	
Maximum Green (s)	37.9	37.9	37.9	37.9	37.9		9.4	42.6		9.4	42.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	7.1	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	13.3	13.3	13.3	13.3	13.3		10.7	80.3		6.5	65.9	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.10	0.73		0.06	0.60	
v/c Ratio	0.59	0.12	0.40	0.47	0.31		0.51	0.40		0.13	0.22	
Control Delay	60.9	41.9	12.3	53.7	27.2		52.5	7.3		51.6	10.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	60.9	41.9	12.3	53.7	27.2		52.5	7.3		51.6	10.9	
LOS	E	D	B	D	C		D	A		D	B	
Approach Delay		34.9			41.0			12.0			11.7	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	18.4	4.9	0.0	14.8	6.5		17.0	30.5		2.7	19.8	
Queue Length 95th (m)	32.8	12.1	14.7	27.6	18.3		26.5	73.1		8.7	32.1	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	428	601	576	444	563		323	3433		141	2810	
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	0.21	0.04	0.19	0.16	0.12		0.49	0.40		0.09	0.22	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.59  
 Intersection Signal Delay: 15.6  
 Intersection LOS: B























Intersection Capacity Utilization 62.3% ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2022 FT Sat  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	25	110	73	33	34	159	1271	97	13	547	66
Future Volume (veh/h)	89	25	110	73	33	34	159	1271	97	13	547	66
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1731	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	89	25	0	73	33	34	159	1271	97	13	547	66
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	198	244	207	238	108	111	217	3031	231	25	2672	318
Arrive On Green	0.14	0.14	0.00	0.14	0.14	0.14	0.07	0.66	0.66	0.01	0.61	0.61
Sat Flow, veh/h	1324	1765	1500	1375	781	804	3261	4563	348	1681	4362	519
Grp Volume(v), veh/h	89	25	0	73	0	67	159	895	473	13	401	212
Grp Sat Flow(s),veh/h/ln	1324	1765	1500	1375	0	1585	1630	1606	1700	1681	1606	1670
Q Serve(g_s), s	7.1	1.4	0.0	5.4	0.0	4.2	5.3	14.3	14.3	0.8	6.1	6.2
Cycle Q Clear(g_c), s	11.3	1.4	0.0	6.8	0.0	4.2	5.3	14.3	14.3	0.8	6.1	6.2
Prop In Lane	1.00		1.00	1.00		0.51	1.00		0.20	1.00		0.31
Lane Grp Cap(c), veh/h	198	244	207	238	0	219	217	2133	1129	25	1967	1023
V/C Ratio(X)	0.45	0.10	0.00	0.31	0.00	0.31	0.73	0.42	0.42	0.52	0.20	0.21
Avail Cap(c_a), veh/h	471	608	517	522	0	546	279	2133	1129	144	1967	1023
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	41.4	0.0	44.4	0.0	42.7	50.4	8.6	8.6	53.8	9.4	9.5
Incr Delay (d2), s/veh	1.6	0.2	0.0	0.7	0.0	0.8	7.0	0.6	1.1	15.6	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.7	0.0	2.1	0.0	1.9	2.6	6.4	6.9	0.5	2.7	3.0
LnGrp Delay(d),s/veh	49.3	41.6	0.0	45.1	0.0	43.4	57.4	9.2	9.7	69.4	9.7	9.9
LnGrp LOS	D	D		D		D	E	A	A	E	A	A
Approach Vol, veh/h		114			140			1527			626	
Approach Delay, s/veh		47.7			44.3			14.4			11.0	
Approach LOS		D			D			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	79.5		22.3	13.9	73.8		22.3				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4		7.1				
Max Green Setting (Gmax), s	9.4	* 43		37.9	9.4	* 43		37.9				
Max Q Clear Time (g_c+I1), s	2.8	16.3		13.3	7.3	8.2		8.8				
Green Ext Time (p_c), s	0.0	12.4		0.5	0.1	5.1		0.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			16.8									
HCM 2010 LOS			B									
<b>Notes</b>												

Lanes, Volumes, Timings  
3: March Road & Site Access #1

2022 FT Sat  
910 March Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	190	108	915	21	62	286
Future Volume (vph)	190	108	915	21	62	286
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				95.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1658	1483	1745	1483	1658	1745
Link Speed (k/h)	30		80			80
Link Distance (m)	120.5		66.1			61.1
Travel Time (s)	14.5		3.0			2.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	190	108	915	21	62	286
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	108	915	21	62	286
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	72.2%
ICU Level of Service	C
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	25.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	190	108	915	21	62	286
Future Vol, veh/h	190	108	915	21	62	286
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	1100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	190	108	915	21	62	286

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1325	915	0	0	936
Stage 1	915	-	-	-	-
Stage 2	410	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	~ 172	331	-	-	732
Stage 1	390	-	-	-	-
Stage 2	670	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 157	331	-	-	732
Mov Cap-2 Maneuver	~ 157	-	-	-	-
Stage 1	390	-	-	-	-
Stage 2	613	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	133	0	1.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	157	331	732	-
HCM Lane V/C Ratio	-	-	1.21	0.326	0.085	-
HCM Control Delay (s)	-	-	196.6	21.1	10.4	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	10.8	1.4	0.3	-

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



Lanes, Volumes, Timings  
4: March Road & Site Access #2

2022 FT Sat  
910 March Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↕
Traffic Volume (vph)	0	19	917	254	0	476
Future Volume (vph)	0	19	917	254	0	476
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		20.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	15.0				15.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1510	3316	1483	0	3316
Flt Permitted						
Satd. Flow (perm)	0	1510	3316	1483	0	3316
Link Speed (k/h)	50		80			80
Link Distance (m)	78.7		142.9			66.1
Travel Time (s)	5.7		6.4			3.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	19	917	254	0	476
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	19	917	254	0	476
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	19	917	254	0	476
Future Vol, veh/h	0	19	917	254	0	476
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	200	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	19	917	254	0	476













Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	459	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	549	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	549	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	549
HCM Lane V/C Ratio	-	-	0.035
HCM Control Delay (s)	-	-	11.8
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.1

Lanes, Volumes, Timings  
3: March Road & Site Access #1

2022 FT-AM Mitigation 1  
910 March Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	169	29	216	11	100	816
Future Volume (vph)	169	29	216	11	100	816
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0	0.0		0.0	110.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				95.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.623	
Satd. Flow (perm)	1658	1483	1745	1483	1087	1745
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		29		11		
Link Speed (k/h)	30		80			80
Link Distance (m)	104.3		66.1			114.5
Travel Time (s)	12.5		3.0			5.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	169	29	216	11	100	816
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	29	216	11	100	816
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	

Lanes, Volumes, Timings  
3: March Road & Site Access #1

2022 FT-AM Mitigation 1  
910 March Road

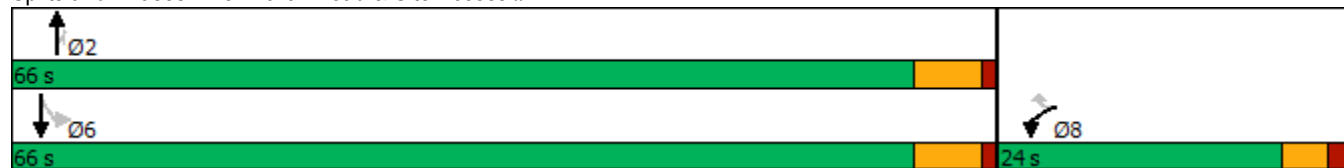


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.8	23.8	25.6	25.6	25.6	25.6
Total Split (s)	24.0	24.0	66.0	66.0	66.0	66.0
Total Split (%)	26.7%	26.7%	73.3%	73.3%	73.3%	73.3%
Maximum Green (s)	19.1	19.1	60.4	60.4	60.4	60.4
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	1.9	1.9	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	5.6	5.6	5.6	5.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	Max	Max
Walk Time (s)			7.0	7.0	7.0	7.0
Flash Dont Walk (s)			13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)			0	0	0	0
Act Effct Green (s)	14.1	14.1	64.6	64.6	64.6	64.6
Actuated g/C Ratio	0.16	0.16	0.72	0.72	0.72	0.72
v/c Ratio	0.65	0.11	0.17	0.01	0.13	0.65
Control Delay	46.0	12.1	4.8	2.5	4.9	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	12.1	4.8	2.5	4.9	10.2
LOS	D	B	A	A	A	B
Approach Delay	41.0		4.7			9.6
Approach LOS	D		A			A
Queue Length 50th (m)	25.9	0.0	9.6	0.0	4.3	59.4
Queue Length 95th (m)	45.0	6.8	20.5	1.5	11.1	117.5
Internal Link Dist (m)	80.3		42.1			90.5
Turn Bay Length (m)	20.0				110.0	
Base Capacity (vph)	355	340	1263	1076	786	1263
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.09	0.17	0.01	0.13	0.65

Intersection Summary













Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	89.2
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	13.4
Intersection LOS:	B
Intersection Capacity Utilization:	64.0%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: March Road & Site Access #1



Lanes, Volumes, Timings  
3: March Road & Site Access #1

2022 FT-PM Mitigation 1  
910 March Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	121	67	946	12	37	298
Future Volume (vph)	121	67	946	12	37	298
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0	0.0		0.0	110.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				95.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.200	
Satd. Flow (perm)	1658	1483	1745	1483	349	1745
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		67		12		
Link Speed (k/h)	30		80			80
Link Distance (m)	103.7		66.1			184.8
Travel Time (s)	12.4		3.0			8.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	121	67	946	12	37	298
Shared Lane Traffic (%)						
Lane Group Flow (vph)	121	67	946	12	37	298
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.9	22.9	25.6	25.6	25.6	25.6
Total Split (s)	23.0	23.0	67.0	67.0	67.0	67.0
Total Split (%)	25.6%	25.6%	74.4%	74.4%	74.4%	74.4%
Maximum Green (s)	18.1	18.1	61.4	61.4	61.4	61.4
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	1.9	1.9	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	5.6	5.6	5.6	5.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)			7.0	7.0	7.0	7.0
Flash Dont Walk (s)			13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)			0	0	0	0
Act Effct Green (s)	10.7	10.7	43.3	43.3	43.3	43.3
Actuated g/C Ratio	0.18	0.18	0.73	0.73	0.73	0.73
v/c Ratio	0.41	0.21	0.75	0.01	0.15	0.23
Control Delay	30.9	10.0	12.4	2.2	6.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	10.0	12.4	2.2	6.0	4.9
LOS	C	A	B	A	A	A
Approach Delay	23.4		12.3			5.0
Approach LOS	C		B			A
Queue Length 50th (m)	11.0	0.0	63.0	0.0	1.3	11.0
Queue Length 95th (m)	34.0	10.4	144.8	1.4	5.4	25.1
Internal Link Dist (m)	79.7		42.1			160.8
Turn Bay Length (m)	20.0				110.0	
Base Capacity (vph)	564	549	1595	1357	319	1595
Starvation Cap Reductn	0	0	24	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.12	0.60	0.01	0.12	0.19

**Intersection Summary**

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	59.5
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	12.1
Intersection LOS:	B
Intersection Capacity Utilization:	68.4%
ICU Level of Service:	C
Analysis Period (min):	15













Splits and Phases: 3: March Road & Site Access #1





Lanes, Volumes, Timings  
3: March Road & Site Access #1

2022 FT Sat Mitigation 1  
910 March Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	190	108	915	21	62	286
Future Volume (vph)	190	108	915	21	62	286
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				95.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.219	
Satd. Flow (perm)	1658	1483	1745	1483	382	1745
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		108		21		
Link Speed (k/h)	30		80			80
Link Distance (m)	120.5		66.1			61.1
Travel Time (s)	14.5		3.0			2.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	190	108	915	21	62	286
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	108	915	21	62	286
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	

Lanes, Volumes, Timings  
3: March Road & Site Access #1

2022 FT Sat Mitigation 1  
910 March Road

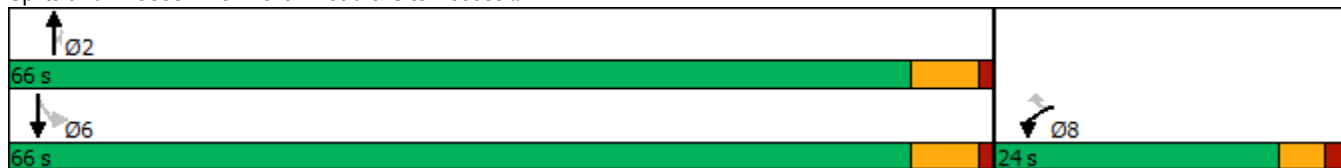


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.8	23.8	25.6	25.6	25.6	25.6
Total Split (s)	24.0	24.0	66.0	66.0	66.0	66.0
Total Split (%)	26.7%	26.7%	73.3%	73.3%	73.3%	73.3%
Maximum Green (s)	19.1	19.1	60.4	60.4	60.4	60.4
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	1.9	1.9	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	5.6	5.6	5.6	5.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	Max	Max
Walk Time (s)			7.0	7.0	7.0	7.0
Flash Dont Walk (s)			13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)			0	0	0	0
Act Effct Green (s)	14.8	14.8	62.8	62.8	62.8	62.8
Actuated g/C Ratio	0.17	0.17	0.71	0.71	0.71	0.71
v/c Ratio	0.68	0.32	0.74	0.02	0.23	0.23
Control Delay	46.8	9.0	13.1	2.1	7.8	5.4
Queue Delay	0.0	0.0	0.6	0.0	0.0	0.0
Total Delay	46.8	9.0	13.7	2.1	7.8	5.4
LOS	D	A	B	A	A	A
Approach Delay	33.1		13.4			5.8
Approach LOS	C		B			A
Queue Length 50th (m)	29.4	0.0	79.5	0.0	3.1	14.1
Queue Length 95th (m)	50.2	12.5	151.1	2.1	9.8	27.2
Internal Link Dist (m)	96.5		42.1			37.1
Turn Bay Length (m)					110.0	
Base Capacity (vph)	359	406	1243	1063	272	1243
Starvation Cap Reductn	0	0	93	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.27	0.80	0.02	0.23	0.23

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	88.1
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	15.5
Intersection LOS:	B
Intersection Capacity Utilization:	74.2%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 3: March Road & Site Access #1



# Appendix T

2027 Future Total Synchro Sheets

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FT-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	37	157	125	17	54	99	578	63	80	1541	71
Future Volume (vph)	106	37	157	125	17	54	99	578	63	80	1541	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99		1.00					0.98	1.00		
Frt		0.879			0.886				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1484	0	1658	1469	0	1551	3020	1414	1658	3316	1401
Flt Permitted	0.711			0.463			0.084			0.434		
Satd. Flow (perm)	1241	1484	0	807	1469	0	137	3020	1380	756	3316	1401
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		157			54				100			100
Link Speed (k/h)		40			40			80			80	
Link Distance (m)		143.7			356.2			324.9			142.9	
Travel Time (s)		12.9			32.1			14.6			6.4	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	14%	2%	2%	2%	9%	9%	12%	7%	2%	2%	8%
Adj. Flow (vph)	106	37	157	125	17	54	99	578	63	80	1541	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	194	0	125	71	0	99	578	63	80	1541	71
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FT-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	48.0	48.0		48.0	48.0		20.0	52.0	52.0	20.0	52.0	52.0
Total Split (%)	40.0%	40.0%		40.0%	40.0%		16.7%	43.3%	43.3%	16.7%	43.3%	43.3%
Maximum Green (s)	41.4	41.4		41.4	41.4		12.6	45.4	45.4	13.6	45.4	45.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	20.1	20.1		20.1	20.1		81.8	75.4	75.4	78.5	70.9	70.9
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.68	0.63	0.63	0.65	0.59	0.59
v/c Ratio	0.51	0.51		0.93	0.24		0.52	0.30	0.07	0.15	0.79	0.08
Control Delay	52.5	15.1		109.0	16.3		20.5	12.7	1.0	7.0	24.3	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	15.1		109.0	16.3		20.5	12.7	1.0	7.0	24.3	1.6
LOS	D	B		F	B		C	B	A	A	C	A
Approach Delay		28.3			75.4			12.7			22.6	
Approach LOS		C			E			B			C	
Queue Length 50th (m)	23.0	7.5		29.3	3.4		6.3	32.4	0.0	4.8	136.2	0.0
Queue Length 95th (m)	37.4	26.4		#51.0	14.7		21.3	54.7	2.5	12.2	#234.7	3.9
Internal Link Dist (m)		119.7			332.2			300.9			118.9	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	428	614		278	542		245	1897	904	635	1960	869
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	0.25	0.32		0.45	0.13		0.40	0.30	0.07	0.13	0.79	0.08

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	99 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	24.2
Intersection LOS:	C

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FT-AM  
 910 March Road

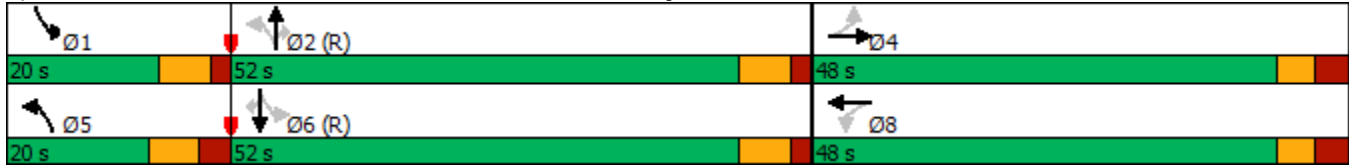
Intersection Capacity Utilization 94.6% ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FT-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	37	253	146	31	52	83	682	62	35	1633	63
Future Volume (vph)	70	37	253	146	31	52	83	682	62	35	1633	63
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.98	0.99	0.99		1.00	1.00		1.00	1.00	
Frt			0.850		0.906			0.987			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1496	1679	1483	1658	1454	0	3124	4464	0	1433	4721	0
Flt Permitted	0.531			0.733			0.950			0.950		
Satd. Flow (perm)	834	1679	1456	1271	1454	0	3122	4464	0	1428	4721	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			156		52			13			5	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	3		6	6		3	3		4	4		3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	2%	2%	8%	11%	5%	7%	9%	18%	2%	9%
Adj. Flow (vph)	70	37	253	146	31	52	83	682	62	35	1633	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	37	253	146	83	0	83	744	0	35	1696	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FT-AM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	4	8	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	5.0	
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	12.0	57.0	57.0	45.0	45.0		15.0	58.0		15.0	58.0	
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		11.5%	44.6%		11.5%	44.6%	
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		8.4	51.6		8.4	51.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag	Lead			Lag			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	30.4	29.9	29.9	20.3	20.3		8.8	76.5		8.7	71.2	
Actuated g/C Ratio	0.23	0.23	0.23	0.16	0.16		0.07	0.59		0.07	0.55	
v/c Ratio	0.32	0.10	0.56	0.74	0.31		0.39	0.28		0.37	0.66	
Control Delay	40.5	35.4	19.7	72.8	22.6		63.0	16.2		67.9	24.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.5	35.4	19.7	72.8	22.6		63.0	16.2		67.9	24.3	
LOS	D	D	B	E	C		E	B		E	C	
Approach Delay		25.4			54.6			20.9			25.1	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	14.2	7.3	20.4	36.1	6.9		10.6	37.2		8.7	112.7	
Queue Length 95th (m)	24.5	15.0	42.9	55.3	20.3		18.8	55.8		19.2	154.7	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	222	644	655	370	460		224	2632		104	2587	
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	0.32	0.06	0.39	0.39	0.18		0.37	0.28		0.34	0.66	

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	64 (49%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	26.2
Intersection LOS:	C























Intersection Capacity Utilization 80.2% ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2027 FT-AM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	37	253	146	31	52	83	682	62	35	1633	63
Future Volume (veh/h)	70	37	253	146	31	52	83	682	62	35	1633	63
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1593	1698	1765	1765	1638	1800	1714	1680	1800	1525	1760	1800
Adj Flow Rate, veh/h	70	37	0	146	31	52	83	682	62	35	1633	63
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	6	2	2	8	8	5	7	7	18	2	2
Cap, veh/h	244	425	375	268	86	145	126	2427	219	41	2638	102
Arrive On Green	0.04	0.25	0.00	0.16	0.16	0.16	0.04	0.57	0.57	0.03	0.56	0.56
Sat Flow, veh/h	1517	1698	1500	1351	547	917	3167	4280	386	1453	4748	183
Grp Volume(v), veh/h	70	37	0	146	0	83	83	486	258	35	1102	594
Grp Sat Flow(s),veh/h/ln	1517	1698	1500	1351	0	1464	1584	1528	1610	1453	1602	1727
Q Serve(g_s), s	4.9	2.2	0.0	13.3	0.0	6.6	3.4	10.6	10.8	3.1	30.3	30.3
Cycle Q Clear(g_c), s	4.9	2.2	0.0	13.3	0.0	6.6	3.4	10.6	10.8	3.1	30.3	30.3
Prop In Lane	1.00		1.00	1.00		0.63	1.00		0.24	1.00		0.11
Lane Grp Cap(c), veh/h	244	425	375	268	0	231	126	1733	913	41	1780	960
V/C Ratio(X)	0.29	0.09	0.00	0.54	0.00	0.36	0.66	0.28	0.28	0.85	0.62	0.62
Avail Cap(c_a), veh/h	244	652	576	449	0	427	205	1733	913	94	1780	960
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.3	37.4	0.0	51.7	0.0	48.9	61.6	14.5	14.5	62.9	19.6	19.6
Incr Delay (d2), s/veh	0.6	0.1	0.0	1.7	0.0	0.9	5.8	0.4	0.8	35.2	1.6	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	1.0	0.0	5.1	0.0	2.7	1.6	4.5	4.9	1.7	13.7	15.2
LnGrp Delay(d),s/veh	43.0	37.5	0.0	53.4	0.0	49.8	67.4	14.9	15.3	98.1	21.2	22.6
LnGrp LOS	D	D		D		D	E	B	B	F	C	C
Approach Vol, veh/h		107			229			827			1731	
Approach Delay, s/veh		41.1			52.1			20.3			23.2	
Approach LOS		D			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.3	80.1		39.6	11.8	78.6	12.0	27.6				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	8.4	* 52		49.9	8.4	* 52	5.4	37.9				
Max Q Clear Time (g_c+I1), s	5.1	12.8		4.2	5.4	32.3	6.9	15.3				
Green Ext Time (p_c), s	0.0	6.6		0.2	0.1	12.9	0.0	1.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			25.3									
HCM 2010 LOS			C									
<b>Notes</b>												

Lanes, Volumes, Timings  
 3: March Road & South Local Road/Site Access #1

2027 FT-AM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Future Volume (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879			0.868			0.997				
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1534	0	1658	1515	0	1658	1740	0	1658	1745	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1658	1534	0	1658	1515	0	1658	1740	0	1658	1745	0
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		86.4			104.3			66.1			51.2	
Travel Time (s)		6.2			12.5			3.0			2.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	26	0	155	42	0	4	631	0	91	1516	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	106.6%
ICU Level of Service	G
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	258.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Vol, veh/h	5	5	21	155	5	37	4	620	11	91	1516	0
Future Vol, veh/h	5	5	21	155	5	37	4	620	11	91	1516	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	200	-	-	0	-	-	1100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	5	21	155	5	37	4	620	11	91	1516	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2353	2337	1516	2345	2332	626	1516	0	0	631	0	0
Stage 1	1698	1698	-	634	634	-	-	-	-	-	-	-
Stage 2	655	639	-	1711	1698	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	25	37	147	~ 25	37	484	441	-	-	951	-	-
Stage 1	117	148	-	467	473	-	-	-	-	-	-	-
Stage 2	455	470	-	~ 115	148	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	19	33	147	~ 17	33	484	441	-	-	951	-	-
Mov Cap-2 Maneuver	19	33	-	~ 17	33	-	-	-	-	-	-	-
Stage 1	116	134	-	463	469	-	-	-	-	-	-	-
Stage 2	412	466	-	~ 86	134	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	92.8	\$ 3227.5	0.1	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	441	-	-	19	88	17	184	951	-	-
HCM Lane V/C Ratio	0.009	-	-	0.263	0.295	9.118	0.228	0.096	-	-
HCM Control Delay (s)	13.2	-	-	252.1	62.4	4093.8	30.3	9.2	-	-
HCM Lane LOS	B	-	-	F	F	F	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.8	1.1	20.1	0.8	0.3	-	-

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

Lanes, Volumes, Timings  
4: March Road & Site Access #2

2027 FT-AM  
910 March Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↕
Traffic Volume (vph)	0	8	627	106	0	1692
Future Volume (vph)	0	8	627	106	0	1692
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		20.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	15.0				15.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1510	3316	1483	0	3316
Flt Permitted						
Satd. Flow (perm)	0	1510	3316	1483	0	3316
Link Speed (k/h)	30		80			80
Link Distance (m)	96.8		142.9			66.1
Travel Time (s)	11.6		6.4			3.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	8	627	106	0	1692
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	8	627	106	0	1692
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	52.7%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	8	627	106	0	1692
Future Vol, veh/h	0	8	627	106	0	1692
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	200	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	8	627	106	0	1692

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	314	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	682	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	682	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	682
HCM Lane V/C Ratio	-	-	0.012
HCM Control Delay (s)	-	-	10.3
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FT-PM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	57	72	79	60	128	250	1539	114	114	709	103
Future Volume (vph)	88	57	72	79	60	128	250	1539	114	114	709	103
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.98		0.98	0.98		1.00		0.96			0.98
Frt		0.916			0.898				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1501	0	1610	1537	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.420			0.615			0.339			0.102		
Satd. Flow (perm)	726	1501	0	1026	1537	0	591	3316	1419	178	3316	1447
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		56			94				100			100
Link Speed (k/h)		40			40			80			80	
Link Distance (m)		143.7			356.2			324.9			142.9	
Travel Time (s)		12.9			32.1			14.6			6.4	
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	88	57	72	79	60	128	250	1539	114	114	709	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	129	0	79	188	0	250	1539	114	114	709	103
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FT-PM  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		12.4	34.6	34.6	11.4	34.6	34.6
Total Split (s)	45.0	45.0		45.0	45.0		20.0	55.0	55.0	20.0	55.0	55.0
Total Split (%)	37.5%	37.5%		37.5%	37.5%		16.7%	45.8%	45.8%	16.7%	45.8%	45.8%
Maximum Green (s)	38.4	38.4		38.4	38.4		12.6	48.4	48.4	13.6	48.4	48.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.8	2.0	2.0	1.8	2.0	2.0
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)	6.6	6.6		6.6	6.6		7.4	6.6	6.6	6.4	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0			21.0	21.0		21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	16.1	16.1		16.1	16.1		85.0	74.6	74.6	81.9	72.1	72.1
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.71	0.62	0.62	0.68	0.60	0.60
v/c Ratio	0.91	0.52		0.58	0.65		0.48	0.75	0.12	0.47	0.36	0.11
Control Delay	119.2	33.7		63.8	34.5		8.6	20.7	3.6	15.1	14.0	3.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	119.2	33.7		63.8	34.5		8.6	20.7	3.6	15.1	14.0	3.3
LOS	F	C		E	C		A	C	A	B	B	A
Approach Delay		68.4			43.1			18.1			13.0	
Approach LOS		E			D			B			B	
Queue Length 50th (m)	20.8	15.9		17.8	20.9		14.8	123.3	1.2	5.9	41.1	0.3
Queue Length 95th (m)	#41.5	32.9		31.7	42.3		29.9	201.2	10.4	19.3	69.2	9.0
Internal Link Dist (m)		119.7			332.2			300.9			118.9	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	232	518		328	555		546	2060	919	297	1991	909
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	0.38	0.25		0.24	0.34		0.46	0.75	0.12	0.38	0.36	0.11

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 50 (42%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 22.0  
 Intersection LOS: C

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FT-PM  
 910 March Road

Intersection Capacity Utilization 98.5% ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FT-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	27	110	87	34	41	159	1810	117	14	861	111
Future Volume (vph)	125	27	110	87	34	41	159	1810	117	14	861	111
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		0.99	1.00		1.00	1.00	
Frt			0.850		0.918			0.991			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1563	0	3216	4708	0	1658	4670	0
Flt Permitted	0.483			0.740			0.950			0.950		
Satd. Flow (perm)	842	1745	1462	1289	1563	0	3200	4708	0	1655	4670	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			110		41			8			19	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	125	27	110	87	34	41	159	1810	117	14	861	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	27	110	87	75	0	159	1927	0	14	972	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FT-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	4	8	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	5.0	
Minimum Split (s)	11.6	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	12.0	57.0	57.0	45.0	45.0		22.0	51.0		22.0	51.0	
Total Split (%)	9.2%	43.8%	43.8%	34.6%	34.6%		16.9%	39.2%		16.9%	39.2%	
Maximum Green (s)	5.4	49.9	49.9	37.9	37.9		15.4	44.6		15.4	44.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.3	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	6.6	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)		30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	26.7	26.2	26.2	14.2	14.2		11.7	84.6		6.7	72.0	
Actuated g/C Ratio	0.21	0.20	0.20	0.11	0.11		0.09	0.65		0.05	0.55	
v/c Ratio	0.61	0.08	0.29	0.62	0.36		0.55	0.63		0.16	0.37	
Control Delay	57.2	40.3	9.0	73.2	31.1		63.4	16.5		62.7	17.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	57.2	40.3	9.0	73.2	31.1		63.4	16.5		62.7	17.4	
LOS	E	D	A	E	C		E	B		E	B	
Approach Delay		35.2			53.7			20.1			18.0	
Approach LOS		D			D			C			B	
Queue Length 50th (m)	27.8	5.7	0.0	21.6	8.1		20.4	84.6		3.5	48.3	
Queue Length 95th (m)	43.7	13.1	14.4	37.4	21.9		30.8	157.3		10.3	68.8	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	206	669	628	375	484		380	3065		196	2594	
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	0.61	0.04	0.18	0.23	0.15		0.42	0.63		0.07	0.37	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 20 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.63  
 Intersection Signal Delay: 22.2  
 Intersection LOS: C























Intersection Capacity Utilization 75.7% ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 2: March Road & Klondike Road



HCM 2010 Signalized Intersection Summary  
2: March Road & Klondike Road

2027 FT-PM  
910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	27	110	87	34	41	159	1810	117	14	861	111
Future Volume (veh/h)	125	27	110	87	34	41	159	1810	117	14	861	111
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1734	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	125	27	0	87	34	41	159	1810	117	14	861	111
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	194	335	285	189	70	84	214	2960	191	26	2549	327
Arrive On Green	0.04	0.19	0.00	0.10	0.10	0.10	0.07	0.64	0.64	0.02	0.59	0.59
Sat Flow, veh/h	1681	1765	1500	1370	714	861	3261	4623	298	1681	4321	554
Grp Volume(v), veh/h	125	27	0	87	0	75	159	1256	671	14	639	333
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1370	0	1576	1630	1606	1709	1681	1606	1663
Q Serve(g_s), s	5.4	1.6	0.0	8.0	0.0	5.9	6.2	30.0	30.2	1.1	13.2	13.3
Cycle Q Clear(g_c), s	5.4	1.6	0.0	8.0	0.0	5.9	6.2	30.0	30.2	1.1	13.2	13.3
Prop In Lane	1.00		1.00	1.00		0.55	1.00		0.17	1.00		0.33
Lane Grp Cap(c), veh/h	194	335	285	189	0	154	214	2057	1094	26	1895	981
V/C Ratio(X)	0.64	0.08	0.00	0.46	0.00	0.49	0.74	0.61	0.61	0.55	0.34	0.34
Avail Cap(c_a), veh/h	194	677	576	455	0	459	386	2057	1094	199	1895	981
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.5	43.3	0.0	56.5	0.0	55.6	59.6	13.8	13.8	63.6	13.6	13.7
Incr Delay (d2), s/veh	7.1	0.1	0.0	1.7	0.0	2.4	5.0	1.4	2.6	16.8	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.8	0.0	3.1	0.0	2.7	3.0	13.7	14.9	0.6	6.0	6.4
LnGrp Delay(d),s/veh	60.6	43.4	0.0	58.3	0.0	58.0	64.6	15.2	16.4	80.4	14.1	14.6
LnGrp LOS	E	D		E		E	E	B	B	F	B	B
Approach Vol, veh/h		152			162			2086			986	
Approach Delay, s/veh		57.6			58.1			19.3			15.2	
Approach LOS		E			E			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.6	89.6		31.8	15.1	83.1	12.0	19.8				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4	6.6	7.1				
Max Green Setting (Gmax), s	15.4	* 45		49.9	15.4	* 45	5.4	37.9				
Max Q Clear Time (g_c+I1), s	3.1	32.2		3.6	8.2	15.3	7.4	10.0				
Green Ext Time (p_c), s	0.0	10.0		0.1	0.3	8.5	0.0	0.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			21.7									
HCM 2010 LOS			C									
<b>Notes</b>												

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Future Volume (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.871			0.864			0.999			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1520	0	1658	1508	0	1658	1743	0	1658	1742	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1658	1520	0	1658	1508	0	1658	1743	0	1658	1742	0
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		91.5			103.7			66.1			81.0	
Travel Time (s)		6.6			12.4			3.0			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	43	0	122	66	0	23	1598	0	44	775	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	109.3%
ICU Level of Service	H
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	203											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	5	6	37	122	6	60	23	1586	12	44	767	8
Future Vol, veh/h	5	6	37	122	6	60	23	1586	12	44	767	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	200	-	-	0	-	-	1100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	6	37	122	6	60	23	1586	12	44	767	8

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	2530	2503	771	2519	2501	1592	775	0	0	1598	0	0
Stage 1	859	859	-	1638	1638	-	-	-	-	-	-	-
Stage 2	1671	1644	-	881	863	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	19	29	400	~ 19	29	132	841	-	-	410	-	-
Stage 1	351	373	-	127	158	-	-	-	-	-	-	-
Stage 2	121	157	-	341	372	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	8	25	400	~ 13	25	132	841	-	-	410	-	-
Mov Cap-2 Maneuver	8	25	-	~ 13	25	-	-	-	-	-	-	-
Stage 1	342	333	-	124	154	-	-	-	-	-	-	-
Stage 2	62	153	-	271	332	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	118.2	\$ 2854.5	0.1	0.8
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	841	-	-	8	129	13	95	410	-	-
HCM Lane V/C Ratio	0.027	-	-	0.625	0.333	9.385	0.695	0.107	-	-
HCM Control Delay (s)	9.4	-	-	\$ 736.3	46.3	\$ 4343	102.9	14.8	-	-
HCM Lane LOS	A	-	-	F	E	F	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.2	1.3	16.4	3.5	0.4	-	-

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



Lanes, Volumes, Timings  
4: March Road & Site Access #2

2027 FT-PM  
910 March Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↕
Traffic Volume (vph)	0	11	1610	139	0	926
Future Volume (vph)	0	11	1610	139	0	926
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		20.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	15.0				15.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1510	3316	1483	0	3316
Flt Permitted						
Satd. Flow (perm)	0	1510	3316	1483	0	3316
Link Speed (k/h)	30		80			80
Link Distance (m)	106.8		142.9			66.1
Travel Time (s)	12.8		6.4			3.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	11	1610	139	0	926
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	1610	139	0	926
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.0%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	11	1610	139	0	926
Future Vol, veh/h	0	11	1610	139	0	926
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	200	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	1610	139	0	926

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	805	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	325	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	325	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	325
HCM Lane V/C Ratio	-	-	0.034
HCM Control Delay (s)	-	-	16.5
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0.1

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FT Sat  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↶↷	↷	↶	↶↷	↷
Traffic Volume (vph)	92	57	72	79	60	132	250	1603	114	117	756	106
Future Volume (vph)	92	57	72	79	60	132	250	1603	114	117	756	106
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	30.0		0.0	60.0		0.0	70.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	60.0			60.0			70.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00		0.96			0.98
Frt		0.916			0.897				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1504	0	1610	1537	0	1658	3316	1483	1658	3316	1483
Flt Permitted	0.530			0.674			0.355			0.109		
Satd. Flow (perm)	918	1504	0	1128	1537	0	619	3316	1427	190	3316	1449
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			15				114			63
Link Speed (k/h)		40			40			80				80
Link Distance (m)		143.7			356.2			324.9				142.9
Travel Time (s)		12.9			32.1			14.6				6.4
Confl. Peds. (#/hr)	11		17	17		11	2		11	11		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	9%	5%	5%	3%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	92	57	72	79	60	132	250	1603	114	117	756	106
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	129	0	79	192	0	250	1603	114	117	756	106
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FT Sat  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6		38.6	38.6		34.6	34.6	34.6	34.6	34.6	34.6
Total Split (s)	39.0	39.0		39.0	39.0		56.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	41.1%	41.1%		41.1%	41.1%		58.9%	58.9%	58.9%	58.9%	58.9%	58.9%
Maximum Green (s)	32.4	32.4		32.4	32.4		49.4	49.4	49.4	49.4	49.4	49.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.0	2.0	2.0	2.0	2.0
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)	6.6	6.6		6.6	6.6		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		21.0	21.0	21.0	21.0	21.0	21.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	16.5	16.5		16.5	16.5		65.3	65.3	65.3	65.3	65.3	65.3
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.69	0.69	0.69	0.69	0.69	0.69
v/c Ratio	0.58	0.40		0.40	0.69		0.59	0.70	0.11	0.90	0.33	0.10
Control Delay	49.3	19.4		39.5	45.9		16.6	12.1	1.7	77.5	7.1	3.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	19.4		39.5	45.9		16.6	12.1	1.7	77.5	7.1	3.3
LOS	D	B		D	D		B	B	A	E	A	A
Approach Delay		31.8			44.0			12.1			15.1	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	15.7	9.1		13.0	30.8		20.9	81.4	0.0	15.2	25.7	2.2
Queue Length 95th (m)	28.9	23.0		24.4	48.7		58.9	134.8	5.9	#34.8	43.8	8.9
Internal Link Dist (m)		119.7			332.2			300.9			118.9	
Turn Bay Length (m)	30.0			30.0			60.0			70.0		15.0
Base Capacity (vph)	313	560		384	534		425	2278	1016	130	2278	1015
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	0.29	0.23		0.21	0.36		0.59	0.70	0.11	0.90	0.33	0.10

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 11 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 130  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 16.7  
 Intersection LOS: B

Lanes, Volumes, Timings  
 1: March Road & Halton Terrace/Maxwell Bridge Road

2027 FT Sat  
 910 March Road

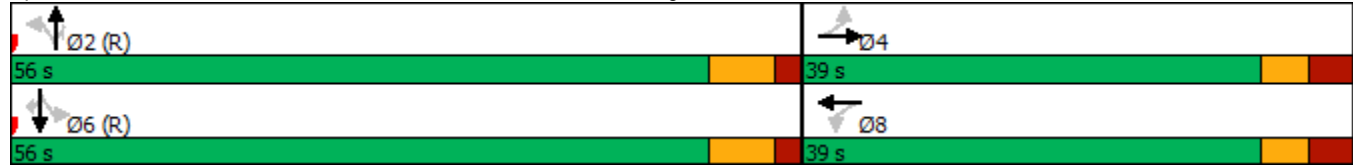
Intersection Capacity Utilization 102.4% ICU Level of Service G

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: March Road & Halton Terrace/Maxwell Bridge Road



Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FT Sat  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	27	110	87	34	45	159	1865	117	17	901	114
Future Volume (vph)	129	27	110	87	34	45	159	1865	117	17	901	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		5.0	15.0		0.0	100.0		0.0	45.0		0.0
Storage Lanes	1		1	1		0	2		0	1		0
Taper Length (m)	0.0			30.0			100.0			85.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99		1.00	1.00		1.00	1.00	
Frt			0.850		0.915			0.991			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1745	1483	1658	1559	0	3216	4709	0	1658	4672	0
Flt Permitted	0.706			0.740			0.950			0.950		
Satd. Flow (perm)	1231	1745	1463	1289	1559	0	3203	4709	0	1655	4672	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			110		45			10			24	
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		117.7			346.6			261.8			142.1	
Travel Time (s)		8.5			25.0			11.8			6.4	
Confl. Peds. (#/hr)	1		2	2		1	8		11	11		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	129	27	110	87	34	45	159	1865	117	17	901	114
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	27	110	87	79	0	159	1982	0	17	1015	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings  
2: March Road & Klondike Road

2027 FT Sat  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	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	5.0	
Minimum Split (s)	44.1	44.1	44.1	44.1	44.1		11.6	32.4		11.6	32.4	
Total Split (s)	45.0	45.0	45.0	45.0	45.0		16.0	49.0		16.0	49.0	
Total Split (%)	40.9%	40.9%	40.9%	40.9%	40.9%		14.5%	44.5%		14.5%	44.5%	
Maximum Green (s)	37.9	37.9	37.9	37.9	37.9		9.4	42.6		9.4	42.6	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		2.0	1.8		2.0	1.8	
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)	7.1	7.1	7.1	7.1	7.1		6.6	6.4		6.6	6.4	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0			19.0			19.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0			0	
Act Effct Green (s)	17.0	17.0	17.0	17.0	17.0		10.7	73.7		6.7	62.2	
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.10	0.67		0.06	0.57	
v/c Ratio	0.68	0.10	0.34	0.44	0.28		0.51	0.63		0.17	0.38	
Control Delay	60.7	37.7	10.0	47.4	21.6		52.5	13.8		52.2	14.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	60.7	37.7	10.0	47.4	21.6		52.5	13.8		52.2	14.5	
LOS	E	D	A	D	C		D	B		D	B	
Approach Delay		37.4			35.1			16.7			15.2	
Approach LOS		D			D			B			B	
Queue Length 50th (m)	26.5	5.0	0.0	17.1	6.4		17.0	64.5		3.5	40.8	
Queue Length 95th (m)	43.0	11.9	13.8	30.3	18.3		26.5	144.7		10.4	62.8	
Internal Link Dist (m)		93.7			322.6			237.8			118.1	
Turn Bay Length (m)	100.0		5.0	15.0			100.0			45.0		
Base Capacity (vph)	424	601	576	444	566		323	3158		141	2650	
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	0.30	0.04	0.19	0.20	0.14		0.49	0.63		0.12	0.38	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 18.6  
 Intersection LOS: B

Intersection Capacity Utilization 77.0% ICU Level of Service D  
 Analysis Period (min) 15























Splits and Phases: 2: March Road & Klondike Road





HCM 2010 Signalized Intersection Summary  
 2: March Road & Klondike Road

2027 FT Sat  
 910 March Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	27	110	87	34	45	159	1865	117	17	901	114
Future Volume (veh/h)	129	27	110	87	34	45	159	1865	117	17	901	114
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1735	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	129	27	0	87	34	45	159	1865	117	17	901	114
Adj No. of Lanes	1	1	1	1	1	0	2	3	0	1	3	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	6	6	2	2	2	2	2	2
Cap, veh/h	235	306	260	286	117	155	217	2898	181	31	2500	315
Arrive On Green	0.17	0.17	0.00	0.17	0.17	0.17	0.07	0.63	0.63	0.02	0.58	0.58
Sat Flow, veh/h	1311	1765	1500	1373	677	896	3261	4632	290	1681	4331	546
Grp Volume(v), veh/h	129	27	0	87	0	79	159	1291	691	17	667	348
Grp Sat Flow(s),veh/h/ln	1311	1765	1500	1373	0	1574	1630	1606	1711	1681	1606	1665
Q Serve(g_s), s	10.5	1.4	0.0	6.2	0.0	4.8	5.3	27.7	27.9	1.1	12.2	12.3
Cycle Q Clear(g_c), s	15.3	1.4	0.0	7.7	0.0	4.8	5.3	27.7	27.9	1.1	12.2	12.3
Prop In Lane	1.00		1.00	1.00		0.57	1.00		0.17	1.00		0.33
Lane Grp Cap(c), veh/h	235	306	260	286	0	273	217	2009	1070	31	1854	961
V/C Ratio(X)	0.55	0.09	0.00	0.30	0.00	0.29	0.73	0.64	0.65	0.55	0.36	0.36
Avail Cap(c_a), veh/h	460	608	517	521	0	542	279	2009	1070	144	1854	961
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	38.2	0.0	41.4	0.0	39.6	50.4	12.9	12.9	53.5	12.4	12.4
Incr Delay (d2), s/veh	2.0	0.1	0.0	0.6	0.0	0.6	7.0	1.6	3.0	14.3	0.5	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.7	0.0	2.4	0.0	2.1	2.6	12.6	13.9	0.6	5.5	5.9
LnGrp Delay(d),s/veh	48.2	38.3	0.0	42.0	0.0	40.2	57.4	14.5	15.9	67.8	12.9	13.5
LnGrp LOS	D	D		D		D	E	B	B	E	B	B
Approach Vol, veh/h		156			166			2141			1032	
Approach Delay, s/veh		46.5			41.1			18.1			14.0	
Approach LOS		D			D			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	75.2		26.2	13.9	69.9		26.2				
Change Period (Y+Rc), s	6.6	* 6.4		7.1	6.6	* 6.4		7.1				
Max Green Setting (Gmax), s	9.4	* 43		37.9	9.4	* 43		37.9				
Max Q Clear Time (g_c+I1), s	3.1	29.9		17.3	7.3	14.3		9.7				
Green Ext Time (p_c), s	0.0	10.4		0.7	0.1	8.9		0.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			19.3									
HCM 2010 LOS			B									
<b>Notes</b>												

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT Sat  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Future Volume (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.882			0.863			0.998			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1539	0	1658	1506	0	1658	1742	0	1658	1742	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1658	1539	0	1658	1506	0	1658	1742	0	1658	1742	0
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		75.3			120.5			66.1			61.1	
Travel Time (s)		5.4			14.5			3.0			2.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	47	0	193	106	0	23	1581	0	74	758	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	112.6%
ICU Level of Service	H
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh 707.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	5	10	37	193	9	97	23	1560	21	74	750	8
Future Vol, veh/h	5	10	37	193	9	97	23	1560	21	74	750	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	1100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	10	37	193	9	97	23	1560	21	74	750	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2572	2529	754	2543	2523	1571	758	0	0	1581	0	0
Stage 1	902	902	-	1617	1617	-	-	-	-	-	-	-
Stage 2	1670	1627	-	926	906	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	17	28	409	~ 18	28	136	853	-	-	416	-	-
Stage 1	332	356	-	~ 130	162	-	-	-	-	-	-	-
Stage 2	121	160	-	322	355	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 3	22	409	~ 9	22	136	853	-	-	416	-	-
Mov Cap-2 Maneuver	~ 3	22	-	~ 9	22	-	-	-	-	-	-	-
Stage 1	323	293	-	~ 126	158	-	-	-	-	-	-	-
Stage 2	32	156	-	233	292	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	302.8	6535.4	0.1	1.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	853	-	-	3	86	9	94	416	-	-
HCM Lane V/C Ratio	0.027	-	-	1.667	0.547	21.444	1.128	0.178	-	-
HCM Control Delay (s)	9.3	-	-	2315.5	88.7	10007	214.4	15.5	-	-
HCM Lane LOS	A	-	-	F	F	F	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.5	2.4	25.8	7.1	0.6	-	-

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

Lanes, Volumes, Timings  
4: March Road & Site Access #2

2027 FT Sat  
910 March Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↕
Traffic Volume (vph)	0	18	1586	231	0	980
Future Volume (vph)	0	18	1586	231	0	980
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		20.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	15.0				15.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1510	3316	1483	0	3316
Flt Permitted						
Satd. Flow (perm)	0	1510	3316	1483	0	3316
Link Speed (k/h)	50		80			80
Link Distance (m)	78.7		142.9			66.1
Travel Time (s)	5.7		6.4			3.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	18	1586	231	0	980
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	18	1586	231	0	980
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.3%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	18	1586	231	0	980
Future Vol, veh/h	0	18	1586	231	0	980
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	200	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	18	1586	231	0	980

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	793	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	331	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	-	331	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	331
HCM Lane V/C Ratio	-	-	0.054
HCM Control Delay (s)	-	-	16.5
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0.2

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Mitigation 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Future Volume (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879			0.868			0.997				
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1534	0	1658	1515	0	1658	1740	0	1658	1745	0
Flt Permitted	0.730			0.420			0.056			0.310		
Satd. Flow (perm)	1274	1534	0	733	1515	0	98	1740	0	541	1745	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			37			1				
Link Speed (k/h)		50			30			80				80
Link Distance (m)		86.4			104.3			66.1				51.2
Travel Time (s)		6.2			12.5			3.0				2.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	26	0	155	42	0	4	631	0	91	1516	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Mitigation 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	32.7	32.7		9.5	32.7		29.6	29.6		9.5	29.6	
Total Split (s)	33.0	33.0		10.0	43.0		76.0	76.0		11.0	87.0	
Total Split (%)	25.4%	25.4%		7.7%	33.1%		58.5%	58.5%		8.5%	66.9%	
Maximum Green (s)	27.3	27.3		5.5	37.3		70.4	70.4		6.5	81.4	
Yellow Time (s)	3.3	3.3		3.5	3.3		4.6	4.6		3.5	4.6	
All-Red Time (s)	2.4	2.4		1.0	2.4		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)	5.7	5.7		4.5	5.7		5.6	5.6		4.5	5.6	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0			0	
Act Effct Green (s)	10.0	10.0		17.1	15.9		71.9	71.9		83.8	82.7	
Actuated g/C Ratio	0.09	0.09		0.16	0.14		0.65	0.65		0.76	0.75	
v/c Ratio	0.04	0.16		0.86	0.17		0.06	0.55		0.19	1.15	
Control Delay	48.0	25.1		83.7	16.3		11.2	13.4		4.8	96.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.5		0.0	0.0	
Total Delay	48.0	25.1		83.7	16.3		11.2	14.0		4.8	96.1	
LOS	D	C		F	B		B	B		A	F	
Approach Delay		28.8			69.3			13.9			90.9	
Approach LOS		C			E			B			F	
Queue Length 50th (m)	1.0	1.0		30.9	0.9		0.3	75.8		4.9	~406.8	
Queue Length 95th (m)	4.8	9.5		#67.6	10.4		2.1	108.0		9.2	#486.6	
Internal Link Dist (m)		62.4			80.3			42.1			27.2	
Turn Bay Length (m)				20.0						110.0		
Base Capacity (vph)	316	397		180	539		64	1138		478	1313	
Starvation Cap Reductn	0	0		0	0		0	192		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	0.02	0.07		0.86	0.08		0.06	0.67		0.19	1.15	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 109.9  
 Natural Cycle: 145  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.15  
 Intersection Signal Delay: 68.6  
 Intersection LOS: E  
 Intersection Capacity Utilization 109.4%  
 ICU Level of Service H  
 Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.

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

Splits and Phases: 3: March Road & South Local Road/Site Access #1

↙ Ø1	↖ Ø2	↙ Ø3	↗ Ø4
11 s	76 s	10 s	33 s
↘ Ø6		↖ Ø8	
87 s		43 s	



Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Mitigation 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Future Volume (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.871			0.864			0.999			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1520	0	1658	1508	0	1658	1743	0	1658	1742	0
Flt Permitted	0.714			0.469			0.295			0.047		
Satd. Flow (perm)	1246	1520	0	818	1508	0	515	1743	0	82	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			36			1			1	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		91.5			103.7			66.1			81.0	
Travel Time (s)		6.6			12.4			3.0			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	43	0	122	66	0	23	1598	0	44	775	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Mitigation 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	32.7	32.7		9.5	32.7		29.6	29.6		29.6	29.6	
Total Split (s)	33.0	33.0		10.0	43.0		87.0	87.0		87.0	87.0	
Total Split (%)	25.4%	25.4%		7.7%	33.1%		66.9%	66.9%		66.9%	66.9%	
Maximum Green (s)	27.3	27.3		5.5	37.3		81.4	81.4		81.4	81.4	
Yellow Time (s)	3.3	3.3		3.5	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.4	2.4		1.0	2.4		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)	5.7	5.7		4.5	5.7		5.6	5.6		5.6	5.6	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	10.0	10.0		19.3	18.1		84.3	84.3		84.3	84.3	
Actuated g/C Ratio	0.09	0.09		0.17	0.16		0.74	0.74		0.74	0.74	
v/c Ratio	0.05	0.26		0.65	0.24		0.06	1.24		0.72	0.60	
Control Delay	48.2	22.3		59.1	23.7		5.0	132.2		75.4	9.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1		0.0	0.0	
Total Delay	48.2	22.3		59.1	23.7		5.0	132.2		75.4	9.7	
LOS	D	C		E	C		A	F		E	A	
Approach Delay		25.0			46.7			130.4			13.2	
Approach LOS		C			D			F			B	
Queue Length 50th (m)	1.0	1.2		23.8	5.6		1.3	~447.4		5.1	74.5	
Queue Length 95th (m)	4.8	12.1		#43.8	17.9		3.7	#529.2		#16.9	106.8	
Internal Link Dist (m)		67.5			79.7			42.1			57.0	
Turn Bay Length (m)				20.0						110.0		
Base Capacity (vph)	299	393		187	519		381	1293		61	1292	
Starvation Cap Reductn	0	0		0	0		0	27		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	0.02	0.11		0.65	0.13		0.06	1.26		0.72	0.60	

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	113.7
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.24
Intersection Signal Delay:	86.8
Intersection LOS:	F
Intersection Capacity Utilization:	112.1%
ICU Level of Service:	H
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	

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

Splits and Phases: 3: March Road & South Local Road/Site Access #1



Lanes, Volumes, Timings  
 3: March Road & South Local Road/Site Access #1

2027 FT Sat Mitigation 1  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Future Volume (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.882			0.863			0.998			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1539	0	1658	1506	0	1658	1742	0	1658	1742	0
Flt Permitted	0.664			0.726			0.330			0.045		
Satd. Flow (perm)	1159	1539	0	1267	1506	0	576	1742	0	79	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			97			1			1	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		75.3			120.5			66.1			61.1	
Travel Time (s)		5.4			14.5			3.0			2.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	47	0	193	106	0	23	1581	0	74	758	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT Sat Mitigation 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	32.7	32.7		32.7	32.7		29.6	29.6		9.5	29.6	
Total Split (s)	33.0	33.0		33.0	33.0		87.0	87.0		10.0	97.0	
Total Split (%)	25.4%	25.4%		25.4%	25.4%		66.9%	66.9%		7.7%	74.6%	
Maximum Green (s)	27.3	27.3		27.3	27.3		81.4	81.4		5.5	91.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		3.5	4.6	
All-Red Time (s)	2.4	2.4		2.4	2.4		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)	5.7	5.7		5.7	5.7		5.6	5.6		4.5	5.6	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	23.0	23.0		23.0	23.0		84.0	84.0		93.0	91.9	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.67	0.67		0.74	0.73	
v/c Ratio	0.02	0.15		0.84	0.30		0.06	1.36		0.58	0.60	
Control Delay	41.4	18.0		79.0	12.2		9.8	192.0		34.5	11.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1		0.0	0.0	
Total Delay	41.4	18.0		79.0	12.2		9.8	192.1		34.5	11.3	
LOS	D	B		E	B		A	F		C	B	
Approach Delay		20.3			55.3			189.5			13.4	
Approach LOS		C			E			F			B	
Queue Length 50th (m)	1.0	2.1		46.5	1.9		2.0	~539.7		4.8	85.8	
Queue Length 95th (m)	4.6	12.3		#79.3	17.0		5.9	#637.2		#23.6	126.9	
Internal Link Dist (m)		51.3			96.5			42.1			37.1	
Turn Bay Length (m)										110.0		
Base Capacity (vph)	250	362		274	401		383	1160		127	1269	
Starvation Cap Reductn	0	0		0	0		0	26		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	0.02	0.13		0.70	0.26		0.06	1.39		0.58	0.60	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 126.2  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.36  
 Intersection Signal Delay: 119.3  
 Intersection Capacity Utilization 115.4%  
 Analysis Period (min) 15  
 Intersection LOS: F  
 ICU Level of Service H  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.

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

Splits and Phases: 3: March Road & South Local Road/Site Access #1



Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Mitigation 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Future Volume (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	30.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.879			0.868			0.997				
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1534	0	1658	1515	0	1658	3306	0	1658	3316	0
Flt Permitted	0.730			0.740			0.120			0.410		
Satd. Flow (perm)	1274	1534	0	1291	1515	0	209	3306	0	715	3316	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			37			3				
Link Speed (k/h)		50			30			80				80
Link Distance (m)		86.4			104.3			66.1				225.6
Travel Time (s)		6.2			12.5			3.0				10.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	5	21	155	5	37	4	620	11	91	1516	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	26	0	155	42	0	4	631	0	91	1516	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Mitigation 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	37.0	37.0		37.0	37.0		29.6	29.6		29.6	29.6	
Total Split (s)	37.0	37.0		37.0	37.0		53.0	53.0		53.0	53.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%		58.9%	58.9%		58.9%	58.9%	
Maximum Green (s)	31.0	31.0		31.0	31.0		47.4	47.4		47.4	47.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.7	2.7		2.7	2.7		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)	6.0	6.0		6.0	6.0		5.6	5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		24.0	24.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	14.6	14.6		14.6	14.6		51.1	51.1		51.1	51.1	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.66	0.66		0.66	0.66	
v/c Ratio	0.02	0.08		0.64	0.13		0.03	0.29		0.19	0.69	
Control Delay	23.0	12.5		40.0	10.6		6.8	6.4		7.5	11.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.0	12.5		40.0	10.6		6.8	6.4		7.5	11.2	
LOS	C	B		D	B		A	A		A	B	
Approach Delay		14.2			33.8			6.4			10.9	
Approach LOS		B			C			A			B	
Queue Length 50th (m)	0.6	0.6		19.7	0.6		0.2	16.7		4.3	60.4	
Queue Length 95th (m)	3.1	6.2		37.2	7.7		1.4	31.6		13.0	108.6	
Internal Link Dist (m)		62.4			80.3			42.1			201.6	
Turn Bay Length (m)				20.0			30.0			110.0		
Base Capacity (vph)	512	629		518	630		138	2185		472	2190	
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	0.01	0.04		0.30	0.07		0.03	0.29		0.19	0.69	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	77.3
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	11.7
Intersection LOS:	B
Intersection Capacity Utilization:	82.6%
ICU Level of Service:	E
Analysis Period (min):	15



Splits and Phases: 3: March Road & South Local Road/Site Access #1



Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Mitigation 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↕	
Traffic Volume (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Future Volume (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	30.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.871			0.864			0.999			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1520	0	1658	1508	0	1658	3312	0	1658	3309	0
Flt Permitted	0.714			0.729			0.352			0.115		
Satd. Flow (perm)	1246	1520	0	1272	1508	0	614	3312	0	201	3309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			18			1			2	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		91.5			103.7			66.1			81.0	
Travel Time (s)		6.6			12.4			3.0			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	6	37	122	6	60	23	1586	12	44	767	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	43	0	122	66	0	23	1598	0	44	775	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Mitigation 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	37.0	37.0		37.0	37.0		29.6	29.6		29.6	29.6	
Total Split (s)	37.0	37.0		37.0	37.0		53.0	53.0		53.0	53.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%		58.9%	58.9%		58.9%	58.9%	
Maximum Green (s)	31.0	31.0		31.0	31.0		47.4	47.4		47.4	47.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.7	2.7		2.7	2.7		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)	6.0	6.0		6.0	6.0		5.6	5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		24.0	24.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	12.7	12.7		12.7	12.7		52.5	52.5		52.5	52.5	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.73	0.73		0.73	0.73	
v/c Ratio	0.02	0.14		0.55	0.24		0.05	0.66		0.30	0.32	
Control Delay	23.8	11.4		36.7	21.6		5.6	9.5		13.5	5.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.8	11.4		36.7	21.6		5.6	9.5		13.5	5.6	
LOS	C	B		D	C		A	A		B	A	
Approach Delay		12.7			31.4			9.4			6.0	
Approach LOS		B			C			A			A	
Queue Length 50th (m)	0.6	0.7		15.1	5.6		0.9	60.4		2.1	19.7	
Queue Length 95th (m)	3.1	8.0		29.9	15.0		3.9	108.2		11.3	36.1	
Internal Link Dist (m)		67.5			79.7			42.1			57.0	
Turn Bay Length (m)				20.0			30.0			110.0		
Base Capacity (vph)	535	673		546	657		446	2407		146	2405	
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	0.01	0.06		0.22	0.10		0.05	0.66		0.30	0.32	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	72.3
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	10.0
Intersection LOS:	A
Intersection Capacity Utilization:	70.1%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 3: March Road & South Local Road/Site Access #1



Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT Sat Mitigation 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Future Volume (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.882			0.863			0.998			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1539	0	1658	1506	0	1658	3309	0	1658	3309	0
Flt Permitted	0.689			0.726			0.345			0.105		
Satd. Flow (perm)	1202	1539	0	1267	1506	0	602	3309	0	183	3309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			27			2			2	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		75.3			120.5			66.1			61.1	
Travel Time (s)		5.4			14.5			3.0			2.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	10	37	193	9	97	23	1560	21	74	750	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	47	0	193	106	0	23	1581	0	74	758	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
 3: March Road & South Local Road/Site Access #1

2027 FT Sat Mitigation 2  
 910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	37.0	37.0		37.0	37.0		29.6	29.6		29.6	29.6	
Total Split (s)	37.0	37.0		37.0	37.0		63.0	63.0		63.0	63.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	31.0	31.0		31.0	31.0		57.4	57.4		57.4	57.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.7	2.7		2.7	2.7		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)	6.0	6.0		6.0	6.0		5.6	5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0	24.0		24.0	24.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	18.7	18.7		18.7	18.7		59.2	59.2		59.2	59.2	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.66	0.66		0.66	0.66	
v/c Ratio	0.02	0.13		0.73	0.32		0.06	0.72		0.61	0.35	
Control Delay	26.0	12.4		48.9	23.7		7.6	13.4		38.6	7.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1		0.0	0.0	
Total Delay	26.0	12.4		48.9	23.7		7.6	13.5		38.6	7.9	
LOS	C	B		D	C		A	B		D	A	
Approach Delay		13.7			40.0			13.5			10.7	
Approach LOS		B			D			B			B	
Queue Length 50th (m)	0.7	1.3		30.3	11.1		1.2	80.4		6.3	26.1	
Queue Length 95th (m)	3.3	9.3		52.3	24.1		5.0	142.3		#35.1	47.7	
Internal Link Dist (m)		51.3			96.5			42.1			37.1	
Turn Bay Length (m)							30.0			110.0		
Base Capacity (vph)	416	558		439	540		398	2190		121	2190	
Starvation Cap Reductn	0	0		0	0		0	94		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	0.01	0.08		0.44	0.20		0.06	0.75		0.61	0.35	

Intersection Summary

Area Type: Other  
 Cycle Length: 100  
 Actuated Cycle Length: 89.5  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.73  
 Intersection Signal Delay: 15.5  
 Intersection LOS: B  
 Intersection Capacity Utilization 86.8%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: March Road & South Local Road/Site Access #1



Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Sensitivity 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	5	5	21	155	5	37	4	620	11	91	1300	0
Future Volume (vph)	5	5	21	155	5	37	4	620	11	91	1300	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879			0.868			0.997				
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1534	0	1658	1515	0	1658	1740	0	1658	1745	0
Flt Permitted	0.730			0.420			0.056			0.310		
Satd. Flow (perm)	1274	1534	0	733	1515	0	98	1740	0	541	1745	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			37			1				
Link Speed (k/h)		50			30			80				80
Link Distance (m)		86.4			104.3			66.1				51.2
Travel Time (s)		6.2			12.5			3.0				2.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	5	21	155	5	37	4	620	11	91	1300	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	26	0	155	42	0	4	631	0	91	1300	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6		



Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Sensitivity 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	32.7	32.7		9.5	32.7		29.6	29.6		9.5	29.6	
Total Split (s)	33.0	33.0		10.0	43.0		76.0	76.0		11.0	87.0	
Total Split (%)	25.4%	25.4%		7.7%	33.1%		58.5%	58.5%		8.5%	66.9%	
Maximum Green (s)	27.3	27.3		5.5	37.3		70.4	70.4		6.5	81.4	
Yellow Time (s)	3.3	3.3		3.5	3.3		4.6	4.6		3.5	4.6	
All-Red Time (s)	2.4	2.4		1.0	2.4		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)	5.7	5.7		4.5	5.7		5.6	5.6		4.5	5.6	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0			0	
Act Effct Green (s)	10.0	10.0		17.1	15.9		71.9	71.9		83.8	82.7	
Actuated g/C Ratio	0.09	0.09		0.16	0.14		0.65	0.65		0.76	0.75	
v/c Ratio	0.04	0.16		0.86	0.17		0.06	0.55		0.19	0.99	
Control Delay	48.0	25.1		83.7	16.3		11.2	13.4		4.8	38.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.5		0.0	0.0	
Total Delay	48.0	25.1		83.7	16.3		11.2	14.0		4.8	38.3	
LOS	D	C		F	B		B	B		A	D	
Approach Delay		28.8			69.3			13.9			36.1	
Approach LOS		C			E			B			D	
Queue Length 50th (m)	1.0	1.0		30.9	0.9		0.3	75.8		4.9	~307.6	
Queue Length 95th (m)	4.8	9.5		#67.6	10.4		2.1	108.0		9.2	#386.5	
Internal Link Dist (m)		62.4			80.3			42.1			27.2	
Turn Bay Length (m)				20.0						110.0		
Base Capacity (vph)	316	397		180	539		64	1138		478	1313	
Starvation Cap Reductn	0	0		0	0		0	192		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	0.02	0.07		0.86	0.08		0.06	0.67		0.19	0.99	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 109.9  
 Natural Cycle: 145  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.99  
 Intersection Signal Delay: 32.6  
 Intersection LOS: C  
 Intersection Capacity Utilization 105.0%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.

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

Splits and Phases: 3: March Road & South Local Road/Site Access #1

↙ Ø1	↖ Ø2	↙ Ø3	↗ Ø4
11 s	76 s	10 s	33 s
↘ Ø6		↖ Ø8	
87 s		43 s	

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Sensitivity 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	6	37	122	6	60	23	1250	12	44	767	8
Future Volume (vph)	5	6	37	122	6	60	23	1250	12	44	767	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.871			0.864			0.999			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1520	0	1658	1508	0	1658	1743	0	1658	1742	0
Flt Permitted	0.714			0.469			0.295			0.051		
Satd. Flow (perm)	1246	1520	0	818	1508	0	515	1743	0	89	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			60			1			1	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		91.5			103.7			66.1			81.0	
Travel Time (s)		6.6			12.4			3.0			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	6	37	122	6	60	23	1250	12	44	767	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	43	0	122	66	0	23	1262	0	44	775	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Sensitivity 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	32.7	32.7		9.5	32.7		29.6	29.6		29.6	29.6	
Total Split (s)	33.0	33.0		10.0	43.0		87.0	87.0		87.0	87.0	
Total Split (%)	25.4%	25.4%		7.7%	33.1%		66.9%	66.9%		66.9%	66.9%	
Maximum Green (s)	27.3	27.3		5.5	37.3		81.4	81.4		81.4	81.4	
Yellow Time (s)	3.3	3.3		3.5	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.4	2.4		1.0	2.4		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)	5.7	5.7		4.5	5.7		5.6	5.6		5.6	5.6	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	10.0	10.0		19.3	18.1		84.3	84.3		84.3	84.3	
Actuated g/C Ratio	0.09	0.09		0.17	0.16		0.74	0.74		0.74	0.74	
v/c Ratio	0.05	0.26		0.65	0.23		0.06	0.98		0.67	0.60	
Control Delay	48.2	22.3		59.1	13.9		5.0	35.9		61.9	9.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	27.6		0.0	0.0	
Total Delay	48.2	22.3		59.1	13.9		5.0	63.6		61.9	9.7	
LOS	D	C		E	B		A	E		E	A	
Approach Delay		25.0			43.2			62.5			12.5	
Approach LOS		C			D			E			B	
Queue Length 50th (m)	1.0	1.2		23.8	1.1		1.3	~247.2		4.7	74.5	
Queue Length 95th (m)	4.8	12.1		#43.8	13.0		3.7	#370.3		#14.6	106.8	
Internal Link Dist (m)		67.5			79.7			42.1			57.0	
Turn Bay Length (m)				20.0						110.0		
Base Capacity (vph)	299	393		187	535		381	1293		66	1292	
Starvation Cap Reductn	0	0		0	0		0	112		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	0.02	0.11		0.65	0.12		0.06	1.07		0.67	0.60	

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	113.7
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.98
Intersection Signal Delay:	42.7
Intersection LOS:	D
Intersection Capacity Utilization:	93.4%
ICU Level of Service:	F
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	

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

Splits and Phases: 3: March Road & South Local Road/Site Access #1



Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT Sat Sensitivity 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	10	37	193	9	97	23	1100	21	74	750	8
Future Volume (vph)	5	10	37	193	9	97	23	1100	21	74	750	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.882			0.863			0.997			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1539	0	1658	1506	0	1658	1740	0	1658	1742	0
Flt Permitted	0.664			0.726			0.330			0.056		
Satd. Flow (perm)	1159	1539	0	1267	1506	0	576	1740	0	98	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			97			1			1	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		75.3			120.5			66.1			61.1	
Travel Time (s)		5.4			14.5			3.0			2.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	10	37	193	9	97	23	1100	21	74	750	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	47	0	193	106	0	23	1121	0	74	758	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT Sat Sensitivity 1  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	32.7	32.7		32.7	32.7		29.6	29.6		9.5	30.0	
Total Split (s)	33.0	33.0		33.0	33.0		87.0	87.0		10.0	97.0	
Total Split (%)	25.4%	25.4%		25.4%	25.4%		66.9%	66.9%		7.7%	74.6%	
Maximum Green (s)	27.3	27.3		27.3	27.3		81.4	81.4		5.5	91.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		3.5	4.6	
All-Red Time (s)	2.4	2.4		2.4	2.4		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)	5.7	5.7		5.7	5.7		5.6	5.6		4.5	5.6	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	23.0	23.0		23.0	23.0		84.0	84.0		93.0	91.9	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.67	0.67		0.74	0.73	
v/c Ratio	0.02	0.15		0.84	0.30		0.06	0.97		0.53	0.60	
Control Delay	41.4	18.0		79.0	12.2		9.8	42.1		24.2	11.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	39.3		0.0	0.0	
Total Delay	41.4	18.0		79.0	12.2		9.8	81.4		24.2	11.3	
LOS	D	B		E	B		A	F		C	B	
Approach Delay		20.3			55.3			79.9			12.5	
Approach LOS		C			E			E			B	
Queue Length 50th (m)	1.0	2.1		46.5	1.9		2.0	~276.9		4.8	85.8	
Queue Length 95th (m)	4.6	12.3		#79.3	17.0		5.9	#387.3		16.6	126.9	
Internal Link Dist (m)		51.3			96.5			42.1			37.1	
Turn Bay Length (m)										110.0		
Base Capacity (vph)	250	362		274	401		383	1158		140	1269	
Starvation Cap Reductn	0	0		0	0		0	134		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	0.02	0.13		0.70	0.26		0.06	1.09		0.53	0.60	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 126.2  
 Natural Cycle: 130  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.97  
 Intersection Signal Delay: 51.3  
 Intersection LOS: D  
 Intersection Capacity Utilization 92.3%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.

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

Splits and Phases: 3: March Road & South Local Road/Site Access #1





Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Sensitivity 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	21	155	5	37	4	620	11	91	1250	0
Future Volume (vph)	5	5	21	155	5	37	4	620	11	91	1250	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879			0.868			0.997				
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1534	0	1658	1515	0	1658	1740	0	1658	1745	0
Flt Permitted	0.730			0.420			0.070			0.310		
Satd. Flow (perm)	1274	1534	0	733	1515	0	122	1740	0	541	1745	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			37			1				
Link Speed (k/h)		50			30			80				80
Link Distance (m)		86.4			104.3			66.1				51.2
Travel Time (s)		6.2			12.5			3.0				2.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	5	21	155	5	37	4	620	11	91	1250	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	26	0	155	42	0	4	631	0	91	1250	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-AM Sensitivity 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	32.7	32.7		9.5	32.7		29.6	29.6		9.5	29.6	
Total Split (s)	33.0	33.0		10.0	43.0		76.0	76.0		11.0	87.0	
Total Split (%)	25.4%	25.4%		7.7%	33.1%		58.5%	58.5%		8.5%	66.9%	
Maximum Green (s)	27.3	27.3		5.5	37.3		70.4	70.4		6.5	81.4	
Yellow Time (s)	3.3	3.3		3.5	3.3		4.6	4.6		3.5	4.6	
All-Red Time (s)	2.4	2.4		1.0	2.4		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)	5.7	5.7		4.5	5.7		5.6	5.6		4.5	5.6	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0			0	
Act Effct Green (s)	10.0	10.0		17.1	15.9		71.9	71.9		83.8	82.7	
Actuated g/C Ratio	0.09	0.09		0.16	0.14		0.65	0.65		0.76	0.75	
v/c Ratio	0.04	0.16		0.86	0.17		0.05	0.55		0.19	0.95	
Control Delay	48.0	25.1		83.7	16.3		10.2	13.4		4.8	30.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.5		0.0	0.0	
Total Delay	48.0	25.1		83.7	16.3		10.2	14.0		4.8	30.3	
LOS	D	C		F	B		B	B		A	C	
Approach Delay		28.8			69.3			13.9			28.6	
Approach LOS		C			E			B			C	
Queue Length 50th (m)	1.0	1.0		30.9	0.9		0.3	75.8		4.9	235.8	
Queue Length 95th (m)	4.8	9.5		#67.6	10.4		1.9	108.0		9.2	#363.1	
Internal Link Dist (m)		62.4			80.3			42.1			27.2	
Turn Bay Length (m)				20.0						110.0		
Base Capacity (vph)	316	397		180	539		79	1138		478	1313	
Starvation Cap Reductn	0	0		0	0		0	192		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	0.02	0.07		0.86	0.08		0.05	0.67		0.19	0.95	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 109.9  
 Natural Cycle: 145  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.95  
 Intersection Signal Delay: 28.0 Intersection LOS: C  
 Intersection Capacity Utilization 105.0% ICU Level of Service G  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: March Road & South Local Road/Site Access #1

 Ø1	 Ø2	 Ø3	 Ø4
11 s	76 s	10 s	33 s
 Ø6			 Ø8
87 s			43 s

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Sensitivity 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	6	37	122	6	60	23	1000	12	44	767	8
Future Volume (vph)	5	6	37	122	6	60	23	1000	12	44	767	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	20.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.871			0.864			0.998			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1520	0	1658	1508	0	1658	1742	0	1658	1742	0
Flt Permitted	0.714			0.469			0.295			0.179		
Satd. Flow (perm)	1246	1520	0	818	1508	0	515	1742	0	312	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			60			1			1	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		91.5			103.7			66.1			81.0	
Travel Time (s)		6.6			12.4			3.0			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	6	37	122	6	60	23	1000	12	44	767	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	43	0	122	66	0	23	1012	0	44	775	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT-PM Sensitivity 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	32.7	32.7		9.5	32.7		29.6	29.6		29.6	29.6	
Total Split (s)	33.0	33.0		10.0	43.0		87.0	87.0		87.0	87.0	
Total Split (%)	25.4%	25.4%		7.7%	33.1%		66.9%	66.9%		66.9%	66.9%	
Maximum Green (s)	27.3	27.3		5.5	37.3		81.4	81.4		81.4	81.4	
Yellow Time (s)	3.3	3.3		3.5	3.3		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.4	2.4		1.0	2.4		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)	5.7	5.7		4.5	5.7		5.6	5.6		5.6	5.6	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	10.0	10.0		19.3	18.1		84.3	84.3		84.3	84.3	
Actuated g/C Ratio	0.09	0.09		0.17	0.16		0.74	0.74		0.74	0.74	
v/c Ratio	0.05	0.26		0.65	0.23		0.06	0.78		0.19	0.60	
Control Delay	48.2	22.3		59.1	13.9		5.0	15.4		7.4	9.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	3.1		0.0	0.0	
Total Delay	48.2	22.3		59.1	13.9		5.0	18.5		7.4	9.7	
LOS	D	C		E	B		A	B		A	A	
Approach Delay		25.0			43.2			18.2			9.6	
Approach LOS		C			D			B			A	
Queue Length 50th (m)	1.0	1.2		23.8	1.1		1.3	128.9		2.7	74.5	
Queue Length 95th (m)	4.8	12.1		#43.8	13.0		3.7	194.1		7.3	106.8	
Internal Link Dist (m)		67.5			79.7			42.1			57.0	
Turn Bay Length (m)				20.0						110.0		
Base Capacity (vph)	299	393		187	535		381	1292		231	1292	
Starvation Cap Reductn	0	0		0	0		0	184		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	0.02	0.11		0.65	0.12		0.06	0.91		0.19	0.60	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 113.7  
 Natural Cycle: 110  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.78  
 Intersection Signal Delay: 17.2  
 Intersection LOS: B  
 Intersection Capacity Utilization 79.5%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: March Road & South Local Road/Site Access #1



Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT Sat Sensitivity 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	10	37	193	9	97	23	800	21	74	750	8
Future Volume (vph)	5	10	37	193	9	97	23	800	21	74	750	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	15.0			15.0			15.0			95.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.882			0.863			0.996			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1658	1539	0	1658	1506	0	1658	1738	0	1658	1742	0
Flt Permitted	0.664			0.726			0.330			0.215		
Satd. Flow (perm)	1159	1539	0	1267	1506	0	576	1738	0	375	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			97			2			1	
Link Speed (k/h)		50			30			80			80	
Link Distance (m)		75.3			120.5			66.1			61.1	
Travel Time (s)		5.4			14.5			3.0			2.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	10	37	193	9	97	23	800	21	74	750	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	47	0	193	106	0	23	821	0	74	758	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
3: March Road & South Local Road/Site Access #1

2027 FT Sat Sensitivity 2  
910 March Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	
Minimum Split (s)	32.7	32.7		32.7	32.7		29.6	29.6		9.5	29.6	
Total Split (s)	33.0	33.0		33.0	33.0		87.0	87.0		10.0	97.0	
Total Split (%)	25.4%	25.4%		25.4%	25.4%		66.9%	66.9%		7.7%	74.6%	
Maximum Green (s)	27.3	27.3		27.3	27.3		81.4	81.4		5.5	91.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		3.5	4.6	
All-Red Time (s)	2.4	2.4		2.4	2.4		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)	5.7	5.7		5.7	5.7		5.6	5.6		4.5	5.6	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	23.0	23.0		23.0	23.0		84.0	84.0		93.0	91.9	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.67	0.67		0.74	0.73	
v/c Ratio	0.02	0.15		0.84	0.30		0.06	0.71		0.22	0.60	
Control Delay	41.4	18.0		79.0	12.2		9.8	19.3		6.9	11.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	2.4		0.0	0.0	
Total Delay	41.4	18.0		79.0	12.2		9.8	21.6		6.9	11.3	
LOS	D	B		E	B		A	C		A	B	
Approach Delay		20.3			55.3			21.3			10.9	
Approach LOS		C			E			C			B	
Queue Length 50th (m)	1.0	2.1		46.5	1.9		2.0	132.1		4.8	85.8	
Queue Length 95th (m)	4.6	12.3		#79.3	17.0		5.9	193.4		9.6	126.9	
Internal Link Dist (m)		51.3			96.5			42.1			37.1	
Turn Bay Length (m)										110.0		
Base Capacity (vph)	250	362		274	401		383	1158		332	1269	
Starvation Cap Reductn	0	0		0	0		0	210		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	0.02	0.13		0.70	0.26		0.06	0.87		0.22	0.60	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 126.2  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay: 22.0  
 Intersection LOS: C  
 Intersection Capacity Utilization 82.5%  
 ICU Level of Service E  
 Analysis Period (min) 15

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



Splits and Phases: 3: March Road & South Local Road/Site Access #1

