



**560 Main Street East,  
Milton, ON  
Transportation Impact and  
Parking Study (2nd Submission)**

Paradigm Transportation Solutions Limited

August 2022  
200624





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## 560 Main Street East, Milton, ON Transportation Impact and Parking Study (2nd Submission)



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# Executive Summary

## Content

Neatt Communities retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study and Parking Study for a proposed mixed-use development at 560 Main Street East in the Town of Milton, Ontario.

This study aims to determine the net impacts of the development traffic on the surrounding road network, document the adequacy of the proposed parking supply and provide options for reducing personal vehicle use through Transportation Demand Management (TDM) policies. If needed, this study will identify any improvements to support the development of the subject site.

## Conclusions

This study evaluated the impacts of background traffic growth and projected the impacts of the development with and without traffic mitigation measures associated with the construction of 570 residential units and 960 m<sup>2</sup> (10,340 sq.ft.) of retail space. Access to the site is proposed via one right in/left out driveway connection to the future Wilson Drive Extension.

### Transportation Study

The proposed development is projected to generate approximately 175 new vehicle trips during the weekday AM peak hour and 206 new vehicle trips during the weekday PM peak hour.

Overall, the forecast traffic volumes to be added by full built out of the development to the study area result in relatively small impacts at the study intersections. However, it is acknowledged that deficiencies are projected to occur at certain locations within the study area. They can be expected to persist in the future with anticipated growth in traffic, independent of the development. The following operational deficiencies have been identified:

- ▶ **Main Street East at Thompsons Road:** The westbound and northbound left turn movements and the southbound and eastbound through movements are projected to operate in the LOS E-F range during the weekday PM peak hour under the 2031 horizon (independent of the development). Despite the above, the widening of any Town roadway to accommodate vehicular traffic goes against the vision of a people-centric,



pedestrian-friendly environment that expects people to use more sustainable modes to travel<sup>1</sup>.

Traditionally, intersection operations have focused on increasing the road network's capacity to accommodate more vehicles. Instead, a “balanced needs” approach that encourages alternative modes of transportation must be considered. Improved capacity along these corridors will be through measures supportive of transit, active transportation and transportation demand management to reduce reliance on single-occupant vehicles. By focusing on shifting commuter travel to public transit, intersection operations are expected to maintain the status quo.

Further, this intersection of major arterial and minor arterial roads would be expected to experience capacity constraints only for two to four hours a day on a typical weekday. The other 20 hours of the weekday, weekends and holidays would be expected to exhibit better vehicle traffic conditions.

## **Parking Study**

The parking requirement for the development under the Town of Milton’s Zoning By-Law 016-2014 is 1,046 spaces, equating to a parking rate of 1.50 per unit (resident) plus 194 spaces for visitors and retail uses. The proposed site provides for a total of 546 parking spaces (excluding 9 lay-by spaces).

The parking requirements outlined in Zoning By-Law 016-2014 are based on an approach that caters to auto-oriented travel rather than transition to promote residential and visitor travel through sustainable modes. Parking ratios need to recognize empirical evidence that parking demand has many factors and varies according to household size, income, auto ownership, and locational factors such as proximity to other uses and availability of multiple transportation mobility options.

Within the context of being in a Mobility Hub area, the land use lends itself to being less reliant on auto use, where residents and visitors can take advantage of the additional transportation choices such as walking, cycling and transit. It is expected that the land use will generate reduced parking demands due to the locale in combination with the proposed overall design and marketing strategy of the project.

Finding the right balance needed to support the Town’s goals is critical, mainly since parking is an expensive resource. Sufficient automobile parking is necessary for the development to be successful. However,

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<sup>1</sup> Milton Major Transit Station Area – Area Transportation Plan, April 2020, WSP



too much parking can encourage traffic congestion, limit the ability to meet trip reduction goals, increase project costs, and impact site design and aesthetics.

Many existing Zoning By-Law parking requirements are antiquated and require updating to conform to and reflect current policies and best practices. Many municipalities recognize the oversupply of parking and are revising the zoning requirement to reflect this. Key municipalities recognized this include Town of Oakville, the City of Burlington, and the City of Kitchener. These municipalities have undertaken a comprehensive review of parking requirements and recognized that changes are required to meet policy objectives.

**On average, the Town of Milton requires 32% more parking to be provided** for this development than would be needed for the City of Burlington, Town of Oakville and City of Kitchener, which has adopted new parking requirements.

The transition from an automobile-dependent environment to one that is transit-supportive will require strategies to assist in shifting modal split and enabling the emergence of a more pedestrian-friendly transit-supportive environment. The over-provision of free or low-cost parking creates areas dominated by parking infrastructure that can negatively impact ridership and the pedestrian environment and provide an incentive for single-occupant vehicle use.

The Town of Milton and Applicant recognized this. As part of early discussions in establishing the terms of reference for the enclosed study, an alternative residential parking requirement of 0.80 spaces per unit plus 0.20 parking spaces for visitor parking was deemed appropriate, subject to a minimum bicycle parking supply of 1.00 long-term spaces per unit and 0.05 short-term space per unit.

Reasonable proxy parking demand data conducted at small format retail developments were compiled. These surveys observed a parking rate of no lower than 1 parking space per 36 square metres. The surveyed results are considered to be the most appropriate and applicable for the retail component as opposed to the generic rate outlined within the Zoning By-law. It is also recognized the Town of Milton Zoning By-law requirements for retail uses of 1 spacer per 20 square meters are reflective of demand typically seen at more prominent format retail outlets and standalone centres rather than smaller retail located within a mixed-use development.

Utilizing the alternative rates supplied by the Town of Milton and the parking rates observed at small retail developments, the actual parking demand for the proposed development is projected to be 597 vehicles



based on a simplistic approach. The rates are expected to be marginally less, around 586 spaces with time-of-day shared parking demand incorporated. The development will also implement a suite of Transportation Demand Management (TDM) Measures to reduce the dependency on vehicular travel further. These measures include:

- ▶ Active uses at grade along street frontages
- ▶ Provision of 570 long-term and 29 short-term bicycle spaces
- ▶ The building owner will allow residents to opt-out of a parking space, providing a discounted purchase price.
- ▶ A minimum of 75% of parking is underground or in a structure.
- ▶ Welcome Packets

As documented within the City of Kitchener and Region of Waterloo checklists, the proposed TDM measures result in a parking reduction of 51 spaces, equating to a total parking supply of 535, consistent with the proposed supply. As the TDM plan will be adopted and implemented, these additional parking reduction credits are warranted as they encourage residents to explore alternative sustainable travel modes made more enticing, given parking will be at a premium cost.

The TDM plan and the developments transportation context will provide residents with a range of mobility choices other than a privately-owned vehicle and supports the provision of an appropriate parking supply in the building.

As the development promotes using other modes of transportation through limited on-site parking to meet the projected demand, the development plays a significant role in setting an example for residents and visitors to consider non-automotive travel. This points to the importance of ongoing parking management and demand reduction strategies for this area, given the significant development plays within a Mobility Hub to ensure that an oversupply of parking is not provided that could hinder the ability to attract a substantial portion of the population to transit mode choice.

Based on the imperial data collected as part of this study, it is evident that the oversupply of parking can undermine the incentive for residents to use transit. Per the current development plan, 546 parking spaces are provided, whereas the Zoning by-law requires 1,046 parking spaces. Through the alternative rates offered by the Town of Milton, a review of proxy surveys collected at small retail establishments, and the incorporation of shared parking and transportation demand management measures, the proposed parking supply of 546 spaces is sufficient for the development. **Table E1** outlines the proposed parking supply.





**TABLE E1: PROPOSED PARKING SUPPLY**

Land Use	Town of Milton Alternative Rates	TDM Credit* Unbundled Parking	Proposed Parking Supply
Apartment - Resident	0.80	10%	0.72
Shared Parking Visitor/Retail	0.20	0%	0.21

\* As agreed upon with Town of Milton during Pre-Consultation

*"The total TDM parking reduction achieved would only need to be equal to any proposed reduction in parking beyond the following minimum parking rates of 0.80 residential space and 0.20 visitor spaces."*

## Recommendations

- ▶ The Town of Milton recognizes the conclusions drawn above;
- ▶ The Town of Milton supports the proposed parking supply of 0.93 spaces per unit.





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# 1 Introduction

## 1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) and Parking Study for a proposed mixed-use development located at 560 Main Street East in the Town of Milton. **Figure 1.1** illustrates the location of the subject site.

This study determines the impacts of the development traffic on the surrounding road network and identifies the recommended improvements to accommodate the site-generated traffic. The scope of the study includes:

- ▶ Determine and assess the current study area traffic conditions;
- ▶ Forecast the additional traffic generated by the proposed development;
- ▶ Assess the site's circulation of delivery and waste collection vehicles;
- ▶ Analyze the impacts of the additional traffic on the study area street network;
- ▶ Recommend any necessary remedial measures to mitigate the traffic impacts;
- ▶ Review the proposed parking supply, and determine its adequacy compared to estimated parking demands; and
- ▶ Review and identify potential Transportation Demand Management (TDM) measures that can be implemented for the proposed development.

**Appendix A** contains the study's Terms of Reference provided to the Town of Milton in February 2021 and additional background material and email correspondence regarding the scope of the study.

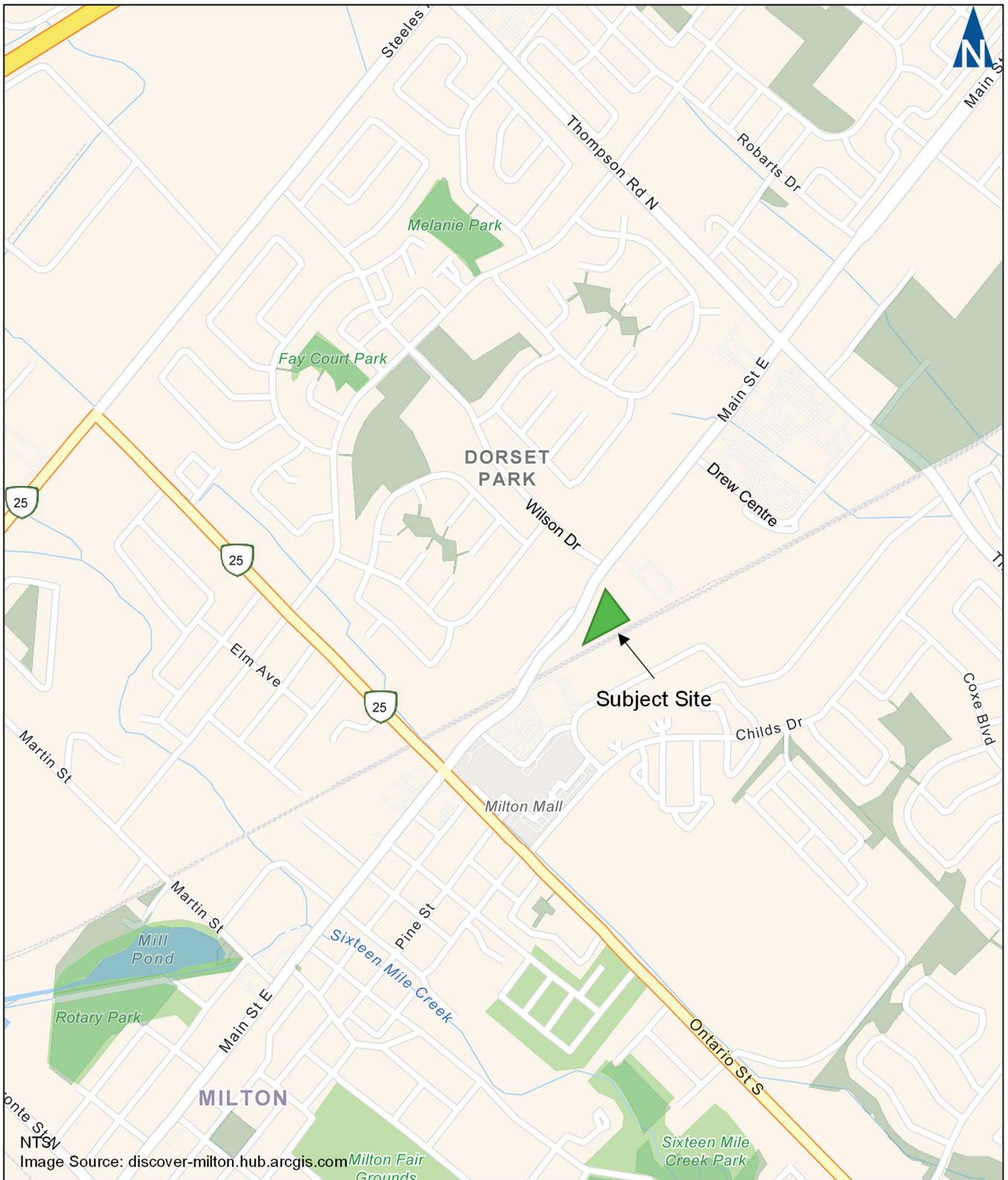


## 1.2 Study Area

This study examines the weekday AM and PM peak hours for the following study area intersections:

- ▶ Main Street East at Ontario St North (signalized);
- ▶ Main Street East at Milton Mall Entrance (signalized);
- ▶ Main Street East at Wilson Drive (signalized);
- ▶ Main Street East at Drew Centre (signalized);
- ▶ Main Street East at Thompson Road (signalized); and
- ▶ One site driveway to the future GO Station Busway.





## Location of Subject Site

560 Main St E, Town of Milton  
200624

Figure 1.1



## 2 Existing Conditions

The section of the report provides an overview of the existing conditions of the roadways in the study area and other features of the transportation network, including transit and active transportation infrastructure.

### 2.1 Road Network

The roadways of interest within the study area include:

- ▶ **Main Street East** is an east-west major roadway<sup>2</sup> with a four-lane urban cross-section. The posted speed limit within the study area is 50 km/h. Bike lanes are on the north and south side of the roadway between the Milton Mall Entrance and Wilson Drive. Sidewalks are provided along the north and south side of this roadway for the entire corridor.
- ▶ **Ontario Street** is a north-south major roadway with a four-lane urban cross-section. The posted speed limit within the study area is 50 km/h. There are no cycling facilities within the study area. Sidewalks are present along the east and west sides of the roadway.
- ▶ **Milton Mall Entrance** is north-south private access with a two-lane urban cross-section. The access connects through to Nipissing Road. The speed limit is assumed to be 50 km/h.
- ▶ **Wilson Drive** is a north-south local roadway with a two-lane urban cross-section. The posted speed limit within the study area is 50 km/h. Sidewalks are present along the east and west sides of the roadway. There are no cycling facilities within the study area. Wilson Drive is planned to be extended in conjunction with the build-out of the proposed development southerly to serve as a bus loop connecting to the Milton GO Station and to provide access to the proposed development. The new busway will give access to the subject site. The extension is assumed to be complete by 2031.
- ▶ **Drew Centre** is a north-south local roadway with a two-lane urban cross-section with exclusive bus lanes. Sidewalks are present along the east and west sides of the street. The statutory 50 km/h speed limit is assumed. There are no cycling facilities within the study area.

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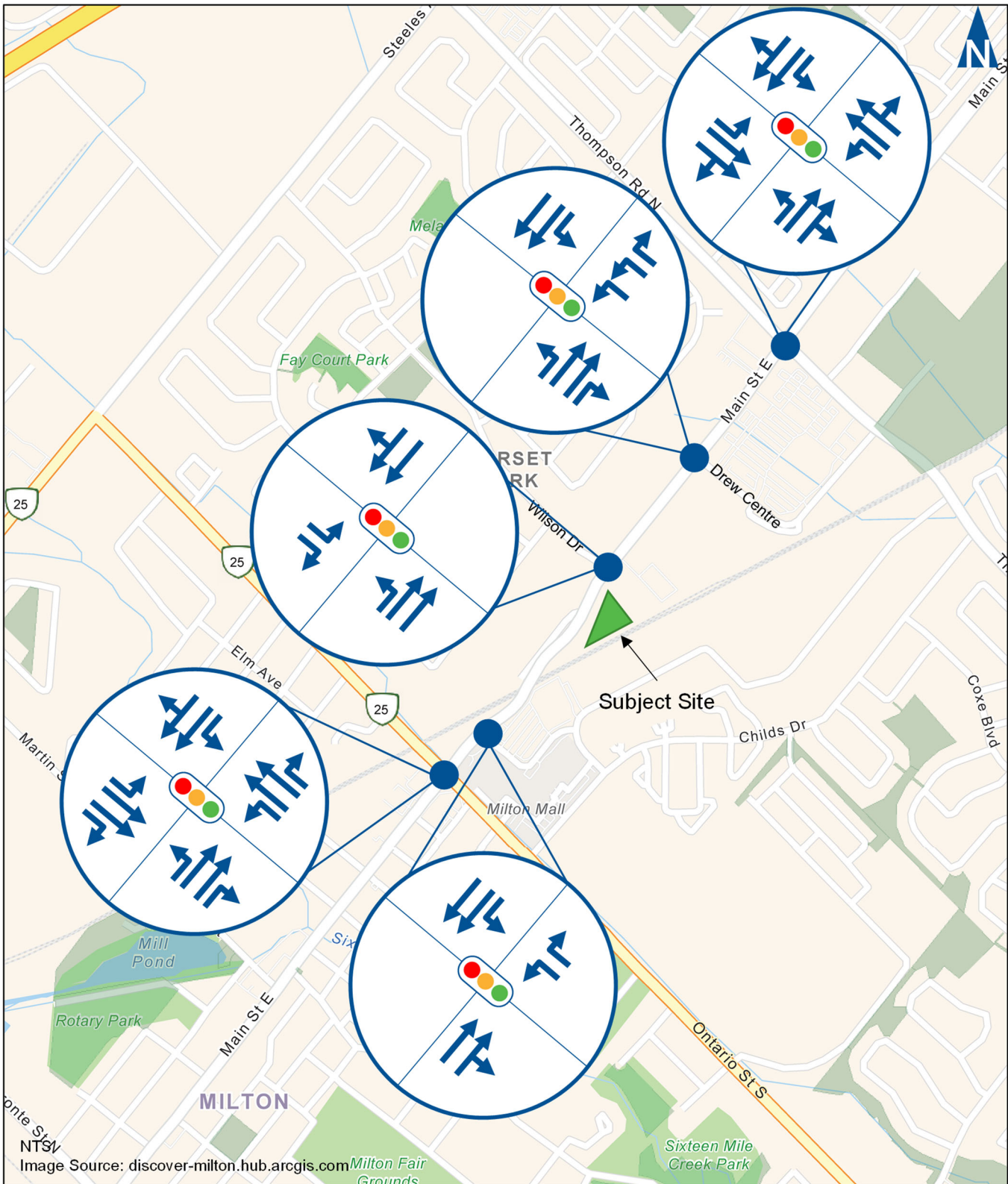
<sup>2</sup> Regional Municipality of Halton Regional Road Network, Halton Region Public Works, June 2017



- ▶ **Thompson Road** is a north-south major roadway with a four-lane urban cross-section. The posted speed limit within the study area is 60 km/h. There are no cycling facilities within the study area. Sidewalks are present along the east and west sides of the roadway.

**Figure 2.1** illustrates the existing lane configuration and traffic control at the study area intersections.





## Existing Lane Configuration & Traffic Control

560 Main St E, Town of Milton  
200624

Figure 2.1

## 2.2 Pedestrian and Cycling Network

### 2.2.1 Pedestrian Network

The Town's pedestrian infrastructure within the study area consists of sidewalks along Main Street East, Ontario Street, Wilson Drive, Drew Centre, and Thompson Road.

### 2.2.2 Cycling Network

Cycling infrastructure typically consists of on-street and off-street facilities. On-street facilities comprise of cycling lanes, signed cycling routes, and paved shoulders. Off-street facilities are in the form of multi-use or informal trails.

Cycling lanes are between Milton Mall Entrance and Wilson Drive on Main Street East.

## 2.3 Transit Service

Milton Transit is the public transit operator in the Town of Milton. Milton Transit currently operates ten surface bus routes between Milton GO Station and the neighbourhoods across Milton between 5:15 AM and 10:13 PM during the weekdays and between 7:10 AM and 7:40 PM on Saturdays. The Milton Transit routes and frequencies are summarized in **Table 2.1**.

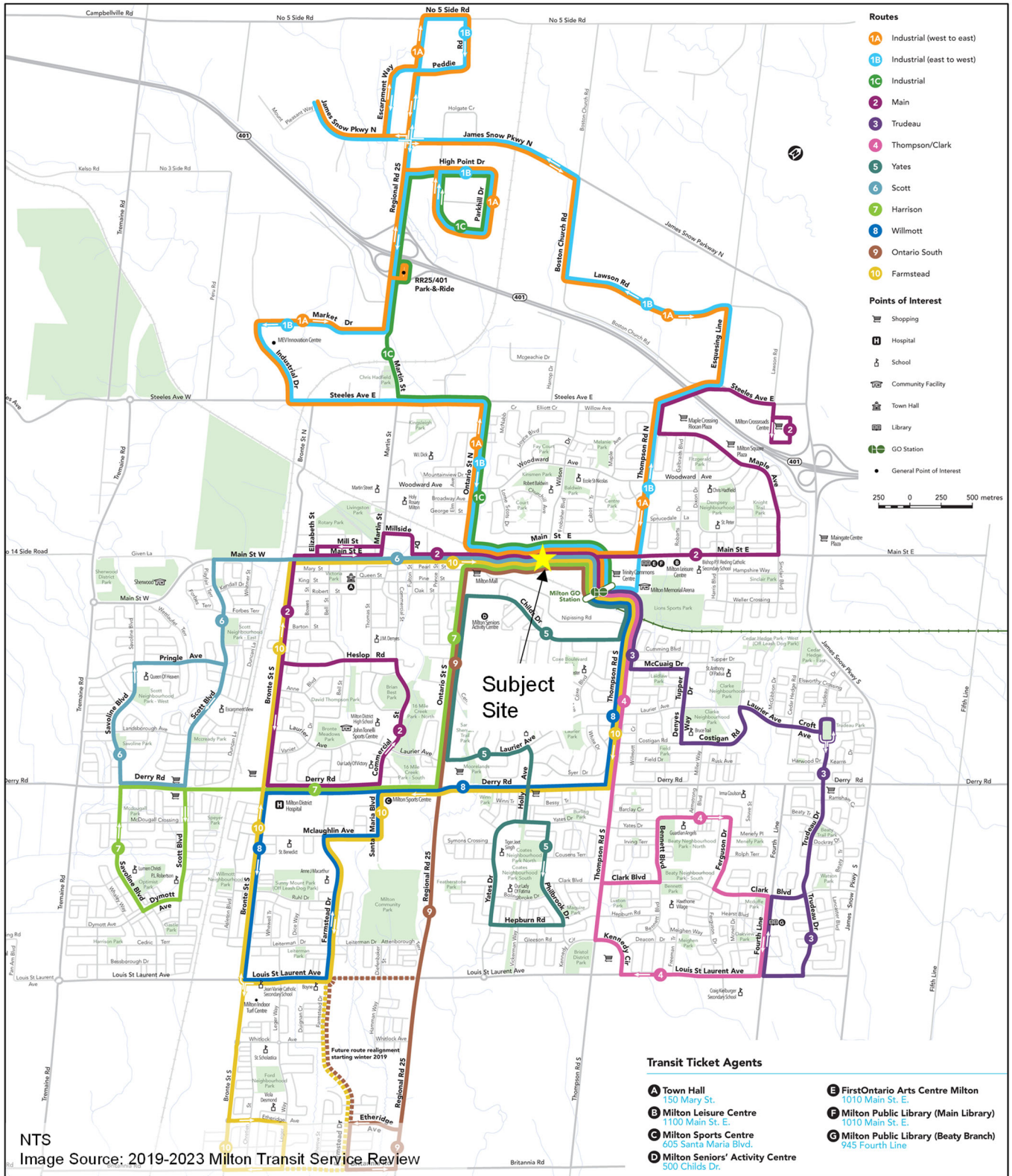
The closest transit stop is approximately 100 metres (2-minute walk) east of the site, located at the northeast corner of Main Street East and Wilson Drive. **Figure 2.2** illustrates the existing transit network, and **Figure 2.3** shows the transit stops within 500 metres (6-minute walk) from the site location.



**TABLE 2.1: MILTON TRANSIT ROUTES**

Route	Description	Service Frequency	
		Weekday	Saturday
1 – Industrial	Provides service between the industrial area of Milton north of Main St and the Milton GO Station.	40-45 minute service	60-minute service
2 – Main	Provides service between the Milton Crossroads Centre and the Milton Hospital, with an intermediate stop at the Milton GO Station.	30-minute service	30-minute service
3 – Trudeau	Provides service from Milton GO Station south along Trudeau Dr.	30-minute peak service and 60-minute off-peak service	60-minute service
4 – Thompson/Clark	Provides service from Milton GO Station south along Thompson Rd and across Clark Blvd, serving the neighbourhood south of Derry Rd and east of Thompson Rd S.	30-minute peak service and 60-minute off-peak service	60-minute service
5 – Yates	Provides service from Milton GO Station south along Ontario St S and Yates Dr serving the neighbourhood south of Derry Rd and east of Regional Rd 25	60-minute service	60-minute service
6 – Scott	Provides service between the Milton GO Station and the neighbourhood west of Bronte St S, south of Main St W.	30-minute peak service and 60-minute off-peak service	60-minute service
7 – Harrison	Provides service from Milton GO Station south along Ontario St S and west along Derry Rd, serving the neighbourhood south of Derry Rd and west of Bronte St S.	30-minute peak service and 60-minute off-peak service	60-minute service
8 – Willmott	Provides service from Milton GO Station south along Thompson Rd S and west along Derry Rd, serving the neighbourhood south of Derry Rd and east of Bronte St S.	60-minute service	60-minute service
9 – Ontario South	Provides service from Milton GO Station south along Ontario St S.	1-hour 15-minute service	60-minute service
10 – Farmstead	Provides service from Milton GO Station south along Bronte St S and Farmstead Dr.	1-hour 15-minute service	60-minute service





# Existing Transit Network



## Transit Stop Locations

560 Main St E, Town of Milton  
200624

Figure 2.3

## 2.4 Traffic Volumes

Turning Movement Counts (TMC) are used to assess intersection operations to quantify the movement of vehicles. Existing traffic counts at an intersection or road section form the foundation for analysis. The traffic counts are usually collected during peak periods at an intersection to complete the level of service analysis.

**Table 2.1** summarizes the location and date of the existing TMC data collected for use in the analysis. Weekday peak hour TMC data was collected by the Town of Milton during February 2020. TMC data for the intersections at Ontario Street North, Wilson Drive, and Drew Centre were referenced from the Milton Major Transit Station Area (MTSA) Transportation Plan<sup>3</sup>. **Appendix B** contains the turning movement data.

**TABLE 2.2: TURNING MOVEMENT COUNT LOCATION AND DATE**

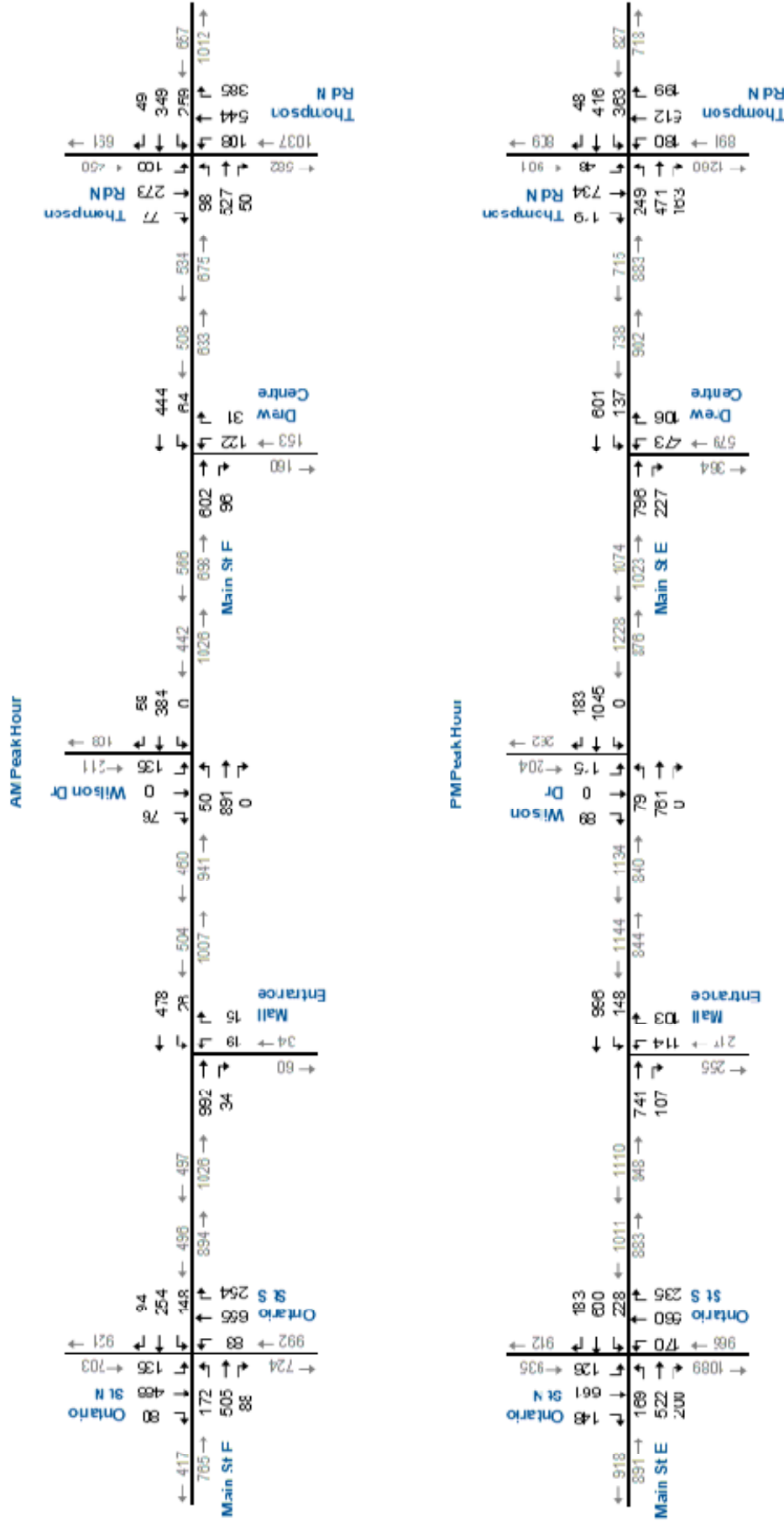
Date	Intersection	Peak Hour	
		AM	PM
September 21, 2017	Main Street East & Ontario Street	07:45 hr	17:30 hr
February 5, 2020	Main Street East & Milton Mall Entrance	07:15 hr	17:15 hr
September 21, 2017	Main Street East & Wilson Drive	07:30 hr	18:00 hr
September 21, 2017	Main Street East & Drew Centre	07:45 hr	18:00 hr
February 5, 2020	Main Street East & Thompson Road	07:30 hr	16:45 hr

Town Staff identified growth rates during the pre-study consultation. To account for possible traffic increases in the historical count volumes, a base year condition (year 2021) is forecast. A generalized growth rate of 2.0% per annum is used to adjust the count data to the base year volumes. **Figure 2.4** illustrates the base year total traffic volumes.

<sup>3</sup> Town of Milton – Milton Major Transit Station Area: Area Transportation Plan – April 2020







# Base Year Traffic Volumes

Figure 2.4

## 2.5 Traffic Operations

The operations of the intersections in the study area were evaluated for level-of-service conditions using the existing lane configurations, traffic controls and peak hour traffic volumes.

Intersection level of service (LOS) is a recognized method of quantifying traffic flow efficiency at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to move compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows. The highest possible rating is LOS A, where the average total delay is equal to or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (or 50 seconds at unsignalized intersections), the movement is considered to have a LOS F and remedial measures are usually implemented if feasible.

The level of service conditions on the existing road network has been assessed using Synchro 10. Based on the Region of Halton guidelines<sup>4</sup>, movements are considered critical under the following conditions:

- ▶ Delays classified as LOS E-F;
- ▶ Volume to capacity ratios for through movements or shared through/turning movements is greater than or equal to 0.85,
- ▶ Volume to capacity ratios for exclusive turning movements is greater than or equal to 0.95, and
- ▶ Queue lengths for individual movements are projected to exceed the available turning lane storage. Queue lengths are estimated using Synchro.

**Table 2.2** details the existing level of service conditions. There are no critical movements in the base year AM and PM peak hours

**Appendix C** contains the supporting detailed Synchro 10 output.

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<sup>4</sup> Halton Region – Transportation Impact Study Guidelines 2015



**TABLE 2.3: BASE YEAR TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall	
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	1 - Ontario St & Main St E	TCS	LOS Delay V/C Q Ex Avail.	C 26 0.51 26 40 14	C 30 0.59 42 -	A 0 0.00 -	C 29	C 27 0.53 22 35 13	C 29 0.41 28 -	C 30 0.43 28 -	C 29	B 14 0.18 9 70 61	B 18 0.43 44 -	B 18 0.37 34 65 31	B 18	B 15 0.39 14 40 26	B 16 0.32 30 -	A 0 0.00 -	B 16	C 22	
	2 - Main St E & Mall Entrance	TCS	LOS Delay V/C Q Ex Avail.		A 3 0.37 26 -	> > > >	A 3	A 4 0.05 2 70 68	A 2 0.19 9 -		A 2	C 27 0.09 2 -		C 26 0.08 2 -	C 27						A 4
	3 - Main St E & Wilson Dr	TCS	LOS Delay V/C Q Ex Avail.	A 4 0.07 2 50 48	A 4 0.33 25 -		A 4	A 6 0.20 15 -	> > > >		A 6					C 34 0.51 22 55 33		C 32 0.33 24 -	C 33	A 8	
	4 - Main St E & Drew Centre	TCS	LOS Delay V/C Q Ex Avail.	A 0 0.00 0 15 15	A 5 0.24 20 -	A 4 0.09 6 40 34	A 5	A 3 0.11 3 45 42	A 2 0.16 9 -		A 2	D 37 0.24 10 -	A 0 0.00 5 -	D 38 0.19 5 55 50	D 38	< < < < <	A 0 0.00 0 -	> > > > >		A 7	
	5 - Main St E & Thompson Rd	TCS	LOS Delay V/C Q Ex Avail.	C 25 0.24 15 60 45	C 34 0.54 55 -	> > > >	C 32	C 29 0.69 42 150 108	C 25 0.32 32 -	> > > >	C 27	B 19 0.24 14 60 46	C 34 0.71 94 -	C 32	C 23 0.42 14 55 41	C 23 0.27 27 -	> > > >	C 23	C 29		
PM Peak Hour	1 - Ontario St & Main St E	TCS	LOS Delay V/C Q Ex Avail.	C 31 0.65 28 40 12	C 30 0.52 45 -	A 0 0.00 -	C 30	C 30 0.67 14 35 21	D 37 0.78 80 -	D 38 0.79 78 -	D 36	B 19 0.45 22 70 48	C 22 0.40 43 -	C 22	B 19 0.35 16 40 24	C 24 0.49 53 -	A 0 0.00 0 -	C 23	C 28		
	2 - Main St E & Mall Entrance	TCS	LOS Delay V/C Q Ex Avail.		A 5 0.33 26 -	> > > >	A 5	A 7 0.29 11 70 59	A 4 0.39 29 -		A 5	C 26 0.35 15 -	C 27 0.36 14 -	C 27						A 7	
	3 - Main St E & Wilson Dr	TCS	LOS Delay V/C Q Ex Avail.	A 6 0.19 4 50 46	A 3 0.29 20 -		A 4	A 9 0.54 58 -	> > > >		A 9				C 33 0.44 19 55 36		C 32 0.37 28 -	C 33	A 9		
	4 - Main St E & Drew Centre	TCS	LOS Delay V/C Q Ex Avail.	A 0 0.00 0 15 15	A 9 0.35 40 -	A 9 0.24 22 40 18	A 9	A 8 0.32 10 45 35	A 5 0.23 21 -		A 5	D 38 0.57 46 -	A 0 0.00 20 -	D 37	< < < < <	A 0 0.00 0 -	> > > > >		B 15		
	5 - Main St E & Thompson Rd	TCS	LOS Delay V/C Q Ex Avail.	C 25 0.52 40 60 20	D 40 0.62 68 -	> > > >	D 35	D 36 0.83 68 150 82	C 29 0.39 42 -	> > > >	C 32	C 32 0.67 31 60 29	C 32 0.56 70 -	C 32	C 27 0.19 8 55 47	D 43 0.75 98 -	> > > >	D 42	D 35		

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length  
 Ex. - Existing Available Storage  
 Avail. - Available Storage

TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 AWSC - All-Way Stop Control

RBT - Roundabout  
 </> - Shared movement



## 3 Development Concept

### 3.1 Site Description

The subject site is 560 Main Street East in the Town of Milton includes a mixed-use development with 570 residential units and 960 m<sup>2</sup> (10,340 sq.ft.) of retail space.

Vehicle access is proposed via a driveway connection to the future southerly extension of Wilson Drive. Build-out is assumed to occur at or before the 2025 horizon for this report. **Figure 3.1** illustrates the site concept plan.





NTS



560 Main St E, Town of Milton  
200624

# Site Concept Plan

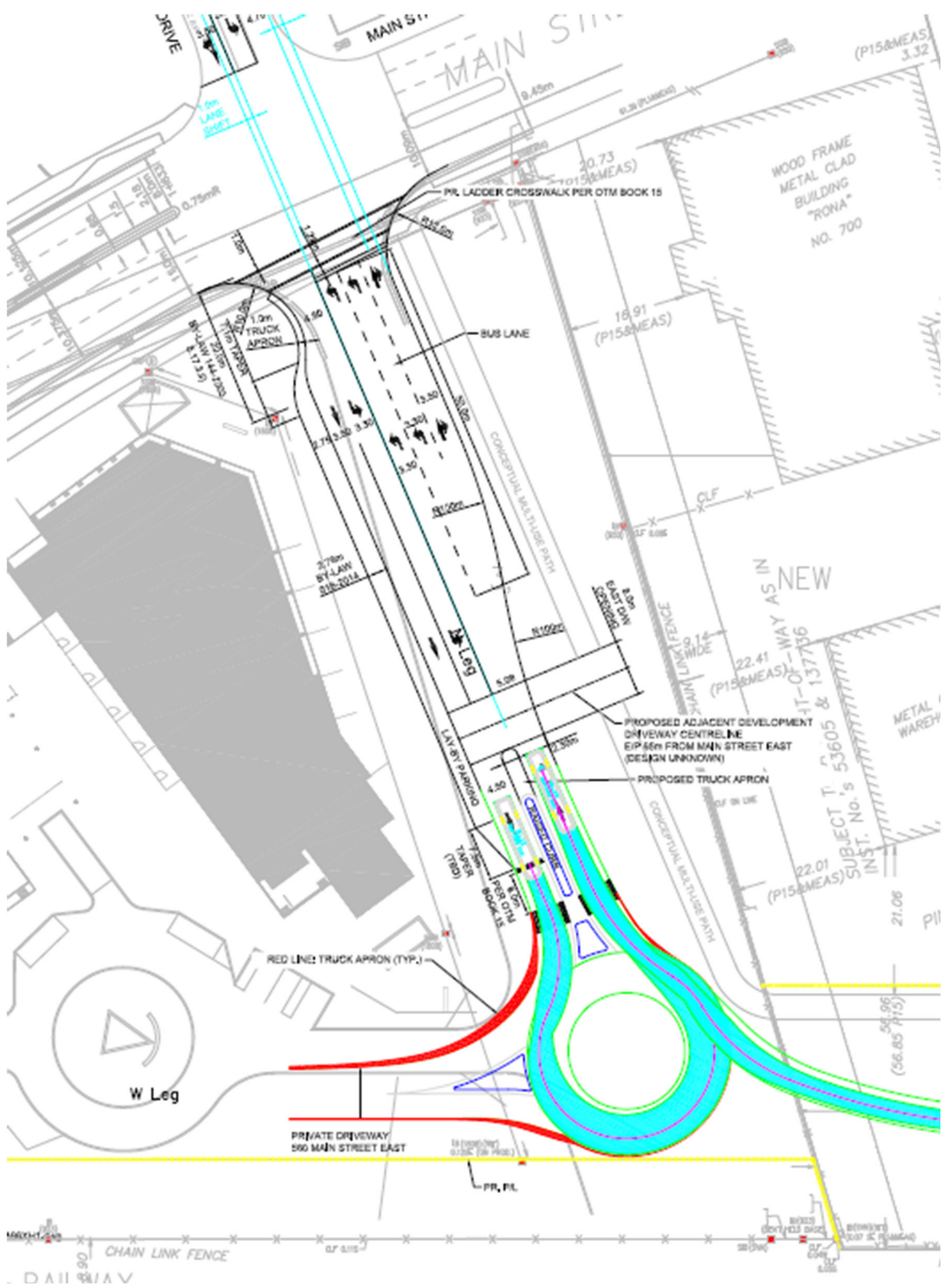
Figure 3.1

### 3.1.1 Wilson Drive Extension

As Metrolinx proposes to provide a bus loop through the future extension of Wilson Drive, this connection's ultimate configuration and functionality have been reviewed. Vehicle access to the development is currently only permitted through the extension of Wilson Drive as the Town of Milton has advised they will not support access to Main Street East. **Appendix D** of the report includes a design brief prepared by Paradigm that discusses the extension's issues and overall design considerations.

**Figure 3.2** illustrates the proposed design. Subject to detailed engineering drawings, the functional design indicates access to adjacent developments can be accommodated within the proposed Wilson Drive Extension right-of-way.





# Wilson Drive Extension Functional Design

## 3.2 Trip Generation

### 3.2.1 Trip Generation Methodology

The Institute of Transportation Engineers (ITE) Trip Generation<sup>5</sup> methods are used to estimate the site trip generation. The following land use codes were referenced:

- ▶ **LUC 222 (Multi-Family Housing – High Rise):** This land use is described as apartments, townhouses, and condominiums with more than ten levels and likely have one or more elevators.

As per the Town recommendations, the retail component's trip generation has been estimated based on proxy data provided by the Town at a site in the City of Burlington at 5327 Upper Middle Road. This development comprises 90 residential condominiums (66 single-bedroom and 24 two-bedroom units) and 9,690 square feet of ground-floor commercial space. The peak hour trip generation for the retail component during the peak hour of the adjacent street network was observed as 0.25 trips and 1.24 trips per 1,000 square feet of GFA during the weekday peak hours.

### 3.2.2 Internal Trips

The ITE Trip Generation Handbook describes a multi-use development as a single project that consists of two or more ITE land use classifications in which trips can be made between land uses without using the off-site roadway system. Based on this description, the proposed development is considered a multi-use development, with compatible commercial land uses that are likely to share – or capture – trips that do not require vehicular travel outside the site. Sharing trips between compatible land uses without travelling off-site is an internal capture.

The ITE Trip Generation Handbook has been used to account for internal trips within the development. ITE data suggests an internal capture rate of up to 1% for residential development and 29% for retail development during the PM peak hours.

### 3.2.3 Pass-by Trips

Pass-by trips are a subset of the trip generation that only applies to commercial/retail land uses and represent a portion of the traffic already using a roadway that may stop at a business along a route. An

<sup>5</sup> Trip Generation Manual 10th Edition + Supplement Institute of Transportation Engineers Washington DC 2020





example of a pass-by trip is a motorist driving home from work and stopping for groceries on the way.

Pass-by rates were not included in the 5327 Upper Middle Road field surveys collected; however, given the retail nature, pass-by reductions should be included. The estimates of pass-by trips were derived using the ITE Trip Generation Handbook<sup>6</sup>. The ITE Trip Generation Handbook identifies a pass-by rate of 34% for shopping centres (LUC 820) during the weekday PM peak hour.

### 3.2.4 Modal Split

As requested by Town staff during pre-consultation, no adjustments have been made to account for alternate modes of transportation (transit, cycling, and walking), which could reduce the trip generation estimates.

### 3.2.5 Trip Generation Estimates

**Table 3.1** summarizes the trip generation estimates for the weekday AM and PM peak hours. These estimates translate the trip generation reductions noted above. A total of 175 new weekday AM and 206 new weekday PM peak hour trips are forecast to be added to the study area roadways.

**TABLE 3.1: SITE-GENERATED TRAFFIC**

ITE Land Use Code / Number of Units	Trips	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Sum	Rate	In	Out	Sum
Multifamily Housing (High-Rise) (222): Units = 570 *	Total	--	41	131	172	--	123	79	202
	Internal	0%	0	0	0	1%	2	1	3
	Pass-By	0%	0	0	0	0%	0	0	0
	<b>New</b>	<b>100%</b>	<b>41</b>	<b>131</b>	<b>172</b>	<b>99%</b>	<b>121</b>	<b>78</b>	<b>199</b>
Commercial - 5327 Upper Middle Road - Burlington Proxy Site: GFA = 10,340 sq.ft. **	Total	--	2	1	3	--	7	7	14
	Internal	0%	0	0	0	29%	1	2	3
	Pass-By	0%	0	0	0	34%	2	2	4
	<b>New</b>	<b>100%</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>37%</b>	<b>4</b>	<b>3</b>	<b>7</b>
<b>Total</b>	<b>Total</b>	--	<b>43</b>	<b>132</b>	<b>175</b>	--	<b>130</b>	<b>86</b>	<b>216</b>
	<b>Internal</b>	--	<b>0</b>	<b>0</b>	<b>0</b>	--	<b>3</b>	<b>3</b>	<b>6</b>
	<b>Pass-By</b>	--	<b>0</b>	<b>0</b>	<b>0</b>	--	<b>2</b>	<b>2</b>	<b>4</b>
	<b>New</b>	--	<b>43</b>	<b>132</b>	<b>175</b>	--	<b>125</b>	<b>81</b>	<b>206</b>

#### Equations

\* LUC 222, Eqn Per Unit AM:  $T = 0.28(X) + 12.86$  | PM:  $T = 0.34(X) + 8.56$

\*\* AM Avg. 1,000 ft<sup>2</sup> GFA Rate = 0.25 | PM Rate = 1.24

<sup>6</sup> Institute of Transportation Engineers. Trip Generation Handbook, 3rd Edition. Washington D.C. 2004.



### 3.3 Development Distribution and Assignment

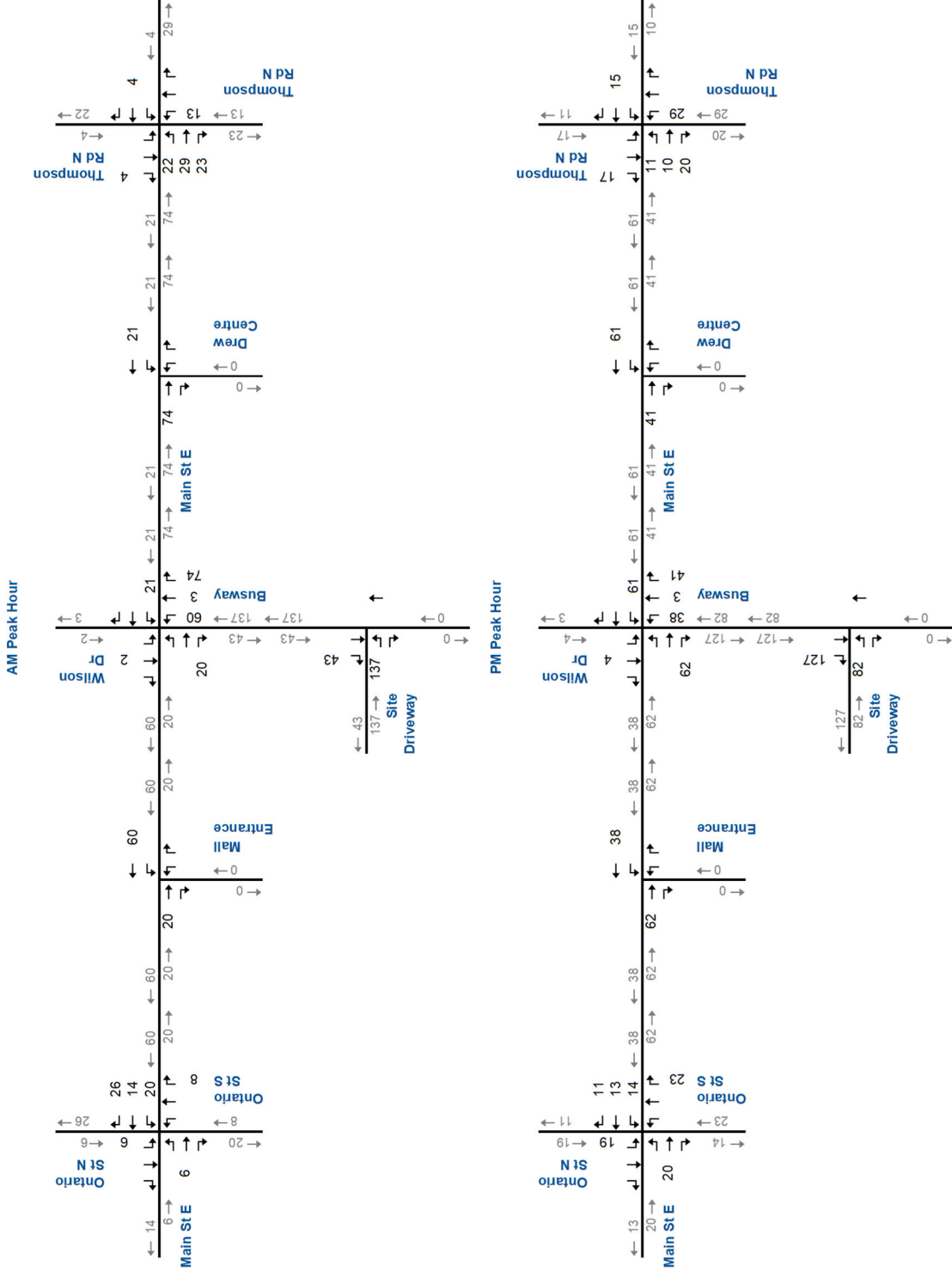
**Table 3.2** summarizes the estimated trip distribution. Traffic distribution is based on traffic count data and trip distributions from the MTSA<sup>7</sup> Transportation Plan. **Figure 3.3** illustrates the estimated new site-generated peak hour traffic volumes. Note that volumes have been rounded up to the nearest whole number; as a result, site traffic volumes assigned to the network show a conservative estimate of traffic volumes.

**TABLE 3.2: ESTIMATED TRIP DISTRIBUTION**

From/To	Route	AM Peak		PM Peak	
		Hour		Hour	
		In	Out	In	Out
North	Ontario Street	13%	19%	15%	14%
	Thompson Road	9%	16%	13%	13%
	Wilson Drive	4%	2%	3%	4%
East	Main Street E	11%	21%	12%	12%
West	Main Street E	15%	10%	16%	16%
South	Ontario Street	18%	15%	18%	17%
	Thompson Road	30%	17%	23%	24%
<b>Total</b>		<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

<sup>7</sup> Town of Milton – Milton Major Transit Station Area: Area Transportation Plan – April 2020





# Estimated New Site Generated Traffic Volumes

Figure 3.3

### 3.4 Access and Circulation Review

The site circulation has been assessed using a Front-End Waste Garbage Truck and Moving truck as large design vehicles.

**Appendix E** contains reduced-scale vehicle turning movement diagrams for the site's loading zones and main circulation drive aisles. The diagrams were produced using the site concept plan, and AutoTURN swept path analysis software.

Based on the analysis, the design vehicles can circulate the site without conflicting with the proposed building and other on-site objects (e.g., parking spaces, etc.).



## 4 Future Conditions

The assessment of future conditions in this section includes the development of future traffic estimates and an operational review to assess the site traffic implications on the adjacent road network:

### 4.1 Traffic Forecast

A ten-year horizon from the year of the study (The year 2031) has been assessed. The likely future traffic volumes near the subject site are estimated to consist of:

- ▶ Increased non-site traffic (generalized background traffic growth). A growth rate of 2.0% per annum was applied to the base year traffic for all intersections<sup>8</sup>;
- ▶ 700 Main Street East is a proposed mixed-use development with 689 residential units and 186 m<sup>2</sup> (2,002 ft<sup>2</sup>) of retail space. Trips generated by this site are based on ITE trip generation rates for LUC 222 (Multifamily Housing High-Rise) and the retail proxy site data outlined in Section 3.2.1. Access to this site will be from the Wilson/Busway extension. Trip distribution for the site trips is based on the MTSA Transportation Plan; and
- ▶ Traffic generated by the subject site.

Milton Transit buses leaving the Milton GO Station via Drew Centre will reroute to use the new Wilson Drive extension busway. Eastbound and westbound buses exiting from Drew Centre at Main Street East will shift to the new busway and are assumed to make the same movements through the corridor as existing buses. Buses exiting Drew Centre at Thompson Road are assumed to travel eastbound from the new Main Street East and Busway intersection.

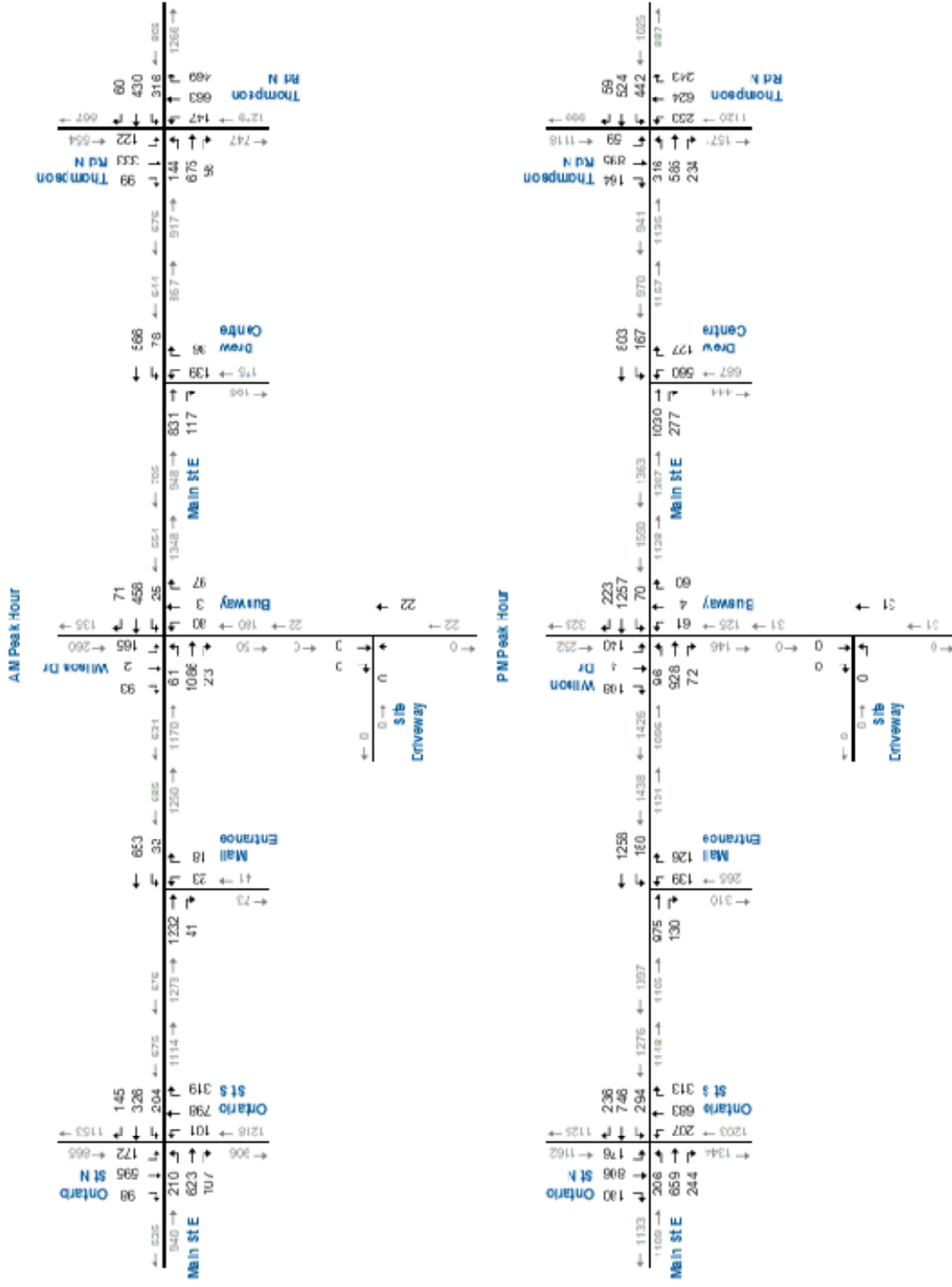
**Appendix F** contains the background development trip assignment and the bus rerouting assignment.

**Figure 4.1** illustrates the forecast Background Traffic volumes. **Figure 4.2** shows the forecast Total Traffic volumes.

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<sup>8</sup> Growth rate identified by Halton Region Staff (Appendix A)

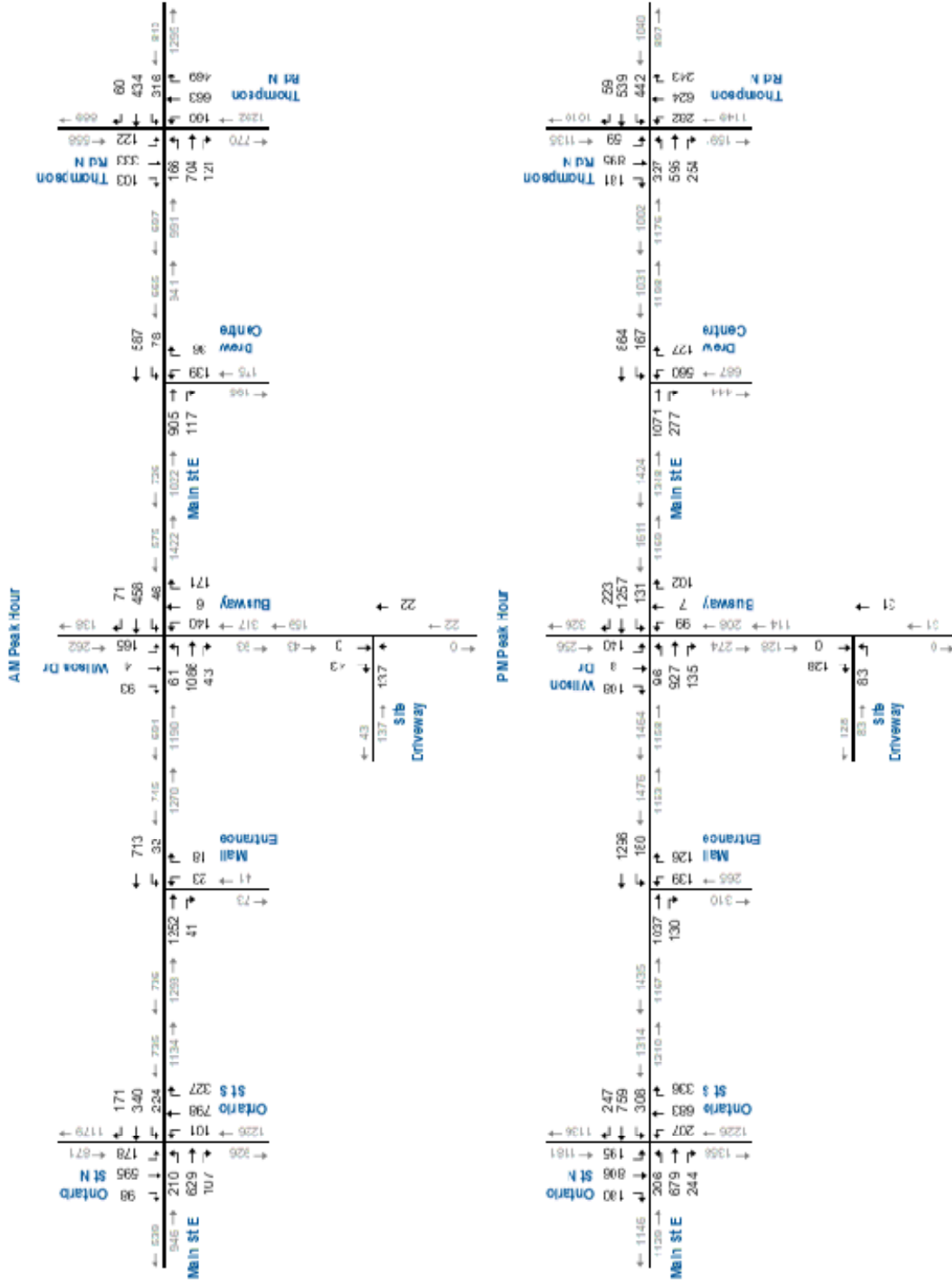




# Forecast Background Traffic Volumes

Figure 4.1





# Forecast Total Traffic Volumes

Figure 4.2

## 4.2 Background Traffic Operations

The study area intersection background traffic operations analyses followed the same methodology used for existing conditions. Signal timings were optimized to improve traffic operations through the corridor. **Table 4.1** details the level of service conditions, and the critical movements are summarized below:

### AM Peak Hour

- ▶ Main Street East and Thompson Road (signalized):
  - Northbound shared through/right-turn is forecast to operate with delays in the LOS F range with a v/c ratio of 1.00.

### PM Peak Hour

- ▶ Main Street East and Ontario Street (signalized):
  - Westbound left-turn queue length is forecast to extend beyond the currently available storage.
  - Westbound shared through/right-turn is forecast to operate with delays in the LOS D range with a v/c ratio greater than 0.90.
- ▶ Main Street East and Thompson Road (signalized):
  - Eastbound shared through/right-turn is forecast to operate with delays in the LOS E range with a v/c ratio greater than 0.90.
  - Westbound left turn is forecast to operate with delays in the LOS E range with a v/c ratio greater than 1.00.
  - Northbound left turn is forecast to operate with delays in the LOS E range with a v/c ratio greater than 0.95. The queue length is forecast to extend beyond existing storage.
  - Southbound shared through/right-turn is forecast to operate with delays in the LOS F range with a v/c ratio of 1.00.

**Appendix G** contains the supporting detailed Synchro 10 output.

Background traffic growth is forecast to result in congestion through the study corridor during the PM peak hour. Westbound through movements at Ontario Street is forecast to operate at a v/c ratio above 0.90. Operations at Thompson Road are forecast to operate with LOS E or worse during the AM and PM peak hours.





Overall operations at Main Street and Thompson Road are expected to worsen from existing conditions, with certain movements forecast to operate at a LOS E-F range during peak hours.



**TABLE 4.1: BACKGROUND TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Ontario St & Main St E	TCS	LOS Delay V/C Q Ex Avail.	C 0.63 11 40 29	C 0.67 52 - -	A 0 - -	C 30	C 0.71 13 35 22	C 0.53 38 - -	> > > >	C 30	B 0.27 12 70 58	C 0.60 61 - -	C 0.53 50 65 15	C 24	B 0.57 20 40 20	B 0.42 40 - -	A 0 0 -	B 20	C 25
	2 - Main St E & Mall Entrance	TCS	LOS Delay V/C Q Ex Avail.		A 0.47 36 - -	> > > >	A 4	A 0.08 2 70 68	A 0.26 14 - -	> > > >	A 3	C 0.10 3 - -		C 0.09 2 - -	C 26					A 4
	3 - Main St E & Wilson Dr/Busway	TCS	LOS Delay V/C Q Ex Avail.	A 0.10 4 50 46	A 0.43 42 - -	> > > >	A 6	A 0.07 2 40 38	A 0.26 22 - -	> > > >	A 8	C 0.32 13 - -	C 0.01 1 - -	C 0.35 14 35 21	C 31	C 0.49 26 55 29	C 0.32 14 - -	> > > >	C 31	B 12
	4 - Main St E & Drew Centre	TCS	LOS Delay V/C Q Ex Avail.	A 0.00 0 15 15	A 0.33 30 - -	A 0.11 8 40 32	A 5	A 0.16 4 45 41	A 0.20 13 - -	> > > >	A 2	D 0.25 12 - -	D 0.21 7 55 48	> > > >	D 38	< < < <	A 0 0 - -	> > > >		A 7
	5 - Main St E & Thompson Rd	TCS	LOS Delay V/C Q Ex Avail.	C 0.32 21 60 39	D 0.67 77 - -	> > > >	C 33	C 0.79 50 150 100	C 0.35 38 - -	> > > >	C 26	C 0.40 22 60 38	F 1.07 182 - -	> > > >	F 87	D 0.65 21 55 34	C 0.42 39 - -	> > > >	C 32	D 51
PM Peak Hour	1 - Ontario St & Main St E	TCS	LOS Delay V/C Q Ex Avail.	D 0.78 36 40 4	C 0.67 61 - -	A 0.00 0 - -	C 34	C 0.77 48 35 -13	D 0.91 118 - -	> > > >	D 46	C 0.66 31 70 39	C 0.59 61 61 -	C 0.59 58 65 7	C 30	C 0.57 26 40 14	C 0.71 77 - -	0.00 0 0 -	C 32	D 36
	2 - Main St E & Mall Entrance	TCS	LOS Delay V/C Q Ex Avail.		A 0.43 38 - -	> > > >	A 6	B 0.45 18 70 52	A 0.49 41 - -	> > > >	A 6	C 0.43 19 - -		C 0.43 17 - -	C 27					A 8
	3 - Main St E & Wilson Dr/Busway	TCS	LOS Delay V/C Q Ex Avail.	B 0.30 8 50 42	A 0.39 37 - -	> > > >	A 6	A 0.16 5 40 35	B 0.69 90 - -	> > > >	B 13	D 0.29 10 - -	C 0.01 9 - -	C 0.25 26 35 26	C 32	C 0.42 23 55 32	C 0.38 18 - -	> > > >	C 32	B 13
	4 - Main St E & Drew Centre	TCS	LOS Delay V/C Q Ex Avail.	A 0.00 0 15 15	B 0.47 61 - -	B 0.30 29 40 11	B 12	B 0.48 14 45 31	A 0.32 32 - -	> > > >	A 7	D 0.61 55 - -	D 0.36 23 55 32	> > > >	D 37	< < < <	A 0 0 - -	> > > >		B 16
	5 - Main St E & Thompson Rd	TCS	LOS Delay V/C Q Ex Avail.	C 0.67 56 60 4	E 0.92 113 - -	> > > >	E 57	E 1.01 141 150 9	C 0.92 55 - -	> > > >	D 52	E 0.97 83 60 -23	D 0.70 94 - -	> > > >	D 46	C 0.29 10 55 45	F 1.04 169 - -	> > > >	F 86	E 60

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length  
 Ex. - Existing Available Storage  
 Avail. - Available Storage

TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 AWSC - All-Way Stop Control

RBT - Roundabout  
 </> - Shared movement



## 4.3 Total Traffic Operations

The study area intersection background traffic operations analyses followed the same methodology used for existing conditions. **Table 4.2** details the level of service conditions, and the critical movements are summarized below:

### AM Peak Hour

- ▶ Main Street East and Thompson Road (signalized):
  - Northbound shared through/right-turn is forecast to operate with delays in the LOS F range with a v/c ratio of 1.00.

### PM Peak Hour

- ▶ Main Street East and Ontario Street (signalized):
  - Westbound left-turn queue length is forecast to extend beyond the currently available storage.
  - Westbound shared through/right-turn is forecast to operate with delays in the LOS D range with a v/c ratio greater than 0.90.
- ▶ Main Street East and Thompson Road (signalized):
  - Eastbound shared through/right-turn is forecast to operate with delays in the LOS E range with a v/c ratio greater than 0.95.
  - Westbound left turn is forecast to operate with delays in the LOS F range with a v/c ratio of 1.00.
  - Northbound left turn is forecast to operate with delays in the LOS F range with a v/c ratio of 1.00. The queue length is forecast to extend beyond existing storage.
  - Southbound shared through/right-turn is forecast to operate with delays in the LOS F range with a v/c ratio of 1.00.

**Appendix H** contains the supporting detailed Synchro 10 output.

Similar to the background traffic operations, congestion is forecasted for westbound movements through the study corridor in the PM peak hour. Specific movements at Ontario Street and Thompson Road are forecast to operate with LOS E or worse during the AM and PM peak hours.



Site traffic is forecast to operate with minimal delay. Northbound queue lengths from Main Street East and Wilson Drive/Busway are not expected to impact driveway operations.

Additional site traffic is expected to increase intersection movement delay by less than 25 seconds during the AM and PM peak hours.



**TABLE 4.2: TOTAL TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall	
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	1 - Ontario St & Main St E	TCS	LOS Delay V/C Q Ex Avail.	C 29 0.65 11 40 29	C 30 0.67 53 - -	A 0 0.00 0 - -	C 30	D 38 0.78 20 35 15	C 30 0.56 43 - -	> > > > >	C 32	B 18 0.27 12 70 58	C 24 0.61 63 - -	C 25 0.55 52 65 13	C 24	B 19 0.59 21 40 19	B 20 0.43 40 - -	A 0 0.00 0 - -	B 20	C 26	
	2 - Main St E & Mall Entrance	TCS	LOS Delay V/C Q Ex Avail.		A 4 0.48 38 - -	> > > > >	A 4	A 5 0.09 2 70 68	A 3 0.28 15 - -		A 3	C 26 0.10 3 - -		C 26 0.09 2 - -							A 4
	3 - Main St E & Wilson Dr/Busway	TCS	LOS Delay V/C Q Ex Avail.	A 6 0.10 4 50 46	A 7 0.46 49 - -	> > > > >	A 7	B 10 0.13 4 40 36	A 9 0.27 23 - -	> > > > >	A 9	C 34 0.47 24 - -	C 25 0.01 1 - -	C 30 0.51 27 35 8	C 32	C 31 0.47 27 55 28	C 28 0.28 14 - -	> > > > >	C 30	B 14	
	4 - Main St E & Drew Centre	TCS	LOS Delay V/C Q Ex Avail.	A 0 0.00 0 15 15	A 6 0.36 33 - -	A 4 0.11 8 40 32	A 5	A 4 0.17 4 45 41	A 2 0.21 13 - -		A 2	D 37 0.25 12 - -	D 38 0.21 7 55 48	> > > > >	D 38	< < < < <	A 0 0.00 0 - -	> > > > >		A 7	
	5 - Main St E & Thompson Rd	TCS	LOS Delay V/C Q Ex Avail.	C 22 0.37 24 60 36	D 38 0.71 84 - -	> > > > >	C 35	C 33 0.82 51 150 99	C 24 0.36 39 - -	> > > > >	C 27	C 25 0.44 24 60 36	F 97 1.07 182 - -	> > > > >	F 86	D 35 0.65 21 55 34	C 42 0.33 40 - -	> > > > >	C 32	D 51	
	6 - Site Driveway & Busway	TWSC	LOS Delay V/C Q Ex Avail.	A 9 0.14 1 -- --			A 9								A 0				0.00		A 0
PM Peak Hour	1 - Ontario St & Main St E	TCS	LOS Delay V/C Q Ex Avail.	D 38 0.79 38 40 2	C 35 0.71 65 - -	A 0 0.00 0 - -	D 36	C 34 0.81 53 35 -18	D 55 0.93 126 - -	> > > > >	D 49	C 27 0.66 31 70 39	C 30 0.60 61 - -	C 35 0.64 65 65 0	C 31	C 25 0.62 28 40 12	C 33 0.71 77 - -	A 0 0.00 0 - -	C 32	D 38	
	2 - Main St E & Mall Entrance	TCS	LOS Delay V/C Q Ex Avail.		A 6 0.46 40 - -	> > > > >	A 6	B 12 0.48 19 70 51	A 5 0.51 44 - -		A 6	C 27 0.43 19 - -		C 27 0.43 17 - -							A 8
	3 - Main St E & Wilson Dr/Busway	TCS	LOS Delay V/C Q Ex Avail.	B 12 0.32 8 50 42	A 7 0.43 44 - -	> > > > >	A 7	B 11 0.34 14 40 26	B 15 0.71 99 - -	> > > > >	B 15	D 36 0.41 17 - -	C 27 0.02 1 - -	C 30 0.35 16 35 19	C 33	C 32 0.40 23 55 32	C 30 0.35 18 - -	> > > > >	C 31	B 14	
	4 - Main St E & Drew Centre	TCS	LOS Delay V/C Q Ex Avail.	A 0 0.00 0 15 15	B 12 0.49 64 - -	B 10 0.30 29 40 11	B 12	B 11 0.50 14 45 31	A 6 0.34 35 - -		A 7	D 37 0.61 55 - -	D 35 0.36 23 55 32	> > > > >	D 37	< < < < <	A 0 0.00 0 - -	> > > > >		B 16	
	5 - Main St E & Thompson Rd	TCS	LOS Delay V/C Q Ex Avail.	C 30 0.71 59 60 1	E 75 0.96 124 - -	> > > > >	E 62	F 88 1.04 145 150 5	C 34 0.56 59 - -	> > > > >	E 57	F 90 1.02 97 60 -37	D 36 0.68 93 - -	> > > > >	D 49	C 30 0.28 10 55 45	F 98 1.06 176 - -	> > > > >	F 94	E 66	
	6 - Site Driveway & Busway	TWSC	LOS Delay V/C Q Ex Avail.	A 9 0.08 0 -- --			A 9								A 0				0.00		A 0

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 Q - 95th Percentile Queue Length  
 Ex. - Existing Available Storage  
 Avail. - Available Storage  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 AWSC - All-Way Stop Control  
 RBT - Roundabout  
 < / > - Shared movement



## 5 Mitigation

As summarized in the analysis tables in the previous Chapter, some of the study area locations either currently experience, or are projected to experience, operational deficiencies independent of the development.

The analysis also concludes that the development would have minimal impacts on traffic conditions in the study area. This Chapter includes a summary of potential improvement measures that have been identified to address the development's limited impacts and improve existing deficiencies.

### 5.1 Intersection / Roadway Mitigation

#### 5.1.1 Main Street East at Thompson Road

Individual movements at the signalized intersection of Thompson Road and Main Street East currently operate at LOS D or better under the 2021 Base year condition. With additional growth projected under the 2031 Background traffic conditions (independent of the proposed development), an increased delay is projected for the all approaches such that operations are forecast to degrade to the LOS E-F range during the PM peak hour.

A possible mitigation measure to alleviate the delay would be through protected dual left turn lanes for the eastbound and westbound approaches. However, dual left turning lanes would prioritize vehicles over pedestrians and decrease the service level for pedestrians with a broader intersection to cross.

Congestion is a known issue in areas with heavy traffic volumes and is typically representative of a good economy. Further, widening any Town roadway to accommodate vehicular traffic volumes is not recommended. Further, widening roads in the study area for additional vehicle traffic goes against the vision of a people-centric, pedestrian-friendly environment that promotes the use of more sustainable modes of travel<sup>9</sup>.

With continued population and employment growth in the Greater Toronto Hamilton Area (GTHA), traffic congestion in Milton will continue. Widening existing roads or building new ones, in most circumstances, will infringe on private property, impact mature trees and green space or compromise the existing public realm (e.g. sidewalks, boulevards). A more sustainable transportation strategy is to move more people per kilometre by

<sup>9</sup> Milton Major Transit Station Area – Area Transportation Plan, April 2020, WSP



walking, cycling and transit or in combination with high occupancy vehicles.

Due to the increased congestion expected due to future growth in population and employment for Milton, future improvements to the transportation network are expected to focus on public transit infrastructure primarily. By concentrating on shifting commuter travel to public transit, intersection operations could be expected to maintain the status quo.



## 6 Parking Justification

As with any equilibrium system, a minimum of two components are required to be in balance and reach the equilibrium point. Parking systems require a balance of parking supply and demand. Achieving an appropriate supply level is equally important as demand. The ubiquitous oversupply of cheap and accessible parking has long been identified as a significant contributing factor to the growth in single-occupant vehicle (SOV) travel.

There is a strong focus on the pedestrian environment and an emphasis on active transportation. As the development proposal focuses on accommodating a suitable pedestrian environment that would encourage active transportation based on the de-emphasis on parking, the use of blanketly applying the Zoning By-law across the development does not reflect these goals.

### 6.1 Zoning Requirements

The current parking requirements for this development are governed by the Town of Milton's Zoning By-law 016-2014. It is recognized that the actual demand for parking spaces may vary from development to development.

#### 6.1.1 Town of Milton Zoning By-law 016-2014

The minimum parking rates for the proposed development under Zoning By-law 016-2014 are as follows:

- ▶ 1.5 parking spaces per unit plus 0.25 parking spaces for visitor parking in a designated visitor parking area; and
- ▶ 1.0 parking space per 20 square metres (215 square feet) gross floor area dedicated to retail.

**Table 6.1** summarizes the minimum parking standard calculations.

**TABLE 6.1: ZONING BY-LAW PARKING REQUIREMENTS**

Use	Units	GFA	Town of Milton By-Law 016-2014	
		m <sup>2</sup>	Parking Rate	Parking Spaces Required
Apartment - Residents	570	-	1.50 spaces per unit	855.0
Apartment - Visitors	570	-	0.25 spaces per unit	142.5
Retail	-	960	1.0 spaces per 20 m <sup>2</sup> GFA	48.0
<b>Total Parking Required</b>				<b>1045.5</b>





The parking requirement for the development under the Town's current Zoning By-Law is 1,046 spaces. The development is proposing 546 parking spaces plus 9 lay-by parking spaces.

However, a number of considerations justify a parking supply that is lower than is required under the Town's standard by-law, as explained in the remainder of this Chapter.

## 6.2 Parking Reform

Parking standards are increasingly seen as an instrument of planning policy, and parking ratios are now considered to have a primary role in determining car use. Parking ratios have existed in most cities since at least the 1950's and have often been amended incrementally by various means over time. Consequently, it is not surprising that municipalities often cannot trace the justification or reasoning behind some of the older parking ratios found in their current Zoning By-laws.

Given that parking standards reflect an "average" condition, they will rarely prescribe the number of parking spaces to match the parking demands of any individual development project exactly. The empirical challenge is understanding the range over which parking demand for a given use may vary, and the policy question is where the parking standard or ratio should be set in that range. Other municipalities are recognizing the advantages of parking ratios in support of broader Official Plan objectives.

The Town of Oakville recently developed a new zoning by-law for lands north of Dundas Street. The parking rates contained within this by-law for multiple dwelling units stipulate that a maximum parking rate of 1.25 parking spaces per unit would be accepted with no prescribed minimum parking requirement. Additionally, the Town of Oakville specifies that for Neighbourhood Centres, parking spaces may be located on the lot and on the street where parking is permitted. In contrast to generic minimum parking requirements, North Oakville provides maximum limits to restrict the total number of spaces that can be constructed rather than establish a minimum number. This recognizes that on-street and lay-by parking is often utilized for mixed-use development land uses.

The City of Kitchener has recently undertaken a comprehensive review of the zoning by-law (CROZBY) to ensure land and growth are appropriately managed and the zoning regulations are up to date. As part of this work, updated parking requirements were developed that follow a similar trend as taken with the by-law for North Oakville. No minimum parking requirement is required for developments located within an urban growth centre; instead, a maximum of 1.00 parking



space per unit is prescribed. However, for all other zones without a specific designation, the minimum parking requirement is 1.00 parking space per unit, with a maximum of 1.40 spaces per unit.

The City of Burlington acknowledges that the parking requirements within their Zoning By-law are more than 30 years old. As a result, Burlington embarked on a parking standard review to ensure the city's parking requirements accurately reflect current demand and emerging trends in transportation. Burlington will use the recommendations of the parking standards review as the basis for updating parking regulations for development in Burlington. Updated parking requirements for intensification areas stipulate 1.00 parking space per unit, whereas all other zones have a tiered structure based on the number of bedrooms ranging from 1.00 - 1.50 spaces per unit.

Attitudes towards automobile ownership and its role in an urban lifestyle are changing in the eyes of both consumers and policymakers, and lower parking regulations reflect this. As parking regulations are an attempt to provide supply to meet demand, regulations requiring lower supply for future buildings indicate that future demand will be lower.

Neighbouring municipalities are adopting new standards based on broader Official Plan objectives that recognize the correlation between supportive land uses and lower automobile ownership. **Parking regulations under Zoning By-law 016-2014 are, on average, 32% higher** when comparing the minimum requirements outlined by the Town of Oakville (North Oakville), City of Burlington and City of Kitchener. Further, these rates can be reduced through Transportation Demand Management (TDM) measures.

### 6.3 Limited Parking Supply

To provide further research on the benefits of a limited parking supply and context into how the supply can influence travel behaviour, recent research indicates that more parking supply influence a higher demand for more automobile use.

- ▶ A New York City study of three boroughs showed a clear relationship between guaranteed vehicular parking at home and a greater tendency to use the automobile for trips to and from work, even when both work and home are well served by transit. The study infers that driving to other non-work activities



is likely higher for households with guaranteed vehicular parking<sup>10</sup>.

- ▶ A study of households within a two-mile radius of ten rail stations in New Jersey concluded that if development near transit stations is developed with a high parking supply, then those developments will not reduce automobile use compared to developments located further away from transit stations and that parking supply can undermine the incentive to use transit that proximity to transit provides<sup>11</sup>.
- ▶ A study of nine cities across the United States examined whether citywide changes in vehicular parking cause automobile use to increase, or whether minimum parking requirements are an appropriate response to the already rising automobile use. The study concluded that: “parking provision in cities is a likely cause of increased driving among residents and employees in those places.”

## 6.4 Mobility Hub Consideration

The Big Move is the regional transportation plan (RTP) published by Metrolinx for the Greater Toronto and Hamilton Area (GTHA). It makes specific recommendations for transit projects. Since its publication, Metrolinx has been mandated to implement the RTP, which includes new and improved GO Transit service, local rapid transit, stations, and fare payment systems.

The Town’s designated mobility hub includes the Milton GO Station, which encompasses approximately 800-metre radii around the transit station. This mobility hub is planned to integrate rapid, regional, and local transit. Mobility Hubs are more than just transit stations. They are places of connectivity where different modes of transportation — from walking to commuter rail — come together seamlessly and where there is an absolute concentration of places to live, work, shop and play. They serve as destinations and places to wait for and connect with transit whether you are walking, cycling, taking transit or driving.

Milton envisions a significant increase in density within the designated Mobility Hub, and a shift to compact, higher density, more intense mixed-use developments is encouraged through revitalizing these

<sup>10</sup> Rachel Weinberger, Death by a thousand curb-cuts: Evidence on the effect of minimum parking requirements on the choice to drive. Transport Policy, 20, March 2012.

<sup>11</sup> Daniel Chatman, Does Transit-Oriented Development Need the Transit? Access, Fall 2015.



areas. The Mobility Hub emphasizes modes of transportation, including walking, cycling, and transit.

The Big Move has developed strategies that will contribute to the transformation of the GTHA transportation system. One of these strategies focuses on building pedestrian, cycling, and transit communities. How we design our communities is a significant factor in our travel. People who live in a higher density neighbourhood with a variety of stores and services near their home are more likely to walk, cycle or take transit. Lower-density areas far from shops and services and lack sidewalks and bike lanes are much more likely to drive.

The Region's transportation system and land use development are intended to achieve a 20% transit modal split target when a "mature state" of urban development is reached<sup>12</sup>. Based on this projected shift, the demand for automobile parking is also expected to decrease. To contribute to the change from automobile trips to other modes, reduced parking requirements in and around Mobility Hubs will contribute to meeting the Region's transit modal share targets.

Transit-oriented development does much more than just shift automobile trips to transit. People who live or work in communities with high-quality public transit tend to own fewer automobiles and drive fewer annual miles than they otherwise would. Given the proximity of the subject property to local transit service within and a future Mobility Hub, a reduced parking rate for the proposed development is consistent with the policies set out in the Town's Mobility Hub Study<sup>13</sup>:

*“Encouraging the adoption of parking standards and policies that promote active transportation and public transit; to consider planning approval, financial and other incentives to encourage development; and to direct Regional services and facilities to Intensification Areas (III.81(8-10)); and*

*“Provide enough parking to meet the needs of users while also incentivizing transit use and prioritizing pedestrian safety. Encourage reduced parking and maximize opportunities for shared parking. Carefully integrate any parking structures into the overall built form and design them with future adaptability in mind (including bike parking and storage facilities). Minimize surface parking and incorporate parking configurations that can transition to other uses over time.”*

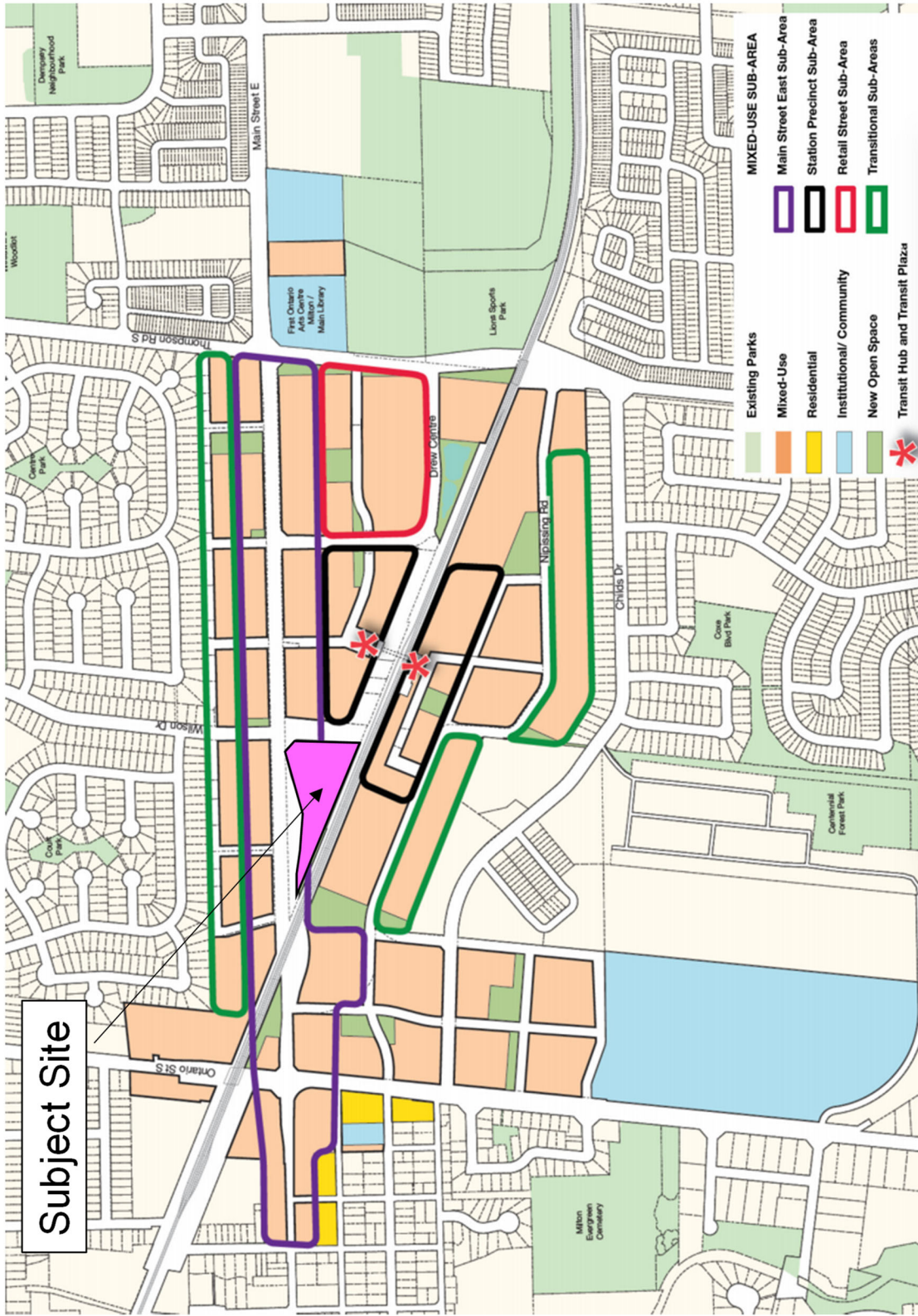
<sup>12</sup> Milton Transportation Master Plan, April 2019, WSP

<sup>13</sup> Milton Major Transit Station Area & Mobility Hub Study, May 2020



**Figure 6.1** illustrates the location of the Mobility Hub with the development.





## 6.5 Parking Demand Forecasts

A review of actual parking demands likely to be generated by the proposed development and alternative rates provided by the Town of Milton has been considered to assess, independent and separate from a review of Zoning By-Law requirements.

### 6.5.1 Alternative Residential Requirements

As part of early discussions in establishing the terms of reference for the enclosed study, The Town of Milton and the Applicant came to a consensus on the overall parking supply that should be considered for the development.

As the development is located adjacent to the Milton GO Station and within the primary zone of the Mobility Hub that offers the greatest opportunity for intensification with significant connectivity to the local and inter-jurisdictional transit network, the following parking rates were identified:

- ▶ 0.80 parking spaces per unit plus 0.20 parking spaces for visitor parking in a designated visitor parking area subject to the following bicycle requirements (1.00 long-term space per unit and 0.05 short-term space per unit).

### 6.5.2 Retail Requirements

Most Zoning By-law “retail” standards typically reflect demand seen at larger format retail outlies and standalone centres rather than smaller retail located within a mixed-use development.

The Institute of Transportation Engineers (ITE) produces a periodic report titled *Parking Generation*<sup>14</sup>, which is the prevailing national standard in determining parking demand for development. ITE standards are based on parking demand studies submitted to ITE by various parties, including public agencies, developers and consulting firms. The most recent parking generation manual available is the 5th edition and is a comparative starting point to determine baseline assumptions.

This study includes ITE peak period parking demand rates as guidelines to benchmark how the Town of Milton’s Zoning requirements compares to small retail land uses. The average peak period parking demand rate calculation is meant to represent the

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<sup>14</sup> Institute of Transportation Engineers. *Parking Generation Manual (5<sup>th</sup> Edition)*, Washington DC, 2019.



number of parked cars at the peak period divided by the quantity of the independent variable, such as building area or employees.

According to industry parking standard calculations from ITE, retail requirements range from 1 parking space per 22 to 141 square metres. The higher end of the parking ratio (22) is comparable to a discount supermarket, whereas the lower end (141) is comparable to a pet supply store. Peak parking demand levels from ITE have also been reviewed for smaller retail formats ranging from 1 parking space per 48 to 104 square metres<sup>15</sup>.

The ITE parking standards are often based on peak hour demands of suburban sites with isolated; single land uses with free parking. Projections using standard ITE parking rates tend to overestimate demand for mixed-use developments that offer the opportunity to share parking supply between various uses. This reduces the total number of spaces the same land uses would require in standalone developments.

The parking requirement stipulated within Zoning By-law 016-2014 for retail uses of 1 space per 20 square metres is considered reflective of peak demands at more prominent format retail outlets and centres rather than smaller format retailers.

To further validate this with local market demand, results of previous parking surveys conducted at small format retail developments were compiled. Available information about each site, such as the number of units, walking distance to the nearest GO Station, peak parking demand, parking supply and demand rates, is outlined in **Table 6.2**.

**TABLE 6.2: SMALL FORMAT RETAIL PARKING SURVEY RESULTS**

Municipality	Address	Type	Distance to Rail Station	GFA Square Metres	Demand	
					Peak Parking Demand	1 parking space per
Burlington	5327 Upper Middle Road	Mixed-Use Building (Resident and Commercial)	4.5 km (Appleby GO)	900	25	36 square metres
Waterdown	35 Main Street South	Mixed-Use Building (Commercial and Office)	4.0 km (Aldershot GO)	1,100	21	53 square metres

Parking supply rates ranged from 1 parking space per 36-53 square metres, indicating that demand is significantly lower than the Town of Milton's requirements. The highest parking demand rate is from a building situated in a subdivision environment as opposed to an urban

<sup>15</sup> ITE Land Use Codes; 812 Building and Material and Lumber Store, 816 Paint Store, 892 Carpet Store, 890 Furniture Store, 860 Book Store.





environment which provides for improved access to adjacent residential, employment and retail opportunities through active travel modes.

The surveyed results at 5327 Upper Middle Road have been considered the most appropriate and applicable for the development's retail component as demand at this site represents the parking demand for ground floor commercial with residential units above. Although the site is in Burlington, it is located in the northern portion of the City, which is similar to the study area in that there is considerable reliance on automobile usage.

### 6.5.3 Projected Base Parking Demand

The base parking demand ratios represent how many spaces should be supplied for each use if the spaces are unshared. A summary of the base peak parking demands for each component uses contemplated within the development is provided in **Table 6.3**. The following summarizes the parking demand rates utilized:

- ▶ Residential demand reflects a peak parking demand of 0.80 spaces per unit, consistent with the alternative rate provided by the Town of Milton.
- ▶ Visitor demand is reflected by a peak parking demand of 0.20 spaces per unit, consistent with the alternative rate provided by the Town of Milton.
- ▶ Retail demand is reflected by a peak parking demand of 1 space per 36 square metres, consistent with the parking demand information collected at a similar site within the Burlington Market.

Assuming that each land use requires a separate pool of parking spaces, the peak unshared parking demand for the whole project is 597 spaces.

**TABLE 6.3: PROJECTED BASE PARKING DEMAND**

Use	Units	GFA m <sup>2</sup>	Baseline Parking Demand	
			Parking Rate	Parking Spaces Required
Apartment - Residents	570		0.80 spaces per unit	456.0
Apartment - Visitors	570		0.20 spaces per unit	114.0
Retail	-	960	1.0 spaces per 36 m <sup>2</sup> GFA*	26.7
<b>Total Parking Required</b>				<b>596.7</b>



#### 6.5.4 Non-Captive Market

In the shared parking analysis, the term “captive market” reflects the adjustment of parking needs and vehicular trip generation rates due to the interaction among uses in an area. “Captive market” is borrowed from market researchers to describe people already present in the immediate vicinity at certain times. Traditionally, the non-captive adjustment is used to fine-tune the parking needs of persons already counted as parked for the day. For example, an apartment resident who dines at a restaurant only generates a parking demand for one space instead of two.

In designing a shared use analysis, Paradigm has used the inverse or non-captive ratio, which is the percentage of parkers not already counted as parked. There is usually a primary land use, in this case, the residential and office space, which accounts for the longest parking durations of a vehicle.

To estimate the retail non-captive factor, we assumed that a percentage of residents and visitors would visit the retail tenants. This analysis assumed that 10% of residents and 5% of visitors would patronize the retail use, consistent with internal trip characteristics.

#### 6.5.5 Shared Parking Demand

Consideration of shared parking opportunities is common within mixed-use facilities. The concept of shared and managed parking reflects the variations in usage levels of different land uses by the time of day, day of the week and seasonal factors to derive efficiencies in overall parking supply requirements through a permissive sharing of a shared pool of parking that support the range of planned uses at different times.

Each land use does not need its dedicated parking supply, yet that is precisely what standard analysis and Zoning indicate is needed. In reality, throughout the day, different uses have different peak demands: for example, an office may have a high demand until 5 PM, and a restaurant open for dinner may have a high demand only after 5 PM.

Paradigm used and adapted a shared parking model using inputs from the Urban Land Institute<sup>16</sup> (ULI) to model this type of activity. Shared parking allows for the accommodation of peak parking demand but shares a supply among different uses. If each land used was built with

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<sup>16</sup> Shared Parking 2nd Edition, Urban Land Institute, 2005



enough parking to accommodate its peak demand, the collection of spaces would be grossly underutilized.

This analysis is essential because it reflects that specific user groups can share the same parking spaces without requiring additional parking. In the case of the proposed development, it is apparent that visitor and commercial parking are excellent candidates for sharing parking as they peak at different times of the day. When the projected demands are overlapped temporally, the following is noted:

- ▶ There is no hour in the day when all user groups peak at the same time (contrary to the assumption of superposition);
- ▶ When retail demands peak in mid-afternoon, visitor demands are at their lowest levels; and
- ▶ As visitor parking demands rise in the late evening, retail and office parking demands fall.

The model started with a baseline demand of 597 spaces, calculated in **Sub-Section 6.5.3**. After adjusting for shared parking and non-captive market, peak demand is estimated to be 586 spaces. If each land used were to build enough parking to accommodate its peak demand, then the supply of spaces would be grossly underutilized. **Table 6.4** outlines the peak shared parking requirement.

**TABLE 6.4: PEAK SHARED PARKING DEMAND**

Land Use	Unadjusted Demand	Peak Adjustment 6:00 PM	Non Captive	Shared Parking Demand
Retail	26.7	70%	85%	15.9
Apartment - Resident	456.0	100%	100%	456.0
Apartment - Visitor	114.0	100%	100%	114.0
Subtotal Reserved Resident	456.0			456.0
Subtotal Retail/Visitor	140.7			129.9
Total	596.7			585.9

With the Town of Milton's zoning requirements of 1,046 spaces, nearly 460 unutilized spaces are at their peak. However, the supply is expected to be lower with the incorporation of Transportation Demand Management (TDM) measures.



## 7 Transportation Demand Management

The goal of a Transportation Demand Management (TDM) plan is to reduce the development's overall traffic and parking impacts through the implementation of strategies that are aimed at affecting the demand side of the transportation equation rather than the supply side. By their very nature, TDM programs attempt to change people's behaviour, and to be successful; they must rely on incentives or disincentives to make behaviour attractive to the commuter.

TDM strategies include financial incentives, time incentives, new or enhanced commuter services, information dissemination, and alternative marketing services. TDM strategies include all the incentives and disincentives that increase people's likelihood of changing travel behaviour.

The TDM plan has been formulated to extend reasonable and practical strategies that encourage residents and visitors to take alternative modes of transportation. The strategies identified are expected to improve transportation access and connectivity within the development and reset the study area. For each strategy, an explanation and a description of what the applicant is proposing to provide are provided.

### 7.1 Through Design

Several factors influencing peoples' travel mode choices are supporting land use/infrastructure that encourage people to choose travel modes other than driving alone. These strategies are already accounted for through the development's overall design and include the following.

#### 7.1.1 Housing Density

Designing the plan with increased densities reduces Greenhouse Gas (GHG) emissions associated with traffic in several ways. Density is usually measured in terms of persons, jobs, or dwellings per unit area. Increased densities generally shorten the distance people travel and provide greater options for their travel mode. This strategy also provides a foundation for the implementation of many other strategies which would benefit from increased densities.

#### 7.1.2 Land Use-Density Mix

Having different types of land uses in close proximity can decrease vehicle mode share since trips between land use types are shorter and may be accommodated by non-automotive transportation. The mix of medium and high-density housing and commercial uses provides land



use diversity that should reduce the number of automobile trips that residents or employees make.

### 7.1.3 Pedestrian Facilities

Accessibility to and from development is essential in helping ensure that those who can walk do. Proper pedestrian connections from the surrounding community to the development should be constructed to ensure safety and enhance the overall pedestrian experience.

Walking is encouraged by providing a pedestrian-friendly site layout with an extensive network of sidewalks and entrances at key points both within site and connecting to the existing pedestrian network. Most of the site provides direct public access for pedestrians via multiple street-level entrances from Main Street East and Wilson Street Drive Extension. This is intended to provide a comprehensive network of pedestrian connections, allowing for an enhanced pedestrian experience for all site users.

By taking advantage of the future public sidewalk network to attract and serve pedestrians, combined with multiple pedestrian connections within the site, the development offers walkability as one of the critical design features.

### 7.1.4 Bicycle Facilities

Increasing bicycling to, from and within Milton is a crucial strategy for reducing vehicle trips. The number of people bicycling is directly related to the quality of the bicycling network and the presence of bicycle facilities. As outlined in **Section 2.3**, bicycle facilities are provided along Main Street East.

### 7.1.5 Bicycle Parking Supply

The Town of Milton By-law includes rates for bicycle parking for Apartment buildings not within the Central Business District (CBD) that require a bicycle parking rate of 0.20 spaces per unit. However, as outlined by the Town of Milton through the alternative parking requirements, the development proposes providing a bicycle parking supply of 1.00 long-term space per unit and 0.05 short-term space per unit.

Overall, 570 long-term bicycle spaces and 29 short-term bicycle spaces are recommended.



### 7.1.6 Transit

The use of transit places less reliance on personal automobiles for trips that convenient and desirable transit options can complete. Providing timely and desirable transit can be provided by delivering well-lit transit stops with seating and weather-protective shelters. Additional amenities, including bicycle parking, schedule information, real-time bus status, and maps, can increase the convenience of the transit network.

The subject site is currently served by ten (10) Milton Transit Routes that operate primarily on Main Street East connecting residential neighbourhoods with the Milton GO Station. Headways are on the order of 30 minutes during most service hours, with shorter headways provided during peak hour services.

Bus stops adjacent to the existing sidewalk network are provided on Main Street East's north and south sides at the intersection with Wilson Drive. These stops are located less than 100 metres from the centre of the subject site and feature schedule information for riders.

Improving these stops, including installing bus shelters with seating, would enhance transit services. Through these modifications, the transit network would be a viable and convenient option for the development's residents, visitors and employees.

At the development level, direct links connecting residents and visitors to nearby bus stops are planned to be provided as part of the overall design scheme making the development area more navigable toward local bus stops.

## 7.2 Proposed Strategies

The development should consider the proposed strategies identified herein to reduce the number of auto-trips made to/from the development:

### 7.2.1 Transportation Information

The applicant will consider developing marketing/informational materials as part of their initial scope of work. Information on transportation options and links to the appropriate website should be conveyed to all prospective residents as a component of a resident welcome packet.

Available information should include schedules for local and regional transit services, bicycle and trail networks and the location of retail and recreational establishments.



## 7.2.2 Parking Supply

Finding the right balance needed to support the Towns' goals is critical, mainly since parking is an expensive resource. Sufficient automobile parking is necessary for the development to be successful. However, too much parking can encourage traffic congestion, limit the ability to meet trip reduction goals, increase project costs, and impact site design and aesthetics.

Research conducted in San Francisco focuses on whether or not a relationship exists between the provision of off-street parking and the choice to drive among individuals travelling to or from the site. Following data collection and an empirical review of the data, this research found that reductions in off-street vehicular parking for office, residential, and retail developments reduce the overall automobile mode share associated with those developments relative to projects with the same land uses in similar contexts that provide more off-street vehicular parking.

In other words, more off-street vehicular parking is linked to more driving, and people without dedicated parking spaces are less likely to drive. Recent research shows that a reduced Parking Supply is one of the most effective TDM measures available to reduce vehicle travel<sup>17</sup>.

The role of parking management is also a key element in helping Milton meet its trip reduction goals. Free and abundant parking encourages people to drive alone rather than car or van pool, be dropped off or picked up, walk, cycle or take transit. If free and unregulated parking is provided, there is little incentive for many residents and visitors to use alternative modes of transportation. When too much parking is provided and is provided free of cost to the user, the use of alternative sustainable modes is put at a substantial disadvantage.

As the development promotes using other modes of transportation through limited on-site parking to meet the projected demand, the development plays a significant role in setting an example for residents and visitors to consider non-automotive travel.

## 7.2.3 Unbundled Parking

Implementing a paid-parking operation is one of the most effective TDM strategies for encouraging alternative travel habits. To further encourage residents of the apartment building to utilize sustainable travel modes, the development allows residents to opt out of

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<sup>17</sup> Transportation Demand Management Technical Justification, City and County of San Francisco, June 2018.



purchasing their parking space, providing a discount on the purchase price of a unit. This is more equitable and efficient since occupants are not forced to pay for parking they do not need and allows consumers to adjust their parking supply to reflect their needs.

The development will consider the use of unbundled parking. This is an essential factor as residents are notified at the onset of the project that parking is proposed to be provided as an additional cost in lieu of the price to rent a unit. If residents are significantly considering changing their travel behaviour, the cost of renting a parking space could be a contributing factor to this change.

### 7.3 City of Kitchener TDM Worksheet

The Town of Milton has advised that if a further reduction in parking supply were being sought in addition to the alternative rates provided in **Sub-Section 6.5.1**, the City of Kitchener's TDM Checklist should be used to identify projected parking reduction through TDM measures would be required.

**Appendix I** contains the City of Kitchener's TDM checklist, indicating a potential reduction of 51 spaces. Combined with the shared parking and non-captive market adjustment, this equates to a total parking supply of 535, consistent with the proposed supply of 546 parking spaces (excluding 9 lay-by spaces). The following measures are proposed that have been considered concerning a parking credit:

- ▶ Active uses at grade along street frontages (4 parking space reduction)
- ▶ The building owner will charge parking as a separate cost to occupants (47 parking space reduction)

Increasing awareness of sustainable transportation opportunities for residents can assist in lowering the site's parking demand and, ultimately, the site's transportation impacts. General education of all modes of transportation, including their benefits and how to make the best use of them, are a vital component of TDM success.





## 8 Conclusions and Recommendations

### 8.1 Conclusions

This study evaluated the impacts of background traffic growth and projected the impacts of the development with and without traffic mitigation measures associated with the construction of 570 residential units and 960 m<sup>2</sup> (10,340 sq.ft.) of retail space. Access to the site is proposed via one right in/left out driveway connection to the future Wilson Drive Extension.

#### Transportation Study

The proposed development is projected to generate approximately 175 new vehicle trips during the weekday AM peak hour and 206 new vehicle trips during the weekday PM peak hour.

Overall, the forecast traffic volumes to be added by full built out of the development to the study area result in relatively small impacts at the study intersections. However, it is acknowledged that deficiencies are projected to occur at certain locations within the study area. They can be expected to persist in the future with anticipated growth in traffic, independent of the development. The following operational deficiencies have been identified:

- ▶ **Main Street East at Thompsons Road:** The westbound and northbound left turn movements and the southbound and eastbound through movements are projected to operate in the LOS E-F range during the weekday PM peak hour under the 2031 horizon (independent of the development). Despite the above, the widening of any Town roadway to accommodate vehicular traffic goes against the vision of a people-centric, pedestrian-friendly environment that expects people to use more sustainable modes to travel<sup>18</sup>.

Traditionally, intersection operations have focused on increasing the road network's capacity to accommodate more vehicles. Instead, a "balanced needs" approach that encourages alternative modes of transportation must be considered. Improved capacity along these corridors will be through measures supportive of transit, active transportation and transportation demand management to reduce reliance on single-occupant vehicles. By focusing on shifting commuter

<sup>18</sup> Milton Major Transit Station Area – Area Transportation Plan, April 2020, WSP



travel to public transit, intersection operations are expected to maintain the status quo.

Further, this intersection of major arterial and minor arterial roads would be expected to experience capacity constraints only for two to four hours a day on a typical weekday. The other 20 hours of the weekday, weekends and holidays would be expected to exhibit better vehicle traffic conditions.

## **Parking Study**

The parking requirement for the development under the Town of Milton's Zoning By-Law 016-2014 is 1,046 spaces, equating to a parking rate of 1.50 per unit (resident) plus 194 spaces for visitors and retail uses. The proposed site provides for a total of 546 parking spaces (excluding 9 lay-by spaces).

The parking requirements outlined in Zoning By-Law 016-2014 are based on an approach that caters to auto-oriented travel rather than transition to promote residential and visitor travel through sustainable modes. Parking ratios need to recognize empirical evidence that parking demand has many factors and varies according to household size, income, auto ownership, and locational factors such as proximity to other uses and availability of multiple transportation mobility options.

Within the context of being in a Mobility Hub area, the land use lends itself to being less reliant on auto use, where residents and visitors can take advantage of the additional transportation choices such as walking, cycling and transit. It is expected that the land use will generate reduced parking demands due to the locale in combination with the proposed overall design and marketing strategy of the project.

Finding the right balance needed to support the Town's goals is critical, mainly since parking is an expensive resource. Sufficient automobile parking is necessary for the development to be successful. However, too much parking can encourage traffic congestion, limit the ability to meet trip reduction goals, increase project costs, and impact site design and aesthetics.

Many existing Zoning By-Law parking requirements are antiquated and require updating to conform to and reflect current policies and best practices. Many municipalities recognize the oversupply of parking and are revising the zoning requirement to reflect this. Key municipalities recognized this include Town of Oakville, the City of Burlington, and the City of Kitchener. These municipalities have undertaken a comprehensive review of parking requirements and recognized that changes are required to meet policy objectives.



**On average, the Town of Milton requires 32% more parking to be provided** for this development than would be needed for the City of Burlington, Town of Oakville and City of Kitchener, which has adopted new parking requirements.

The transition from an automobile-dependent environment to one that is transit-supportive will require strategies to assist in shifting modal split and enabling the emergence of a more pedestrian-friendly transit-supportive environment. The over-provision of free or low-cost parking creates areas dominated by parking infrastructure that can negatively impact ridership and the pedestrian environment and provide an incentive for single-occupant vehicle use.

The Town of Milton and Applicant recognized this. As part of early discussions in establishing the terms of reference for the enclosed study, an alternative residential parking requirement of 0.80 spaces per unit plus 0.20 parking spaces for visitor parking was deemed appropriate, subject to a minimum bicycle parking supply of 1.00 long-term spaces per unit and 0.05 short-term space per unit.

Reasonable proxy parking demand data conducted at small format retail developments were compiled. These surveys observed a parking rate of no lower than 1 parking space per 36 square metres. The surveyed results are considered to be the most appropriate and applicable for the retail component as opposed to the generic rate outlined within the Zoning By-law. It is also recognized the Town of Milton Zoning By-law requirements for retail uses of 1 spacer per 20 square meters are reflective of demand typically seen at more prominent format retail outlets and standalone centres rather than smaller retail located within a mixed-use development.

Utilizing the alternative rates supplied by the Town of Milton and the parking rates observed at small retail developments, the actual parking demand for the proposed development is projected to be 597 vehicles based on a simplistic approach. The rates are expected to be marginally less, around 586 spaces with time-of-day shared parking demand incorporated. The development will also implement a suite of Transportation Demand Management (TDM) Measures to reduce the dependency on vehicular travel further. These measures include:

- ▶ Active uses at grade along street frontages
- ▶ Provision of 570 long-term and 29 short-term bicycle spaces
- ▶ The building owner will allow residents to opt-out of a parking space, providing a discounted purchase price.
- ▶ A minimum of 75% of parking is underground or in a structure.
- ▶ Welcome Packets



As documented within the City of Kitchener and Region of Waterloo checklists, the proposed TDM measures result in a parking reduction of 51 spaces, equating to a total parking supply of 535, consistent with the proposed supply. As the TDM plan will be adopted and implemented, these additional parking reduction credits are warranted as they encourage residents to explore alternative sustainable travel modes made more enticing, given parking will be at a premium cost.

The TDM plan and the developments transportation context will provide residents with a range of mobility choices other than a privately-owned vehicle and supports the provision of an appropriate parking supply in the building.

As the development promotes using other modes of transportation through limited on-site parking to meet the projected demand, the development plays a significant role in setting an example for residents and visitors to consider non-automotive travel. This points to the importance of ongoing parking management and demand reduction strategies for this area, given the significant development plays within a Mobility Hub to ensure that an oversupply of parking is not provided that could hinder the ability to attract a substantial portion of the population to transit mode choice.

Based on the imperial data collected as part of this study, it is evident that the oversupply of parking can undermine the incentive for residents to use transit. Per the current development plan, 546 parking spaces are provided, whereas the Zoning by-law requires 1,046 parking spaces. Through the alternative rates offered by the Town of Milton, a review of proxy surveys collected at small retail establishments, and the incorporation of shared parking and transportation demand management measures, the proposed parking supply of 546 spaces is sufficient for the development.

## 8.2 Recommendations

- ▶ The Town of Milton recognizes the conclusions drawn above;
- ▶ The Town of Milton supports the proposed parking supply of 0.93 spaces per unit.





# Appendix A

## Terms of Reference



## Greg Lue

---

**From:** Michael.Turco@milton.ca  
**Sent:** March 4, 2021 11:31 AM  
**To:** Adam Makarewicz  
**Cc:** Stirling.Todd@milton.ca; 'Colin Rauscher'; 'Mike Vernooy'; Greg Lue; christian.lupis@milton.ca  
**Subject:** RE: 200624: 560 Main Street East - TIA PS - TOR

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi Adam,

Regarding #4 (background developments), the previously provided site statistics for 700 Main Street East should be utilized. The Brookfield site (706 Main Street East) developer has not provided a concept plan to the Town as of yet. Therefore, we do not have any preliminary site statistics for this site. However, they have been advised that they will only have access to the Wilson Drive extension and need to coordinate with the adjacent development accordingly.

With respect to #5 – site traffic generation and trip distribution, the Town is satisfied with the suggested proxy data for use in the study. Please ensure that the report outlines the similarities between the two sites and why they are anticipated to generate a similar traffic rate.

Regarding #9 (Wilson Drive Extension), per the Region's TIS Guidelines: "Functional design plans or detailed design drawings may be required for identified physical improvements to ensure their feasibility." The functional design is intended to demonstrate feasibility and confirm whether any additional right of way would be required.

In regards to the TDM plan, the Town offers the following alternative solution:

The total TDM parking reduction achieved in Table C of the checklist would only need to be equal to any proposed reduction in parking beyond the following minimum parking rates:

Land Use	Setting/Location	Minimum Parking Rates (Spaces Per Unit)		
		Residential	Visitor	Total
Apartment	UGC	1.00	0.20	1.20
Mixed-Use	UGC	0.80	0.20	1.00

However, this would be subject to the proposed development providing bicycle parking as per (or higher than) the following rates:

Land Use	Setting/Location	Minimum Bike Parking	
		Type 1 (Long-Term)	Type 2 (Short-Term)
Apartment	UGC	1.00	0.05
Mixed-Use	UGC	1.00	0.05

*Long-term bicycle parking*

- Also known as "bicycle parking space-occupant, or Type 1 bicycle parking";
- Includes bicycle racks in an enclosed, secured area with controlled access; or
- Individual, secure enclosures like bicycle lockers;

*Short-term bicycle parking*

- Also known as "bicycle parking space-visitor, or Type 2 bicycle parking"
- Includes bicycle racks in an easily accessible location;
- Available for public use;
- Sheltered or unsheltered;
- Does not protect bicycles from vandalism or theft attempts.

Should you have any questions, please feel free to contact

me.

Thank you,



**Michael Turco**, C.E.T., MITE  
Transportation Planning Technologist  
150 Mary Street, Milton ON,  
905-878-7252 x2363  
[www.milton.ca](http://www.milton.ca)

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---

**From:** Adam Makarewicz <amakarewicz@ptsl.com>

**Sent:** Friday, February 26, 2021 2:19 PM

**To:** Michael Turco <Michael.Turco@milton.ca>

**Cc:** Stirling Todd <Stirling.Todd@milton.ca>; Colin Rauscher <Colin.Rauscher@neattcommunities.com>; Mike Vernooy <mike@neattcommunities.com>; Greg Lue <glue@ptsl.com>; Christian Lupis <christian.lupis@milton.ca>

**Subject:** RE: 200624: 560 Main Street East - TIA PS - TOR

Hi Michael,

Thank you for providing your comments. We have reviewed these with our client and have provided additional responses below in **RED**.

We unfortunately cannot accept the Town's request regarding the proposed parking supply needs to be equal of less to the City of Kitchener TDM worksheet. The proposed development is located within the primary zone of the Milton Mobility Hub that offers the greatest opportunities for intensification, improved pedestrian and multimodal connectivity. As outlined in the Milton's Major Transit Station Area & Mobility Hub Study, the market is the best determinate of necessary parking spaces with a further emphasis that minimum parking ratio is not necessary while a maximum parking ratio should be mandatory. The parking supply will be supported through the parking study



justification and will be based on empirical data (proxy surveys, ITE Parking Generation, Comparison of other municipalities, etc.) The emphasis will be on minimizing the over-supply of parking by using the lowest requirement that is reasonable for the area in contrast to the usual approach of requiring extra parking just in case there is not enough.

Given 700 Main Street East is still in the preliminary stages, we are also requesting a reasonable unit count be provided by Town of Milton planning staff as there is no guarantee the density proposed by 700 Main Street East will be approved. If 700 Main Street East intends to seek the density outlined below, their traffic study will capture the higher scenario.

Additionally, as part of the submission, our client has requested that the study be peer reviewed by a consultant approved by the Town.

We look forward to moving ahead with our study.

Regards,

**Adam J. Makarewicz**  
*Senior Project Manager*



**Paradigm Transportation Solutions Limited**

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e: [amakarewicz@ptsl.com](mailto:amakarewicz@ptsl.com)  
w: [www.ptsl.com](http://www.ptsl.com)

---

**From:** [Michael.Turco@milton.ca](mailto:Michael.Turco@milton.ca) <[Michael.Turco@milton.ca](mailto:Michael.Turco@milton.ca)>  
**Sent:** 24-Feb-21 11:21 AM  
**To:** Adam Makarewicz <[amakarewicz@ptsl.com](mailto:amakarewicz@ptsl.com)>  
**Subject:** RE: 200624: 560 Main Street East - TIA PS - TOR

Hi Adam,

Thank you for providing a proposed TIS and PS Terms of Reference for 560 Main Street East. Please see the Town's comments below in [green](#):

Should you have any questions, please feel free to contact me.

Regards,

Hi Michael,

See below the TOR.

This email provides our proposed scope of work for a transportation and parking study for the proposed mixed-use development at 560 Main Street East in the Town of Milton. The subject site is located on the south side of Main Street East and west of Wilson Drive. ~~Vehicle access is proposed via a driveway to Nipissing Road~~. Vehicle access is proposed via a driveway connection to the future southerly extension of Wilson Drive. As Metrolinx proposes to provide a bus loop through the future extension of Wilson Drive, the ultimate configuration and functionality of this secondary connection is not defined at this point. As you are aware, Paradigm has provided a preliminary concept on how this driveway to the Wilson Drive extension may operate. This transportation impact study component will examine the proposed development's anticipated impact on the study area's traffic operations and identify any necessary road improvements required to accommodate the generated traffic. The parking study component will review the proposed development's anticipated parking demand and propose a Zoning By-law parking requirement variance, if warranted.

## **Scope of Work**

The proposed scope of work, outlined in this section, was developed based on the Town of Milton Transportation Impact Study Guidelines (2010).

### **Transportation Impact Study**

1. **Development Study Area:** We will comment on existing transportation facilities within 500 metres of the subject site. Existing key roadways, major intersections, transit services, and pedestrian facilities will be discussed, as appropriate.
2. **Analysis Time Periods and Intersections:** Based on the proposed development's land use, size, and proximity, we plan to analyze the following intersections during the weekday AM/PM peak periods:
  - Main Street East at Ontario Street North (signalized);
  - **Main Street East at Milton Mall Entrance (signalized);**
  - Main Street East at Wilson Drive (signalized);
  - Main Street East at Drew Centre (signalized); and
  - Main Street East at Thompson Road (signalized)
  - Up to one (1) site driveways
3. **2021 Existing Conditions:** Due to the COVID-19 pandemic and stay at home orders at the time of writing. Traffic counts at the study area intersections will be obtained through the Town of Milton and Region of Halton and factored to 2021 volumes (if required). In the event that stay-at-home orders are lifted, and volumes are normalized at the onset of the study, we will reevaluate this position in consultation with the review agencies. The 2021 existing traffic operations at the aforementioned intersections will be analyzed using the software program Synchro (version 10) for the weekday AM/PM peak hours.
4. **2031 Future Background Traffic Conditions:** The background traffic volumes will be determined for the study area intersections, ten years after the study is commissioned. We will identify an applicable background traffic growth rate and other area developments that may introduce traffic into the study area, based on our previous assumptions and discussions with the City. Planned road improvements and other approved developments within close proximity will be taken into consideration. The 2031 background traffic operations will be analyzed for the weekday AM/PM peak hours.
  - The Milton Major Transit Station Area Transportation Plan (MTSA) will need to be considered to develop local road forecasts.

- Confirmation required from Town and Regional staff regarding other nearby developments not accounted for in the MTSA. Please include the following in-stream background development:
  - 700 Main Street East – Two proposed residential towers (25 and 32 storeys) with a combined 689 residential units, 186 sq metres of commercial GFA fronting onto Main Street East, 3 storey podiums in both towers. Access via the Wilson Drive extension only. Draft TIS not yet completed/available. You will need to calculate the trip generation for this site within the report. We do agree that adjacent developments will need to be considered within the background traffic conditions. As the application for 700 Main Street East is still in preliminary stages, we request a reasonable preliminary unit count be provided by Town of Milton planning staff as there is no guarantee the density proposed by 700 Main Street East will be approved. If 700 Main Street East intends to seek the density outlined above, their traffic study will capture the higher scenario.

We are also requesting the Brookfield site be included as part of in-stream background development given this development will most likely require access through the Wilson Street Extension. Again, we request a reasonable preliminary unit count be provided by Town of Milton planning staff.

5. **Site Traffic Generation and Trip Distribution:** The size and nature of the proposed subject site will be documented based on the received site drawings and statistics, and will be used to estimate the number of automobile and nonautomobile trips likely to be produced during the weekday AM and PM peak hours. The estimation will be based on information from the Institute of Transportation Engineers (ITE) publication, Trip Generation, 10th Edition. The trip distribution for the proposed site will be based on a review of the 2016 Transportation Tomorrow Survey (TTS). The forecast site traffic for the development will be added to the road network based on the trip distribution and assigned to the network based on existing travel patterns, logical travel routes, and available traffic capacity in accordance with our interpretation of these various patterns. Please be advised that LUC 820 is not a good representation of ground floor commercial trip generation. Proxy data at similar high density mixed-use surrogate sites within Halton Region should be used instead (minimum 2-3 sites). The report must outline the similarities between the proxy site(s) and the proposed site and why they will generate a similar traffic demand. The selection and justification of the survey sites is the responsibility of the consultant. No modal split trip reductions are to be applied to the trip generation. As COVID-19 has significantly hampered commercial and retail business activity at “small-scale” developments, the collection of proxy data is not feasible at this time. We will rely on the proxy site data collected at Times Square in Burlington. This data has been previously recommended by the Town of Milton in prior applications.
6. **2031 Future Total Traffic Conditions:** The estimated site traffic volumes will be combined with the future background traffic volumes to determine the 2031 total traffic volumes for the study area intersections. Intersection operations analysis will be undertaken for the weekday AM/PM peak hours. Any necessary road improvements required to accommodate total traffic volumes will be identified if necessary, such as additional turning lanes, storage length modifications, intersection reconfigurations, signal timing adjustments, and signal installation. Please be advised that a PHF of 1.0 should be used to simulate a flat hourly peak for the future background/total scenarios.
7. **Traffic Signal Warrant Analysis:** TAC Signal Warrant will be referenced with regards to signal warrant guidelines to determine if the installation of a traffic signal at the unsignalized intersections within the study area will be required in the future.

8. **Access and Circulation Review:** We will review the site access and circulation design using AutoTURN and include assessments of vehicle access and egress, clearance and swept path manoeuvres within the site using two design vehicles; MSU and PTAC. The MSU design vehicle will modelled to identify potential conflicts with the site driveways, circulation aisles and loading areas. The PTAC design vehicle will modelled to identify if two passenger vehicles can navigate the underground parking ramp simultaneously in opposing directions. **MSU and garbage trucks must be able to enter the site in a forward motion, turn around internal to the site without the use of parking stalls/curbs/etc, and exit in a forward motion. Internal site circulation must be evaluated for safety and functionality. A site access review must be completed to determine that the site access conforms to all TAC and Town standards.**
  
9. **Functional Design for the Wilson Drive Extension based on TIS findings. Review and evaluate the feasibility of an exclusive bus only lane on the northbound approach of the intersection of Main Street East and Wilson Drive, as well as transit signal priority at this intersection. Confirm necessary lane configurations, driveway traffic control, etc. Ensure that active transportation is highly prioritized, safe, convenient, direct, accessible, with strong consideration to desire lines and access to the transit stops. Although we do agree the Wilson Drive Extension will need to be shown within the TIS, the approval of the functional design should not be a requirement of the TIS as these are two separate issues. The Wilson Drive Extension has additional stake holders and adjacent landowners that will need to be consulted. A separate approval process will need to be undertaken as the consultation will be fairly extensive between all impacted parties.**
  
10. **Transportation Demand Management (TDM):** ~~We will prepare a TDM Plan for the proposed development that will capture existing TDM opportunities near the development site and a list of measures to be considered by the Applicant to encourage greater use of more sustainable modes of transportation (transit, walking, cycling) and trip decision making that reduces, combines, or shortens vehicle trips.~~ **TDM should be reviewed the Parking Study instead. Refer to Parking Study TDM requirements below.** TDM is outlined in the Milton Transportation Impact Study Guidelines as a requirement for a Traffic impact Study. The following are requirements of the TDM plan as outlined in the Impact Study Guidelines:
  - Provide a description of the TDM initiatives and their function, including a pedestrian routing plan;
  - Evaluate the impacts of the proposed TDM initiatives specifically relating to reduced trip generation associated with the site, reduced peak hour travel, increased transit usage and/or increased auto occupancy; and
  - Incorporate these adjustments into the traffic generation assumptions.
 The TDM plan is a component of the Traffic Impact Study and will remain as such.

## Parking Study

1. **Town of Milton Zoning By-law Review:** The proposed development's parking requirements as per Town of Milton's Zoning By-law will be determined. The by-law parking requirement will be used as a baseline for comparison with other jurisdictions, best practices and empirical data collected.
  
2. **Parking Utilization Survey:** In order to estimate the proposed development's residential peak parking demand, parking utilization surveys conducted at two sites previously approved by the Town of Milton will be reviewed: 33 Whitmer Street and 100 Millside Drive. The proxy site surveys were completed in 2017 between 4:00PM and 10:00PM on two separate weekdays

and one weekend. These survey times represent the anticipated peak conditions of the residential component. The parking surveys recorded parking demand every 15 minutes.

3. [Review the estimated parking demand from ITE Parking Generation Manual, 5th Edition](#)
4. **Shared Parking:** Consideration of shared parking opportunities is common within mixed-use facilities and will be reviewed. To model this type of activity, a shared parking model using inputs from the Urban Land Institute (ULI) will be used. Shared parking allows for accommodation of peak parking demand but shares a supply among different uses.
5. **Parking Demand Review:** Using the observed parking rate obtained from the proxy site survey data, [ITE Parking Generation Manual, and ZBL comparisons](#), a parking rate will be recommended that is deemed applicable to the subject site taking into account the developments locations in relation to the Milton GO Station Mobility Hub. The recommended rate will then be used to estimate the number of parking spaces needed to meet the projected parking demand. The estimated parking supply needed will be compared to the By-law required supply to assess the feasibility of providing less than the By-law supply requirements. In the event that the parking review determines that a parking reduction cannot be justified, the report will speak to this point.
6. [A comprehensive TDM plan using the City of Kitchener's TDM Checklist. Through the proposed TDM checklist measures, it must be ensured that the resultant parking requirement in Table C is less than or equal to the proposed parking supply. All proposed TDM measures must be included in the recommendation section of the report. We will include the City of Kitchener TDM worksheet within the TDM plan however the TDM worksheet will not form the sole basis for supporting proposed parking supply. The parking supply will be supported through the parking study justification and will be based on empirical data \(proxy surveys, ITE Parking Generation, Comparison of other municipalities, etc.\) The emphasis will be on minimizing the over-supply of parking by using the lowest requirement that is reasonable for the area in contrast to the usual approach of requiring extra parking just in case there is not enough. We unfortunately cannot accept the role TDM will play as the deciding factor in supporting the proposed parking supply.](#)

Regards,

**Adam J. Makarewicz**  
Senior Project Manager



**Paradigm Transportation Solutions Limited**

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w: [www.ptsl.com](http://www.ptsl.com)

---

**From:** Adam Makarewicz  
**Sent:** 22-Feb-21 10:17 AM  
**To:** [Michael.Turco@milton.ca](mailto:Michael.Turco@milton.ca)  
**Subject:** RE: 200624: 560 Main Street East - TIA PS - TOR

Hi Michael,

Hope you had a good weekend.

Just touching base on the TOR.

Regards,

**Adam J. Makarewicz**  
*Senior Project Manager*



**Paradigm Transportation Solutions Limited**

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w: [www.ptsl.com](http://www.ptsl.com)

---

**From:** Adam Makarewicz  
**Sent:** 10-Feb-21 11:26 AM  
**To:** [Michael.Turco@milton.ca](mailto:Michael.Turco@milton.ca)  
**Cc:** Colin Rauscher <[Colin.Rauscher@neattcommunities.com](mailto:Colin.Rauscher@neattcommunities.com)>; Mike Vernooy <[mike@neattcommunities.com](mailto:mike@neattcommunities.com)>  
**Subject:** 200624: 560 Main Street East - TIA PS - TOR

Good Morning Michael,

Paradigm has been retained by Neatt Communities to undertake a Transportation Impact and Parking Study for their proposed development at 560 Main Street East in Milton. I have enclosed our proposed scope of work, site plan as well as our access review regarding the proposed location of the driveway connection to the future Wilson Drive Extension. Note that I have been advised an updated site plan is being prepared.

If you could review and provide confirmation or any comments as soon as possible, that would be helpful, so that we can get started.

Please contact me with any questions.

Regards,

**Adam J. Makarewicz**  
*Senior Project Manager*



**Paradigm Transportation Solutions Limited**

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# Appendix B

## Existing Traffic Data





















































Summary  
 Bin Size 15 minutes  
 AggregatioMedian  
 Time Zone America/Toronto  
 Start Time 2/5/2020 0:00  
 End Time 2/5/2020 23:59  
 Location Thompson Road and Main Street  
 Latitude ar 43.52813223,-79.86691475  
 Passenger Vehicles

Start Time	North						East						South						West					
	Southbound			Westbound			Northbound			Eastbound			Northbound			Eastbound			Northbound			Eastbound		
	Right	Thru	Left	U-Turn	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	Peds CW	Peds CCW
0:00:00	2	10	1	0	0	0	1	7	7	0	0	0	4	9	1	0	0	0	4	6	2	0	0	0
0:15:00	1	8	0	0	0	0	1	4	15	0	0	0	4	3	1	0	0	0	4	8	0	0	0	0
0:30:00	3	13	0	0	0	0	0	1	7	0	0	0	7	4	0	0	0	0	0	1	1	0	0	0
0:45:00	0	6	0	0	0	0	0	6	7	0	0	0	3	2	1	0	0	0	0	6	0	0	0	0
1:00:00	2	5	0	0	0	0	2	2	7	0	0	0	4	6	0	0	0	0	0	3	1	0	0	0
1:15:00	1	7	0	0	0	0	0	1	6	0	0	0	8	2	0	0	0	0	0	3	0	0	0	0
1:30:00	1	2	0	0	0	0	1	1	2	0	0	0	2	1	1	0	0	0	1	1	1	0	0	0
1:45:00	0	2	0	0	0	0	0	2	3	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0
2:00:00	0	1	0	0	0	0	0	1	2	0	0	0	0	4	2	0	0	0	0	1	1	0	0	0
2:15:00	0	4	0	0	0	0	0	0	4	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0
2:30:00	0	5	0	0	0	0	0	3	5	0	0	0	2	1	0	0	0	0	0	1	0	0	0	0
2:45:00	1	0	0	0	0	0	0	1	2	0	0	0	7	4	1	0	0	0	0	2	0	0	0	0
3:00:00	0	0	0	0	0	0	0	4	3	0	0	0	1	2	0	0	0	0	0	2	0	0	0	0
3:15:00	2	12	0	0	0	0	0	0	4	0	0	0	1	5	0	0	0	0	0	1	0	0	0	0
3:30:00	1	8	0	0	0	0	0	1	4	0	0	0	7	5	0	0	0	0	0	1	1	0	0	0
3:45:00	1	0	0	0	0	0	0	1	3	0	0	0	3	2	1	0	0	0	0	5	1	0	0	0
4:00:00	0	4	0	0	0	0	1	1	3	0	0	0	10	4	0	0	0	0	0	2	1	0	0	0
4:15:00	0	5	1	0	0	0	1	2	5	0	0	0	8	6	0	0	0	0	0	4	0	0	0	0
4:30:00	1	6	0	0	0	0	0	3	2	0	0	0	2	4	1	0	0	0	0	6	4	0	0	0
4:45:00	2	6	0	0	0	0	1	2	4	0	0	0	18	26	0	0	0	0	0	7	2	0	0	0
5:00:00	3	6	2	0	0	0	1	4	4	0	0	0	24	38	0	0	0	0	2	8	4	0	0	0
5:15:00	3	13	4	0	0	0	1	7	12	0	0	0	37	16	0	0	0	0	0	19	5	0	0	0
5:30:00	6	6	5	0	0	0	0	17	10	0	0	0	45	47	0	0	0	0	0	27	6	0	0	0
5:45:00	6	17	9	0	0	0	2	22	13	0	0	0	32	46	11	0	0	0	0	27	7	0	0	0
6:00:00	11	20	4	0	0	0	0	28	13	1	0	0	30	36	3	0	0	0	2	33	2	0	0	0
6:15:00	8	30	8	0	0	0	2	32	20	0	0	0	40	50	4	0	0	0	4	33	7	0	0	0
6:30:00	9	38	6	0	0	0	3	37	35	1	0	0	34	57	14	0	0	0	8	32	7	0	0	0
6:45:00	9	48	14	0	0	0	4	59	28	1	0	0	43	81	17	1	0	0	8	48	11	0	0	0
7:00:00	13	47	13	0	0	0	2	65	33	2	0	0	60	70	12	0	0	0	7	77	14	0	0	0
7:15:00	18	69	21	0	0	0	4	68	37	0	0	0	63	80	16	1	0	0	7	91	15	0	0	0
7:30:00	18	55	24	0	0	0	6	68	51	0	0	0	82	101	15	0	0	0	14	134	24	0	0	0
7:45:00	21	63	26	0	0	0	14	76	52	0	0	0	101	131	19	0	0	0	14	154	20	1	0	0
8:00:00	21	65	38	0	0	0	22	108	73	0	0	0	133	148	41	3	0	0	10	138	25	0	0	0
8:15:00	15	76	11	0	0	0	7	88	70	0	0	0	61	152	30	1	0	0	12	91	25	0	0	0
8:30:00	21	93	13	0	0	0	4	51	44	0	0	0	53	104	24	0	0	0	10	81	15	0	0	0
8:45:00	18	88	11	0	0	0	7	84	52	0	0	0	42	111	25	1	0	0	19	71	31	0	0	0
9:00:00	21	80	19	0	0	0	5	52	54	0	0	0	47	108	34	1	0	0	17	69	29	0	0	0
9:15:00	22	72	14	0	0	0	7	58	44	0	0	0	36	115	35	0	0	0	11	49	28	0	0	0
9:30:00	19	82	15	0	0	0	3	45	39	1	0	0	19	102	26	0	0	0	17	50	31	0	0	0
9:45:00	15	75	10	0	0	0	4	52	49	0	0	0	39	81	25	0	0	0	15	50	40	0	0	0
10:00:00	25	79	11	0	0	0	7	37	22	0	0	0	38	74	22	0	0	0	13	47	35	0	0	0
10:15:00	22	81	13	0	0	0	10	44	52	0	0	0	22	82	17	0	0	0	15	62	45	0	0	0
10:30:00	27	70	5	0	0	0	7	66	38	0	0	0	28	78	19	0	0	0	14	57	37	0	0	0
10:45:00	21	100	16	0	0	0	8	46	37	0	0	0	24	97	25	1	0	0	20	66	38	0	0	0
11:00:00	25	71	5	0	0	0	7	53	42	1	0	0	34	79	25	1	0	0	13	51	42	0	0	0
11:15:00	23	84	12	0	0	0	14	54	48	0	0	0	30	96	20	0	0	0	29	73	44	0	0	0
11:30:00	26	104	11	0	0	0	6	52	30	0	0	0	28	103	20	1	0	0	17	69	38	0	0	0
11:45:00	27	92	10	1	0	0	5	63	36	0	0	0	44	118	30	1	0	0	22	62	52	0	0	0
12:00:00	32	116	14	0	0	0	15	54	54	0	0	0	34	98	25	0	0	0	23	81	67	0	0	0
12:15:00	29	106	14	0	0	0	9	48	47	0	0	0	32	101	21	1	0	0	23	71	62	0	0	0
12:30:00	22	108	8	0	0	0	9	51	39	0	0	0	40	100	24	1	0	0	24	67	59	0	0	0







19:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
19:30:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
19:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:15:00	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0
20:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:15:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
21:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00:00	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:45:00	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
23:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:15:00	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
23:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Articulated Trucks

Start Time	East						South						West												
	North			Westbound			Northbound			Eastbound			Southbound			Westbound									
	Right	Thru	Left	U-Turn	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	Peds CW	Peds CCW	Right	Thru	Left	U-Turn	Peds CW	Peds CCW	
0:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
0:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00:00	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
3:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
4:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30:00	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00:00	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
7:45:00	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
8:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
8:45:00	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15:00	0	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30:00	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0
9:45:00	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0

















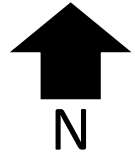








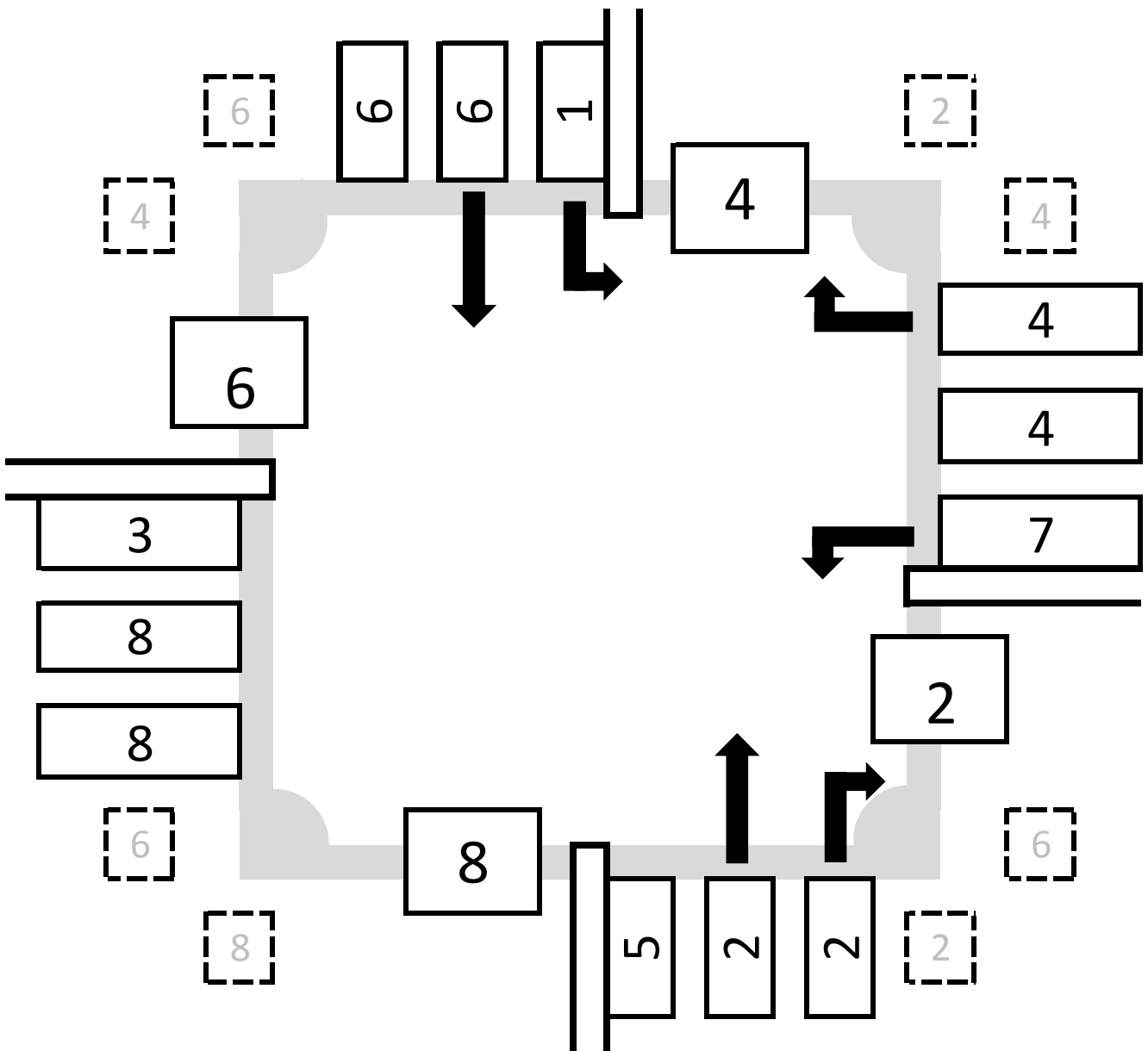
# Program Reference Card



Intersection : Ontario Street South & Main Street East

Controller #: ASC/2

Date: 5/14/2019



Cabinet Installed: May 2006

## Controller Timing Data

Timing Plan 1																
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green	5	15	5	15	5	15	7	15								
Delayed Green																
Walk		7		7		7		7								
Walk 2																
Walk Max																
Pedestrian Clearance		18		18		18		18								
Pedestrian Clearance 2																
Pedestrian Clearance Max																
Vehicle Extension	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0								
Vehicle Extension 2																
Max 1	18	38	13	36	18	38	13	36								
Max 2																
Max 3																
Dynamic Max																
Dynamic Max Step																
Yellow Change	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0								
Red Clearance	1.0	3.0	1.0	3.0	1.0	3.0	1.0	3.0								

## Coordinator Options

Coord Options			
Manual Pattern	0	ECPI Coord	
System Source	TBC	System Format	
Splits In	%	Offset IN	
Transition	smooth	Max Select	
Dwell/Add Time		Enable Man Sync	
DLY Coord WK-LZ		No Force Off	
Offset Ref		Lead Cal Use Ped Tm	
Ped Recall		Ped Reserve	
Local Zero OvrD		FO Add INI Green	
Re-Sync Count		Multisync	

**Coordinatio Pattern**

**Time Period 6:00-9:30 AM**

Coordinator Pattern	1							
Use Split Pattern 1	1							
TS2 Pattern/Offset								
Cycle	90s				STD(COS)			
Offset Val	37%							
Actuated Coord					Timing Plan			
Act Walk Resto	yes				Sequence			
Phase Resrvce 0					Action Plan			
Split Preference Phases								
Phases	1	2	3	4	5	6	7	8
SPT	12	39	12	37	12	39	12	37
Pref 1								
Pref2								
Splt Ext								
Veh Perm				Disp				
Ring Disp					(Ring 2-4)			
Split Preference Phases								
Phases	9	10	11	12	13	14	15	16
SPT								
Pref 1								
Pref2								
			1	2				
Split Demand Ptrn					Xart Ptrn			

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord		x				x										
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT									(1-8)							

**Coordinatio Pattern**

**Time Period 3:30-8:00 PM**

Coordinator Pattern	3							
Use Split Pattern 1	3							
TS2 Pattern/Offset								
Cycle	100s	STD(COS)						
Offset Val	49%							
Actuated Coord			Timing Plan					
Act Walk Resto	yes		Sequence					
Phase Resrvce 0			Action Plan					
Split Preference Phases								
Phases	1	2	3	4	5	6	7	8
SPT	12	37	13	38	12	37	13	38
Pref 1								
Pref2								
Splt Ext								
Veh Perm				Disp				
Ring Disp					(Ring 2-4)			
Split Preference Phases								
Phases	9	10	11	12	13	14	15	16
SPT								
Pref 1								
Pref2								
			1	2				
Split Demand Ptrn				Xart Ptrn				

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord		x				x										
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT										(1-8)						

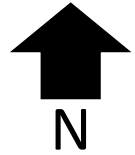






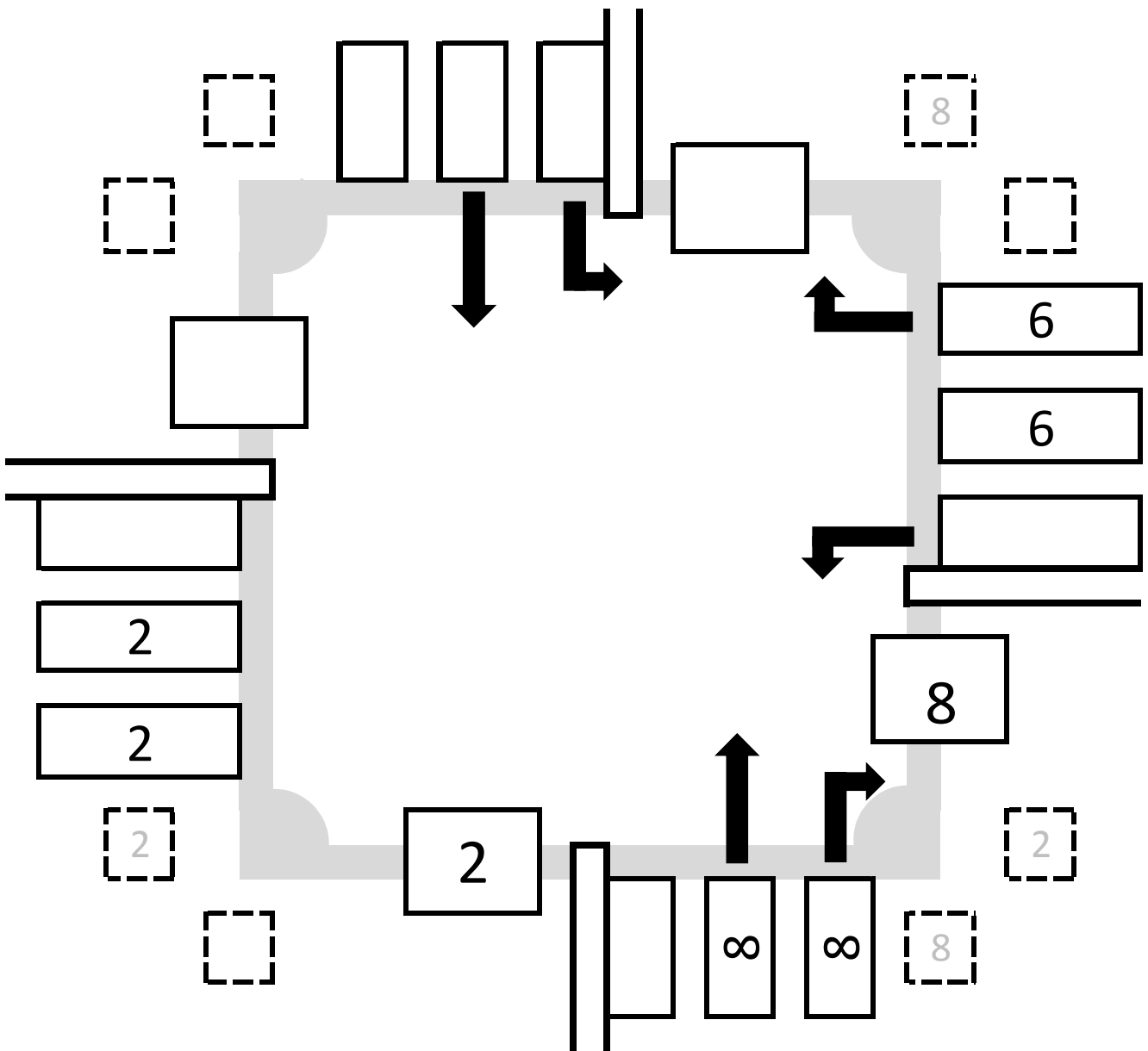


# Program Reference Card



Intersection : Main St. E & Mall Entrance

Controller #: Cobalt Date: 10/05/17



Cabinet Installed: 04/12/2014

## Controller Timing Data

Timing Plan 1																
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green	5	30		5		30		10								
Delayed Green																
Walk		15						20								
Walk 2																
Walk Max																
Pedestrian Clearance		7						7								
Pedestrian Clearance 2																
Pedestrian Clearance Max																
Vehicle Extension	3.0															
Vehicle Extension 2																
Max 1	17	55				55		35								
Max 2																
Max 3																
Dynamic Max																
Dynamic Max Step																
Yellow Change	3.0	4.0				4.0		4.0								
Red Clearance	1.0	3.0				3.0		3.0								

## Coordinator Options

Coord Options			
Manual Pattern		ECPI Coord	
System Source		System Format	
Splits In		Offset IN	
Transition		Max Select	
Dwell/Add Time		Enable Man Sync	
DLY Coord WK-LZ		No Force Off	
Offset Ref		Lead Cal Use Ped Tm	
Ped Recall		Ped Reserve	
Local Zero Ovrđ		FO Add INI Green	
Re-Sync Count		Multisync	

**Coordinator Pattern**

**Time Period**

AM

Coordinator Pattern								
Use Split Pattern 1								
TS2 Pattern/Offset								
Cycle				STD(COS)				
Offset Val								
Actuated Coord				Timing Plan				
Act Walk Resto				Sequence				
Phase Resrvce 0				Action Plan				
Split Preference Phases								
Phases	1	2	3	4	5	6	7	8
SPT								
Pref 1								
Pref2								
Splt Ext								
Veh Perm				Disp				
Ring Disp					(Ring 2-4)			
Split Preference Phases								
Phases	9	10	11	12	13	14	15	16
SPT								
Pref 1								
Pref2								
Split Demand Ptrn			Xart Ptrn					

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord																
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT									(1-8)							

**Coordinator Pattern**

**Time Period**

PM

Coordinator Pattern								
Use Split Pattern 1								
TS2 Pattern/Offset								
Cycle				STD(COS)				
Offset Val								
Actuated Coord				Timing Plan				
Act Walk Resto				Sequence				
Phase Resrvce 0				Action Plan				
Split Preference Phases								
Phases	1	2	3	4	5	6	7	8
SPT								
Pref 1								
Pref2								
Splt Ext								
Veh Perm				Disp				
Ring Disp					(Ring 2-4)			
Split Preference Phases								
Phases	9	10	11	12	13	14	15	16
SPT								
Pref 1								
Pref2								
Split Demand Ptrn			Xart Ptrn					

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord																
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT									(1-8)							

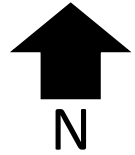






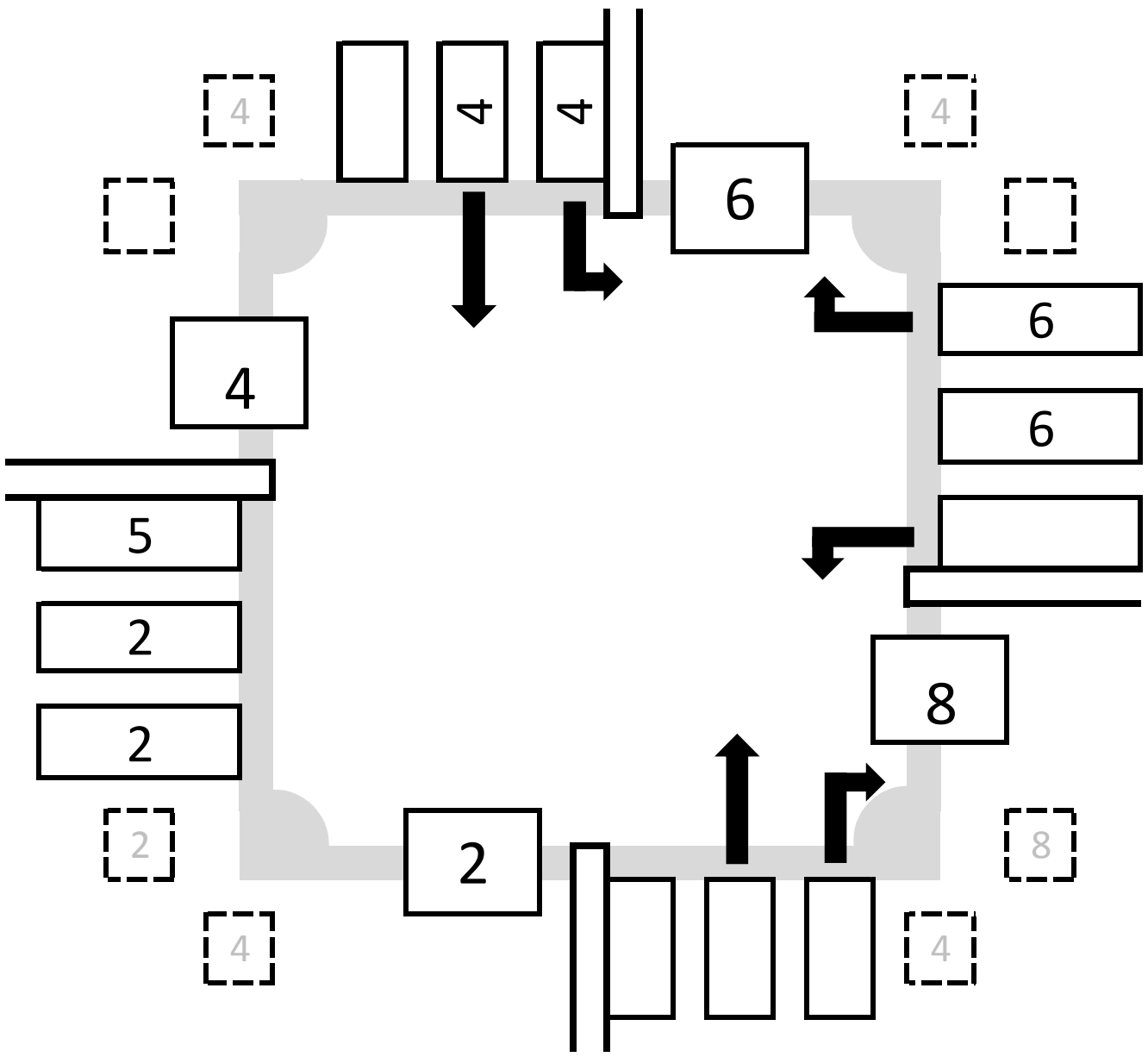


# Program Reference Card



Intersection : Main St. E & Wilson Dr.

Controller #: ASC/3 Date: 10/5/17



Cabinet Installed: September 2011

## Controller Timing Data

Timing Plan 1																
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green		40		10	5	40										
Delayed Green																
Walk		30		7		30										
Walk 2																
Walk Max																
Pedestrian Clearance		10		13		10										
Pedestrian Clearance 2																
Pedestrian Clearance Max																
Vehicle Extension		4.0		4.0	3.0	4.0										
Vehicle Extension 2																
Max 1		40		30	15	50										
Max 2																
Max 3																
Dynamic Max																
Dynamic Max Step																
Yellow Change		4.0		4.0	3.0	4.0										
Red Clearance		2.0		2.0	2.0	2.0										

## Coordinator Options

Coord Options			
Manual Pattern		ECPI Coord	
System Source		System Format	
Splits In		Offset IN	
Transition		Max Select	
Dwell/Add Time		Enable Man Sync	
DLY Coord WK-LZ		No Force Off	
Offset Ref		Lead Cal Use Ped Tm	
Ped Recall		Ped Reserve	
Local Zero Ovr		FO Add INI Green	
Re-Sync Count		Multisync	

**Coordinator Pattern**

**Time Period**

AM

Coordinator Pattern								
Use Split Pattern 1								
TS2 Pattern/Offset								
Cycle				STD(COS)				
Offset Val								
Actuated Coord				Timing Plan				
Act Walk Resto				Sequence				
Phase Resrvce 0				Action Plan				
Split Preference Phases								
Phases	1	2	3	4	5	6	7	8
SPT								
Pref 1								
Pref2								
Splt Ext								
Veh Perm				Disp				
Ring Disp					(Ring 2-4)			
Split Preference Phases								
Phases	9	10	11	12	13	14	15	16
SPT								
Pref 1								
Pref2								
Split Demand Ptrn			Xart Ptrn					

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord																
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT									(1-8)							

**Coordinator Pattern**

**Time Period**

PM

Coordinator Pattern								
Use Split Pattern 1								
TS2 Pattern/Offset								
Cycle				STD(COS)				
Offset Val								
Actuated Coord				Timing Plan				
Act Walk Resto				Sequence				
Phase Resrvce 0				Action Plan				
Split Preference Phases								
Phases	1	2	3	4	5	6	7	8
SPT								
Pref 1								
Pref2								
Splt Ext								
Veh Perm				Disp				
Ring Disp					(Ring 2-4)			
Split Preference Phases								
Phases	9	10	11	12	13	14	15	16
SPT								
Pref 1								
Pref2								
Split Demand Ptrn			Xart Ptrn					

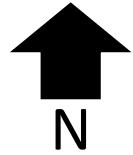
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord																
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT									(1-8)							





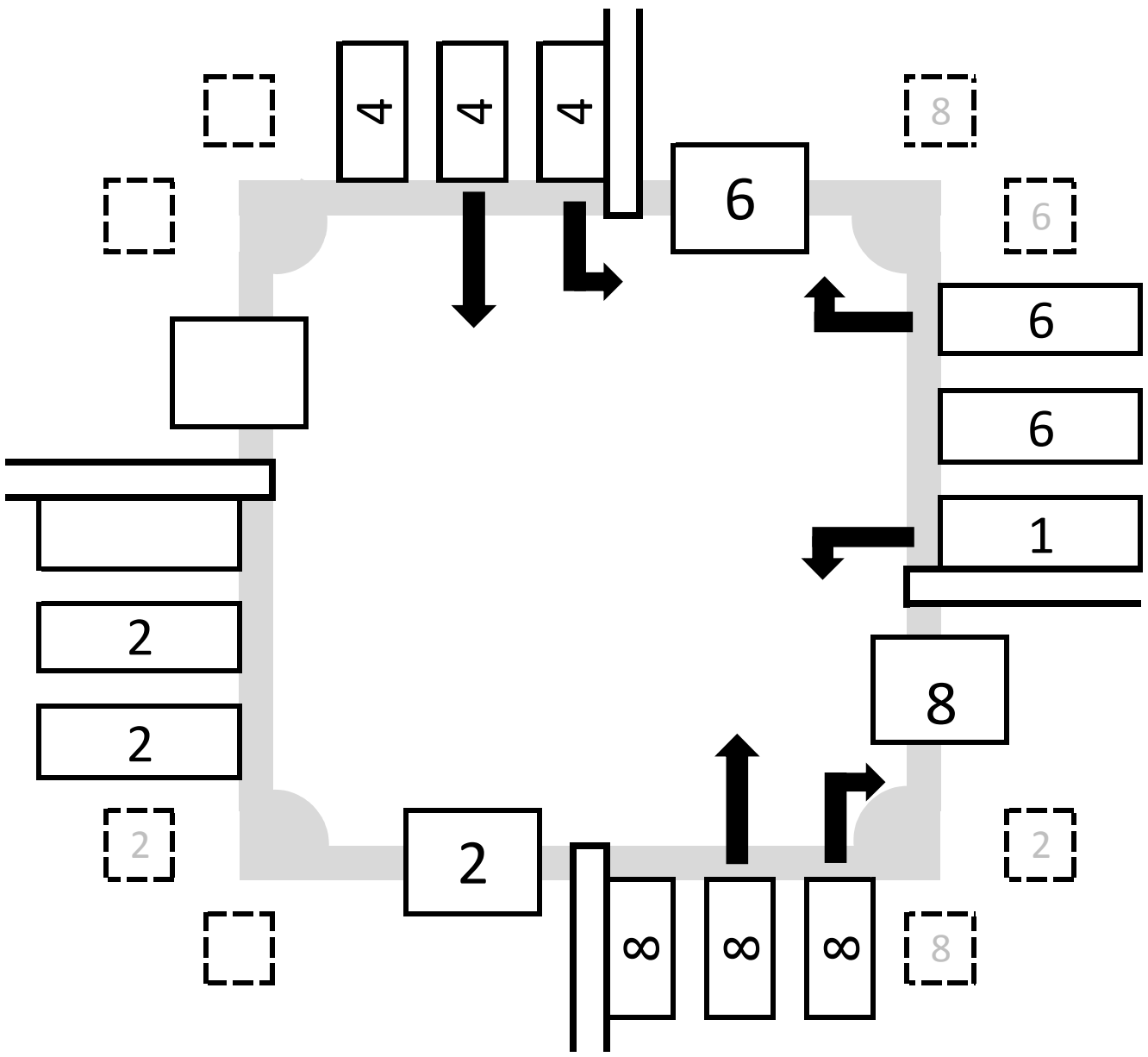


# Program Reference Card



Intersection : Main St E & Drew Centre

Controller #: ASC/2S Date: 10/05/17



Cabinet Installed: N/B & S/B is split phase operation

## Controller Timing Data

Timing Plan 1																
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green	5	15		6	0	15	0	6								
Delayed Green																
Walk		7				7		7								
Walk 2																
Walk Max																
Pedestrian Clearance		21				21		13								
Pedestrian Clearance 2																
Pedestrian Clearance Max																
Vehicle Extension	3.0	3.0		3.0		3.0		3.0								
Vehicle Extension 2																
Max 1	16	30		12		30		27								
Max 2																
Max 3																
Dynamic Max																
Dynamic Max Step																
Yellow Change	3.0	4.0		4.0		4.0		4.0								
Red Clearance	1.0	3.0		3.0		3.0		3.0								

## Coordinator Options

Coord Options			
Manual Pattern		ECPI Coord	
System Source		System Format	
Splits In		Offset IN	
Transition		Max Select	
Dwell/Add Time		Enable Man Sync	
DLY Coord WK-LZ		No Force Off	
Offset Ref		Lead Cal Use Ped Tm	
Ped Recall		Ped Reserve	
Local Zero Ovr		FO Add INI Green	
Re-Sync Count		Multisync	



**Coordinator Pattern**

**Time Period**

**AM**

Coordinator Pattern	1							
Use Split Pattern 1	1							
TS2 Pattern/Offset								
Cycle	90s	STD(COS)						
Offset Val	21%							
Actuated Coord	NO	Timing Plan						
Act Walk Resto	NO	Sequence						
Phase Resrvce 0		Action Plan						
Split Preference Phases								
Phases	1	2	3	4	5	6	7	8
SPT	12	88	0	16	0	47		37
Pref 1								
Pref2								
Splt Ext								
Veh Perm				Disp				
Ring Disp					(Ring 2-4)			
Split Preference Phases								
Phases	9	10	11	12	13	14	15	16
SPT								
Pref 1								
Pref2								
Split Demand Ptrn					Xart Ptrn			

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord		X				X										
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT										(1-8)						

**Coordinator Pattern**

**Time Period**

PM

Coordinator Pattern	2								
Use Split Pattern 1	2								
TS2 Pattern/Offset									
Cycle	100s	STD(COS)							
Offset Val	16%								
Actuated Coord	NO	Timing Plan							
Act Walk Resto	NO	Sequence							
Phase Resrvce 0		Action Plan							
Split Preference Phases									
Phases	1	2	3	4	5	6	7	8	
SPT	13	87	0	14	0	50		36	
Pref 1									
Pref2									
Splt Ext									
Veh Perm				Disp					
Ring Disp					(Ring 2-4)				
Split Preference Phases									
Phases	9	10	11	12	13	14	15	16	
SPT									
Pref 1									
Pref2									
Split Demand Ptrn					Xart Ptrn				

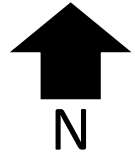
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord		X				X										
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT										(1-8)						







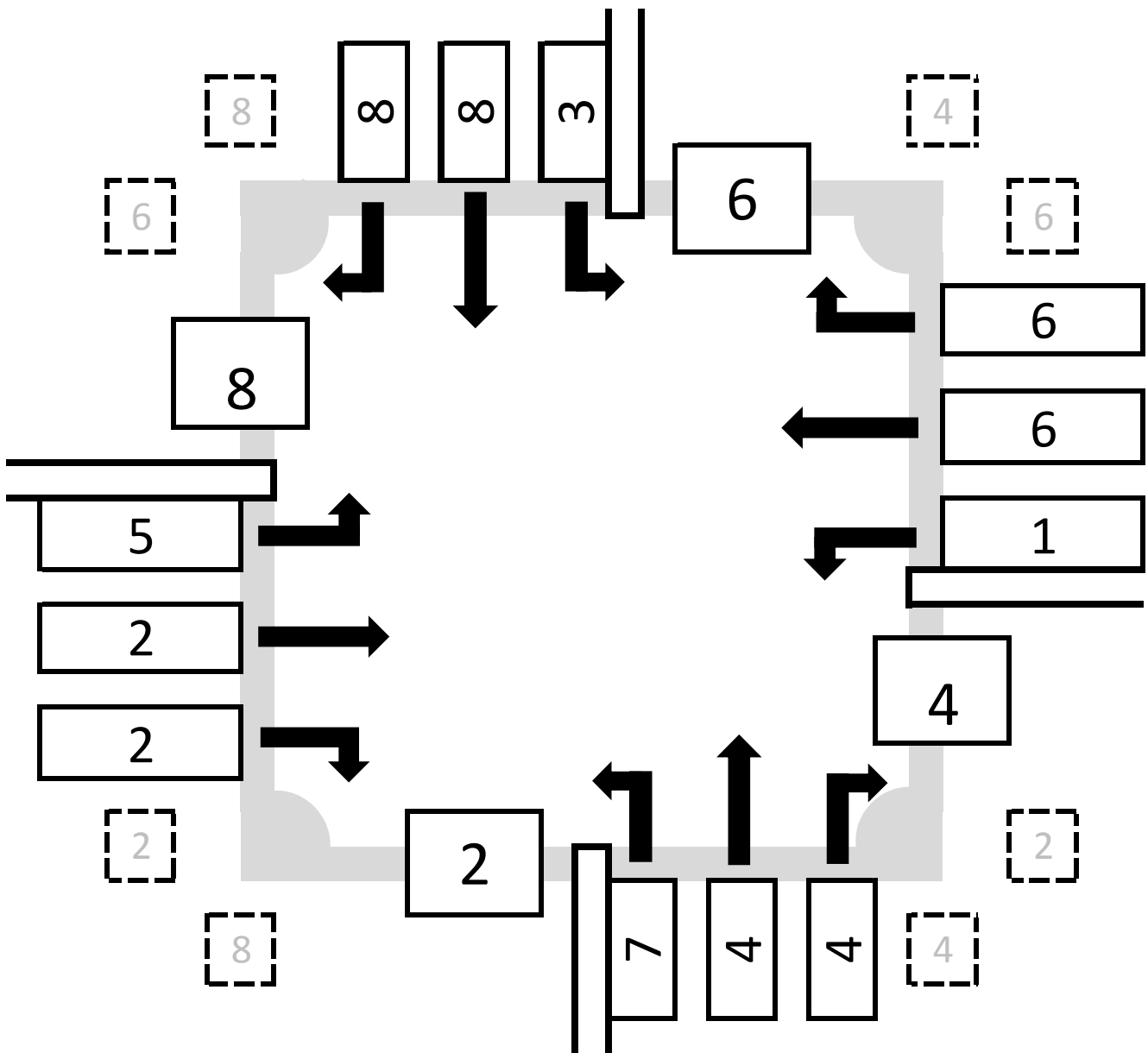
# Program Reference Card



Intersection : Main Street East and Thompson Road South

Controller #: ASC/3

Date: 12/4/2018



Cabinet Installed: Aug-07

## Controller Timing Data

Timing Plan 1																
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green	5	15	5	10	5	15	5	10								
Delayed Green																
Walk		7		7		7		7								
Walk 2																
Walk Max																
Pedestrian Clearance		18		18		18		18								
Pedestrian Clearance 2																
Pedestrian Clearance Max																
Vehicle Extension	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0								
Vehicle Extension 2																
Max 1	14	30	10	25	14	30	10	25								
Max 2																
Max 3																
Dynamic Max																
Dynamic Max Step																
Yellow Change	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0								
Red Clearance	1.0	3.0	1.0	3.0	1.0	3.0	1.0	3.0								

## Coordinator Options

Coord Options			
Manual Pattern	auto	ECPI Coord	yes
System Source	sys	System Format	std
Splits In	%	Offset IN	%
Transition	smooth	Max Select	
Dwell/Add Time	0	Enable Man Sync	no
DLY Coord WK-LZ	no	No Force Off	float
Offset Ref	lead	Lead Cal Use Ped Tm	yes
Ped Recall	no	Ped Reserve	no
Local Zero Ovrd	no	FO Add INI Green	no
Re-Sync Count	3	Multisync	no

**Coordinatio Pattern**

**Time Period 6:00-9:30 AM**

Coordinator Pattern	1							
Use Split Pattern 1	1							
TS2 Pattern/Offset								
Cycle	100s	STD(COS)	111					
Offset Val	0							
Actuated Coord	yes	Timing Plan	1					
Act Walk Resto	yes	Sequence	1					
Phase Resrvce 0	no	Action Plan	1					
Split Preference Phases								
Phases	1	2	3	4	5	6	7	8
SPT	15	32	11	42	11	36	11	42
Pref 1								
Pref2								
Splt Ext								
Veh Perm				Disp				
Ring Disp					(Ring 2-4)			
Split Preference Phases								
Phases	9	10	11	12	13	14	15	16
SPT								
Pref 1								
Pref2								
			1	2				
Split Demand Ptrn					Xart Ptrn			

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord				x				x								
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT									(1-8)							

**Coordinatio Pattern**

**Time Period 3:00-8:00 PM**

Coordinator Pattern	3							
Use Split Pattern 1	3							
TS2 Pattern/Offset								
Cycle	110s	STD(COS)						
Offset Val	0							
Actuated Coord	yes	Timing Plan		1				
Act Walk Resto	yes	Sequence		1				
Phase Resrvce 0	no	Action Plan		3				
Split Preference Phases								
Phases	1	2	3	4	5	6	7	8
SPT	20	33	10	37	20	33	13	34
Pref 1								
Pref2								
Splt Ext								
Veh Perm				Disp				
Ring Disp					(Ring 2-4)			
Split Preference Phases								
Phases	9	10	11	12	13	14	15	16
SPT								
Pref 1								
Pref2								
			1	2				
Split Demand Ptrn					Xart Ptrn			

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord				x				x								
VE Recal																
PD Recal																
MX Recal																
OMIT																
SF OUT									(1-8)							







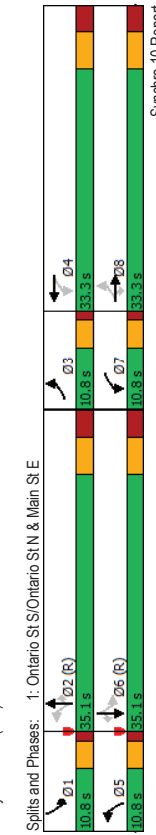
# Appendix C

## Base Year Traffic Operations



Lanes, Volumes, Timings  
1: Ontario St S/Ontario St N & Main St E  
Base Year AM Peak Hour  
200624

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)												
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	3	8	8	7	4	5	2	2	2	1	6	6
Permitted Phases	8	8	8	4	4	7	4	5	2	2	1	6
Detector Phase	3	8	8	7	4	5	2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	6.8	15.0	5.0	15.0	15.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	32.0	32.0	10.8	32.0	9.5	32.0	32.0	9.5	32.0	9.5	32.0
Total Split (s)	10.8	33.3	33.3	10.8	33.3	10.8	35.1	35.1	10.8	35.1	10.8	35.1
Total Split (%)	12.0%	37.0%	37.0%	12.0%	37.0%	12.0%	39.0%	39.0%	12.0%	39.0%	12.0%	39.0%
Maximum Green (s)	6.8	26.3	26.3	6.8	26.3	6.8	28.1	28.1	6.8	28.1	6.8	28.1
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	1.0	3.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	0.0	-3.0	0.0	-3.0	-3.0	0.0	-3.0	0.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead/Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	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	7.0	7.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Ad Effect Green (s)	27.5	20.7	20.7	27.5	20.7	45.1	38.3	38.3	45.1	41.6	41.6	41.6
Actuated Cycle Length: 90	0.31	0.23	0.23	0.31	0.23	0.50	0.43	0.43	0.50	0.54	0.46	0.46
Offset: 33.3 (37%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green	0.66	0.62	0.62	0.19	0.65	0.43	0.18	0.45	0.32	0.37	0.31	0.40
v/c Ratio	28.9	34.4	34.4	1.9	35.4	25.2	11.2	20.6	4.0	13.1	17.4	0.6
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	28.9	34.4	34.4	1.9	35.4	25.2	11.2	20.6	4.0	13.1	17.4	0.6
Total Delay	28.9	34.4	34.4	1.9	35.4	25.2	11.2	20.6	4.0	13.1	17.4	0.6
LOS	C	C	C	D	D	C	B	C	A	B	B	A
Approach Delay	29.5	C	C	28.3	C	C	15.5	B	C	A	B	B
Approach LOS	C	C	C	C	C	C	B	B	C	B	B	B



Splitts and Phases: 1: Ontario St S/Ontario St N & Main St E  
200624  
Page 2

Lanes, Volumes, Timings  
1: Ontario St S/Ontario St N & Main St E  
Base Year AM Peak Hour  
200624

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑
Traffic Volume (vph)	172	505	88	148	254	94	83	655	254	135	488	80
Future Volume (vph)	172	505	88	148	254	94	83	655	254	135	488	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	40.0	0.0	35.0	0.0	35.0	0.0	70.0	0.0	65.0	40.0	0.0	1.0
Storage Lanes	1	1	1	0	1	0	1	1	1	1	1	1
Tapar Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	0.95	0.99	1.00	0.95	1.00	0.99	1.00	0.95	1.00
Ped Bike Factor	0.99	0.97	0.99	0.99	1.00	0.99	0.98	1.00	0.98	1.00	0.98	0.98
Frt	0.850	0.850	0.850	0.959	0.959	0.850	0.850	0.850	0.850	0.850	0.850	0.850
Flt Protected												
Satd. Flow (prot)	1728	3539	1581	1662	3331	0	1662	3438	1551	1631	3374	1581
FltP Permitted	0.425	0.255		0.451			0.288					
Satd. Flow (perm)	769	3639	1535	443	3331	0	788	3438	1522	483	3374	1557
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	145			63			50		254			145
Link Speed (k/h)	50	147.9	134.8	338.1			256.3					
Link Distance (m)	10.6	9.7	24.3				18.5					
Confl. Peds. (#/hr)	16	16	8	3	3	6	6	6	18.5			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 (%)	1%	2%	1%	5%	2%	7%	5%	3%	7%	7%	7%	1%
Adj. Flow (vph)	172	505	88	148	254	94	83	655	254	135	488	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	172	505	88	148	348	0	83	655	254	135	488	80
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Left	Right
Median Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Link Offset (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width (m)	4.8			4.8			4.8				4.8	
Two way Left Turn Lane	1.04	1.00	1.01	1.04	1.00	1.04	1.00	1.01	1.04	1.00	1.01	1.00
Headway Factor	25	15	25	25	15	25	15	25	15	25	25	15
Turning Speed (k/h)	1	2	1	2	1	2	1	2	1	2	1	2
Number of Detectors	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Detector Template	2.0	10.0	2.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0
Leading Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4	0.6	9.4	9.4	0.6	9.4	0.6	9.4	0.6	9.4	0.6	9.4
Detector 2 Size (m)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Detector 2 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 2 Channel	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Paradigm Transportation Solutions Limited  
Synchro 10 Report  
Page 1

Queues  
1: Ontario St S/Ontario St N & Main St E

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	172	505	88	148	348	83	655	254	135	488	80
v/c Ratio	0.56	0.62	0.19	0.65	0.43	0.18	0.45	0.32	0.37	0.31	0.10
Control Delay	28.9	34.4	1.9	35.4	25.2	11.2	20.6	4.0	13.1	17.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	34.4	1.9	35.4	25.2	11.2	20.6	4.0	13.1	17.4	0.6
Queue Length 50th (m)	22.5	43.9	0.0	19.1	23.2	6.4	42.7	0.0	10.8	29.1	0.0
Queue Length 95th (m)	35.5	56.6	2.9	43.1	34.0	14.8	67.6	15.9	22.4	47.3	1.3
Internal Link Dist (m)	123.9										
Turn Bay Length (m)	40.0										
Base Capacity (vph)	307										
Starvation Cap Reductn	0										
Spillback Cap Reductn	0										
Storage Cap Reductn	0										
Reduced v/c Ratio	0.56	0.44	0.15	0.65	0.31	0.18	0.45	0.32	0.36	0.31	0.10

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

1: Ontario St S/Ontario St N & Main St E

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	172	505	88	148	348	83	655	254	135	488	80
Traffic Volume (veh/h)	172	505	88	148	348	83	655	254	135	488	80
Future Volume (veh/h)	172	505	88	148	348	83	655	254	135	488	80
Number	3	8	18	7	4	14	5	2	12	1	6
Initial Q (Obs.) veh	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99	1.00	0.99	0.98	1.00	0.98	1.00	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
Adj Sat Flow, veh/h	1881	1863	1881	1810	1838	1900	1810	1845	1776	1776	1881
Adj Flow Rate, veh/h	172	505	0	148	254	94	83	655	254	135	488
Adj No. of Lanes	1	2	1	1	2	0	1	2	1	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	1	2	1	5	2	7	5	3	7	7	1
Cap. veh/h	338	857	387	281	606	218	454	1508	685	351	1538
Arrive On Green	0.08	0.24	0.00	0.08	0.24	0.21	0.05	0.44	0.44	0.07	0.46
Sat Flow, veh/h	1792	3539	1599	1723	2502	899	1723	3438	1562	1691	3374
Grp Volume(v), veh/h	172	505	0	148	175	173	83	655	254	135	488
Grp Sat Flow(s), veh/h	1792	1770	1599	1723	1746	1655	1723	1719	1562	1691	1687
Q Serve(g.s), s	6.8	11.4	0.0	6.1	7.6	8.1	2.5	11.9	9.8	4.1	8.3
Cycle Q Clear(g.c), s	6.8	11.4	0.0	6.1	7.6	8.1	2.5	11.9	9.8	4.1	8.3
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.54	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	338	857	387	281	423	401	454	1508	685	351	1538
V/C Ratio(X)	0.51	0.59	0.00	0.53	0.41	0.43	0.18	0.43	0.37	0.39	0.32
Avail Cap(c.a), veh/h	338	1152	521	281	569	539	500	1508	685	367	1538
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
Upstream Filter(I)	1.00	1.00	0.00	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	30.1	0.0	26.1	28.7	29.6	14.4	17.5	16.9	14.7	15.6
Incr Delay (d2), s/veh	0.5	0.2	0.0	0.9	0.2	0.3	0.1	0.9	1.5	0.3	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
%ile BackOfQ(50%), veh/m	3.4	5.6	0.0	2.9	3.7	3.7	1.2	5.8	4.5	1.9	4.0
LnGrp Delay(d), s/veh	26.5	30.4	0.0	27.0	29.0	29.9	14.5	18.4	18.5	15.0	16.1
LnGrp LOS	C	C	C	C	C	C	B	B	B	B	B
Approach Vol, veh/h	677										
Approach Delay, s/veh	29.4										
Approach LOS	C										
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	9.9	43.5	10.8	25.8	8.4	45.0	10.8	25.8			
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0			
Max Green Setting (Gmax), s	6.8	28.1	6.8	26.3	6.8	28.1	6.8	26.3			
Max Q Clear Time (g_c+H), s	6.1	13.9	8.8	10.1	4.5	10.3	8.1	13.4			
Green Ext Time (p_c), s	0.0	4.0	0.0	1.5	0.0	2.5	0.0	2.3			
Intersection Summary	22.2										
HCM 2010 Cfr Delay	C										

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	992	34	26	478	19	15
Future Volume (vph)	992	34	26	478	19	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.3	3.6	3.3	3.5
Storage Length (m)	0.0	0.0	70.0	0.0	0.0	0.0
Storage Lanes	0	1			1	1
Taper Length (m)		7.5		7.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.995					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3491	0	1745	3343	1711	1597
Flt Permitted			0.288		0.950	
Satd. Flow (perm)	3491	0	492	3343	1711	1597
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6					15
Link Speed (k/h)	50			50		50
Link Distance (m)	134.8		273.6	144.7		
Travel Time (s)	9.7		19.7	10.4		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	8%	2%	0%
Adj. Flow (vph)	992	34	26	478	19	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1026	0	26	478	19	15
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3		3.3		3.3	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.04	1.00	1.04	1.01
Turning Speed (k/h)	15	25	25	25	15	15
Number of Detectors	2		1	2	1	1
Detector Template	Thru	Left	Thru	Left	Right	Right
Leading Detector (m)	10.0	2.0	10.0	2.0	2.0	2.0
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)	0.6	2.0	0.6	2.0	2.0	2.0
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	Perm	0.0	Prot	Perm	Perm
Turn Type	NA	Perm	NA	Prot	Perm	Perm

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Protected Phases	2				6	8
Permitted Phases					6	8
Detector Phase	2				6	8
Switch Phase						
Minimum Initial (s)	30.0		30.0		30.0	10.0
Minimum Split (s)	37.0		37.0		37.0	35.0
Total Split (s)	55.0		55.0		55.0	35.0
Total Split (%)	61.1%		61.1%		61.1%	38.9%
Maximum Green (s)	48.0		48.0		48.0	28.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	3.0		3.0		3.0	3.0
Lost Time Adjust (s)	-3.0		-3.0		-3.0	-3.0
Total Lost Time (s)	4.0		4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	Max		None		None	None
Walk Time (s)	15.0				20.0	20.0
Flash Dorn Walk (s)	7.0				7.0	7.0
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	63.4		63.4		63.4	13.0
Actuated g/C Ratio	0.89		0.89		0.16	0.18
v/c Ratio	0.33		0.06		0.16	0.05
Control Delay	2.5		2.9		2.0	25.5
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	2.5		2.9		2.0	25.5
LOS	A		A		A	C
Approach Delay	2.5		2.1		20.2	
Approach LOS	A		A		A	C
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	71.5					
Natural Cycle:	75					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.33					
Intersection Signal Delay:	2.8					
Intersection Capacity Utilization:	43.5%					
Analysis Period (min)	15					
Splits and Phases:	2: Mail Entrance & Main St E					

2: Mail Entrance & Main St E

2: Mail Entrance & Main St E

Queues

	EBT	WBL	NBL	NBR
Lane Group	1026	26	478	19
Lane Group Flow (vph)	0.33	0.06	0.16	0.06
v/c Ratio	2.5	2.9	2.0	25.5
Control Delay	0.0	0.0	0.0	0.0
Queue Delay	2.5	2.9	2.0	25.5
Total Delay	0.0	0.0	0.0	0.0
Queue Length 50th (m)	34.3	3.0	14.4	7.7
Queue Length 95th (m)	110.8	70.0	249.6	120.7
Internal Link Dist (m)				
Turn Bay Length (m)	3094	436	2962	742
Base Capacity (vph)	243	0	0	0
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0.36	0.06	0.16	0.03
Reduced v/c Ratio				



Intersection Summary

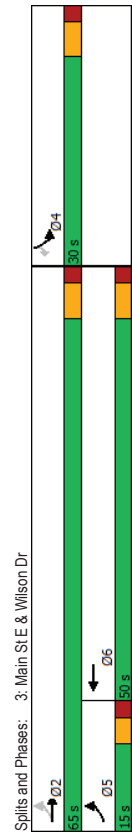
	EBT	EBR	WBL	WBT	NBL	NBR
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	992	34	26	478	19	15
Traffic Volume (veh/h)	992	34	26	478	19	15
Future Volume (veh/h)	2	12	1	6	3	18
Number	0	0	0	0	0	0
Initial Q (Ob.) veh	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1846	1900	1900	1759	1863	1900
Adj Sat Flow, veh/h/m	992	34	26	478	19	15
Adj Flow Rate, veh/h	2	0	1	2	1	1
Adj No. of Lanes	1.00	1.00	1.00	1.00	1.00	1.00
Peak Hour Factor	3	0	0	8	2	0
Percent Heavy Veh, %	2647	91	482	2557	204	186
Cap. veh/h	0.76	0.72	0.76	0.76	0.12	0.12
Arrive On Green	3553	119	558	3431	1774	1615
Sat Flow, veh/h	503	523	26	478	19	15
Grp Volume(v), veh/h	1764	1826	558	1671	1774	1615
Grp Sat Flow(s), veh/h/m	6.3	6.4	1.1	2.6	0.6	0.6
Q Serve(g.s), s	6.3	6.4	7.4	2.6	0.6	0.6
Cycle Q Clear(g.c), s	0.06	1.00	1.00	1.00	1.00	1.00
Prop In Lane	1342	1396	482	2557	204	186
Lane Grp Cap(c), veh/h	0.37	0.37	0.05	0.19	0.09	0.08
V/C Ratio(X)	1342	1396	482	2557	825	751
Avail Cap(c.a), veh/h	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	2.6	2.6	3.8	2.1	26.4	26.3
Uniform Delay (d), s/veh	0.8	0.8	0.0	0.0	0.2	0.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	3.2	3.4	0.2	1.2	0.3	0.3
%ile Back(Q50%) veh/m	3.4	3.4	3.9	2.2	26.6	26.5
LnGrp Delay(d), s/veh	A	A	A	A	C	C
LnGrp LOS	1026	504	34	504	34	34
Approach Vol, veh/h	3.4	2.3	26.6	2.3	26.6	26.6
Approach Delay, s/veh	A	A	A	A	C	C
Approach LOS	1	2	3	4	5	6
Timer	2	6	7	8	8	8
Assigned Phs	55.0	55.0	55.0	55.0	55.0	55.0
Phs Duration (G+Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0
Change Period (Y+Rc), s	48.0	48.0	48.0	48.0	48.0	48.0
Max Green Setting (Gmax), s	8.4	8.4	8.4	8.4	8.4	8.4
Max Q Clear Time (g_c+I), s	10.3	10.3	10.3	10.3	10.3	10.3
Green Ext Time (p_c), s						

Intersection Summary

	EBT	EBR	WBL	WBT	NBL	NBR
Intersection Summary						
HCM 2010 Ctrl Delay	3.5					
HCM 2010 LOS	A					

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	50	891	384	58	135	76
Future Volume (vph)	50	891	384	58	135	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.3	3.5
Storage Length (m)	50.0	0.0	55.0	0.0	0.0	0.0
Storage Lanes	1				1	1
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99	
Frt	0.950				0.950	0.850
Satd. Flow (prot)	1646	3539	3379	0	1728	1551
FltP Permitted	0.455				0.950	
Satd. Flow (perm)	786	3539	3379	0	1708	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			24			76
Link Speed (k/h)	50	50			50	
Link Distance (m)	260.1	360.6			174.4	
Travel Time (s)	18.7	26.0			12.6	
Confl. Peds. (#/hr)	5		5		8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	2%	5%	0%	1%	3%
Adj. Flow (vph)	50	891	384	58	135	76
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	891	442	0	135	76
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width (m)	3.3	3.3			3.3	
Link Offset (m)	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width (m)	4.8	4.8			4.8	
Two Way Left Turn Lane						
Headway Factor	1.04	1.00	1.00	1.00	1.04	1.01
Turning Speed (k/h)	25		15		25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Left		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size (m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	C+Ex	C+Ex	C+Ex		C+Ex	C+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position (m)		9.4	9.4			
Detector 2 Size (m)		0.6	0.6			
Detector 2 Type		C+Ex	C+Ex			
Detector 2 Channel						

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2				4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	40.0	40.0		10.0	10.0
Minimum Split (s)	10.0	46.0	46.0		26.0	26.0
Total Split (s)	15.0	65.0	50.0		30.0	30.0
Total Split (%)	15.8%	68.4%	52.6%		31.6%	31.6%
Maximum Green (s)	10.0	59.0	44.0		24.0	24.0
Yellow Time (s)	3.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag	Lead	Lag				
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	4.0	4.0		4.0	4.0
Recall Mode	None	Max	None		None	None
Walk Time (s)	30.0	30.0	30.0		7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Adj Effect Green (s)	61.7	61.7	54.8		15.1	15.1
Actuated g/C Ratio	0.73	0.73	0.65		0.18	0.18
v/c Ratio	0.08	0.35	0.20		0.44	0.22
Control Delay	4.1	4.9	7.3		35.5	9.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	4.1	4.9	7.3		35.5	9.1
LOS	A	A	A		D	A
Approach Delay	4.9	7.3			26.0	
Approach LOS	A	A			C	
Intersection Summary						
Area Type:	Other					
Cycle Length:	95					
Actuated Cycle Length:	84.8					
Natural Cycle:	85					
Control Type:	Semi Act-Uncoordinated					
Maximum v/c Ratio:	0.44					
Intersection Signal Delay:	8.3					
Intersection Capacity Utilization:	55.8%					
Analysis Period (min):	15					





Queues

3: Main St E & Wilson Dr

	EBL	EBT	WBT	SBL	SBR
Lane Group	50	891	442	135	76
Lane Group Flow (vph)	0.08	0.35	0.20	0.44	0.22
v/c Ratio	4.1	4.9	7.3	35.5	9.1
Control Delay	0.0	0.0	0.0	0.0	0.0
Queue Delay	4.1	4.9	7.3	35.5	9.1
Total Delay	1.9	23.3	15.5	20.5	0.0
Queue Length 50th (m)	5.8	39.5	27.3	37.3	10.9
Queue Length 95th (m)	236.1	336.6	150.4		
Internal Link Dist (m)	50.0			55.0	
Turn Bay Length (m)	683	2575	2191	529	528
Base Capacity (vph)	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0.07	0.35	0.20	0.26	0.14
Reduced v/c Ratio					
Intersection Summary					

3: Main St E & Wilson Dr

	EBL	EBT	WBT	SBL	SBR
Movement	50	891	442	135	76
Lane Configurations	50	891	384	58	135
Traffic Volume (veh/h)	50	891	384	58	135
Future Volume (veh/h)	5	2	6	16	14
Number	1.00	1.00	1.00	1.00	1.00
Initial Q (Ob), veh	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/m	1792	1863	1821	1900	1881
Adj Flow Rate, veh/h	50	891	384	58	135
Adj No. of Lanes	1	2	2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	6	2	5	0	1
Cap. veh/h	713	2668	1962	294	264
Arrive On Green	0.05	0.75	0.65	0.65	0.15
Sat Flow, veh/h	1707	3632	3108	452	1792
Grp Volume(v), veh/h	50	891	219	223	135
Grp Sat Flow(s), veh/h/m	1707	1770	1730	1739	1792
Q Serve(g, s), s	0.7	6.7	4.1	4.2	5.6
Cycle Q Clear(g, c), s	0.7	6.7	4.1	4.2	5.6
Prop In Lane	1.00	1.00	1.00	0.26	1.00
Lane Grp Cap(c), veh/h	713	2668	1125	1131	264
V/C Ratio(X)	0.07	0.33	0.19	0.20	0.51
Avail Cap(c, a), veh/h	853	2668	1125	1131	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	3.6	3.3	5.7	5.7	31.8
Incr Delay (d2), s/veh	0.0	0.3	0.1	0.1	2.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0
%ile Back(Q50%) veh/m	0.3	3.3	2.0	2.0	2.9
LnGrp Delay(d), s/veh	3.6	3.6	5.8	5.8	34.0
LnGrp LOS	A	A	A	A	C
Approach Vol, veh/h	941	442		211	
Approach Delay, s/veh	3.6	5.8		33.3	
Approach LOS	A	A		C	
Timer	1	2	3	4	5
Assigned Phs	2			4	6
Phs Duration (G+Y+Rc), s	65.0			15.9	8.4
Change Period (Y+Rc), s	6.0			6.0	5.0
Max Green Setting (Gmax), s	59.0			24.0	10.0
Max Q Clear Time (g_c+H), s	8.7			7.6	2.7
Green Ext Time (p_c), s	13.8			1.1	0.1
Intersection Summary					
HCM 2010 Ctrl Delay	8.1				
HCM 2010 LOS	A				

Lanes, Volumes, Timings  
4: Drew Centre/Private Driveway & Main St E

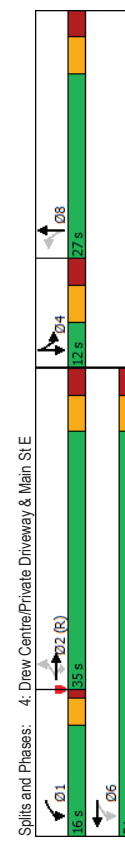
200624  
Base Year-AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	0	602	96	64	444	0	122	0	31	0	0	0
Future Volume (vph)	0	602	96	64	444	0	122	0	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Storage Length (m)	15.0	40.0	40.0	45.0	0.0	0.0	0.0	0.0	55.0	0.0	0.0	0.0
Storage Lanes	1	1	1	1	1	1	0	2	0	0	0	0
Taper Length (m)	7.5	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	0.96	0.99	0.98	0.98	0.98	0.850				
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1837	3539	1439	1646	3539	0	3134	1493	0	0	1900	0
Flt Permitted	0.380			0.950			0.950					
Satd. Flow (perm)	1837	3539	1387	655	3539	0	3134	1493	0	0	1900	0
Right Turn on Red		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)		182				473						
Link Speed (k/h)	50			50		50		50		50		50
Link Distance (m)	360.6			362.0		256.9		256.9		51.9		51.9
Travel Time (s)	26.0			26.1		18.5		18.5		3.7		3.7
Confl. Peds. (#/hr)	2	10	10	10	10	2	10	10	10	10	6	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
Heavy Vehicles (%)	0%	2%	11%	6%	2%	0%	8%	0%	6%	0%	0%	0%
Adj. Flow (vph)	0	602	96	64	444	0	122	0	31	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	602	96	64	444	0	122	31	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Right	Left	Right
Median Width(m)	3.3			3.3			6.6		6.6		6.6	
Link Offset(m)	0.0			0.0			0.0		0.0		0.0	
Crosswalk Width(m)	4.8			4.8			4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.01	1.04	1.00	1.04	1.00	1.04	1.01	1.00	1.00	1.00
Turning Speed (k/h)	25	15	15	25	15	15	25	15	15	25	15	15
Number of Detectors	1	2	1	1	2	1	2	1	2	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	10.0	2.0	10.0	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	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	Ci+Ex	Ci+Ex	Ci+Ex	Ci+Ex	Ci+Ex	Ci+Ex	Ci+Ex	Ci+Ex	Ci+Ex	Ci+Ex	Ci+Ex	Ci+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4			9.4		9.4		9.4	
Detector 2 Size(m)	0.6			0.6			0.6		0.6		0.6	
Detector 2 Type	Ci+Ex			Ci+Ex			Ci+Ex		Ci+Ex		Ci+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings  
4: Drew Centre/Private Driveway & Main St E

200624  
Base Year-AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0		0.0		0.0	0.0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA		Perm	NA		
Protected Phases				1	6				8		4	4
Permitted Phases	2	2	2	2	6	2	2	2	8	8	4	4
Detector Phase	2	2	2	2	1	6	8	8	8	8	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0
Minimum Split (s)	35.0	35.0	35.0	9.5	35.0	27.0	27.0	27.0	27.0	27.0	12.0	12.0
Total Split (s)	35.0	35.0	35.0	16.0	51.0	27.0	27.0	27.0	27.0	27.0	12.0	12.0
Total Split (%)	38.9%	38.9%	38.9%	17.8%	56.7%	30.0%	30.0%	30.0%	30.0%	30.0%	13.3%	13.3%
Maximum Green (s)	28.0	28.0	28.0	12.0	44.0	20.0	20.0	20.0	20.0	20.0	5.0	5.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	0.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0	21.0	21.0	21.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	60.8	60.8	69.3	69.3	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
Act Effct g/C Ratio	0.68	0.68	0.77	0.77	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
v/c Ratio	0.25	0.10	0.11	0.16	0.28	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Control Delay	6.8	0.2	3.3	3.1	35.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	0.2	3.3	3.1	35.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2
LOS	A	A	A	A	D	A	D	A	A	A	D	A
Approach Delay	5.9			3.1		28.3						
Approach LOS	A			A		C						
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	18.9 (21%), Referenced to phase 2/EBTL, Start of Green											
Natural Cycle:	95											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.28											
Intersection Signal Delay:	7.4											
Intersection Capacity Utilization:	44.6%											
Analysis Period (min):	15											
ICU Level of Service:	A											



4: Drew Centre/Private Driveway & Main St E

4: Drew Centre/Private Driveway & Main St E

	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group Flow (vph)	602	96	64	444	122	31
v/c Ratio	0.25	0.10	0.11	0.16	0.28	0.05
Control Delay	6.8	0.2	3.3	3.1	35.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	0.2	3.3	3.1	35.4	0.2
Queue Length 50th (m)	21.2	0.0	2.2	8.7	10.3	0.0
Queue Length 95th (m)	33.9	0.0	5.7	15.0	17.8	0.0
Internal Link Dist (m)	338.6			338.0		232.9
Turn Bay Length (m)	40.0	45.0				
Base Capacity (vph)	2390	996	636	2724	800	733
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	0.25	0.10	0.10	0.16	0.15	0.04
<b>Intersection Summary</b>						

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (veh/h)	0	602	96	64	444	0	122	0	31	0	0
Future Volume (veh/h)	0	602	96	64	444	0	122	0	31	0	0
Number	5	2	12	1	6	16	3	8	18	7	4
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98	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
Adj Sat Flow, veh/h	1900	1863	1712	1792	1863	0	1759	1792	1900	1900	1900
Adj Flow Rate, veh/h	0	602	96	64	444	0	122	0	31	0	0
Adj No. of Lanes	1	2	1	1	2	0	2	1	0	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	0	2	11	6	2	0	8	0	6	0	0
Cap. veh/h	80	2521	1029	599	2835	0	518	0	164	0	0
Arrive On Green	0.00	0.71	0.71	0.04	0.80	0.00	0.11	0.00	0.08	0.00	0.00
Sat Flow, veh/h	961	3539	1445	1707	3632	0	3250	0	1488	0	0
Grp Volume(v), veh/h	0	602	96	64	444	0	122	0	31	0	0
Grp Sat Flow(s), veh/h	961	1770	1445	1707	1770	0	1625	0	1488	0	0
Q Serve(g.s), s	0.0	5.3	1.8	0.9	2.6	0.0	3.1	0.0	1.8	0.0	0.0
Cycle Q Clear(g.c), s	0.0	5.3	1.8	0.9	2.6	0.0	3.1	0.0	1.8	0.0	0.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	80	2521	1029	599	2835	0	518	0	164	0	0
V/C Ratio(X)	0.00	0.24	0.09	0.11	0.16	0.00	0.24	0.00	0.19	0.00	0.00
Avail Cap(c.a), veh/h	80	2521	1029	751	2835	0	991	0	380	0	0
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
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	4.5	4.0	3.4	2.0	0.0	37.0	0.0	37.8	0.0	0.6
Incr Delay (d2), s/veh	0.0	0.2	0.2	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0
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
%ile BackOfQ(50%) veh/m	0.0	2.7	0.8	0.4	1.2	0.0	1.4	0.0	0.7	0.0	0.0
LnGrp Delay(d), s/veh	0.0	4.7	4.2	3.4	2.1	0.0	37.3	0.0	38.3	0.0	0.6
LnGrp LOS	A	A	A	A	A	D	D	D	D	D	D
Approach Vol, veh/h	698	508		508		153			153		
Approach Delay, s/veh	4.6	2.2		2.2		37.5			37.5		
Approach LOS	A	A		A		D			D		
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2				6		8			
Phs Duration (G+Y+Rc), s	8.0	68.1				76.1		13.9			
Change Period (Y+Rc), s	4.0	7.0				7.0		7.0			
Max Green Setting (Gmax), s	12.0	28.0				44.0		20.0			
Max Q Clear Time (g_c+I), s	2.9	7.3				4.6		5.1			
Green Ext Time (p_c), s	0.1	5.3				4.0		0.6			
<b>Intersection Summary</b>											
HCM 2010 Ctrl Delay	7.4										
HCM 2010 LOS	A										

Lanes, Volumes, Timings  
5: Thompson Rd & Main St E

200624  
Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	98	527	50	259	349	49	108	544	385	100	273	77
Future Volume (vph)	98	527	50	259	349	49	108	544	385	100	273	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.3	3.3	3.6	3.3	3.6	3.3	3.6	3.3	3.6	3.6
Storage Length (m)	60.0	0.0	180.0	0.0	60.0	0.0	60.0	0.0	55.0	0.0	0.0	0.0
Taper Length (m)	7.5	0.0	0.0	7.5	0.0	0.0	7.5	0.0	0.0	7.5	0.0	0.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt	0.987			0.982			0.938			0.967		
FIT Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1728	3531	0	1711	3514	0	1711	3339	0	1745	3404	0
FIT Permitted	0.517			0.207			0.480			0.162		
Satd. Flow (perm)	940	3531	0	373	3514	0	864	3339	0	298	3404	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	10			16			207			42		
Link Speed (km/h)	50			50			60			60		
Link Distance (m)	362.0			250.3			278.6			217.9		
Travel Time (s)	26.1			18.0			16.7			13.1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	0%	2%	1%	0%	2%	1%	2%	0%	3%	1%
Adj. Flow (Vph)	98	527	50	259	349	49	108	544	385	100	273	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	577	0	259	398	0	108	929	0	100	350	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (m)	3.3			3.3			3.3			3.3		
Link Offset (m)	0.0			0.0			0.0			0.0		
Crosswalk Width (m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.04	1.00	1.04	1.00	1.04	1.00	1.04	1.00	1.00
Turning Speed (km/h)	25	15	25	25	15	25	15	25	15	25	15	15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	0.6	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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	

Lanes, Volumes, Timings  
5: Thompson Rd & Main St E

200624  
Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			3		8
Detector Phase	5	2		1	6		7	4		3		8
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	9.5	32.0		9.5	32.0		9.5	32.0		9.5	32.0	
Total Split (s)	11.0	32.0		15.0	36.0		11.0	42.0		11.0	42.0	
Total Split (%)	11.0%	32.0%		15.0%	36.0%		11.0%	42.0%		11.0%	42.0%	
Maximum Green (s)	7.0	25.0		11.0	29.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0		0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		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	C-Max		None	Max		None	Max		None	Max	
Walk Time (s)	7.0			7.0			7.0			7.0		
Flash Dorn Walk (s)	18.0			18.0			18.0			18.0		
Pedestrian Calls (#/hr)	0			0			0			0		
Act Effct Green (s/hr)	34.8	28.0		43.0	34.2		45.8	40.2		45.0	38.1	
Actuated G/C Ratio	0.35	0.28		0.43	0.34		0.46	0.40		0.43	0.38	
v/c Ratio	0.26	0.58		0.84	0.33		0.24	0.63		0.45	0.26	
Control Delay	19.5	33.2		45.8	25.0		15.4	21.1		19.9	19.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.5	33.2		45.8	25.0		15.4	21.1		19.9	19.3	
LOS	B	C		D	C		B	C		B	B	
Approach Delay	31.2			33.2			20.5			19.4		
Approach LOS	C			C			C			C		
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	0 (0%), Referenced to phase 2EBTL, Start of Green											
Natural Cycle:	85											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.84											
Intersection Signal Delay:	25.9											
Intersection Capacity Utilization:	76.8%											
Analysis Period (min):	15											
ICU Level of Service D												

5: Thompson Rd & Main St E

5: Thompson Rd & Main St E

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	98	577	259	398	108	929	100	350
Lane Group Flow (vph)	0.26	0.58	0.84	0.33	0.24	0.63	0.43	0.26
v/c Ratio	19.5	33.2	45.8	25.0	15.4	21.1	19.9	19.3
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	19.5	33.2	45.8	25.0	15.4	21.1	19.9	19.3
Total Delay	22.2	70.3	#63.9	44.3	21.4	86.1	19.9	33.2
Queue Length 50th (m)	11.8	52.2	34.6	31.1	11.5	63.4	10.6	22.1
Queue Length 95th (m)	22.2	70.3	#63.9	44.3	21.4	86.1	19.9	33.2
Internal Link Dist (m)	338.0			226.3		254.6		193.9
Turn Bay Length (m)	60.0		150.0		60.0		55.0	
Base Capacity (vph)	384	995	307	1212	455	1466	235	1324
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	0.26	0.58	0.84	0.33	0.24	0.63	0.43	0.26

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

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Movement	98	577	259	398	108	929	100	350
Lane Configurations	98	527	50	259	349	49	108	544
Traffic Volume (veh/h)	98	527	50	259	349	49	108	544
Future Volume (veh/h)	5	2	12	1	6	16	7	4
Number	0	0	0	0	0	0	0	0
Initial Q (Obs.) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/hln	1881	1883	1900	1863	1883	1900	1863	1874
Adj Flow Rate, veh/h	98	527	50	259	349	49	108	544
Adj No. of Lanes	1	2	0	1	2	0	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	1	1	0	2	1	0	2	1
Cap. veh/h	406	972	92	375	1099	153	457	766
Arrive On Green	0.06	0.29	0.26	0.11	0.35	0.32	0.06	0.38
Sat Flow, veh/h	1792	3304	313	1774	3156	439	1774	1994
Grp Volume(v), veh/h	98	285	292	259	197	201	108	466
Grp Sat Flow(s), veh/hln	1792	1789	1828	1774	1789	1806	1774	1780
Q Serve(g.s), s	3.9	13.4	13.5	10.4	8.0	8.2	3.9	23.1
Cycle Q Clear(g.c), s	3.9	13.4	13.5	10.4	8.0	8.2	3.9	23.1
Prop In Lane	1.00	0.17	1.00	0.24	1.00	0.24	1.00	0.87
Lane Grp Cap(c), veh/h	406	526	537	375	623	629	457	683
V/C Ratio(X)	0.24	0.54	0.54	0.69	0.32	0.32	0.24	0.71
Avail Cap(c.a), veh/h	431	526	537	375	623	629	482	683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.5	29.6	29.9	23.2	23.9	24.2	19.1	26.1
Incr Delay (d2), s/veh	0.3	4.0	3.9	5.3	1.3	1.3	0.3	6.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%) veh/ln	2.0	7.1	7.3	5.6	4.2	4.3	1.9	12.5
LnGrp Delay(d)s/veh	24.8	33.6	33.8	28.6	25.2	25.5	19.3	32.3
LnGrp LOS	C	C	C	C	C	C	B	C
Approach Vol, veh/h	675			657			1037	450
Approach Delay, s/veh	32.4			26.6			31.7	22.7
Approach LOS	C			C			C	C
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	33.4	9.2	42.4	9.6	38.8	9.6	42.0
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0
Max Green Setting (Gmax), s	11.0	25.0	7.0	35.0	7.0	29.0	7.0	35.0
Max Q Clear Time (g_c+H), s	12.4	15.5	5.5	25.5	5.9	10.2	5.9	9.2
Green Ext Time (p_c), s	0.0	2.8	0.0	4.6	0.0	2.6	0.0	2.4

Intersection Summary  
HCM 2010 Ctrl Delay  
29.3  
C

Queuing and Blocking Report

200624  
Base Year AM Peak Hour

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
	L	T	R	L	T	TR	L	T	TR	L	R	L
Directions Served												
Maximum Queue (m)	47.4	100.8	82.8	42.0	50.2	53.7	41.1	77.2	70.6	63.2	47.3	81.3
Average Queue (m)	29.1	47.7	36.4	24.5	20.8	29.0	13.8	45.8	37.8	20.9	23.2	36.8
95th Queue (m)	51.0	78.7	63.9	41.6	39.9	47.6	29.4	69.7	62.6	40.7	43.8	64.7
Link Distance (m)		133.0	133.0		108.2	108.2		322.4	322.4			241.6
Upstream Blk Time (%)		0	0									
Queuing Penalty (veh)												
Storage Bay Dist (m)	40.0			35.0			70.0			65.0		40.0
Storage Blk Time (%)	1	14		5	1		1	0	0	1		7
Queuing Penalty (veh)	2	24		7	1		1	1	0	2		9

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	SB	SB
	T	R
Directions Served		
Maximum Queue (m)	61.9	2.8
Average Queue (m)	26.4	0.1
95th Queue (m)	50.0	1.9
Link Distance (m)	241.6	241.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Mall Entrance & Main St E

Movement	EB	EB	WB	WB	WB	NB	NB	NB	R
	T	TR	L	T	T	L	R		
Directions Served									
Maximum Queue (m)	63.6	64.0	14.7	29.6	36.2	10.3	9.8		
Average Queue (m)	18.8	19.9	4.4	7.1	8.3	3.5	3.7		
95th Queue (m)	51.5	51.5	12.5	22.3	26.0	10.1	10.4		
Link Distance (m)	108.2	108.2		251.1	251.1	127.6	127.6		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				70.0					
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Main St E & Wilson Dr

Movement	EB	EB	EB	WB	WB	WB	SB	SB	R
Directions Served	L	T	T	T	T	T	L	R	
Maximum Queue (m)	44.5	61.6	70.1	39.9	37.6	41.1	18.7	18.7	
Average Queue (m)	7.6	22.4	26.8	13.9	14.5	21.9	8.2	8.2	
95th Queue (m)	22.9	49.1	52.8	29.6	30.9	36.2	15.4	15.4	
Link Distance (m)	242.6 242.6 338.7 338.7 160.5								
Upstream Blk. Time (%)									
Queuing Penalty (veh)	50.0								
Storage Bay Dist (m)	0								
Storage Blk. Time (%)	0								
Queuing Penalty (veh)	0								

Intersection: 4: Drew Centre/Private Driveway & Main St E

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	TR
Directions Served	T	R	R	L	T	T	L	L	TR	
Maximum Queue (m)	38.4	39.1	21.3	25.8	31.2	42.2	37.0	21.0	14.4	
Average Queue (m)	13.4	14.7	6.0	9.6	8.8	12.6	18.3	6.0	3.8	
95th Queue (m)	28.8	31.1	16.8	20.5	23.2	30.3	31.4	15.6	10.6	
Link Distance (m)	338.7 338.7 334.9 334.9 239.6 239.6 239.6									
Upstream Blk. Time (%)										
Queuing Penalty (veh)	5									
Storage Bay Dist (m)	0									
Storage Blk. Time (%)	0									
Queuing Penalty (veh)	0									

Intersection: 5: Thompson Rd & Main St E

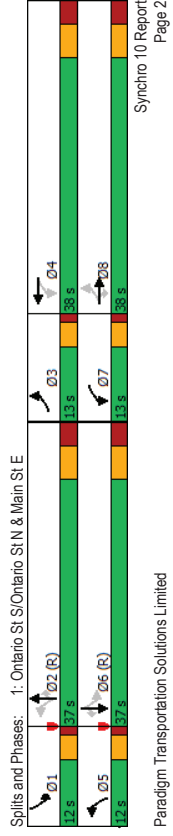
Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	TR
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	45.5	74.0	78.3	79.0	50.9	52.1	62.9	86.4	109.7	27.4
Average Queue (m)	17.1	43.3	47.1	38.8	29.7	28.0	16.7	49.2	59.8	12.8
95th Queue (m)	34.8	67.6	71.4	67.7	47.7	47.4	40.2	77.9	97.7	24.2
Link Distance (m)	334.9 334.9 233.6 233.6 263.1 263.1 201.3 201.3									
Upstream Blk. Time (%)										
Queuing Penalty (veh)	60.0									
Storage Bay Dist (m)	0									
Storage Blk. Time (%)	0									
Queuing Penalty (veh)	0									

Network Summary

Network wide Queuing Penalty: 51

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	169	522	200	228	600	183	170	560	235	126	661	148
Future Volume (vph)	169	522	200	228	600	183	170	560	235	126	661	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	40.0	0.0	35.0	0.0	70.0	0.0	70.0	40.0	40.0	0.0	40.0	0.0
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	0.96	0.99	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.99	0.98
Frt	0.850											
Flt Protected	0.950											
Satd. Flow (prot)	1728	3574	1566	1894	3425	0	1728	3438	1581	1711	3505	1597
Flt Permitted	0.156											
Satd. Flow (perm)	282	3574	1495	522	3425	0	489	3438	1559	628	3505	1561
Right Turn on Red	Yes											
Satd. Flow (RTOR)	200											
Link Speed (k/h)	50											
Link Distance (m)	147.9											
Travel Time (s)	10.6											
Conf. Peds. (#/hr)	15											
Peak Hour Factor	1.00											
Heavy Vehicles (%)	1%											
Adj. Flow (vph)	169	522	200	228	600	183	170	560	235	126	661	148
Shared Lane Traffic (%)	0.0											
Enter Blocked Intersection	No											
Lane Alignment	Left											
Median Width (m)	3.3											
Link Offset (m)	0.0											
Crosswalk Width (m)	4.8											
Two way Left Turn Lane	No											
Headway Factor	1.04											
Turning Speed (k/h)	25											
Number of Detectors	1											
Detector Template	Left											
Leading Detector (m)	2.0											
Trailing Detector (m)	0.0											
Detector 1 Position (m)	0.0											
Detector 1 Size (m)	2.0											
Detector 1 Type	Ch+Ex											
Detector 1 Channel	Ch+Ex											
Detector 1 Extend (s)	0.0											
Detector 1 Queue (s)	0.0											
Detector 1 Delay (s)	0.0											
Detector 2 Position (m)	9.4											
Detector 2 Size (m)	0.6											
Detector 2 Type	Ch+Ex											
Detector 2 Channel	Ch+Ex											

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	3	8	8	7	4	5	2	2	2	1	6	6
Permitted Phases	8	8	8	4	4	4	2	2	2	2	6	6
Detector Phase	3	8	8	7	4	5	2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	7.0	15.0	5.0	15.0	15.0	5.0	5.0	15.0	15.0
Minimum Split (s)	9.5	32.0	32.0	11.0	32.0	9.5	32.0	32.0	11.0	9.5	32.0	32.0
Total Split (s)	13.0	38.0	38.0	13.0	38.0	12.0	37.0	37.0	12.0	12.0	37.0	37.0
Total Split (%)	13.0%	38.0%	38.0%	13.0%	38.0%	12.0%	37.0%	37.0%	12.0%	12.0%	37.0%	37.0%
Maximum Green (s)	9.0	31.0	31.0	9.0	31.0	8.0	30.0	30.0	8.0	8.0	30.0	30.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0	3.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	1.0	3.0	3.0	1.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	0.0	-3.0	0.0	-3.0	-3.0	0.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	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	7.0	7.0
Flesh Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (Hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	37.3	28.6	28.6	38.0	29.0	47.1	38.6	38.6	45.6	37.8	37.8	37.8
Actuated g/C Ratio	0.37	0.29	0.29	0.38	0.27	0.47	0.39	0.39	0.46	0.38	0.38	0.38
v/c Ratio	0.73	0.51	0.35	0.75	0.77	0.51	0.42	0.32	0.34	0.50	0.50	0.22
Control Delay	38.0	31.1	5.4	36.8	35.6	21.1	25.0	4.5	17.4	26.6	5.0	5.0
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.0	31.1	5.4	36.8	35.9	21.1	25.0	4.5	17.4	26.6	5.0	5.0
LOS	D	C	A	D	D	C	C	C	A	B	C	A
Approach Delay	26.6			36.1			19.3					21.9
Approach LOS	C			D			B					C
Intersection Summary												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	49 (49%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	85											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.77											
Intersection Signal Delay:	26.1											
Intersection Capacity Utilization:	75.7%											
Analysis Period (min):	15											
ICU Level of Service D												



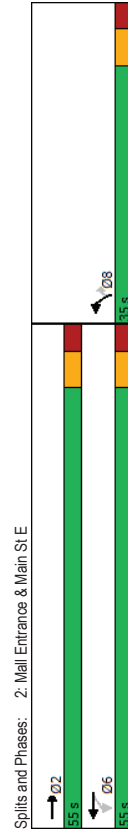
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	169	522	200	228	783	170	560	235	126	661	148	148
v/c Ratio	0.73	0.51	0.35	0.75	0.77	0.51	0.42	0.32	0.34	0.50	0.22	0.22
Control Delay	38.0	31.1	5.4	36.8	35.6	21.1	25.0	4.5	17.4	26.6	5.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.0	31.1	5.4	36.8	35.9	21.1	25.0	4.5	17.4	26.6	5.0	5.0
Queue Length 50th (m)	21.6	46.2	0.0	30.3	72.1	18.6	44.3	0.0	13.4	55.4	0.0	0.0
Queue Length 95th (m)	#39.9	58.2	15.2	#46.6	87.9	34.7	64.4	16.4	26.5	76.8	13.4	13.4
Internal Link Dist (m)	123.9											
Turn Bay Length (m)	40.0											
Base Capacity (vph)	236	1215	640	303	1193	342	1326	745	382	1325	682	682
Starvation Cap Reductn	0	0	0	0	89	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.43	0.31	0.75	0.71	0.50	0.42	0.32	0.33	0.50	0.22	0.22
Intersection Summary												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																										
Movement	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔																										
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔																										
Traffic Volume (veh/h)	169	522	200	228	600	183	170	560	235	126	661	148																										
Future Volume (veh/h)	169	522	200	228	600	183	170	560	235	126	661	148																										
Number	3	8	18	7	4	14	5	2	12	1	6	16																										
Initial Q (Cb), veh	0	0	0	0	0	0	0	0	0	0	0	0																										
Ped-Bike Adj(A_pbT)	0.99	1.00	0.99	0.97	1.00	0.97	1.00	0.99	1.00	0.99	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/hln	1881	1881	1863	1845	1881	1881	1881	1810	1881	1863	1845	1900																										
Adj Flow Rate, veh/h	169	522	0	228	600	183	170	560	235	126	661	0																										
Adj No. of Lanes	1	2	1	1	2	0	1	2	1	1	2	1																										
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																										
Percent Heavy Veh, %	1	1	2	3	1	1	1	5	1	1	2	3																										
Cap, veh/h	262	1012	448	342	764	232	380	1389	642	359	1361	627																										
Arrive On Green	0.09	0.28	0.00	0.09	0.29	0.26	0.08	0.40	0.40	0.06	0.39	0.00																										
Sat Flow, veh/h	1792	3574	1583	1757	2677	815	1792	3438	1588	1774	3505	1615																										
Grp Volume(V), veh/h	169	522	0	228	400	383	170	560	235	126	661	0																										
Grp Sat Flow(S), veh/hln	1792	1787	1583	1757	1787	1705	1792	1719	1588	1774	1752	1615																										
Q Serve(g, s), s	6.9	12.3	0.0	9.0	20.6	20.8	5.9	11.6	10.3	4.4	14.2	0.0																										
Cycle Q Clear(g, c), s	6.9	12.3	0.0	9.0	20.6	20.8	5.9	11.6	10.3	4.4	14.2	0.0																										
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																										
Lane Grp Cap(c), veh/h	262	1012	448	342	510	486	380	1389	642	359	1361	627																										
V/C Ratio(X)	0.65	0.52	0.00	0.67	0.78	0.79	0.45	0.40	0.37	0.35	0.49	0.00																										
Avail Cap(c, a), veh/h	266	1215	538	342	608	580	383	1389	642	389	1361	627																										
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	0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	0.00																										
Uniform Delay (d), s/veh	26.7	30.1	0.0	26.7	32.9	33.6	18.8	21.2	20.8	18.7	23.0	0.0																										
Incr Delay (d2), s/veh	4.0	0.2	0.0	3.7	4.3	4.6	0.3	0.9	1.6	0.2	1.2	0.0																										
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 Back(Q)(50%),veh/m	3.7	6.0	0.0	1.8	10.7	10.4	2.9	5.7	4.8	2.2	7.1	0.0																										
LnGrp Delay(d),s/veh	30.7	30.2	0.0	30.4	37.2	38.2	19.1	22.1	22.4	18.9	24.3	0.0																										
LnGrp LOS	C	C	C	C	D	D	B	C	C	C	B	C																										
Approach Vcl, veh/h	691	1011						965			787																											
Approach Delay, s/veh	30.4	36.0						21.6			23.4																											
Approach LOS	C	C						C			C																											
Timer	1	2	3	4	5	6	7	8																														
Assigned Phs	1	2	3	4	5	6	7	8																														
Phs Duration (G+Y+Rc), s	10.3	44.4	12.8	32.5	11.8	42.8	13.0	32.3																														
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0																														
Max Green Setting (Gmax), s	8.0	30.0	9.0	31.0	8.0	30.0	9.0	31.0																														
Max Q Clear Time (g_c+H1), s	6.4	13.6	8.9	22.8	7.9	16.2	11.0	14.3																														
Green Ext Time (p_c), s	0.0	3.6	0.0	2.7	0.0	3.2	0.0	2.7																														
Intersection Summary	<table border="0"> <tr><td>HCM 2010 Ctrl Delay</td><td>28.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>HCM 2010 LOS</td><td>C</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>												HCM 2010 Ctrl Delay	28.0												HCM 2010 LOS	C											
HCM 2010 Ctrl Delay	28.0																																					
HCM 2010 LOS	C																																					

	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group	↔	↔	↔	↔	↔	↔
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	741	107	148	996	114	103
Future Volume (vph)	741	107	148	996	114	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.3	3.6	3.3	3.5
Storage Length (m)	0.0	0.0	70.0	0.0	0.0	0.0
Storage Lanes	0	1	1	0	0	1
Taper Length (m)		7.5	7.5	7.5	7.5	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.981					0.850
Flt Protected		0.950			0.950	
Satd. Flow (prot)	3511	0	1745	3610	1745	1597
Flt Permitted		0.313			0.950	
Satd. Flow (perm)	3511	0	575	3610	1745	1597
Right Turn on Red	Yes	Yes			Yes	Yes
Satd. Flow (RTOR)	29					103
Link Speed (k/h)	50		50		50	
Link Distance (m)	134.8		273.6		144.7	
Travel Time (s)	9.7		19.7		10.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	741	107	148	996	114	103
Shared Lane Traffic (%)						
Lane Group Flow (vph)	848	0	148	996	114	103
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3		3.3		3.3	
Link Offset(m)	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.04	1.00	1.04	1.01
Turning Speed (k/h)	15	25	25	15	25	15
Number of Detectors	2	1	2	1	1	1
Detector Template	Thru	Left	Thru	Left	Right	Right
Leading Detector (m)	10.0	2.0	10.0	2.0	2.0	2.0
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)	0.6	2.0	0.6	2.0	2.0	2.0
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+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		9.4	
Detector 2 Size(m)	0.6		0.6		0.6	
Detector 2 Type	Ch+Ex		Ch+Ex		Ch+Ex	
Detector 2 Channel						
Detector 2 Extend (s)	0.0		0.0		0.0	
Turn Type	NA	Perm	NA	Prot	Perm	Perm

	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group	2	6	6	6	8	8
Protected Phases						
Permitted Phases						
Detector Phase	2	6	6	6	8	8
Switch Phase						
Minimum Initial (s)	30.0	30.0	30.0	30.0	10.0	10.0
Minimum Split (s)	37.0	37.0	37.0	35.0	35.0	35.0
Total Split (s)	55.0	55.0	55.0	35.0	35.0	35.0
Total Split (%)	61.1%	61.1%	61.1%	38.9%	38.9%	38.9%
Maximum Green (s)	48.0	48.0	48.0	28.0	28.0	28.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	None	None	None	None	None
Walk Time (s)	15.0	20.0	20.0	20.0	20.0	20.0
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0	7.0
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	53.8	53.8	53.8	14.1	14.1	14.1
Actuated G/C Ratio	0.71	0.71	0.71	0.19	0.19	0.19
v/c Ratio	0.34	0.36	0.36	0.35	0.27	0.27
Control Delay	4.7	7.8	5.2	29.1	7.7	7.7
Queue Delay	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	7.8	5.2	29.1	7.7	7.7
LOS	A	A	A	C	A	A
Approach Delay	4.9	5.5	5.5	18.9		
Approach LOS	A	A	A	B		
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	76					
Natural Cycle:	75					
Control Type:	Semi Act/Uncoord					
Maximum v/c Ratio:	0.39					
Intersection Signal Delay:	6.6					
Intersection Capacity Utilization:	68.3%					
Analysis Period (min):	15					



	EBT	WBL	WBT	NBL	NBR
Lane Group	848	148	996	114	103
Lane Group Flow (vph)	0.34	0.36	0.39	0.35	0.27
v/c Ratio	4.7	7.8	5.2	29.1	7.7
Control Delay	0.2	0.0	0.0	0.0	0.0
Queue Delay	4.9	7.8	5.2	29.1	7.7
Total Delay	18.7	6.7	24.1	14.4	0.0
Queue Length 50th (m)	32.2	19.5	40.5	28.4	11.6
Queue Length 95th (m)	110.8	70.0	249.6	120.7	
Internal Link Dist (m)					
Turn Bay Length (m)	2494	407	2556	715	715
Base Capacity (vph)	856	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.52	0.36	0.39	0.16	0.14
Intersection Summary					

2: Mail Entrance & Main St E

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Base Year PM Peak Hour

HCM 2010 Signalized Intersection Summary

	EBT	EBR	WBL	WBT	NBL	NBR	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	
Traffic Volume (veh/h)	741	107	148	996	114	103	
Future Volume (veh/h)	741	107	148	996	114	103	
Number	2	12	1	6	3	0	
Initial Q (Cb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/hln	1884	1900	1900	1900	1900	1900	
Adj Flow Rate, veh/h	741	107	148	996	114	103	
Adj No. of Lanes	2	0	1	2	1	1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Percent Heavy Veh, %	1	0	0	0	0	0	
Cap, veh/h	2228	322	508	2562	324	289	
Arrive On Green	0.71	0.67	0.71	0.71	0.18	0.18	
Sat Flow, veh/h	3234	453	660	3705	1810	1615	
Grp Volume(v), veh/h	422	426	148	996	114	103	
Grp Sat Flow(s), veh/hln	1789	1804	660	1805	1810	1615	
Q Serve(g, s), s	6.4	6.7	8.0	8.0	4.0	4.0	
Cycle Q Clear(g, c), s	6.4	6.7	14.6	8.0	4.0	4.0	
Prop In Lane	0.25	1.00	1.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	1270	1280	508	2562	324	289	
V/C Ratio(X)	0.33	0.33	0.29	0.39	0.35	0.36	
Avail Cap(c, a), veh/h	1270	1280	508	2562	781	697	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	4.0	4.1	6.8	4.2	25.8	25.9	
Incr Delay (d2), s/veh	0.7	0.7	0.3	0.1	0.7	0.7	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile Back(Q)(50%), veh/ln	3.4	3.5	1.5	3.9	2.0	1.8	
LnGrp Delay(d), s/veh	4.7	4.8	7.1	4.3	26.5	26.6	
LnGrp LOS	A	A	A	A	C	C	
Approach Vol, veh/h	848		1144	217			
Approach Delay, s/veh	4.8		4.6	26.6			
Approach LOS	A		A	C			
Timer	1	2	3	4	5	6	7
Assigned Phs	2						8
Phs Duration (G+Y+Rc), s	55.0						16.9
Change Period (Y+Rc), s	7.0						7.0
Max Green Setting (Gmax), s	48.0						28.0
Max Q Clear Time (g_c+H), s	8.7						16.6
Green Ext Time (p_c), s	8.0						12.5
Intersection Summary							
HCM 2010 Ctrl Delay	6.8						
HCM 2010 LOS	A						

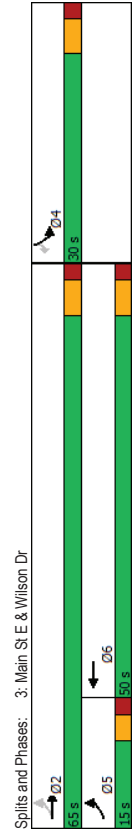
3: Main St E & Wilson Dr

200624  
Base Year PM Peak Hour

Lanes, Volumes, Timings

	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	
Traffic Volume (vph)	79	761	1045	183	115	89	
Future Volume (vph)	79	761	1045	183	115	89	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (m)	3.3	3.6	3.6	3.6	3.3	3.5	
Storage Length (m)	50.0	0.0	55.0	0.0	0.0	0.0	
Storage Lanes	1				0	1	
Taper Length (m)	7.5				7.5		
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00	
Ped Bike Factor	1.00		1.00		1.00	0.97	
Frt		0.978				0.850	
Frt Protected		0.950			0.950		
Satd. Flow (prot)	1745	3539	3459	0	1728	1597	
FltPPermitted	0.152				0.950		
Satd. Flow (perm)	279	3539	3459	0	1720	1551	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			29			89	
Link Speed (k/h)	50	50			50		
Link Distance (m)	260.1	360.6			174.4		
Travel Time (s)	18.7	26.0			12.6		
Confl. Peds. (#/hr)	4		4		3	12	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	
Adj. Flow (vph)	79	761	1045	183	115	89	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	79	761	1228	0	115	89	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)	3.3	3.3			3.3		
Link Offset(m)	0.0	0.0			0.0		
Crosswalk Width(m)	4.8	4.8			4.8		
Two way Left Turn Lane							
Headway Factor	1.04	1.00	1.00	1.00	1.04	1.01	
Turning Speed (k/h)	25		15		25	15	
Number of Detectors	1	2	2		1	1	
Detector Template	Left	Thru	Thru	Left	Right	Right	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	2.0	
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	0.6	0.6	2.0	2.0	2.0	
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+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		C+Ex	C+Ex				
Detector 2 Channel		C+Ex	C+Ex				

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector 2 Extend (s)	0.0	0.0				
Turn Type	pm-pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2				4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	40.0	40.0		10.0	10.0
Minimum Split (s)	10.0	46.0	46.0		26.0	26.0
Turn Bay Length (m)	15.0	65.0	50.0		30.0	30.0
Total Split (%)	15.8%	68.4%	52.5%		31.6%	31.6%
Maximum Green (s)	10.0	59.0	44.0		24.0	24.0
Yellow Time (s)	3.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag			Lag			
Lead-Leg Optimize?						
Vehicle Extension (s)	3.0	4.0	4.0		4.0	4.0
Recall Mode	None	Max	None		None	None
Walk Time (s)	30.0	30.0	30.0		7.0	7.0
Flesh Dont Walk (s)	10.0	10.0	10.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	61.2	61.2	51.8		14.2	14.2
Actuated g/C Ratio	0.73	0.73	0.62		0.17	0.17
v/c Ratio	0.23	0.29	0.57		0.39	0.26
Control Delay	5.2	4.3	11.4		34.7	9.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	5.2	4.3	11.4		34.7	9.1
LOS	A	A	B		C	A
Approach Delay	4.4	11.4			23.5	
Approach LOS	A	B			C	
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	95					
Actuated Cycle Length:	83.4					
Natural Cycle:	85					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.57					
Intersection Signal Delay:	9.9					
Intersection Capacity Utilization:	60.2%					
Analysis Period (min):	15					



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	79	761	1228	115	89
v/c Ratio	0.23	0.29	0.57	0.39	0.26
Control Delay	5.2	4.3	11.4	34.7	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	4.3	11.4	34.7	9.1
Queue Length 50th (m)	2.9	17.8	59.0	17.3	0.0
Queue Length 95th (m)	7.6	30.4	93.0	32.6	12.0
Internal Link Dist (m)		236.1	336.6	150.4	
Turn Bay Length (m)	50.0			55.0	
Base Capacity (vph)	398	2597	2158	538	545
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.29	0.57	0.21	0.16
<b>Intersection Summary</b>					

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Base Year PM Peak Hour  
3: Main St E & Wilson Dr

HCM 2010 Signalized Intersection Summary

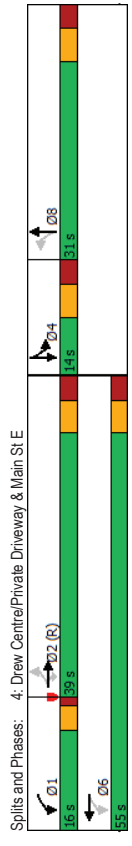
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	79	761	1045	183	115	89
Traffic Volume (veh/h)	79	761	1045	183	115	89
Future Volume (veh/h)	79	761	1045	183	115	89
Number	5	2	6	16	7	14
Initial Q (Cb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1863	1868	1900	1881	1900
Adj Flow Rate, veh/h	79	761	1045	183	115	89
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	2	2	0	1	0
Cap. veh/h	406	2669	1936	338	263	238
Arrive On Green	0.06	0.75	0.64	0.64	0.15	0.15
Sat Flow, veh/h	1810	3632	3114	528	1792	1615
Grp Volume(v), veh/h	79	761	613	615	115	89
Grp Sat Flow(s),veh/hln	1810	1770	1775	1773	1792	1615
Q Serve(g, s)	1.0	5.5	15.3	15.4	4.7	4.0
Cycle Q Clear(g, s)	1.0	5.5	15.3	15.4	4.7	4.0
Prop In Lane	1.00	0.30	0.30	0.30	1.00	1.00
Lane Grp Cap(c), veh/h	406	2669	1137	1136	263	238
V/C Ratio(X)	0.19	0.29	0.54	0.54	0.44	0.37
Avail Cap(c, a), veh/h	537	2669	1137	1136	576	519
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.7	3.1	8.0	8.0	31.4	31.1
Incr Delay (d2), s/veh	0.2	0.3	0.7	0.7	1.6	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%),veh/ln	0.5	2.7	7.5	7.7	2.5	1.9
LnGrp Delay(d),s/veh	5.9	3.4	8.6	8.7	33.1	32.5
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h	840 1228 204					
Approach Delay, s/veh	3.6 8.7 32.8					
Approach LOS	A A C					
Timer	1	2	3	4	5	6
Assigned Phs	2	4	5	6	7	8
Phs Duration (G+Y+Rc), s	65.0 15.9 9.2 55.8					
Change Period (Y+Rc), s	6.0 6.0 5.0 6.0					
Max Green Setting (Gmax), s	59.0 24.0 10.0 44.0					
Max Q Clear Time (g_c+H), s	7.5 6.7 3.0 17.4					
Green Ext Time (p_c), s	11.2 1.1 0.1 15.3					
Intersection Summary	9.0					
HCM 2010 Ctrl Delay	A					
HCM 2010 LOS	A					

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Base Year PM Peak Hour  
4: Drew Centre/Private Driveway & Main St E

Lanes, Volumes, Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	0	796	227	137	601	0	473	0	106	0	0	
Future Volume (vph)	0	796	227	137	601	0	473	0	106	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5	3.6	3.6	
Storage Length (m)	15.0	40.0	45.0	0.0	0.0	0.0	55.0	0.0	0.0	0.0	0.0	
Storage Lanes	1	1	1	1	1	1	2	0	0	0	0	
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.99 0.98											
Flt	0.850											
Flt Protected	0.950											
Satd. Flow (prot)	1837	3610	1521	1894	3610	0	3255	1557	0	0	1900	
Flt Permitted	0.258 0.950											
Satd. Flow (perm)	1837	3610	1451	457	3610	0	3239	1557	0	0	1900	
Right Turn on Red	Yes Yes											
Satd. Flow (RTOR)	180 435											
Link Speed (k/h)	50 50											
Link Distance (m)	360.6 256.9											
Travel Time (s)	26.0 26.1											
Confl. Peds. (#/hr)	15	15	15	15	15	2	3	3	3	3	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	
Heavy Vehicles (%)	0%	0%	5%	3%	0%	0%	4%	0%	2%	0%	0%	
Adj. Flow (vph)	0	796	227	137	601	0	473	0	106	0	0	
Shared Lane Traffic (%)	0											
Lane Group Flow (vph)	0	796	227	137	601	0	473	106	0	0	0	
Enter Blocked Intersection	No No No No No No No No No No No No											
Lane Alignment	Left Left Left Left Left Left Left Left Left Left Left Left											
Median Width(m)	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3											
Link Offset(m)	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0											
Crosswalk Width(m)	4.8 4.8 4.8 4.8 4.8 4.8 4.8 4.8 4.8 4.8 4.8 4.8											
Two way Left Turn Lane	1.04 1.00 1.01 1.04 1.00 1.00 1.04 1.00 1.01 1.00 1.00 1.00											
Headway Factor	25	15	25	25	25	15	25	25	15	25	15	
Turning Speed (k/h)	1	2	1	1	1	2	1	2	1	2	1	
Number of Detectors	1	2	1	1	2	1	2	1	2	1	2	
Detector Template	Left	Thru	Right	Left	Thru	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	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	
Detector 1 Type	Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex											
Detector 1 Channel	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0											
Detector 1 Extend (s)	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0											
Detector 1 Queue (s)	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0											
Detector 1 Delay (s)	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0											
Detector 2 Position(m)	9.4 9.4 9.4 9.4 9.4 9.4 9.4 9.4 9.4 9.4 9.4 9.4											
Detector 2 Size(m)	0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6											
Detector 2 Type	Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex Ch+Ex											
Detector 2 Channel	0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	NA	NA	4	4	4
Protected Phases	2	2	2	6	6	8	8	8	8	4	4	4
Permitted Phases	2	2	2	2	1	6	8	8	8	4	4	4
Detector Phase	2	2	2	2	1	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	35.0	35.0	35.0	9.5	35.0	27.0	27.0	27.0	27.0	13.0	13.0	13.0
Total Split (s)	39.0	39.0	39.0	16.0	55.0	31.0	31.0	31.0	31.0	14.0	14.0	14.0
Total Split (%)	39.0%	39.0%	39.0%	16.0%	55.0%	31.0%	31.0%	31.0%	31.0%	14.0%	14.0%	14.0%
Maximum Green (s)	32.0	32.0	32.0	12.0	48.0	24.0	24.0	24.0	24.0	7.0	7.0	7.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	0.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flesh Dont Walk (s)	21.0	21.0	21.0	21.0	21.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	52.8	52.8	52.8	65.6	65.6	26.4	26.4	26.4	26.4	26.4	26.4	26.4
Actuated g/C Ratio	0.53	0.53	0.53	0.66	0.66	0.26	0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.42	0.27	0.34	0.25	0.34	0.25	0.55	0.15	0.15	0.15	0.15	0.15
Control Delay	16.3	5.0	9.7	8.0	8.0	33.7	0.4	0.4	0.4	0.4	0.4	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	5.0	9.7	8.0	8.0	33.7	0.4	0.4	0.4	0.4	0.4	0.4
LOS	B	A	A	A	A	C	A	A	A	C	A	A
Approach Delay	13.8					8.3						27.6
Approach LOS	B					A						C
Intersection Summary												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	-16 (16%), Referenced to phase 2:EBTL, Start of Green											
Natural Cycle:	85											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.55											
Intersection Signal Delay:	15.5											
Intersection Capacity Utilization:	61.1%											
Analysis Period (min):	15											



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group Flow (vph)	796	227	137	601	473	106
v/c Ratio	0.42	0.27	0.34	0.25	0.55	0.15
Control Delay	16.3	5.0	9.7	8.0	33.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	5.0	9.7	8.0	33.7	0.4
Queue Length 50th (m)	48.7	4.4	9.4	23.8	42.9	0.0
Queue Length 95th (m)	77.6	19.9	20.3	38.9	53.8	0.0
Internal Link Dist (m)	336.6			338.0		232.9
Turn Bay Length (m)		40.0	45.0			
Base Capacity (vph)	1907	851	448	2366	926	755
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	0.42	0.27	0.31	0.25	0.51	0.14
Intersection Summary						

200624  
Base Year PM Peak Hour  
HCM 2010 Signalized Intersection Summary  
4: Drew Centre/Private Driveway & Main St E

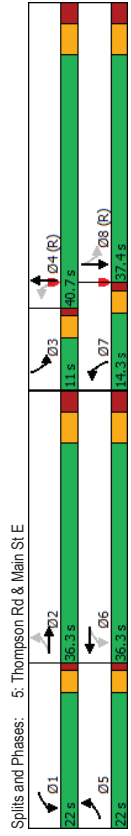
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	796	227	137	601	0	473	0	106	0	0	0
Future Volume (veh/h)	0	796	227	137	601	0	473	0	106	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Cb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99	1.00	1.00	1.00	1.00	1.00	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/hln	1900	1900	1810	1845	1900	0	1827	1863	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	796	227	137	601	0	473	0	106	0	0	0
Adj No. of Lanes	1	2	1	1	2	0	2	1	0	0	1	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, %	0	0	5	3	0	0	4	0	2	0	0	0
Cap. veh/h	72	2266	954	426	2589	0	828	0	319	0	0	0
Arrive On Green	0.00	0.63	0.63	0.05	0.72	0.00	0.20	0.00	0.17	0.00	0.00	0.00
Sat Flow, veh/h	831	3610	1520	1757	3705	0	3375	0	1575	0	0	0
Grp Volume(V), veh/h	0	796	227	137	601	0	473	0	106	0	0	0
Grp Sat Flow(S),veh/hln	831	1805	1520	1757	1805	0	1688	0	1575	0	0	0
Q Serve(g, s)	0	10.5	6.5	2.8	5.6	0	13.0	0	5.9	0	0	0
Cycle Q Clear(g, s)	0	10.5	6.5	2.8	5.6	0	13.0	0	5.9	0	0	0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	72	2266	954	426	2589	0	828	0	319	0	0	0
V/C Ratio(X)	0.00	0.35	0.24	0.32	0.23	0.00	0.57	0.00	0.33	0.00	0.00	0.00
Avail Cap(c, a), veh/h	72	2266	954	426	2589	0	1055	0	425	0	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	8.9	8.2	7.1	4.8	0.0	37.0	0.0	35.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.6	0.4	0.0	0.0	0.6	0.0	0.6	0.0	0.0	0.0
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 BackQ(50%),veh/ln	0.0	5.3	2.9	1.4	2.8	0.0	6.1	0.0	2.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.3	8.7	7.5	4.8	0.0	37.6	0.0	36.0	0.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	D	D	D	D	D	D	D
Approach Vol, veh/h	1023			738			579					
Approach Delay, s/veh	9.2			5.3			37.3					
Approach LOS	A			A			D					
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2										
Phs Duration (G+Y+Rc), s	9.0	66.8				6	8					
Change Period (Y+Rc), s	4.0	7.0			75.7	24.3						
Max Green Setting (Gmax), s	12.0	32.0			48.0	24.0						
Max Q Clear Time (g_c+H), s	4.8	12.5			7.6	15.0						
Green Ext Time (p_c), s	0.3	7.6			5.7	2.2						
Intersection Summary	14.9											
HCM 2010 Ctrl Delay	B											
HCM 2010 LOS	B											

200624  
Base Year PM Peak Hour  
Lanes, Volumes, Timings  
5: Thompson Rd & Main St E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (vph)	249	471	163	363	416	48	180	512	199	48	734	119
Future Volume (vph)	249	471	163	363	416	48	180	512	199	48	734	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	60.0	0.0	0.0	150.0	0.0	0.0	60.0	0.0	0.0	55.0	0.0	0.0
Storage Lanes	1	0	0	1	0	0	1	0	0	1	0	0
Taper Length (m)	7.5	0.95	0.95	7.5	0.95	0.95	7.5	0.95	0.95	7.5	0.95	0.95
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Fit	0.961			0.984			0.958			0.979		
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	3435	0	1728	3538	0	1728	3439	0	1711	3529	0
Fit Permitted	0.416			0.198			0.116			0.254		
Satd. Flow (perm)	764	3435	0	360	3538	0	211	3439	0	457	3529	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)	44			11			56			60		17
Link Speed (k/h)	50			50			60			60		60
Link Distance (m)	362.0			250.3			278.6			217.9		
Travel Time (s)	26.1			18.0			16.7			13.1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	1%	0%	0%	4%	1%	0%	2%	2%	0%	1%
Adj. Flow (vph)	249	471	163	363	416	48	180	512	199	48	734	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	249	634	0	363	464	0	180	711	0	48	853	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Left	Right	Left	Left	Right
Median Width(m)	3.3			3.3			3.3			3.3		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.00
Turning Speed (k/h)	25	15	25	15	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	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+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	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		6	6		4			4	8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	9.5	32.0		9.5	32.0		9.5	32.0		9.5	32.0	
Total Split (s)	22.0	36.3		22.0	36.3		14.3	40.7		11.0	37.4	
Total Split (%)	20.0%	33.0%		20.0%	33.0%		13.0%	37.0%		10.0%	34.0%	
Maximum Green (s)	18.0	29.3		18.0	29.3		10.3	33.7		7.0	30.4	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0		0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Vehicle Extension (s)	None	Max		None	None		None	C-Max		None	C-Max	
Recall Mode	None	7.0		None	7.0		None	7.0		None	7.0	
Flash Dont Walk (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0			0			0			0		
Act Effct Green (s)	46.9	32.5		52.8	35.9		47.3	39.0		40.2	33.6	
Actuated G/C Ratio	0.43	0.30		0.48	0.33		0.43	0.35		0.37	0.31	
v/c Ratio	0.55	0.61		0.92	0.40		0.78	0.57		0.20	0.78	
Control Delay	21.8	33.8		52.8	29.9		46.2	29.0		20.5	40.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.8	33.8		52.8	29.9		46.2	29.0		20.5	40.2	
LOS	C	C		D	C		D	C		C	D	
Approach Delay	30.4			40.0			32.5			39.2		
Approach LOS	C			D			C			D		

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	0 (0%), Referenced to phase 4:NBLT and 8:SBTL, Start of Green
Natural Cycle:	85
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.92
Intersection Signal Delay:	35.4
Intersection Capacity Utilization:	65.7%
Analysis Period (min):	15



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	249	634	363	464	180	711	48	853				
v/c Ratio	0.55	0.61	0.92	0.40	0.78	0.57	0.20	0.78				
Control Delay	21.8	33.8	52.8	29.9	46.2	29.0	20.5	40.2				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	21.8	33.8	52.8	29.9	46.2	29.0	20.5	40.2				
Queue Length 50th (m)	32.1	60.3	51.7	41.6	25.2	64.5	6.2	90.8				
Queue Length 95th (m)	49.6	80.0	#113.5	59.3	#58.1	84.6	13.6	115.5				
Internal Link Dist (m)	338.0			226.3		254.6		193.9				
Turn Bay Length (m)	60.0	150.0		60.0		55.0						
Base Capacity (vph)	510	1045	396	1160	232	1255	248	1089				
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	0.49	0.61	0.92	0.40	0.78	0.57	0.19	0.78				

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



200624  
Base Year PM Peak Hour  
HCM 2010 Signalized Intersection Summary  
5: Thompson Rd & Main StE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	249	471	163	363	416	48	180	512	199	48	734
Future Volume (veh/h)	249	471	163	363	416	48	180	512	199	48	734
Number	5	2	12	1	6	16	7	4	14	3	8
Initial Q (Cb), veh	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	1.00	1.00	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
Adj Sat Flow, veh/h	1900	1881	1900	1881	1892	1900	1881	1889	1900	1863	1897
Adj Flow Rate, veh/h	249	471	163	363	416	48	180	512	199	48	734
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	0	4	1	0	2	2	0
Cap, veh/h	479	767	264	439	1084	124	268	926	358	256	977
Arrive On Green	0.12	0.29	0.27	0.16	0.33	0.31	0.09	0.37	0.34	0.03	0.31
Sat Flow, veh/h	1810	2612	898	1792	3251	373	1792	2532	980	1774	3107
Grp Volume(V), veh/h	249	321	313	363	229	235	180	362	349	48	426
Grp Sat Flow(s), veh/h	1810	1787	1723	1792	1798	1826	1792	1795	1717	1774	1802
Q Serve(g. s), s	10.8	17.0	17.4	15.5	10.7	10.9	7.5	17.6	18.0	2.1	23.3
Cycle Q Clear(g. c), s	10.8	17.0	17.4	15.5	10.7	10.9	7.5	17.6	18.0	2.1	23.3
Prop In Lane	1.00	0.52	1.00	1.00	0.20	1.00	1.00	0.57	1.00	0.28	0.28
Lane Grp Cap(c), veh/h	479	525	506	439	599	609	268	657	628	256	567
V/C Ratio(X)	0.52	0.61	0.62	0.83	0.38	0.39	0.67	0.55	0.56	0.19	0.75
Avail Cap(c. a), veh/h	557	525	506	445	599	609	282	657	628	307	567
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
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	33.5	34.3	24.3	28.0	28.3	26.7	27.7	28.5	26.7	33.8
Incr Delay (d2), s/veh	0.9	5.3	5.6	12.1	0.4	0.4	5.7	3.3	3.5	0.4	8.9
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
%ile Back(Q)(50%), veh/m	5.4	9.2	9.0	9.0	5.3	5.6	4.1	9.4	9.1	1.0	13.0
LnGrp Delay(d), s/veh	25.1	38.7	39.8	36.4	28.4	28.7	32.4	31.0	32.0	27.1	42.7
LnGrp LOS	C	D	D	D	C	C	C	C	C	C	D
Approach Vol, veh/h	883			827			891				901
Approach Delay, s/veh	35.3			32.0			31.7				42.1
Approach LOS	D			C			C				D
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	21.6	36.3	7.8	44.2	17.2	40.7	13.5	38.6			
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0			
Max Green Setting (Gmax), s	18.0	29.3	7.0	33.7	18.0	29.3	10.3	30.4			
Max Q Clear Time (g. c+H), s	17.5	19.4	4.1	20.0	12.8	12.9	9.5	25.4			
Green Ext Time (p. c), s	0.1	3.3	0.0	4.3	0.5	3.0	0.1	2.5			
Intersection Summary											
HCM 2010 Ctrl Delay											
HCM 2010 LOS											

Queuing and Blocking Report

200624  
Base Year PM Peak Hour

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	L	T	R	L	T	TR	L	T	T	L	R	L
Directions Served												
Maximum Queue (m)	47.4	96.6	71.3	19.6	42.5	108.1	109.8	71.0	78.4	73.9	51.2	47.4
Average Queue (m)	32.8	47.8	36.4	0.8	38.1	69.9	73.3	27.0	47.0	40.3	19.2	28.1
95th Queue (m)	52.5	76.5	60.7	9.2	50.5	107.5	108.8	48.6	69.9	64.8	35.5	54.1
Link Distance (m)		133.0	133.0		133.0		108.2	108.2		322.4		322.4
Upstream Blk Time (%)				1		1						
Queuing Penalty (veh)				8		8						
Storage Bay Dist (m)	40.0			35.0		70.0					65.0	40.0
Storage Blk Time (%)	3	14		17	23	0	1	0	1	0	1	1
Queuing Penalty (veh)	8	23		51	52	0	1	1	1	1	1	2

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
	T	T	R	T	T	R	T	T	R	T	R
Directions Served											
Maximum Queue (m)	93.6	84.4	18.0								
Average Queue (m)	55.3	43.6	2.3								
95th Queue (m)	83.5	71.7	11.3								
Link Distance (m)		241.6	241.6								
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)				20							
Storage Blk Time (%)				25							
Queuing Penalty (veh)				25							

Intersection: 2: Mall Entrance & Main St E

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	T	TR	L	T	T	L	L	R	T	L	R	L
Directions Served												
Maximum Queue (m)	64.6	67.6	49.6	61.9	63.0	42.1	25.1	25.1				
Average Queue (m)	25.7	27.6	21.3	26.9	32.0	17.9	10.4	10.4				
95th Queue (m)	53.5	54.7	40.4	52.5	60.3	34.2	19.0	19.0				
Link Distance (m)		108.2		251.1	251.1	127.6	127.6					
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)				70.0								
Storage Blk Time (%)				0								
Queuing Penalty (veh)				0								

Queuing and Blocking Report

200624  
Base Year PM Peak Hour

Intersection: 3: Main St E & Wilson Dr

Movement	EB	EB	EB	WB	WB	WB	SB	SB	SB	SB	SB
	L	T	T	T	TR	L	L	R	L	R	L
Directions Served											
Maximum Queue (m)	28.0	49.4	58.0	99.0	96.9	37.6	22.8				
Average Queue (m)	12.4	19.9	24.2	44.2	45.8	18.7	10.3				
95th Queue (m)	22.0	42.9	47.9	80.1	84.1	32.4	19.3				
Link Distance (m)		242.6	242.6	338.7	338.7		160.5				
Upstream Blk Time (%)											
Queuing Penalty (veh)							55.0				
Storage Bay Dist (m)	50.0										
Storage Blk Time (%)	0										
Queuing Penalty (veh)	0										

Intersection: 4: Drew Centre/Private Driveway & Main St E

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	T	T	R	L	T	T	L	T	L	T	R	TR
Directions Served												
Maximum Queue (m)	71.1	80.3	47.5	48.2	53.8	49.7	73.7	71.9	22.4			
Average Queue (m)	39.3	38.2	21.6	21.0	20.5	24.4	49.5	40.4	8.8			
95th Queue (m)	68.7	70.3	47.9	38.1	40.5	44.3	70.2	64.6	18.9			
Link Distance (m)		338.7			334.9	334.9	239.6	239.6				
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)				40.0	45.0							
Storage Blk Time (%)				26	5	0	0	0				
Queuing Penalty (veh)				0	12	0	1	1				

Intersection: 5: Thompson Rd & Main St E

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Directions Served												
Maximum Queue (m)	67.4	87.6	95.0	131.9	88.3	64.3	66.2	86.7	84.2	62.3	127.8	122.0
Average Queue (m)	41.4	50.6	58.6	67.0	39.7	34.5	32.8	45.0	46.7	20.4	86.4	77.7
95th Queue (m)	66.9	82.4	88.1	112.0	72.4	56.9	57.8	72.1	73.9	59.1	124.5	118.1
Link Distance (m)		334.9	334.9		233.6	233.6	263.1	263.1			201.3	201.3
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)				60.0		150.0		60.0				
Storage Blk Time (%)				1	5	0	0	1	1	0	34	
Queuing Penalty (veh)				3	12	1	0	4	3	0	16	

Network Summary

Network wide Queuing Penalty: 232

# Appendix D

## Design Brief



02 August 2022  
Project: (200624)

Colin Rauscher  
NEATT Communities

Dear Mr. Rauscher:

**RE: 560 MAIN STREET EAST, MILTON  
DESIGN BRIEF**

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Paradigm Transportation Solutions Limited (Paradigm) has provided the following design brief for the proposed mixed-used development at 560 Main Street East, in the Town of Milton.

Vehicle access to the development is currently only permitted through the extension of Wilson Drive as the Town of Milton has advised they will not support access to Main Street East. As Metrolinx proposes to provide a bus loop through the future extension of Wilson Drive, the ultimate configuration and functionality of this access connection needs to be reviewed.

**Figure 1 (attached)** illustrates the development location.

This technical memorandum provides guidance and opinion regarding the proposed access location. It should be noted the Paradigm has relied on information contained within the Milton Major Transit Station Area, Area Transportation Plan (MTSA)<sup>1</sup>.

### Access Review

To assist in determining the appropriateness of the access locations, the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads<sup>2</sup> was reviewed. Other additional considerations such as capacity requirements have also been included.

### Corner Clearances at Major Intersections

TAC Chapter 8.8 (Corner Clearances at Major Intersection), Section 8.8.1 (General) states, "Corner clearance is the distance from an intersection to the nearest access upstream or downstream of it. Corner clearance is measured from the near curb of the cross roadway to the near edge of the access throat. It consists of three components: the curb return radius at the intersection, a length of tangent, and the curb return radius or flare dimension at the

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<sup>1</sup> Milton Major Transit Station Area, Area Transportation Plan (MTSA), BA Group, April 2020.

<sup>2</sup> Geometric Design Guide for Canadian Roads, Transportation Association of Canada, 2017

driveway. Inadequate corner clearance between accesses and intersections along a major road, such as a major arterial, can create operational issues.”

TAC has been reviewed to determine sufficiency of the corner clearance from a major intersection. The suggested corner clearances as stipulated by TAC are as follows:

- ▶ Arterials - 70 metres (curb radii to curb radii)
- ▶ Collectors - 55 metres (curb radii to curb radii)
- ▶ Locals - 15 metres (curb radii to curb radii)

As the proposed bus loop will have dual purpose, serve local travel demands and accommodate transit service, the bus loop resembles the characteristics of a collector roadway. Based on this assessment, access to 560 Main Street East should be located at least 55 metres (curb radii to curb radii) from the signalized intersection of Main Street East and Wilson Drive.

The method utilized by TAC in determining corner clearances is a standard method in assessing spacing of access driveways. However, this approach often does not recognize that some intersections are more important than other minor public or private intersections, in terms of protecting the higher level of service needs of the roadway.

## **Operational Assessment**

With the accesses spaced relatively close to the Main Street East and Wilson Drive intersection, vehicles wanting to turn left out of 560 Main Street East may be blocked as a result of queue spillback from the intersection of Main Street East and Wilson Drive. This would result in traffic queuing behind the vehicle waiting to turn which may creating operational issues within the development.

Based on projections contained in the MTSA, detailed intersection performance analysis of at the Main Street East and Wilson Drive signalized intersections to identify the potential vehicle delays, capacity constraints and queue lengths at full build out of the study area. The operation assessment It is a qualitative measure that provides an index to the operational qualities of a roadway segment or an intersection with designations that range from LOS A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. The evaluation criteria used to analyze intersections are based on the 2000 Highway Capacity Manual (HCM) utilizing Synchro 10. The following parameters were used in the analysis:

- ▶ Future lane configurations, synchro settings, and traffic volumes for Main Street East & Wilson Drive/Busway intersection were referenced from the Milton Major Transit Station Area (MTSA) - Area Transportation Plan (2020).
- ▶ The future Main Street East & Wilson Drive intersection lane configuration adds the south leg to the intersection. The south leg has been assumed to have exclusive lanes



for left, through, and right-turn movements. The future lane configuration also assumes a westbound left turn lane has been added.

- ▶ Future traffic volumes, heavy vehicle percentages, peak hour factors, and conflicting pedestrian volumes are consistent with the Milton MTSA Transportation Report.
- ▶ Future signal timings have been optimized for traffic operations. No northbound/southbound exclusive left-turn phases have been assumed.
- ▶ Queuing at the intersection has been modelled using SimTraffic Queueing (five 60-min iterations) for the AM and PM peak hours.

**Table 1** summarizes the operational analysis for full-build out of the area; the following is noted:

- ▶ The northbound approach is forecast to operate at level of service C or better with a v/c ratio no greater than 0.70 during the AM and PM Peak Hours. The 95<sup>th</sup> percentile queue length is projected at 60 metres. Overall, the intersection is operating with satisfactory conditions.

**Appendix A** contains the Synchro outputs.

**TABLE 1: OPERATIONAL ASSESSMENT**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Main Street East at Wilson Drive	TCS	LOS	A	B	B	<b>B</b>	A	B	B	<b>B</b>	C	C	C	<b>C</b>	C	C	C	<b>C</b>	<b>B</b>
			Delay	9	14	14	<b>14</b>	9	13	13	<b>12</b>	31	24	24	<b>28</b>	27	25	25	<b>26</b>	<b>16</b>
			V/C	0.16	0.51	0.51		0.09	0.39	0.39		0.44	0.02	0.08		0.30	0.17	0.17		<b>0.46</b>
			Q	38	71	65		14	55	47		38	8	20		34	34	34		
PM Peak Hour	1 - Main Street East at Wilson Drive	TCS	LOS	B	B	B	<b>B</b>	B	B	B	<b>B</b>	D	C	C	<b>C</b>	C	C	C	<b>C</b>	<b>B</b>
			Delay	15	16	16	<b>16</b>	12	16	16	<b>16</b>	37	22	22	<b>31</b>	25	22	22	<b>24</b>	<b>19</b>
			V/C	0.42	0.55	0.55		0.28	0.56	0.56		0.67	0.10	0.05		0.30	0.11	0.11		<b>0.59</b>
			Q	46	76	67		42	75	68		59	21	16		37	27	27		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex. - Existing Available Storage

Avail. - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

RBT - Roundabout



## Driveway Alignment

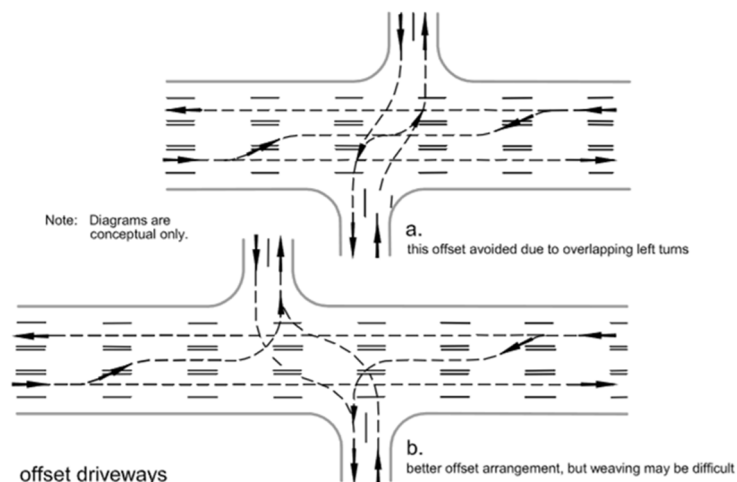
It is understood there is an adjacent development proposed on the east side of the Wilson Drive extension, providing for opposing driveways.

When the roadway has a moderate to high volume of traffic and the driveway volumes are moderate to high, such as a high-volume collector serving a busy land use, the examination of the relative location of opposite driveways constitutes good design practice. The key traffic movements in the analysis are the accommodation of left turns into the opposite developments, and the inter-development traffic flow.

Where inter-development traffic is expected to be significant, and signalization of the driveway intersection is not desirable, the manoeuvre required to cross the entire width of a busy roadway in a single continuous movement may be difficult. In this case, it is often advantageous to offset the opposing driveways to eliminate the concentrated conflict zone. A minimum offset of 100 metres between driveway centre lines is desirable. This technique does, however, increase the number of slow-moving vehicles making ingress, egress and weaving manoeuvres on the roadway, which may present other operational concerns.

The current concept plans provided for both 560 Main Street East and the adjacent development depicts an offset arrangement. The primary issue to consider with offset intersections are the possibility of overlapping left turns and the potential difficulty in making a weaving maneuver to travel between the offset legs of the intersection. These issues are illustrated in **Exhibit 1** as outlined by TAC<sup>3</sup>.

### EXHIBIT 1: OFFSET ARRANGEMENT



<sup>3</sup> Transportation Association of Canada (TAC), Geometric Design Guide for Canadian Road, 1999



The location of the two opposite driveways would result in a similar situation as shown in Diagram “b” of **Exhibit 1**, which is identified as the better offset arrangement since there is no issues with overlapping left turns along the main roadway as in Diagram “a”.

With respect to the weaving manoeuvre that would be required to, it is reasoned that the potential for this traffic movement is negligible as inter-development traffic is not expected to be significant given the similarities in land uses (i.e., residential with limited retail). Therefore, unlike a situation where offset intersections may comprise two busy public roads or private driveways with a high expectation of weaving traffic travelling between the offset legs, it can be concluded that the location of the two opposing driveways is of no consequence in this regard.

Another issue to consider with the offset would be conflicting vehicle movements with respect to the potential for simultaneous turns from the opposing driveways onto the Wilson Drive extension. However, as the adjacent property will not be permitted to operate with outbound left turn movements given the one-way designation of the bus loop, it is reasoned that this manoeuvre is of no consequence in this regard.

The offset arrangement between the opposing driveway connections does not create any remarkable impacts or differences with respect to traffic operations, design considerations, or traffic safety.

## Functional Design

Based on our engineering judgement and professional traffic operations experience, we have developed a functional design that provides access for adjacent development parcels to the Wilson Street Extension. The design includes the following:

- ▶ Outbound lanes are reflective of lane arrangement developed by Metrolinx;
- ▶ Inbound lanes are reflective of two travel lanes to minimize delay and queuing between development traffic;
- ▶ A centre median is provided to separate inbound and outbound traffic;
- ▶ Multi-use trail provided on east side of Wilson Drive Extension as development by Metrolinx;
- ▶ Crosswalk proposed for the south leg of Main Street and Wilson Drive intersection to facilitate pedestrian crossing movements between the two sites;
- ▶ A Roundabout is proposed at the access to 560 Main Street East to accommodate access to 560 Main as well as the Metrolinx Bus Loop but also to streamline winter maintenance activities and accommodate turnaround movements;
- ▶ Development driveways are located at least 60 metres (curb radii to curb radii) from the intersection of Main Street East and Wilson Drive;
- ▶ An 8.0 metre median break is provided to facilitate inbound movements for development traffic on the east side of the Wilson Drive Extension but to further act as a turnaround





for vehicles that drive down the extension by mistake. The median break has been designed to facilitate large design vehicles;

- ▶ Development driveways have been positioned in a positive offset arrangement.
- ▶ Emergency access and winter maintenance considered by providing for a pavement width of at least 6 metres;
- ▶ Separate Left Turn Lane for Busses Only is provided for the south approach at Main Street East and Wilson Drive.
- ▶ Transit priority for northbound left turns will be provided through a split phasing.
- ▶ Lane configuration has been designed to a practical minimum to reduce the pedestrian crossing distance for the south leg of Main and Wilson by eliminating one lane. Previous iterations of the functional design included five lanes.

Subject to detailed engineering drawings, the functional design indicates access to adjacent developments can be accommodated within the proposed Wilson Drive Extension right-of-way.

**Appendix B** illustrates the proposed design.

Yours very truly,

**PARADIGM TRANSPORTATION SOLUTIONS LIMITED**



**Adam J. Makarewicz**  
C.E.T.  
Senior Project Manager



**Stew Elkins**  
B.E.S., MITE  
Vice President



## Attachments





## Proposed Location

# Appendix A

## SYNCHRO REPORTS

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Timings

200624

1: Busway/Wilson Drive & Main Street East

Future Background AM Peak Hour

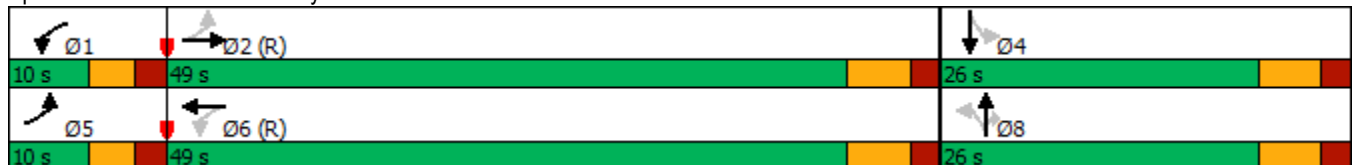


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↙	↕	↙	↕	↙	↕	↗	↙	↕
Traffic Volume (vph)	67	777	31	638	122	11	119	103	43
Future Volume (vph)	67	777	31	638	122	11	119	103	43
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	40.0	5.0	40.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	10.0	47.0	10.0	47.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	10.0	49.0	10.0	49.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	11.8%	57.6%	11.8%	57.6%	30.6%	30.6%	30.6%	30.6%	30.6%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	51.0	45.0	51.0	45.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.60	0.53	0.60	0.53	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.16	0.52	0.09	0.39	0.44	0.02	0.25	0.30	0.30
Control Delay	6.6	13.5	6.1	12.3	32.2	23.8	6.5	28.1	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	13.5	6.1	12.3	32.2	23.8	6.5	28.1	10.5
LOS	A	B	A	B	C	C	A	C	B
Approach Delay		13.0		12.0		19.7			17.5
Approach LOS		B		B		B			B

Intersection Summary

Cycle Length: 85  
 Actuated Cycle Length: 85  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 85  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.52  
 Intersection Signal Delay: 14.0  
 Intersection LOS: B  
 Intersection Capacity Utilization 75.8%  
 ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 1: Busway/Wilson Drive & Main Street East



HCM Signalized Intersection Capacity Analysis  
 1: Busway/Wilson Drive & Main Street East

200624  
 Future Background AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗	↗	↖	↗	
Traffic Volume (vph)	67	777	167	31	638	71	122	11	119	103	43	112
Future Volume (vph)	67	777	167	31	638	71	122	11	119	103	43	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1645	3418		1711	3388		1711	1863	1531	1710	1649	
Flt Permitted	0.33	1.00		0.23	1.00		0.60	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	565	3418		406	3388		1082	1863	1531	1351	1649	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	67	777	167	31	638	71	122	11	119	103	43	112
RTOR Reduction (vph)	0	22	0	0	10	0	0	0	88	0	83	0
Lane Group Flow (vph)	67	922	0	31	699	0	122	11	31	103	72	0
Confl. Peds. (#/hr)	5					5			8	8		
Heavy Vehicles (%)	6%	3%	2%	2%	5%	2%	2%	2%	2%	1%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	48.0	43.0		48.0	43.0		20.0	20.0	20.0	20.0	20.0	
Effective Green, g (s)	50.0	45.0		50.0	45.0		22.0	22.0	22.0	22.0	22.0	
Actuated g/C Ratio	0.59	0.53		0.59	0.53		0.26	0.26	0.26	0.26	0.26	
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	408	1809		330	1793		280	482	396	349	426	
v/s Ratio Prot	c0.01	c0.27		0.01	0.21			0.01			0.04	
v/s Ratio Perm	0.08			0.05			c0.11		0.02	0.08		
v/c Ratio	0.16	0.51		0.09	0.39		0.44	0.02	0.08	0.30	0.17	
Uniform Delay, d1	7.8	12.9		8.1	11.9		26.3	23.5	23.8	25.3	24.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	1.0		0.6	0.6		4.9	0.1	0.4	2.1	0.9	
Delay (s)	8.6	13.9		8.7	12.5		31.2	23.6	24.2	27.4	25.3	
Level of Service	A	B		A	B		C	C	C	C	C	
Approach Delay (s)		13.6			12.3			27.6			26.1	
Approach LOS		B			B			C			C	

Intersection Summary

HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Busway/Wilson Drive & Main Street East

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	47.3	80.7	69.2	17.9	60.2	52.8	47.6	11.8	23.6	41.6	44.2
Average Queue (m)	13.9	47.7	38.6	5.2	34.8	24.2	21.0	1.9	10.5	17.9	18.1
95th Queue (m)	37.6	71.3	64.5	14.3	54.9	46.5	37.6	8.0	19.5	34.2	34.0
Link Distance (m)		199.4	199.4		321.7	321.7	125.0	125.0			237.8
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	40.0			40.0					35.0	60.0	
Storage Blk Time (%)	0	11			4						0
Queuing Penalty (veh)	0	8			1						0

Network Summary

Network wide Queuing Penalty: 9

1: Busway/Wilson Drive & Main Street East

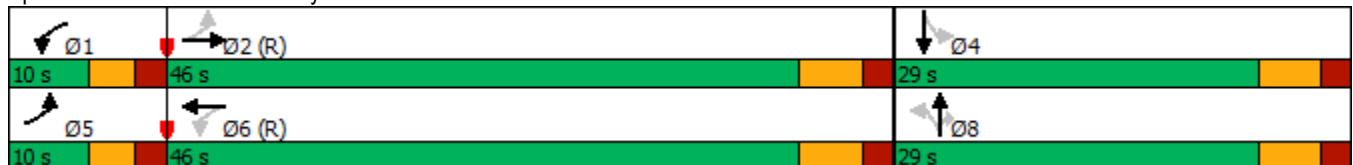


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	121	867	85	845	226	57	73	115	14
Future Volume (vph)	121	867	85	845	226	57	73	115	14
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	40.0	5.0	40.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	10.0	46.0	10.0	46.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	10.0	46.0	10.0	46.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	11.8%	54.1%	11.8%	54.1%	34.1%	34.1%	34.1%	34.1%	34.1%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	48.0	42.0	48.0	42.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.56	0.49	0.56	0.49	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.41	0.55	0.28	0.56	0.67	0.10	0.14	0.30	0.25
Control Delay	11.4	16.2	9.3	16.3	37.9	22.6	3.0	25.9	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	16.2	9.3	16.3	37.9	22.6	3.0	25.9	6.9
LOS	B	B	A	B	D	C	A	C	A
Approach Delay		15.7		15.7		28.3			15.5
Approach LOS		B		B		C			B

Intersection Summary

Cycle Length: 85  
 Actuated Cycle Length: 85  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 85  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.67  
 Intersection Signal Delay: 17.3  
 Intersection LOS: B  
 Intersection Capacity Utilization 78.4%  
 ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 1: Busway/Wilson Drive & Main Street East





HCM Signalized Intersection Capacity Analysis  
 1: Busway/Wilson Drive & Main Street East

200624

Paradigm Transportation Solutions Limited



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	867	84	85	845	103	226	57	73	115	14	127
Future Volume (vph)	121	867	84	85	845	103	226	57	73	115	14	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.6
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1646	3461		1711	3383		1711	1863	1531	1711	1597	
Flt Permitted	0.21	1.00		0.21	1.00		0.64	1.00	1.00	0.72	1.00	
Satd. Flow (perm)	364	3461		376	3383		1148	1863	1531	1297	1597	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	121	867	84	85	845	103	226	57	73	115	14	127
RTOR Reduction (vph)	0	9	0	0	11	0	0	0	52	0	90	0
Lane Group Flow (vph)	121	942	0	85	937	0	226	57	21	115	51	0
Confl. Peds. (#/hr)	5					5			8	8		
Heavy Vehicles (%)	6%	3%	2%	2%	5%	2%	2%	2%	2%	1%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	45.0	40.0		45.0	40.0		23.0	23.0	23.0	23.0	23.0	
Effective Green, g (s)	47.0	42.0		47.0	42.0		25.0	25.0	25.0	25.0	25.0	
Actuated g/C Ratio	0.55	0.49		0.55	0.49		0.29	0.29	0.29	0.29	0.29	
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	291	1710		302	1671		337	547	450	381	469	
v/s Ratio Prot	c0.03	0.27		0.02	c0.28			0.03			0.03	
v/s Ratio Perm	0.20			0.14			c0.20		0.01	0.09		
v/c Ratio	0.42	0.55		0.28	0.56		0.67	0.10	0.05	0.30	0.11	
Uniform Delay, d1	10.4	14.9		10.0	15.0		26.4	21.8	21.5	23.2	21.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.3	1.3		2.3	1.4		10.2	0.4	0.2	2.0	0.5	
Delay (s)	14.7	16.2		12.4	16.4		36.6	22.2	21.7	25.3	22.4	
Level of Service	B	B		B	B		D	C	C	C	C	
Approach Delay (s)		16.1			16.1			31.2			23.7	
Approach LOS		B			B			C			C	

Intersection Summary

HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Busway/Wilson Drive & Main Street East

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	47.4	85.2	75.0	47.3	87.4	77.0	78.2	24.5	21.0	40.2	31.1
Average Queue (m)	22.2	50.9	41.0	17.6	49.5	42.2	34.9	9.2	7.3	20.2	15.6
95th Queue (m)	45.6	75.5	67.2	41.7	74.9	68.2	59.0	21.3	15.5	36.6	26.6
Link Distance (m)		199.4	199.4		321.7	321.7	125.0	125.0			237.8
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	40.0			40.0					35.0	60.0	
Storage Blk Time (%)	1	13		0	12			0			
Queuing Penalty (veh)	4	16		0	10			0			

Network Summary

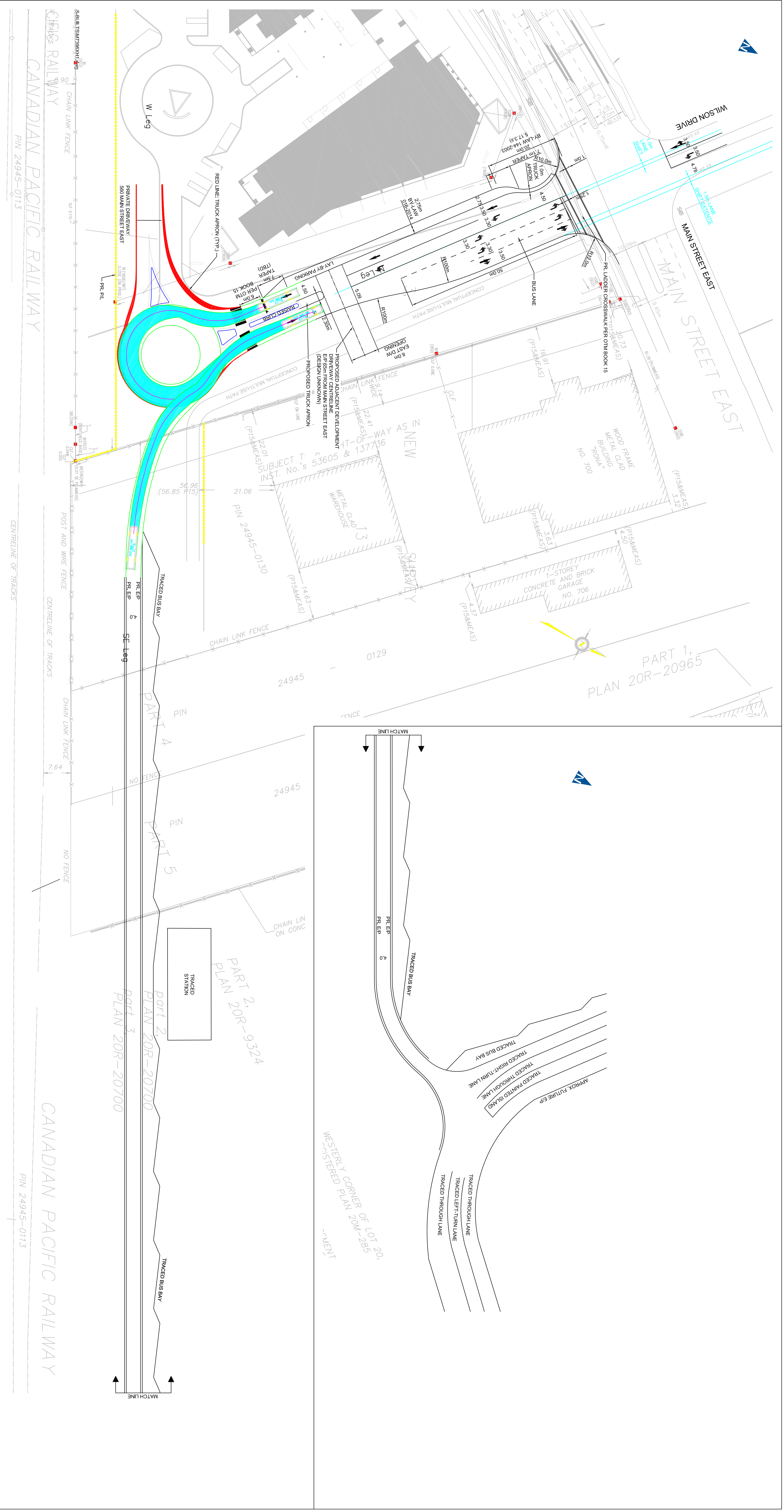
Network wide Queuing Penalty: 30

## Appendix B

### FUNCTINOAL DESIGN

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NOTES:  
 ONLY FIGURED DIMENSIONS ARE TO BE REFERENCED. PLAN DEVELOPED USING AIR PHOTOS. DO NOT SCALE.  
 PROVINCIAL LEGISLATION PROVIDES THAT MARKINGS MAY BE PLACED BY THE ROAD AUTHORITY HAVING JURISDICTION, OR GUIDING TRAFFIC SECTION 182 OF THE HIGHWAY TRAFFIC ACT (R.S.O. 1990). PAVEMENT AND CURB MARKINGS BEING EXCLUSIVE TO A CONCEPTUAL PLAN PROVIDED TO PARADIGM TRANSPORTATION SOLUTIONS LTD. AND NOT TO BE USED FOR CONSTRUCTION. DELINEATORS AND OBJECT MARKERS THAT ARE WITHIN THE HIGHWAY JURISDICTIONAL REGULATIONS, MARKINGS AND DELINEATIONS SERVE AN ADVISORY OR WARNING FUNCTION, AND DO NOT HAVE LEGAL FORCE OR WARNING UNDER THE HTA. ITS REGULATIONS, OR A MUNICIPAL MARKINGS OR DELINEATION, TO AVOID POSSIBLE CONFLICT OR DELINEATION SHOULD BE CHECKED AGAINST THE PREVAILING TRAFFIC LAWS AND REGULATIONS BEFORE THEY ARE INSTALLED OR REMOVED.

NOTES:  
 1) DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.  
 2) DRAWING NOT TO BE SCALED.  
 3) EXISTING SURVEY INFORMATION WAS PROVIDED BY THE TOWN OF MILTON AND WAS NOT VERIFIED BY PARADIGM TRANSPORTATION SOLUTIONS LTD.  
 4) PARADIGM TRANSPORTATION SOLUTIONS LTD. AND MORE BEING INCLUDED IN THIS DRAWING. TRACED LINESHIPS FOR ILLUSTRATIVE PURPOSES ONLY.  
 5) ALL LANE MARKING TYPES, DIMENSIONS AND COLOURS ON DRAWINGS ARE FOR ILLUSTRATIVE PURPOSES ONLY. ANY DIFFERENCES BETWEEN THE MARKINGS AND REGULATIONS SHOULD BE CHECKED AGAINST THE PREVAILING TRAFFIC LAWS AND REGULATIONS BEFORE THEY ARE INSTALLED OR REMOVED.

PAVEMENT MARKING NOTES  
 PROVINCIAL LEGISLATION PROVIDES THAT MARKINGS MAY BE PLACED BY THE ROAD AUTHORITY HAVING JURISDICTION FOR THE PURPOSES OF REGULATING, MARKING OR GUIDING TRAFFIC SECTION 182 OF THE HIGHWAY TRAFFIC ACT (R.S.O. 1990).  
 MARKINGS AND DELINEATION SERVE AN ADVISORY OR WARNING FUNCTION, AND DO NOT HAVE LEGAL FORCE OR WARNING UNDER THE HTA. ITS REGULATIONS, OR A MUNICIPAL BY-LAW, BUT THEIR ENFORCEABILITY DERIVES FROM THE MAIN OR DELINEATION, TO AVOID POSSIBLE CONFLICT OR CONUSION. THE MEANING OF MARKINGS AND DELINEATION SHOULD BE CHECKED AGAINST THE PREVAILING TRAFFIC LAWS AND REGULATIONS BEFORE THEY ARE INSTALLED OR REMOVED.



NO.	DATE	INITIAL	REVISION DETAIL	STAMP

DRAWING STATUS  
 ISSUED FOR REVIEW  
 APPROVED DATE: \_\_\_\_\_

PROJECT NO.: 210047  
 DATE: AUGUST 2021  
 SCALE: 1:500  
 DRAWN: SH  
 DESIGN: SH  
 CHECK: SC



FUNCTIONAL DESIGN  
 560 MAIN STREET EAST  
 MILTON, ON

DRAWING NO.: FD 1

NAME	DIMENSION	COLOUR	USE
1) SOLID	0.10 m	WHITE	EDGE LINE, LANE LINES
2) BOLD	3.33 SMP	WHITE	PROHIBITING LANE CHANGES
3) SOLID	0.10 m	WHITE	CONTINUITY LINES
4) SOLID	0.10 m	YELLOW	DIRECTIONAL DIVING LINES
5) SOLID	0.45 m	YELLOW	GOVE LINES
6) SOLID	0.60 m	WHITE	INTERSECTION STOP LINES

NAME	DIMENSION	COLOUR	USE
1) SOLID	0.10 m	WHITE	EDGE LINE, LANE LINES
2) BOLD	3.33 SMP	WHITE	PROHIBITING LANE CHANGES
3) SOLID	0.10 m	WHITE	CONTINUITY LINES
4) SOLID	0.10 m	YELLOW	DIRECTIONAL DIVING LINES
5) SOLID	0.45 m	YELLOW	GOVE LINES
6) SOLID	0.60 m	WHITE	INTERSECTION STOP LINES

NAME	DIMENSION	COLOUR	USE
1) SOLID	0.10 m	WHITE	EDGE LINE, LANE LINES
2) BOLD	3.33 SMP	WHITE	PROHIBITING LANE CHANGES
3) SOLID	0.10 m	WHITE	CONTINUITY LINES
4) SOLID	0.10 m	YELLOW	DIRECTIONAL DIVING LINES
5) SOLID	0.45 m	YELLOW	GOVE LINES
6) SOLID	0.60 m	WHITE	INTERSECTION STOP LINES

NAME	DIMENSION	COLOUR	USE
1) SOLID	0.10 m	WHITE	EDGE LINE, LANE LINES
2) BOLD	3.33 SMP	WHITE	PROHIBITING LANE CHANGES
3) SOLID	0.10 m	WHITE	CONTINUITY LINES
4) SOLID	0.10 m	YELLOW	DIRECTIONAL DIVING LINES
5) SOLID	0.45 m	YELLOW	GOVE LINES
6) SOLID	0.60 m	WHITE	INTERSECTION STOP LINES

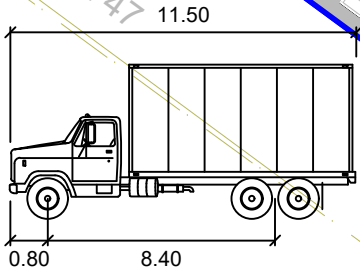
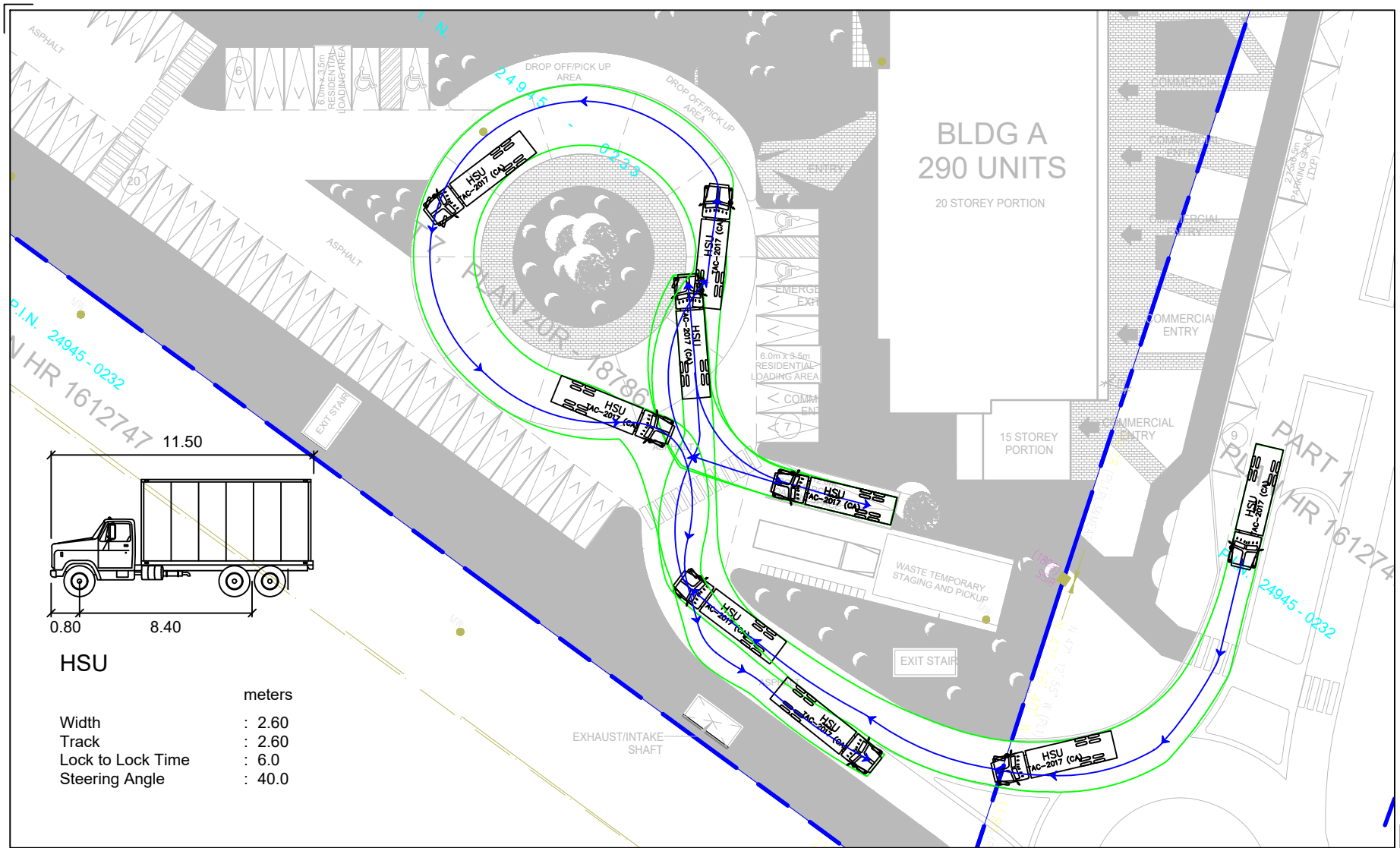
NAME	DIMENSION	COLOUR	USE
1) SOLID	0.10 m	WHITE	EDGE LINE, LANE LINES
2) BOLD	3.33 SMP	WHITE	PROHIBITING LANE CHANGES
3) SOLID	0.10 m	WHITE	CONTINUITY LINES
4) SOLID	0.10 m	YELLOW	DIRECTIONAL DIVING LINES
5) SOLID	0.45 m	YELLOW	GOVE LINES
6) SOLID	0.60 m	WHITE	INTERSECTION STOP LINES

NAME	DIMENSION	COLOUR	USE
1) SOLID	0.10 m	WHITE	EDGE LINE, LANE LINES
2) BOLD	3.33 SMP	WHITE	PROHIBITING LANE CHANGES
3) SOLID	0.10 m	WHITE	CONTINUITY LINES
4) SOLID	0.10 m	YELLOW	DIRECTIONAL DIVING LINES
5) SOLID	0.45 m	YELLOW	GOVE LINES
6) SOLID	0.60 m	WHITE	INTERSECTION STOP LINES

# Appendix E

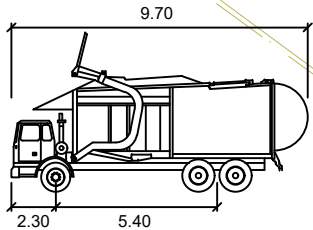
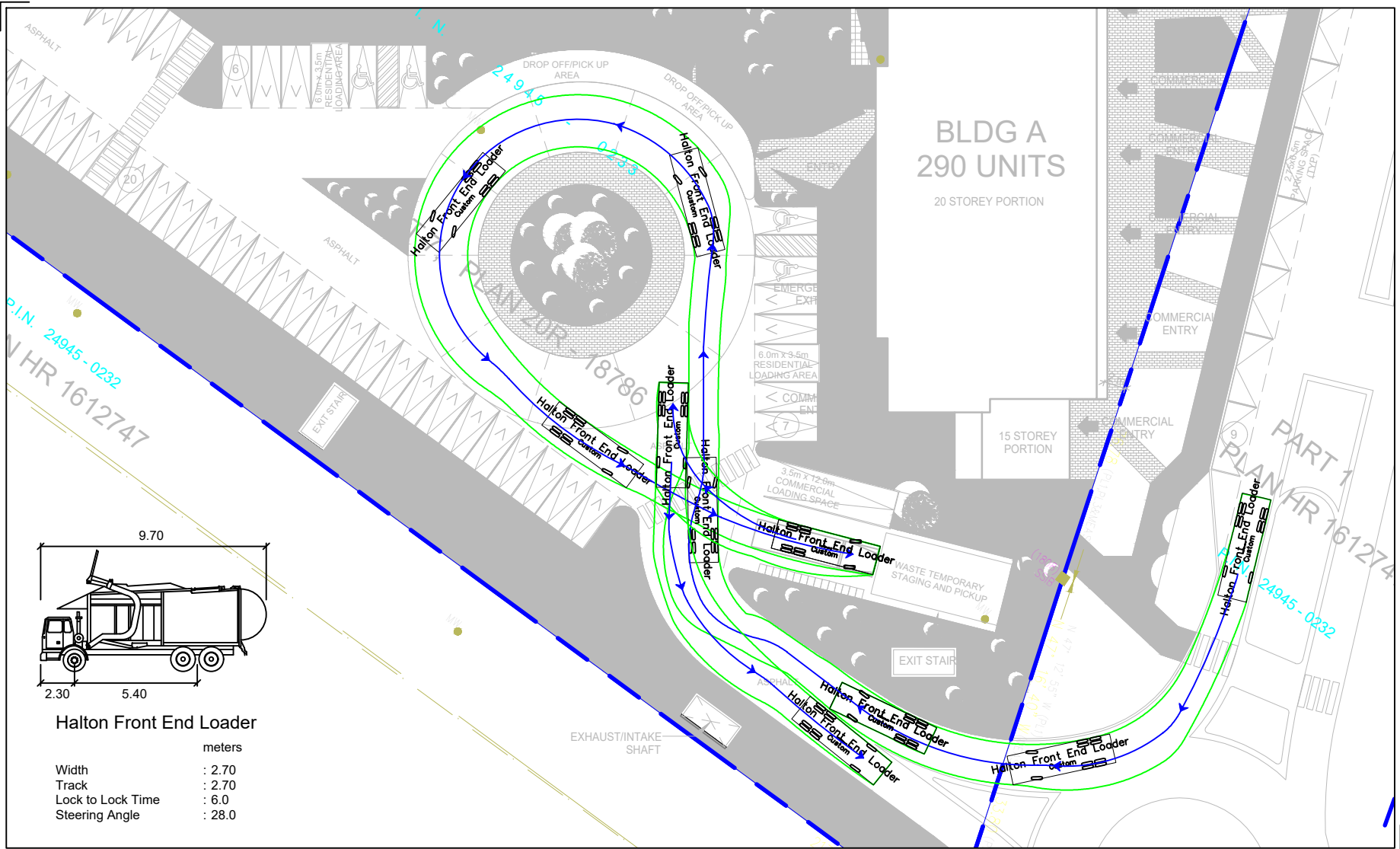
## Vehicle Circulation Diagrams





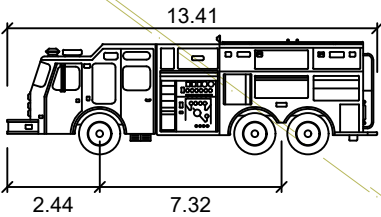
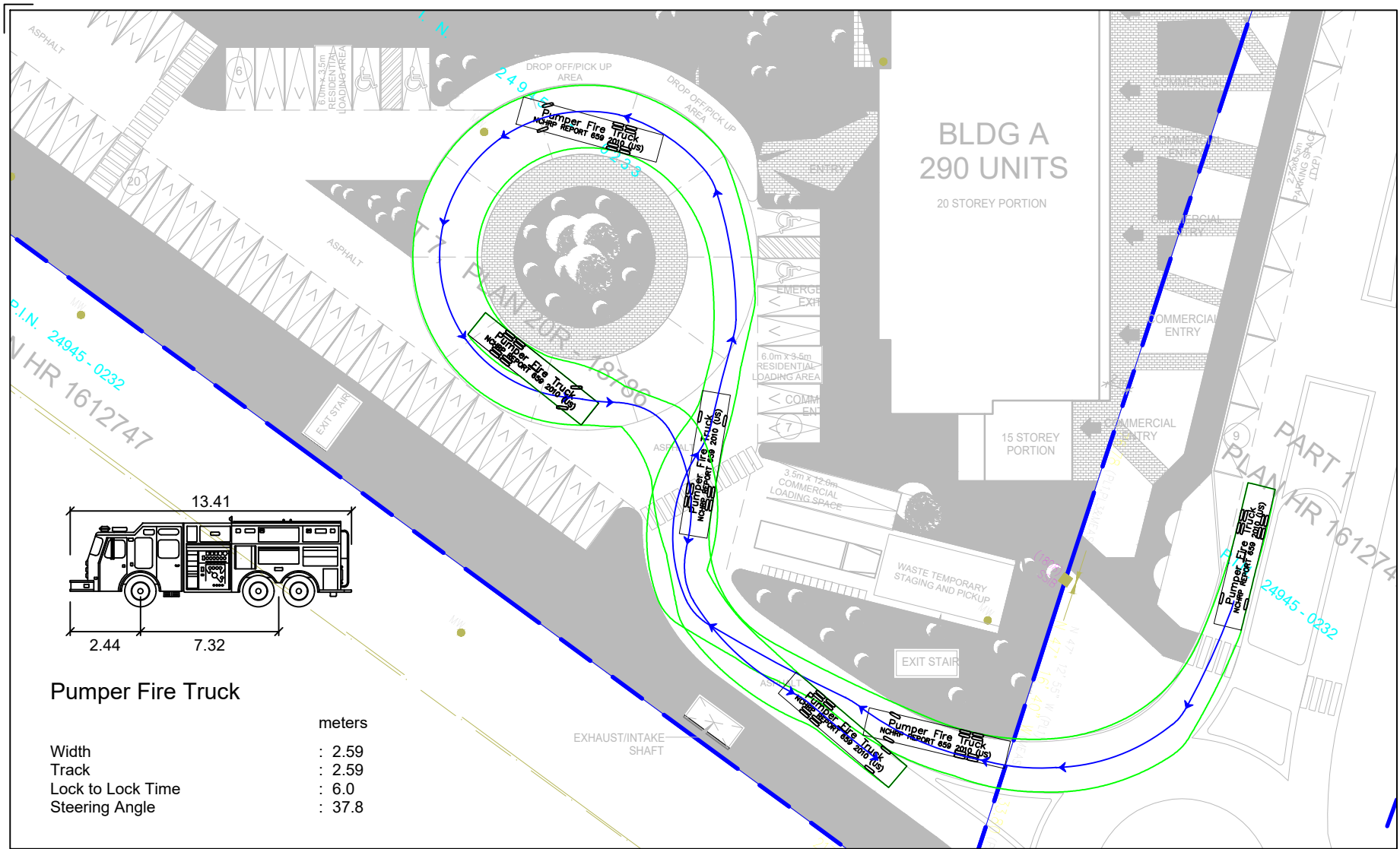
**HSU**

	units	meters
Width	:	2.60
Track	:	2.60
Lock to Lock Time	:	6.0
Steering Angle	:	40.0



Halton Front End Loader

	units
	meters
Width	: 2.70
Track	: 2.70
Lock to Lock Time	: 6.0
Steering Angle	: 28.0



**Pumper Fire Truck**

	meters
Width	: 2.59
Track	: 2.59
Lock to Lock Time	: 6.0
Steering Angle	: 37.8

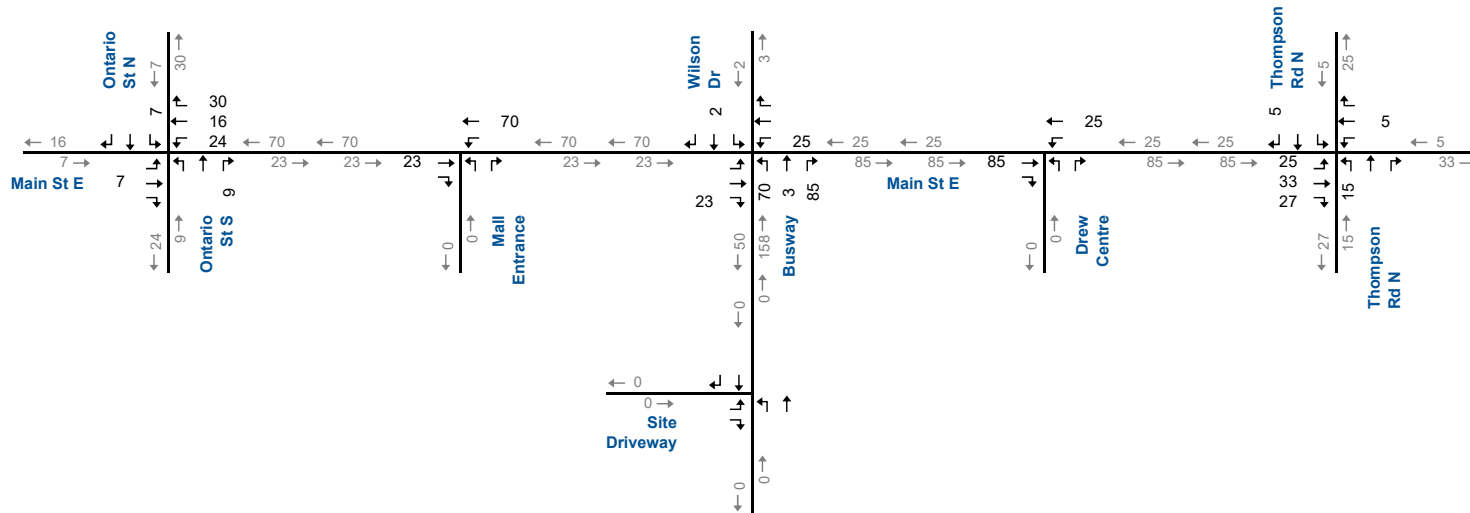


# Appendix F

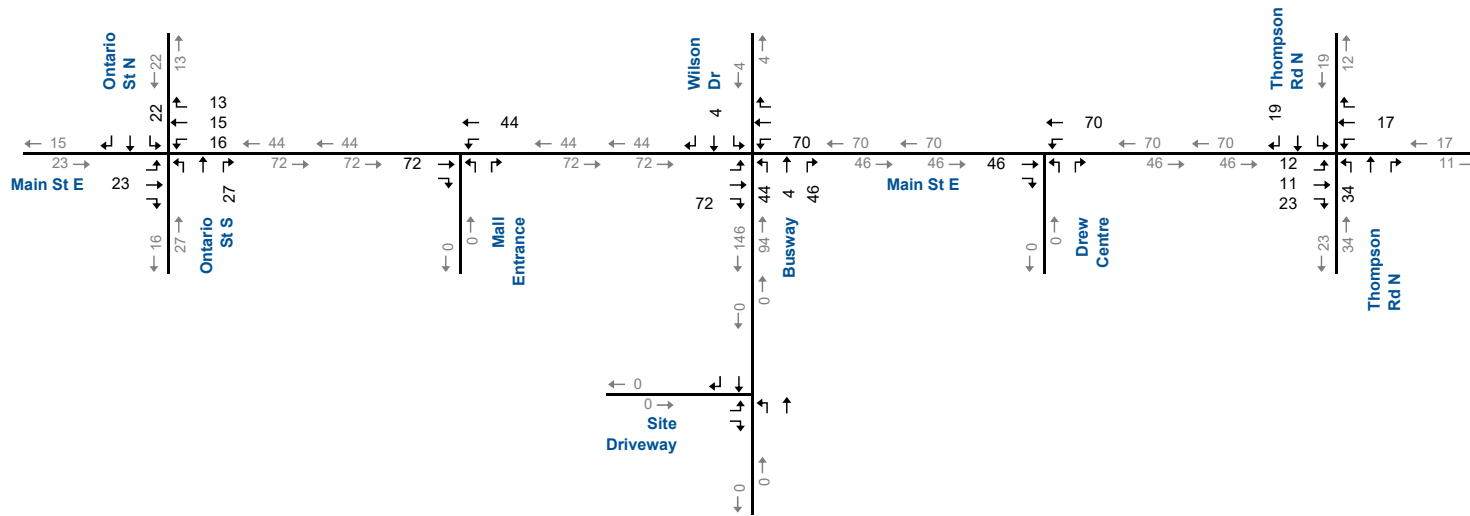
## Background Trip Assignment & Bus Rerouting



AM Peak Hour

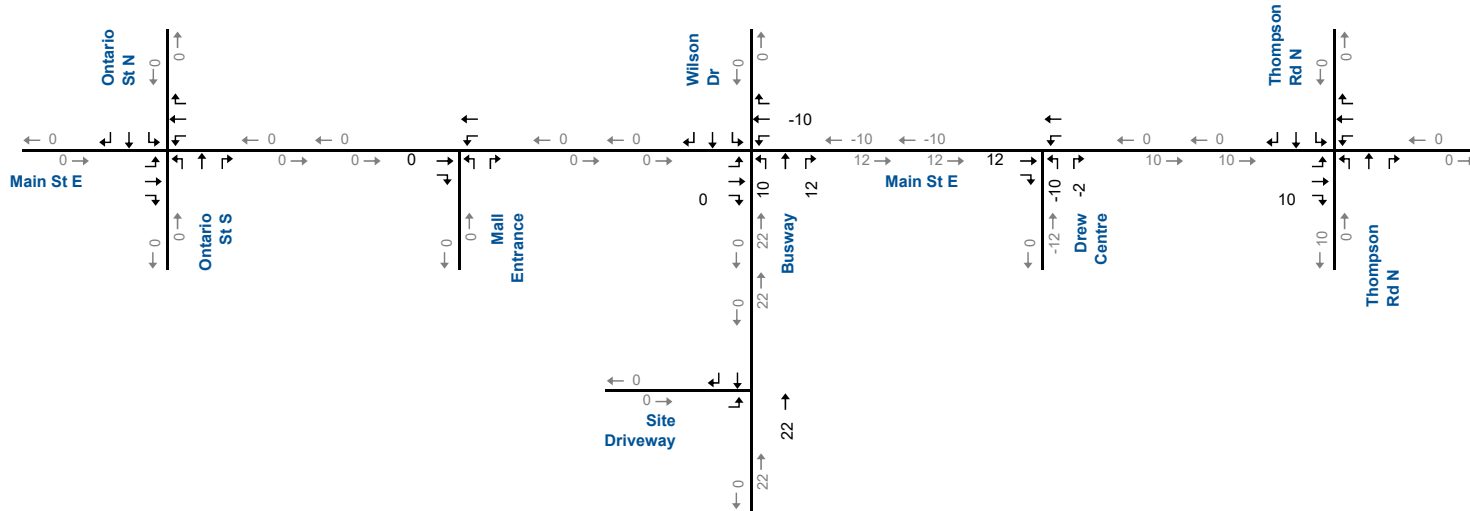


PM Peak Hour

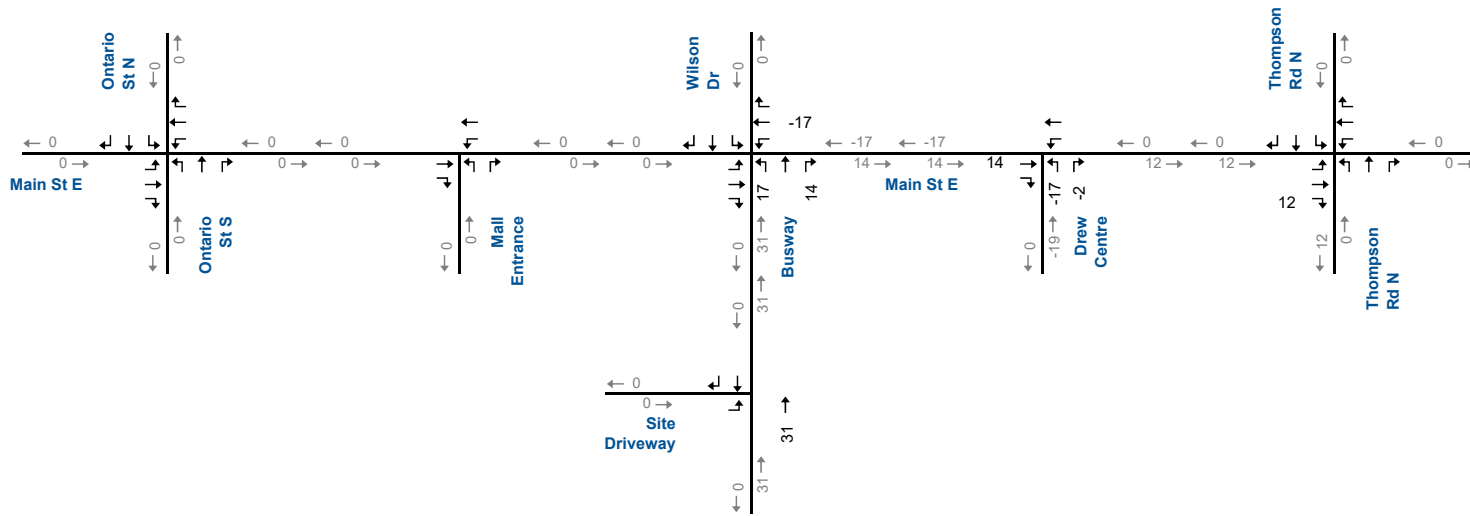


# 700 Main Street East Trip Assignment

AM Peak Hour



PM Peak Hour



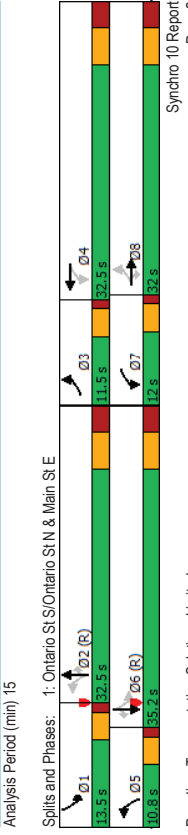
# Milton Transit Bus Reroute Trip Assignment

# Appendix G

## Future Background Traffic Operations



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	3	8	7	4	7	4	5	2	2	1	6	6
Permitted Phases	8	8	8	4	7	4	5	2	2	1	6	6
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	7.0	15.0	15.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	9.5	32.0	32.0	11.0	32.0	32.0	9.5	32.0	32.0	9.5	32.0	32.0
Total Split (s)	11.5	32.0	32.0	12.0	32.5	32.5	10.8	32.5	32.5	13.5	35.2	35.2
Total Split (%)	12.8%	35.6%	35.6%	13.3%	36.1%	36.1%	12.0%	36.1%	36.1%	15.0%	39.1%	39.1%
Maximum Green (s)	7.5	25.0	25.0	8.0	25.5	25.5	6.8	25.5	25.5	9.5	28.2	28.2
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	0.0	-3.0	-3.0	0.0	-3.0	-3.0	0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Vehicle Extension (s)	None	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Ad Effect Green (s)	30.6	23.1	23.1	31.6	23.6	23.6	40.5	33.7	33.7	45.9	38.0	38.0
Actuated g/C Ratio	0.34	0.26	0.26	0.35	0.26	0.26	0.45	0.37	0.37	0.51	0.42	0.42
v/c Ratio	0.70	0.69	0.21	0.86	0.51	0.51	0.27	0.62	0.62	0.42	0.59	0.42
Control Delay	33.0	34.0	2.9	54.5	24.6	24.6	14.4	26.6	26.6	5.5	21.4	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	34.0	2.9	54.5	24.6	24.6	14.4	26.6	26.6	5.5	21.4	21.0
LOS	C	C	A	D	C	C	B	C	C	A	C	C
Approach Delay	30.2	C	C	C	C	C	20.1	C	C	C	18.9	C
Approach LOS	C	C	C	C	C	C	C	C	C	C	B	B
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	33.3 (37%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green											
Natural Cycle:	95											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.86											
Intersection Signal Delay:	24.8											
Intersection Capacity Utilization:	74.9%											
Analysis Period (min):	15											
ICU Level of Service:	D											



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	210	623	107	204	326	145	101	798	319	172	595	98
Future Volume (vph)	210	623	107	204	326	145	101	798	319	172	595	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Storage Length (m)	40.0	0.0	35.0	0.0	35.0	0.0	70.0	0.0	65.0	40.0	40.0	1
Storage Lanes	1		1		1		0		1		1	1
Taper Length (m)	7.5	0.95	1.00	7.5	0.95	1.00	7.5	0.95	1.00	7.5	0.95	1.00
Lane Util. Factor	1.00	0.97	0.99	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98
Ped Bike Factor	1.00	0.850	0.954				0.850			0.850		0.850
Frt Protected	0.950		0.950				0.950			0.950		0.950
Satd. Flow (prot)	1728	3539	1581	1662	3305	0	1662	3438	1551	1631	3374	1581
Flt Permitted	0.336		0.194		0.377		0.377			0.180		0.180
Satd. Flow (perm)	609	3539	1535	337	3305	0	659	3438	1522	309	3374	1557
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	145		145		82		82		300		145	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	147.9		134.8		338.1		338.1		256.3		256.3	
Travel Time (s)	10.6		9.7		24.3		24.3		18.5		18.5	
Conf. Peds. (#/hr)	16		16		8		3		6		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
Heavy Vehicles (%)	1%	2%	1%	5%	2%	7%	5%	5%	3%	7%	7%	1%
Adj. Flow (vph)	210	623	107	204	326	145	101	798	319	172	595	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	623	107	204	471	0	101	798	319	172	595	98
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Left	Right
Median Width (m)	3.3		3.3		3.3		3.3		3.3		3.3	
Link Offset (m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width (m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane	1.04	1.00	1.01	1.04	1.00	1.04	1.00	1.04	1.00	1.04	1.00	1.01
Headway Factor	25	15	25	25	15	25	15	25	15	25	15	25
Turning Speed (k/h)	1	2	1	1	2	1	1	2	1	1	2	1
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	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	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size (m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	C+Ex		C+Ex		C+Ex		C+Ex		C+Ex		C+Ex	
Detector 2 Channel												

Queues  
1: Ontario St S/Ontario St N & Main St E

1: Ontario St S/Ontario St N & Main St E

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	210	623	107	204	471	101	798	319	172	595	98
Lane Group Flow (vph)	0.70	0.69	0.21	0.86	0.51	0.27	0.62	0.42	0.59	0.42	0.13
v/c Ratio	33.0	34.0	2.9	54.5	24.6	14.4	26.6	5.5	21.4	21.0	1.7
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	33.0	34.0	2.9	54.5	24.6	14.4	26.6	5.5	21.4	21.0	1.7
Total Delay	26.0	53.7	0.0	25.2	31.3	8.9	62.1	2.2	15.9	40.8	0.0
Queue Length 50th (m)	39.2	67.1	6.3	45.1	23.0	19.5	89.4	21.6	31.2	61.1	4.3
Queue Length 95th (m)	123.9			110.8			314.1			232.3	
Internal Link Dist (m)	40.0			35.0			70.0			40.0	
Turn Bay Length (m)	300	1101	577	236	1102	380	1288	757	305	1423	740
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.57	0.19	0.86	0.43	0.27	0.62	0.42	0.56	0.42	0.13

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

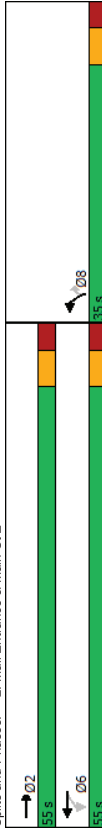
1: Ontario St S/Ontario St N & Main St E

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Movement	210	623	107	204	471	101	798	319	172	595	98
Lane Configurations	210	623	107	204	326	145	101	798	319	172	595
Traffic Volume (veh/h)	210	623	107	204	326	145	101	798	319	172	595
Future Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6
Number	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Obs.) veh	0.99	1.00	0.99	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1881	1863	1881	1810	1835	1900	1810	1845	1776	1776	1881
Adj Sat Flow, veh/h	210	623	0	204	326	145	101	798	319	172	595
Adj Flow Rate, veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Peak Hour Factor	1	2	1	1	2	0	1	2	1	1	2
Percent Heavy Veh. %	1	2	1	5	2	7	5	5	3	7	7
Cap. veh/h	333	892	421	289	632	275	378	1324	601	303	1401
Arrive On Green	0.08	0.26	0.00	0.09	0.27	0.24	0.05	0.39	0.39	0.08	0.42
Sat Flow, veh/h	1792	3539	1599	1723	2351	1022	1723	3438	1561	1691	3374
Grp Volume(v), veh/h	210	623	0	204	240	231	101	798	319	172	595
Grp Sat Flow(s), veh/h	1792	1770	1599	1723	1743	1630	1723	1719	1561	1691	1687
Q Serve(g.s), s	7.5	14.2	0.0	8.0	10.5	11.0	3.3	16.7	14.2	5.7	11.3
Cycle Q Clear(g.c), s	7.5	14.2	0.0	8.0	10.5	11.0	3.3	16.7	14.2	5.7	11.3
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.63	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	333	892	421	289	469	438	378	1324	601	303	1401
V/C Ratio(X)	0.63	0.67	0.00	0.71	0.51	0.53	0.27	0.60	0.53	0.57	0.42
Avail Cap(c.a), veh/h	333	1101	497	289	552	516	414	1324	601	338	1401
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
Upstream Filter(I)	1.00	1.00	0.00	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.7	29.6	0.0	25.6	27.9	28.9	17.3	22.1	21.4	18.1	18.7
Incr Delay (d2), s/veh	2.9	0.8	0.0	6.4	0.3	0.4	0.1	2.0	3.3	0.8	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
%ile BackOfQ(50%) veh/m	1.5	7.0	0.0	1.7	5.1	5.0	1.6	8.2	6.6	2.6	5.4
LnGrp Delay(d)s/veh	28.6	30.4	0.0	32.0	28.2	29.3	17.4	24.2	24.7	18.8	19.6
LnGrp LOS	C	C	C	C	C	C	B	C	C	C	B
Approach Vol, veh/h	833			675			1218			767	
Approach Delay, s/veh	29.9			29.7			23.8			19.5	
Approach LOS	C			C			C			B	
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	11.6	38.7	11.5	28.2	8.9	41.4	12.0	27.7			
Change Period (Y+Rc), s	4.0	7.0	4.0	4.0	7.0	4.0	7.0	4.0			
Max Green Setting (Gmax), s	9.5	25.5	7.5	25.5	6.8	28.2	8.0	25.0			
Max Q Clear Time (g_c+H), s	7.7	18.7	9.5	13.0	5.3	13.3	10.0	16.2			
Green Ext Time (p_c), s	0.1	3.2	0.0	1.9	0.0	2.9	0.0	2.4			
Intersection Summary											
HCM 2010 Ctrl Delay	25.4										
HCM 2010 LOS	C										

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	1232	41	32	653	23	18
Future Volume (vph)	1232	41	32	653	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.3	3.6	3.3	3.5
Storage Length (m)	0.0	0.0	70.0	0.0	0.0	0.0
Storage Lanes	0	1	1	1	1	1
Taper Length (m)	0.95	0.95	1.00	0.95	1.00	1.00
Lane Util. Factor	0.995					
FRT	0.950					0.850
FRT Protected			0.950		0.950	
Satd. Flow (prot)	3491	0	1745	3343	1711	1597
FRT Permitted			0.197		0.950	
Satd. Flow (perm)	3491	0	362	3343	1711	1597
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6					18
Link Speed (k/h)	50			50		50
Link Distance (m)	134.8		273.6	144.7		
Travel Time (s)	9.7		19.7	10.4		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	8%	2%	0%
Adj. Flow (vph)	1232	41	32	653	23	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1273	0	32	653	23	18
Enter Blocked Intersection	No	No	No	No	Left	Right
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3		3.3		3.3	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.04	1.00	1.04	1.01
Turning Speed (k/h)	15	25	25	15	25	15
Number of Detectors	2	1	2	1	1	1
Detector Template	Thru	Left	Thru	Left	Right	Right
Leading Detector (m)	10.0	2.0	10.0	2.0	2.0	2.0
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)	0.6	2.0	0.6	2.0	2.0	2.0
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	Perm	0.0	Prot	Perm	Perm
Turn Type	NA	Perm	NA	Prot	Perm	Perm

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Protected Phases	2				8	8
Permitted Phases			6	6	8	8
Detector Phase	2		6	6	8	8
Switch Phase						
Minimum Initial (s)	30.0	30.0	30.0	30.0	10.0	10.0
Minimum Split (s)	37.0	37.0	37.0	35.0	35.0	35.0
Total Split (s)	55.0	55.0	55.0	55.0	35.0	35.0
Total Split (%)	61.1%	61.1%	61.1%	61.1%	38.9%	38.9%
Maximum Green (s)	48.0	48.0	48.0	28.0	28.0	28.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	None	3.0	3.0	3.0	3.0
Recall Mode	Max	None	None	None	None	None
Walk Time (s)	15.0		20.0		20.0	
Flash Dorn Walk (s)	7.0		7.0		7.0	
Pedestrian Calls (#/hr)	0		0		0	
Act Effct Green (s)	62.0	62.0	62.0	13.1	13.1	13.1
Actuated G/C Ratio	0.84	0.84	0.84	0.18	0.18	0.18
v/c Ratio	0.44	0.11	0.23	0.08	0.06	0.06
Control Delay	3.8	4.1	2.9	26.6	12.5	12.5
Queue Delay	0.3	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	4.1	2.9	26.6	12.5	12.5
LOS	A	A	A	C	B	B
Approach Delay	4.1		2.9		20.4	
Approach LOS	A		A		C	
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	74.2					
Natural Cycle:	75					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.44					
Intersection Signal Delay:	4.0					
Intersection Capacity Utilization:	50.4%					
Analysis Period (min):	15					

Splits and Phases: 2: Mail Entrance & Main St E



Queues

2. Mail Entrance & Main St E

	EBT	WBL	WBT	NBL	NBR
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1273	32	653	23	18
v/c Ratio	0.44	0.11	0.23	0.08	0.06
Control Delay	3.8	4.1	2.9	26.6	12.5
Queue Delay	0.3	0.0	0.0	0.0	0.0
Total Delay	4.1	4.1	2.9	26.6	12.5
Queue Length 50th (m)	34.8	1.2	14.2	3.5	0.0
Queue Length 95th (m)	47.0	3.9	20.2	8.7	5.1
Internal Link Dist (m)	110.8		249.6	120.7	
Turn Bay Length (m)	70.0				
Base Capacity (vph)	2916	302	2791	719	682
Starvation Cap Reductn	878	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.62	0.11	0.23	0.03	0.03

Intersection Summary

2. Mail Entrance & Main St E

	EBT	EBR	WBL	WBT	NBL	NBR
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	←	←	←	←
Traffic Volume (veh/h)	1232	41	32	653	23	18
Future Volume (veh/h)	1232	41	32	653	23	18
Number	2	12	1	6	3	18
Initial Q (Ob.) veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/m	1846	1900	1900	1759	1863	1900
Adj Flow Rate, veh/h	1232	41	32	653	23	18
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	0	0	8	2	0
Cap. veh/h	2623	87	382	2531	220	200
Arrive On Green	0.76	0.71	0.76	0.76	0.12	0.12
Sat Flow, veh/h	3557	115	442	3431	1774	1615
Grp Volume(v), veh/h	623	650	32	653	23	18
Grp Sat Flow(s), veh/h/m	1754	1826	442	1671	1774	1615
Q Serve(g.s), s	9.0	9.1	2.0	4.0	0.8	0.7
Cycle Q Clear(g.c), s	9.0	9.1	11.1	4.0	0.8	0.7
Prop In Lane	0.06	0.06	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1328	1383	382	2531	220	200
V/C Ratio(X)	0.47	0.47	0.08	0.26	0.10	0.09
Avail Cap(c.a), veh/h	1328	1383	382	2531	816	743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	3.1	3.1	5.2	2.5	26.2	26.1
Incr Delay (d2), s/veh	1.2	1.1	0.1	0.1	0.2	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%) veh/m	4.6	4.8	0.2	1.8	0.4	0.3
LnGrp Delay(d), s/veh	4.3	4.3	5.3	2.5	26.4	26.3
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h	1273		685	41		
Approach Delay, s/veh	4.3		2.7	26.4		
Approach LOS	A		A	C		
Timer	1	2	3	4	5	6
Assigned Phs		2				8
Phs Duration (G+Y+Rc), s		55.0				12.4
Change Period (Y+Rc), s		7.0				7.0
Max Green Setting (Gmax), s		48.0				28.0
Max Q Clear Time (g_c+H), s		11.1				13.1
Green Ext Time (p_c), s		14.0				6.8
0.1						
Intersection Summary						
HCM 2010 Ctrl Delay			4.2			
HCM 2010 LOS			A			



Lanes, Volumes, Timings  
3: Busway/Wilson Dr & Main St E

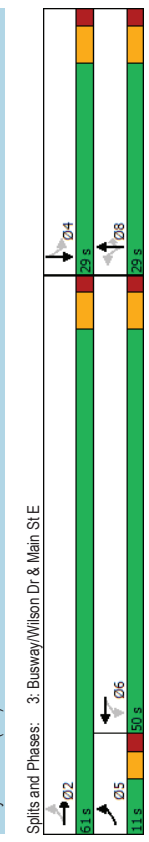
200624  
2031 Background AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	61	1086	23	25	458	71	80	3	97	165	2	93
Future Volume (vph)	61	1086	23	25	458	71	80	3	97	165	2	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5	3.5
Storage Length (m)	50.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	35.0	55.0	0.0	0.0
Storage Lanes	1	0	0	1	0	0	1	1	1	1	0	0
Taper Length (m)	7.5	0.95	0.95	7.5	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.997	0.997	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
Frt	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1646	3529	0	1770	3379	0	1597	1863	1442	1728	1574	0
FltP/Permitted	0.398	0.257	0.695	0.695	0.695	0.695	0.695	0.695	0.695	0.695	0.695	0.695
Satd. Flow (perm)	688	3529	0	479	3379	0	1169	1863	1442	1360	1574	0
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	4	28	28	28	28	28	28	28	28	28	28	28
Link Speed (k/h)	50	50	50	50	50	50	50	50	50	50	50	50
Link Distance (m)	260.1	360.6	200.7	200.7	200.7	200.7	200.7	200.7	200.7	200.7	200.7	200.7
Travel Time (s)	18.7	26.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
Confl. Peds. (#/hr)	5	5	5	5	5	5	5	5	5	5	5	5
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 (%)	6%	2%	2%	5%	0%	13%	2%	12%	1%	2%	3%	3%
Adj. Flow (vph)	61	1086	23	25	458	71	80	3	97	165	2	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	1109	0	25	529	0	80	3	97	165	95	0
Enter Blocked Intersection	Left	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Link Offset (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width (m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.01
Headway Factor	25	15	15	25	25	25	25	25	25	25	25	25
Turning Speed (k/h)	1	2	2	1	2	2	1	2	1	2	1	2
Number of Detectors	Left	Thru	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Thru
Detector Template	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Leading Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4	0.6	9.4	0.6	9.4	0.6	9.4	0.6	9.4	0.6	9.4	0.6
Detector 2 Size (m)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Detector 2 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Lanes, Volumes, Timings  
3: Busway/Wilson Dr & Main St E

200624  
2031 Background AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm-pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	NA
Protected Phases	5	2	6	6	6	6	8	8	8	4	4	4
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Detector Phase	5	2	2	6	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	40.0	40.0	40.0	40.0	40.0	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	10.0	46.0	46.0	46.0	46.0	46.0	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	11.0	61.0	61.0	50.0	50.0	50.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	12.2%	67.8%	67.8%	55.6%	55.6%	55.6%	32.2%	32.2%	32.2%	32.2%	32.2%	32.2%
Maximum Green (s)	6.0	55.0	44.0	44.0	44.0	44.0	23.0	23.0	23.0	23.0	23.0	23.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	None	Max	None	None	None	None	None	None	None	None	None	None
Recall Mode	30.0	30.0	30.0	30.0	30.0	30.0	7.0	7.0	7.0	7.0	7.0	7.0
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0	13.0	13.0	13.0	13.0	13.0	13.0
Flash Dont Walk (s)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	57.2	57.2	48.5	48.5	48.5	48.5	18.1	18.1	18.1	18.1	18.1	18.1
Act Effct Green (s)	0.69	0.69	0.58	0.58	0.58	0.58	0.22	0.22	0.22	0.22	0.22	0.22
Actuated g/C Ratio	0.11	0.46	0.09	0.27	0.32	0.01	0.25	0.66	0.23	0.23	0.23	0.23
v/c Ratio	5.7	7.3	11.5	9.9	30.4	24.3	7.5	36.5	7.6	7.6	7.6	7.6
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	5.7	7.3	11.5	9.9	30.4	24.3	7.5	36.5	7.6	7.6	7.6	7.6
Total Delay	A	A	B	A	A	A	C	C	A	D	A	A
LOS	7.2	9.9	17.9	9.9	9.9	9.9	17.9	9.9	9.9	17.9	9.9	9.9
Approach Delay	A	A	A	A	A	A	B	B	B	B	B	B
Approach LOS	A	A	A	A	A	A	B	B	B	B	B	B
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	83.3											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoordinated											
Maximum v/c Ratio:	0.56											
Intersection Signal Delay:	11.0											
Intersection LOS:	B											
Intersection Capacity Utilization:	73.2%											
ICU Level of Service D												
Analysis Period (min)	15											



	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	61	1109	25	529	80	3	97	165	95
v/c Ratio	0.11	0.46	0.09	0.27	0.32	0.01	0.25	0.56	0.23
Control Delay	5.7	7.3	11.5	9.9	30.4	24.3	7.5	36.5	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	7.3	11.5	9.9	30.4	24.3	7.5	36.5	7.6
Queue Length 50th (m)	2.8	37.6	1.8	21.3	11.3	0.4	0.0	24.6	0.3
Queue Length 95th (m)	8.3	65.6	6.8	36.8	23.6	2.5	11.4	44.0	11.5
Internal Link Dist (m)	236.1 176.7 150.4								
Turn Bay Length (m)	50.0 40.0 35.0 55.0								
Base Capacity (vph)	553	2424	279	1980	351	561	501	409	539
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.46	0.09	0.27	0.23	0.01	0.19	0.40	0.18

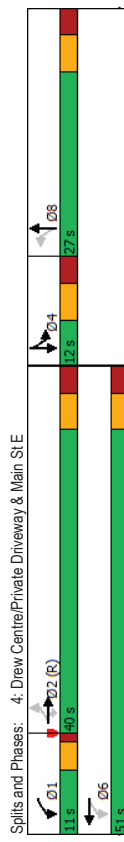
Intersection Summary

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	61	1086	23	25	458	71	80	3	97
Traffic Volume (veh/h)	61	1086	23	25	458	71	80	3	97
Future Volume (veh/h)	5	2	12	1	6	16	3	8	7
Number	0	0	0	0	0	0	0	0	0
Initial Q (Obs.) veh	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/h	1792	1863	1900	1863	1821	1900	1863	1696	1881
Adj Flow Rate, veh/h	61	1086	23	25	458	71	80	3	97
Adj No. of Lanes	1	2	0	1	2	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	6	2	2	2	5	0	13	2	12
Cap. veh/h	619	2506	53	381	1799	277	253	360	279
Arrive On Green	0.06	0.71	0.68	0.60	0.60	0.60	0.19	0.19	0.19
Sat Flow, veh/h	1707	3544	75	506	3004	463	1158	1442	1302
Grp Volume(v), veh/h	61	542	25	263	266	80	3	97	165
Grp Sat Flow(s), veh/h	1707	1770	1849	506	1730	1737	1158	1863	1442
Q Serve(g.s), s	1.0	10.4	10.5	1.8	5.8	5.9	5.1	0.1	4.7
Cycle Q Clear(g.c), s	1.0	10.4	10.5	3.5	5.8	5.9	9.4	0.1	4.7
Prop In Lane	1.00	0.04	1.00	0.27	1.00	1.00	1.00	1.00	0.98
Lane Grp Cap(c), veh/h	619	1252	1308	381	1036	1041	253	360	279
V/C Ratio(X)	0.10	0.43	0.43	0.07	0.25	0.26	0.32	0.01	0.35
Avail Cap(c.a), veh/h	668	1252	1308	381	1036	1041	388	578	447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.0	5.0	5.0	7.6	7.6	7.7	31.9	28.1	30.1
Incr Delay (d2), s/veh	0.1	1.1	1.0	0.1	0.2	0.2	1.0	0.0	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
%ile BackOfQ(50%) veh/m	0.5	5.4	5.6	0.3	2.8	2.9	1.7	0.1	1.9
LnGrp Delay(d), s/veh	5.0	6.1	6.1	7.7	7.8	7.8	33.0	29.2	31.6
LnGrp LOS	A	A	A	A	A	A	C	C	C
Approach Vol, veh/h	1170 554 180								
Approach Delay, s/veh	6.0 7.8 30.8								
Approach LOS	A A A C C C								
Timer	1	2	3	4	5	6	7	8	
Assigned Phs	2 4 5 6 7 8								
Phs Duration (G+Y+Rc), s	61.0 19.6 8.7 52.3 19.6								
Change Period (Y+Rc), s	6.0 6.0 5.0 6.0 6.0								
Max Green Setting (Gmax), s	55.0 23.0 6.0 44.0 23.0								
Max Q Clear Time (g_c+H), s	12.5 11.5 3.0 7.9 11.4								
Green Ext Time (p_c), s	16.8 1.4 0.0 6.6 0.8								
Intersection Summary	11.5 B								
HCM 2010 Ctrl Delay	11.5								
HCM 2010 LOS	B								

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	61	1086	23	25	458	71	80	3	97
Traffic Volume (veh/h)	61	1086	23	25	458	71	80	3	97
Future Volume (veh/h)	5	2	12	1	6	16	3	8	7
Number	0	0	0	0	0	0	0	0	0
Initial Q (Obs.) veh	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/h	1792	1863	1900	1863	1821	1900	1863	1696	1881
Adj Flow Rate, veh/h	61	1086	23	25	458	71	80	3	97
Adj No. of Lanes	1	2	0	1	2	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	6	2	2	2	5	0	13	2	12
Cap. veh/h	619	2506	53	381	1799	277	253	360	279
Arrive On Green	0.06	0.71	0.68	0.60	0.60	0.60	0.19	0.19	0.19
Sat Flow, veh/h	1707	3544	75	506	3004	463	1158	1442	1302
Grp Volume(v), veh/h	61	542	25	263	266	80	3	97	165
Grp Sat Flow(s), veh/h	1707	1770	1849	506	1730	1737	1158	1863	1442
Q Serve(g.s), s	1.0	10.4	10.5	1.8	5.8	5.9	5.1	0.1	4.7
Cycle Q Clear(g.c), s	1.0	10.4	10.5	3.5	5.8	5.9	9.4	0.1	4.7
Prop In Lane	1.00	0.04	1.00	0.27	1.00	1.00	1.00	1.00	0.98
Lane Grp Cap(c), veh/h	619	1252	1308	381	1036	1041	253	360	279
V/C Ratio(X)	0.10	0.43	0.43	0.07	0.25	0.26	0.32	0.01	0.35
Avail Cap(c.a), veh/h	668	1252	1308	381	1036	1041	388	578	447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.0	5.0	5.0	7.6	7.6	7.7	31.9	28.1	30.1
Incr Delay (d2), s/veh	0.1	1.1	1.0	0.1	0.2	0.2	1.0	0.0	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
%ile BackOfQ(50%) veh/m	0.5	5.4	5.6	0.3	2.8	2.9	1.7	0.1	1.9
LnGrp Delay(d), s/veh	5.0	6.1	6.1	7.7	7.8	7.8	33.0	29.2	31.6
LnGrp LOS	A	A	A	A	A	A	C	C	C
Approach Vol, veh/h	1170 554 180								
Approach Delay, s/veh	6.0 7.8 30.8								
Approach LOS	A A A C C C								
Timer	1	2	3	4	5	6	7	8	
Assigned Phs	2 4 5 6 7 8								
Phs Duration (G+Y+Rc), s	61.0 19.6 8.7 52.3 19.6								
Change Period (Y+Rc), s	6.0 6.0 5.0 6.0 6.0								
Max Green Setting (Gmax), s	55.0 23.0 6.0 44.0 23.0								
Max Q Clear Time (g_c+H), s	12.5 11.5 3.0 7.9 11.4								
Green Ext Time (p_c), s	16.8 1.4 0.0 6.6 0.8								
Intersection Summary	11.5 B								
HCM 2010 Ctrl Delay	11.5								
HCM 2010 LOS	B								

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	831	117	78	566	0	139	0	36	0	0	0
Future Volume (vph)	0	831	117	78	566	0	139	0	36	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Storage Length (m)	15.0	40.0	40.0	45.0	0.0	0.0	0.0	55.0	0.0	0.0	0.0	0.0
Storage Lanes	1	1	1	1	0	0	2	0	0	0	0	0
Taper Length (m)	7.5	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	0.96	1.00	0.98	0.98	0.950	0.850				
Frt		0.850					0.950					
Flt Protected							0.950					
Satd. Flow (prot)	1837	3539	1439	1646	3539	0	3395	1583	0	0	1900	0
Flt Permitted							0.284	0.950				
Satd. Flow (perm)	1837	3539	1387	490	3539	0	3395	1583	0	0	1900	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			182				337					
Link Speed (km/h)	50	50	50	362.0	256.9	18.5	3.7					
Link Distance (m)	360.6	26.0	10	10	10	10	10	10	10	10	10	10
Travel Time (s)	26.0	26.0	10	10	10	10	10	10	10	10	10	10
Conf. Peds. (#/hr)	2	10	10	10	10	10	10	10	10	10	10	10
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 (%)	0%	2%	11%	6%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	831	117	78	566	0	139	0	36	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	831	117	78	566	0	139	36	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Link Offset (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width (m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane	1.04	1.00	1.01	1.04	1.00	1.04	1.00	1.04	1.00	1.01	1.00	1.00
Headway Factor	25	15	25	25	15	25	25	15	25	15	25	15
Turning Speed (km/h)	1	2	1	1	2	1	2	1	2	1	2	1
Number of Detectors	1	2	1	1	2	1	2	1	2	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	10.0	2.0	10.0	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	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4	0.6	9.4	9.4	0.6	9.4	0.6	9.4	0.6	9.4	0.6	9.4
Detector 2 Size (m)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Detector 2 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	NA	NA	NA	NA	NA
Protected Phases				1	6		8			4		4
Permitted Phases	2	2	2	2	1	6	8	8	8	4	4	4
Detector Phase	2	2	2	2	1	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0
Minimum Split (s)	35.0	35.0	35.0	9.5	35.0	27.0	27.0	27.0	27.0	12.0	12.0	12.0
Total Split (s)	40.0	40.0	40.0	11.0	51.0	27.0	27.0	27.0	27.0	13.3%	13.3%	13.3%
Total Split (%)	44.4%	44.4%	44.4%	12.2%	56.7%	30.0%	30.0%	30.0%	30.0%	13.3%	13.3%	13.3%
Maximum Green (s)	33.0	33.0	33.0	7.0	44.0	20.0	20.0	20.0	20.0	5.0	5.0	5.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	0.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0	21.0	21.0	21.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	60.3	60.3	60.3	69.0	69.0	13.0	13.0	13.0	13.0	0.14	0.14	0.14
Act Effct Green Ratio	0.67	0.67	0.67	0.77	0.77	0.14	0.14	0.14	0.14	0.29	0.29	0.29
v/c Ratio	0.35	0.12	0.17	0.21	0.21	0.29	0.07	0.07	0.07	0.29	0.29	0.29
Control Delay	7.7	0.5	3.8	3.3	3.3	35.3	0.2	0.2	0.2	35.3	35.3	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	0.5	3.8	3.3	3.3	35.3	0.2	0.2	0.2	35.3	35.3	35.3
LOS	A	A	A	A	A	D	A	A	A	D	A	A
Approach Delay	6.8	6.8	6.8	3.4	3.4	28.1	0.2	0.2	0.2	28.1	28.1	28.1
Approach LOS	A	A	A	A	A	C	A	A	A	C	A	A
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	18.9 (21%), Referenced to phase 2/EBTL, Start of Green											
Natural Cycle:	95											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.35											
Intersection Signal Delay:	7.7											
Intersection Capacity Utilization:	45.8%											
Analysis Period (min):	15											



	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group Flow (vph)	831	117	78	566	139	36
v/c Ratio	0.35	0.12	0.17	0.21	0.29	0.07
Control Delay	7.7	0.5	3.8	3.3	35.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	0.5	3.8	3.3	35.3	0.2
Queue Length 50th (m)	32.4	0.0	2.7	11.8	11.8	0.0
Queue Length 95th (m)	50.2	1.7	6.8	19.5	19.7	0.0
Internal Link Dist (m)	338.6			338.0		232.9
Turn Bay Length (m)	40.0	45.0				
Base Capacity (vph)	2372	990	468	2715	865	655
Station 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	0.35	0.12	0.17	0.21	0.16	0.05

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	831	117	78	566	0	139	0	36	0	0
Future Volume (veh/h)	0	831	117	78	566	0	139	0	36	0	0
Number	5	2	12	1	6	16	3	8	18	7	4
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98	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
Adj Sat Flow, veh/h	1900	1863	1712	1792	1863	0	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	831	117	78	566	0	139	0	36	0	0
Adj No. of Lanes	1	2	1	1	2	0	2	1	0	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	0	2	11	6	2	0	0	0	0	0	0
Cap. veh/h	80	2507	1023	493	2833	0	549	0	175	0	0
Arrive On Green	0.00	0.71	0.71	0.05	0.80	0.00	0.11	0.00	0.08	0.00	0.00
Sat Flow, veh/h	858	3539	1445	1707	3632	0	3510	0	1577	0	0
Grp Volume(v), veh/h	0	831	117	78	566	0	139	0	36	0	0
Grp Sat Flow(s), veh/h	858	1770	1445	1707	1770	0	1755	0	1577	0	0
Q Serve(g.s), s	0.0	8.1	2.3	1.1	3.4	0.0	3.3	0.0	1.9	0.0	0.0
Cycle Q Clear(g.c), s	0.0	8.1	2.3	1.1	3.4	0.0	3.3	0.0	1.9	0.0	0.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Lane Grp Cap(c), veh/h	80	2507	1023	493	2833	0	549	0	175	0	0
V/C Ratio(X)	0.00	0.33	0.11	0.16	0.20	0.00	0.25	0.00	0.21	0.00	0.00
Avail Cap(c.a), veh/h	80	2507	1023	544	2833	0	1057	0	403	0	0
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
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.0	4.2	3.7	2.1	0.0	37.1	0.0	37.8	0.0	0.6
Incr Delay (d2), s/veh	0.0	0.4	0.2	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0
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
%ile Back(Q50%), veh/m	0.0	4.0	1.0	0.5	1.7	0.0	1.6	0.0	0.9	0.0	0.0
LnGrp Delay(d), s/veh	0.0	5.4	4.4	3.9	2.2	0.0	37.3	0.0	38.4	0.0	0.6
LnGrp LOS	A	A	A	A	A	D	D	D	D	D	D
Approach Vol, veh/h	948			644		175					
Approach Delay, s/veh	5.2			2.4		37.5					
Approach LOS	A			A		D					
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2									
Phs Duration (G+Y+Rc), s	8.3	67.8				6					
Change Period (Y+Rc), s	4.0	7.0				76.0					
Max Green Setting (Gmax), s	7.0	33.0				44.0					
Max Q Clear Time (g_c+H), s	3.1	10.1				5.4					
Green Ext Time (p_c), s	0.1	7.9				5.2					
Intersection Summary											
HCM 2010 Cfl Delay						7.4					
HCM 2010 LOS						A					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	144	675	98	316	430	60	147	663	469	122	333	99
Traffic Volume (vph)	144	675	98	316	430	60	147	663	469	122	333	99
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Lane Width (m)	60.0	0.0	180.0	0.0	60.0	0.0	60.0	0.0	55.0	0.0	0.0	0.0
Storage Length (m)	7.5	0.0	1.0	7.5	0.0	1.0	7.5	0.0	1.0	7.5	0.0	0.0
Taper Length (m)	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95
Lane Util. Factor	0.981			0.982			0.938			0.966		
FRT Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1728	3511	0	1711	3514	0	1711	3339	0	1745	3401	0
FRT Permitted	0.473			0.127			0.373			0.148		
Satd. Flow (perm)	860	3511	0	229	3514	0	672	3339	0	272	3401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	16		18		18		185		60		40	
Link Speed (k/h)	50		50		50		278.6		217.9		13.1	
Link Distance (m)	362.0		250.3		250.3		278.6		217.9		13.1	
Travel Time (s)	26.1		18.0		18.0		16.7		13.1		1.0	
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
Heavy Vehicles (%)	1%	1%	0%	2%	1%	0%	2%	1%	2%	0%	3%	1%
Adj. Flow (vph)	144	675	98	316	430	60	147	663	469	122	333	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	144	773	0	316	490	0	147	1132	0	122	432	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (m)	3.3		3.3		3.3		3.3		3.3		3.3	
Link Offset (m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width (m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.04	1.00	1.04	1.00	1.04	1.00	1.04	1.00	1.00
Turning Speed (k/h)	25	15	25	25	15	25	15	25	15	25	15	15
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	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	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	0.0	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	0.6	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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size (m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			3		8
Detector Phase	5	2		1	6		7	4		3		8
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Spilt (s)	9.5	32.0		9.5	32.0		9.5	32.0		9.5	32.0	
Total Spilt (s)	11.6	33.4		21.2	43.0		11.4	35.0		10.4	34.0	
Total Spilt (%)	11.6%	33.4%		21.2%	43.0%		11.4%	35.0%		10.4%	34.0%	
Maximum Green (s)	7.6	26.4		17.2	36.0		7.4	28.0		6.4	27.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0		0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		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	C-Max		None	Max		None	Max		None	Max	
Walk Time (s)	7.0			7.0			7.0			7.0		
Flash Dont Walk (s)	18.0			18.0			18.0			18.0		
Pedestrian Calls (#/hr)	0			0			0			0		
Act Eff Green (s)	37.8	30.4		50.6	39.1		38.4	31.0		36.4	30.0	
Actuated v/c Ratio	0.38	0.30		0.51	0.39		0.38	0.31		0.36	0.30	
v/c Ratio	0.37	0.72		0.89	0.35		0.44	0.97		0.63	0.41	
Control Delay	17.4	35.1		50.5	21.6		23.7	50.2		35.2	26.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.4	35.1		50.5	21.6		23.7	50.2		35.2	26.6	
LOS	B	D		D	C		C	D		D	C	
Approach Delay	32.3			32.9			47.2			28.5		
Approach LOS	C			C			D			C		
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	0 (0%), Referenced to phase 2EBTL, Start of Green											
Natural Cycle:	85											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.97											
Intersection Signal Delay:	37.2											
Intersection Capacity Utilization:	92.7%											
Analysis Period (min):	15											
ICU Level of Service F												
Splits and Phases:	5: Thompson Rd & Main St E											

5. Thompson Rd & Main StE

5. Thompson Rd & Main StE

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	144	773	316	490	147	1132	122	432
v/c Ratio	0.37	0.72	0.89	0.35	0.44	0.97	0.63	0.41
Control Delay	17.4	35.1	50.5	21.6	23.7	50.2	35.2	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	35.1	50.5	21.6	23.7	50.2	35.2	26.6
Queue Length 50th (m)	15.2	73.2	45.3	35.1	18.8	103.6	15.4	33.3
Queue Length 95th (m)	26.4	95.4	#93.2	48.5	32.7	#151.3	#29.5	47.6
Internal Link Dist (m)	338.0			226.3		254.6		193.9
Turn Bay Length (m)	60.0	150.0		60.0		60.0		55.0
Base Capacity (vph)	392	1077	370	1385	334	1162	193	1048
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	0.37	0.72	0.85	0.35	0.44	0.97	0.63	0.41

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

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	144	675	98	316	430	60	147	663
Traffic Volume (veh/h)	144	675	98	316	430	60	147	663
Future Volume (veh/h)	144	675	98	316	430	60	147	663
Number	5	2	12	1	6	16	4	14
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/h	1881	1884	1900	1863	1883	1900	1863	1874
Adj Flow Rate, veh/h	144	675	98	316	430	60	147	663
Adj No. of Lanes	1	2	0	1	2	0	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	1	1	0	2	1	0	2	1
Cap. veh/h	446	1015	147	399	1238	172	363	619
Arrive On Green	0.07	0.32	0.29	0.14	0.39	0.36	0.07	0.31
Sat Flow, veh/h	1792	3138	455	1774	3157	438	1774	1997
Grp Volume(v), veh/h	144	385	388	316	243	247	147	591
Grp Sat Flow(s), veh/h	1792	1789	1803	1774	1789	1806	1774	1780
Q Serve(g.s), s	5.5	18.5	18.7	11.8	9.5	9.7	5.9	31.0
Cycle Q Clear(g.c), s	5.5	18.5	18.7	11.8	9.5	9.7	5.9	31.0
Prop In Lane	1.00	0.25	1.00	0.24	1.00	0.24	1.00	0.87
Lane Grp Cap(c), veh/h	446	579	583	399	702	708	363	562
V/C Ratio(X)	0.32	0.66	0.67	0.79	0.35	0.35	0.40	1.07
Avail Cap(c.a), veh/h	449	579	583	451	702	708	363	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.8	29.1	29.5	21.7	21.4	21.7	24.1	34.5
Incr Delay (d2), s/veh	0.4	5.9	5.9	8.3	1.4	1.4	0.7	58.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%) veh/m	2.8	10.0	10.3	6.6	5.0	5.1	2.9	24.2
LnGrp Delay(d)s/veh	22.2	35.1	35.4	30.0	22.7	23.1	24.8	93.1
LnGrp LOS	C	D	D	C	C	C	F	D
Approach Vol, veh/h	917			806			1279	554
Approach Delay, s/veh	33.2			25.7			87.1	31.7
Approach LOS	C			C			F	C
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.3	36.3	10.4	35.0	11.4	43.2	11.4	34.0
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0
Max Green Setting (Gmax), s	17.2	26.4	6.4	28.0	7.6	36.0	7.4	27.0
Max Q Clear Time (g_c+H), s	13.8	20.7	6.8	33.0	7.5	11.7	7.9	12.2
Green Ext Time (p_c), s	0.5	2.7	0.0	0.0	0.0	3.6	0.0	2.5

Intersection Summary  
HCM 2010 Ctrl Delay  
HCM 2010 LOS

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB
	L	T	R	L	T	TR	L	T	TR	L	T	R	L
Directions Served													
Maximum Queue (m)	47.4	112.9	89.8	42.4	84.9	83.8	77.3	106.2	109.7	72.2	47.4	88.8	88.8
Average Queue (m)	37.6	61.5	48.1	33.8	37.7	38.1	21.9	63.8	58.4	34.9	30.7	46.7	46.7
95th Queue (m)	56.9	96.0	77.3	48.8	77.0	66.7	54.4	95.7	94.5	68.0	52.0	72.9	72.9
Link Distance (m)		133.0	133.0		108.2	108.2		322.4	322.4			241.6	241.6
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)	40.0			35.0			70.0			65.0		40.0	40.0
Storage Blk Time (%)	9	22		24			0		5	4		1	4
Queuing Penalty (veh)	27	45		40			0		5	12		3	11

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	SB	SB
	T	R
Directions Served		
Maximum Queue (m)	76.3	2.8
Average Queue (m)	36.8	0.1
95th Queue (m)	64.6	2.0
Link Distance (m)	241.6	241.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Mall Entrance & Main St E

Movement	EB	EB	WB	WB	WB	NB	NB	NB	R
	T	TR	L	T	T	L	R		
Directions Served									
Maximum Queue (m)	74.0	79.2	19.2	48.0	43.9	14.0	13.9		
Average Queue (m)	24.5	25.9	6.7	12.1	12.2	4.5	3.6		
95th Queue (m)	62.4	64.6	16.1	34.0	32.8	11.9	10.9		
Link Distance (m)	108.2	108.2		251.1	251.1	127.6	127.6		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				70.0					
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Busway/Wilson Dr & Main St E

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Directions Served												
Maximum Queue (m)	43.1	85.8	82.7	12.9	57.2	53.1	40.2	16.8	33.6	47.7	24.1	
Average Queue (m)	8.9	30.2	34.5	4.1	18.0	17.1	16.9	0.9	14.0	26.0	10.4	
95th Queue (m)	24.5	62.0	65.3	11.1	41.1	37.5	32.3	8.4	28.1	44.8	19.4	
Link Distance (m)	240.3			240.3			335.0			186.0		
Upstream Blk. Time (%)	160.4											
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0											
Storage Blk Time (%)	1											
Queuing Penalty (veh)	1											

Intersection: 4: Drew Centre/Private Driveway & Main St E

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	T	R	R	L	T	T	L	L	TR	L	T	TR
Directions Served												
Maximum Queue (m)	50.4	55.2	43.1	28.7	38.2	37.2	35.9	25.7	11.3			
Average Queue (m)	20.9	23.6	9.1	11.4	12.1	14.6	18.9	6.9	4.0			
95th Queue (m)	42.9	47.2	28.0	22.6	30.1	32.0	32.0	17.5	9.3			
Link Distance (m)	335.0			334.9			239.5			239.5		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	40.0											
Storage Blk Time (%)	10											
Queuing Penalty (veh)	0											

Intersection: 5: Thompson Rd & Main St E

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Directions Served												
Maximum Queue (m)	67.3	109.6	109.5	83.5	61.9	55.6	67.4	274.1	278.2	42.8	56.9	56.6
Average Queue (m)	28.5	64.5	70.4	46.8	33.5	29.8	53.9	230.2	239.3	20.7	33.3	26.3
95th Queue (m)	62.7	98.5	99.7	78.8	55.2	50.9	88.6	323.3	319.4	35.9	54.0	49.9
Link Distance (m)	334.9			334.9			233.6			263.1		
Upstream Blk Time (%)	32			46			0			0		
Queuing Penalty (veh)												
Storage Bay Dist (m)	60.0											
Storage Blk Time (%)	0											
Queuing Penalty (veh)	0											

Network Summary

Network wide Queuing Penalty: 288
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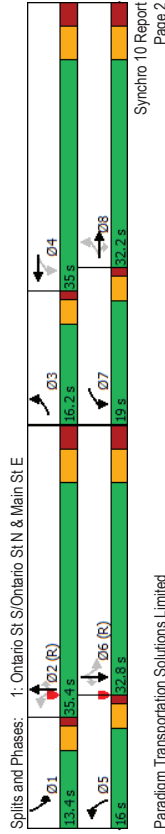
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	206	659	244	294	746	236	207	683	313	176	806	180
Future Volume (vph)	206	659	244	294	746	236	207	683	313	176	806	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6	3.3
Storage Length (m)	40.0	0.0	0.0	35.0	0.0	0.0	70.0	0.0	65.0	40.0	0.0	0.0
Storage Lanes	1			1			0		1		1	
Taper Length (m)	7.5			7.5			7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	0.96	0.99	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.98	0.98
Frt		0.850		0.964			0.850		0.850		0.850	
Flt Protected	0.950			0.950			0.950		0.950		0.950	
Satd. Flow (prot)	1728	3574	1566	1694	3421	0	1728	3438	1581	1711	3505	1597
Flt Permitted	0.163			0.160			0.132		0.245		0.245	
Satd. Flow (perm)	296	3574	1495	283	3421	0	240	3438	1559	441	3505	1561
Right Turn on Red	Yes			Yes			Yes		Yes		Yes	
Satd. Flow (RTOR)	50			44			50		313		50	
Link Speed (k/h)	147.9			134.8			338.1		256.3		256.3	
Travel Time (s)	10.6			9.7			24.3		2		18.5	
Confl. Peds. (#/hr)	15			28			15		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 (%)	1%	2%	3%	1%	1%	1%	1%	5%	1%	2%	3%	0%
Adj. Flow (vph)	206	659	244	294	746	236	207	683	313	176	806	180
Shared Lane Traffic (%)												
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)	3.3			3.3			3.3		3.3		3.3	
Link Offset (m)	0.0			0.0			0.0		0.0		0.0	
Crosswalk Width (m)	4.8			4.8			4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.01	1.04	1.00	1.00	1.04	1.00	1.01	1.04	1.00	1.01
Turning Speed (k/h)	25	15	25	25	15	25	25	15	25	25	15	25
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	10.0	2.0	10.0	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	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4			9.4			9.4		9.4		9.4	
Detector 2 Size (m)	0.6			0.6			0.6		0.6		0.6	
Detector 2 Type	Ch+Ex			Ch+Ex			Ch+Ex		Ch+Ex		Ch+Ex	
Detector 2 Channel												



Lanes, Volumes, Timings  
 1: Ontario St S/Ontario St N & Main St E

200624  
 2031 Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	3	8	8	7	4	5	2	2	2	1	6	6
Permitted Phases	8	8	8	4	4	2	2	2	2	2	6	6
Switch Phase	3	8	8	7	4	5	2	2	2	1	6	6
Minimum Initial (s)	5.0	15.0	15.0	7.0	15.0	5.0	15.0	15.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	32.0	32.0	11.0	32.0	9.5	32.0	32.0	11.0	32.0	9.5	32.0
Total Split (s)	16.2	32.2	32.2	19.0	35.0	16.0	35.4	35.4	13.4	32.8	32.8	32.8
Total Split (%)	16.2%	32.2%	32.2%	19.0%	35.0%	16.0%	35.4%	35.4%	13.4%	32.8%	32.8%	32.8%
Maximum Green (s)	12.2	25.2	25.2	15.0	28.0	12.0	28.4	28.4	9.4	25.8	25.8	25.8
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	0.0	-3.0	0.0	-3.0	-3.0	0.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Vehicle Extension (s)	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max	C-Max
Recall Mode	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flesh Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (Hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	38.5	27.5	27.5	45.3	31.0	44.1	33.2	33.2	39.9	31.1	31.1	31.1
Actuated g/C Ratio	0.38	0.28	0.28	0.45	0.31	0.44	0.33	0.33	0.40	0.31	0.31	0.31
v/c Ratio	0.76	0.67	0.41	0.89	0.90	0.78	0.60	0.43	0.61	0.74	0.30	0.30
Control Delay	35.0	36.0	6.0	50.3	43.9	40.2	31.1	5.0	27.4	36.5	5.6	5.6
Queue Delay	0.0	0.0	0.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	36.0	6.0	50.3	43.9	40.2	31.1	5.0	27.4	36.5	5.6	5.6
LOS	D	D	A	D	D	D	D	C	A	C	D	A
Approach Delay	29.8			49.8			25.9			30.3		
Approach LOS	C			D			C			C		
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	49 (49%), Referenced to phase 2:NBTl and 6:SBTL, Start of Green											
Natural Cycle:	85											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.90											
Intersection Signal Delay:	34.3											
Intersection Capacity Utilization:	87.0%											
Analysis Period (min):	15											



Queues  
 1: Ontario St S/Ontario St N & Main St E

200624  
 2031 Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	206	659	244	294	982	207	683	313	176	806	180	180
v/c Ratio	0.76	0.67	0.41	0.89	0.90	0.78	0.60	0.43	0.61	0.74	0.30	0.30
Control Delay	38.0	36.0	6.0	50.3	43.9	40.2	31.1	5.0	27.4	36.5	5.6	5.6
Queue Delay	0.0	0.0	0.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.0	36.0	6.0	50.3	43.9	40.2	31.1	5.0	27.4	36.5	5.6	5.6
Queue Length 50th (m)	24.3	62.2	0.0	38.8	96.2	25.8	62.4	0.0	21.5	79.7	0.0	0.0
Queue Length 95th (m)	#52.4	82.0	18.1	#86.2	#135.3	#57.2	82.3	19.1	36.0	103.3	15.7	15.7
Internal Link Dist (m)	123.9			35.0			70.0		65.0	40.0		
Turn Bay Length (m)	40.0			35.0			70.0		65.0	40.0		
Base Capacity (vph)	292	1007	596	339	1104	286	1140	726	297	1089	609	609
Starvation Cap Reductn	0	0	0	0	88	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.65	0.41	0.87	0.97	0.72	0.60	0.43	0.59	0.74	0.30	0.30
Intersection Summary	# 95th percentile volume exceeds capacity, queue may be longer.											
# 95th percentile volume exceeds capacity, queue may be longer.	Queue shown is maximum after two cycles.											

2: Mail Entrance & Main St E

2: Mail Entrance & Main St E

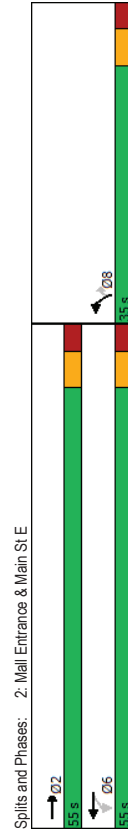
2: Mail Entrance & Main St E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	→	→	→	←	←	←	←	←	←	←	←	←
Traffic Volume (veh/h)	206	659	244	294	746	236	207	683	313	176	806	180
Future Volume (veh/h)	206	659	244	294	746	236	207	683	313	176	806	180
Ideal Flow (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16
Storage Length (m)	1.00	1.00	0.99	1.00	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Taper Length (m)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit Protected	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
Satd. Flow (prot)	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514
Fit Permitted	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (perm)	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	27	27	27	27	27	27	27	27	27	27	27	27
Link Speed (k/h)	50	50	50	50	50	50	50	50	50	50	50	50
Link Distance (m)	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8
Travel Time (s)	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
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
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	975	130	180	1258	139	126	126	126	126	126	126	126
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1105	0	180	1258	139	126	126	126	126	126	126	126
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Left	Left	Left	Left	Left	Right	Right
Median Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Link Offset (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width (m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.01	1.01
Turning Speed (k/h)	15	25	25	15	25	25	15	25	25	15	15	15
Number of Detectors	2	1	2	1	2	1	1	1	1	1	1	1
Detector Template	Thru	Left	Thru	Left	Thru	Left	Right	Right	Right	Right	Right	Right
Leading Detector (m)	10.0	2.0	10.0	2.0	10.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	2.0	2.0
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Detector 2 Size (m)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Detector 2 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	Perm	NA	Perm	NA	Perm	Prot	Perm	NA	Prot	Perm	Perm

1: Ontario St S/Ontario St N & Main St E

Lane Configurations	→	→	→	←	←	←	←	←	←	←	←	←
Traffic Volume (veh/h)	206	659	244	294	746	236	207	683	313	176	806	180
Future Volume (veh/h)	206	659	244	294	746	236	207	683	313	176	806	180
Ideal Flow (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16
Storage Length (m)	1.00	1.00	0.99	1.00	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Taper Length (m)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit Protected	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
Satd. Flow (prot)	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514
Fit Permitted	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (perm)	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514	3514
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	27	27	27	27	27	27	27	27	27	27	27	27
Link Speed (k/h)	50	50	50	50	50	50	50	50	50	50	50	50
Link Distance (m)	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8	134.8
Travel Time (s)	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
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
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	975	130	180	1258	139	126	126	126	126	126	126	126
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1105	0	180	1258	139	126	126	126	126	126	126	126
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Left	Left	Left	Left	Left	Right	Right
Median Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Link Offset (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width (m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.01	1.01
Turning Speed (k/h)	15	25	25	15	25	25	15	25	25	15	15	15
Number of Detectors	2	1	2	1	2	1	1	1	1	1	1	1
Detector Template	Thru	Left	Thru	Left	Thru	Left	Right	Right	Right	Right	Right	Right
Leading Detector (m)	10.0	2.0	10.0	2.0	10.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	2.0	2.0
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Detector 2 Size (m)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Detector 2 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	Perm	NA	Perm	NA	Perm	Prot	Perm	NA	Prot	Perm	Perm

	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Protected Phases	2				8	8
Permitted Phases			6	6	8	8
Detector Phase	2	6	6	6	8	8
Switch Phase						
Minimum Initial (s)	30.0	30.0	30.0	30.0	10.0	10.0
Minimum Split (s)	37.0	37.0	37.0	35.0	35.0	35.0
Total Split (s)	55.0	55.0	55.0	35.0	35.0	35.0
Total Split (%)	61.1%	61.1%	61.1%	38.9%	38.9%	38.9%
Maximum Green (s)	48.0	48.0	48.0	28.0	28.0	28.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	None	None	None	None	None
Walk Time (s)	15.0		20.0	20.0	20.0	20.0
Flash Dont Walk (s)	7.0		7.0	7.0	7.0	7.0
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	51.1	51.1	51.1	14.8	14.8	14.8
Actuated G/C Ratio	0.69	0.69	0.69	0.20	0.20	0.20
v/c Ratio	0.45	0.64	0.50	0.40	0.31	0.31
Control Delay	5.9	20.6	6.5	29.2	9.0	9.0
Queue Delay	0.4	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	20.6	6.5	29.2	9.0	9.0
LOS	A	C	A	C	A	A
Approach Delay	6.4		8.3	19.6		
Approach LOS	A		A	B		
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	73.9					
Natural Cycle:	90					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.64					
Intersection Signal Delay:	8.6					
Intersection Capacity Utilization:	74.4%					
Analysis Period (min):	15					



	EBT	WBL	WBT	NBL	NBR
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1105	180	1258	139	126
v/c Ratio	0.45	0.64	0.50	0.40	0.31
Control Delay	5.9	20.6	6.5	29.2	9.0
Queue Delay	0.4	0.0	0.0	0.0	0.0
Total Delay	6.4	20.6	6.5	29.2	9.0
Queue Length 50th (m)	29.2	11.5	36.2	17.8	1.7
Queue Length 95th (m)	50.1	#53.0	60.8	33.4	14.6
Internal Link Dist (m)	110.8		249.6	120.7	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2436	283	2494	733	735
Starvation Cap Reductn	759	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.66	0.64	0.50	0.19	0.17
Intersection Summary					
# 95th percentile volume exceeds capacity, queue may be longer.					
Queue shown is maximum after two cycles.					

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2031 Background PM Peak Hour  
2: Mail Entrance & Main St E

200624  
2031 Background PM Peak Hour  
3: Busway/Wilson Dr & Main St E

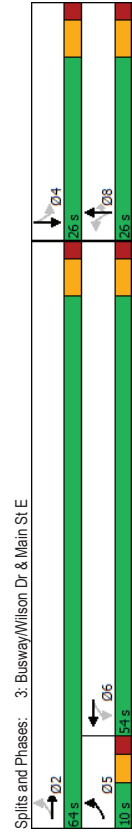
	EBT	EBR	WBL	WBT	NBL	NBR	
Movement							
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	975	130	180	1258	139	126	126
Future Volume (veh/h)	975	130	180	1258	139	126	126
Number	2	12	1	6	3	18	0
Initial Q (Cb), veh	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1883	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	975	130	180	1258	139	126	126
Adj No. of Lanes	2	0	1	2	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	0	0	0	0	0	0
Cap, veh/h	2250	300	399	2559	326	291	291
Arrive On Green	0.71	0.67	0.71	0.71	0.18	0.18	0.18
Sat Flow, veh/h	3269	423	518	3705	1810	1615	1615
Grp Volume(v), veh/h	549	556	180	1258	139	126	126
Grp Sat Flow(s), veh/hln	1789	1809	518	1805	1810	1615	1615
Q Serve(g, s)	9.3	9.5	16.2	11.2	4.9	5.0	5.0
Cycle Q Clear(g, c), s	9.3	9.5	25.8	11.2	4.9	5.0	5.0
Prop In Lane	1.00	0.23	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1268	1282	399	2559	326	291	291
V/C Ratio(X)	0.43	0.43	0.45	0.49	0.43	0.43	0.43
Avail Cap(c, a), veh/h	1268	1282	399	2559	780	696	696
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.4	4.6	9.9	4.7	26.2	26.2	26.2
Incr Delay (d2), s/veh	1.1	1.1	0.8	0.1	0.9	1.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/ln	4.8	5.1	2.4	5.5	2.5	2.3	2.3
LnGrp Delay(d), s/veh	5.5	5.7	10.7	4.8	27.1	27.3	27.3
LnGrp LOS	A	A	B	A	C	C	C
Approach Vol, veh/h	1105		1438	265			
Approach Delay, s/veh	5.6		5.6	27.2			
Approach LOS	A		A	C			
Timer	1	2	3	4	5	6	7
Assigned Phs	2						
Phs Duration (G+Y+Rc), s	55.0						
Change Period (Y+Rc), s	7.0						
Max Green Setting (Gmax), s	48.0						
Max Q Clear Time (g_c+H), s	11.5						
Green Ext Time (p_c), s	11.4						
Intersection Summary							
HCM 2010 Ctrl Delay							
HCM 2010 LOS							

	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	96	928	72	70	1257	223	61	4	60
Future Volume (vph)	96	928	72	70	1257	223	61	4	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6
Storage Length (m)	50.0	0.0	40.0	0.0	0.0	0.0	35.0	55.0	0.0
Storage Lanes	1	0	1	0	1	0	1	1	0
Taper Length (m)	7.5	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			1.00			1.00	1.00	0.97
Frt	0.989			0.977			0.850		0.855
Flt Protected	0.950			0.950			0.950		0.950
Satd. Flow (prot)	1745	3500	0	1770	3455	0	1410	1863	1313
Flt Permitted	0.095			0.287			0.661		0.755
Satd. Flow (perm)	174	3500	0	535	3455	0	981	1863	1313
Right Turn on Red		Yes		Yes		Yes	Yes		1580
Satd. Flow (RTOR)	19			36			97		108
Link Speed (k/h)	50			50			50		50
Link Distance (m)	260.1			360.6			143.5		174.4
Travel Time (s)	18.7			26.0			10.3		12.6
Confl. Peds. (#/hr)	4			4			3		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	2%	2%	0%	28%	2%	23%	1%
Adj. Flow (vph)	96	928	72	70	1257	223	61	4	60
Shared Lane Traffic (%)									
Lane Group Flow (vph)	96	1000	0	70	1480	0	61	4	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Right	Left	Right
Median Width(m)	3.6			3.6			3.6		3.6
Link Offset(m)	0.0			0.0			0.0		0.0
Crosswalk Width(m)	4.8			4.8			4.8		4.8
Two way Left Turn Lane									
Headway Factor	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00
Turning Speed (k/h)	25	15	25	25	25	25	15	25	15
Number of Detectors	1	2	1	2	1	2	1	2	1
Detector Template	Left	Thru	Left	Thru	Left	Right	Left	Thru	Left
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	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
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	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+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	C+Ex			C+Ex			C+Ex		C+Ex
Detector 2 Channel									

Lanes, Volumes, Timings  
 3: Busway/Wilson Dr & Main St E

200624  
 2031 Background PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm-pt	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	5	2		6	6		8	8		8	4	4
Permitted Phases	2		2	6	6	6	8	8	8	8	4	4
Detector Phase	5	2		6	6	6	8	8	8	8	4	4
Switch Phase												
Minimum Initial (s)	5.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	10.0	46.0	46.0	46.0	46.0	46.0	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	10.0	64.0	54.0	54.0	54.0	54.0	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	11.1%	71.1%	60.0%	60.0%	60.0%	60.0%	28.9%	28.9%	28.9%	28.9%	28.9%	28.9%
Maximum Green (s)	5.0	58.0	48.0	48.0	48.0	48.0	20.0	20.0	20.0	20.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Recall Mode	None	Max	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	30.0	30.0	30.0	30.0	30.0	30.0	7.0	7.0	7.0	7.0	7.0	7.0
Flesh Dont Walk (s)	10.0	10.0	10.0	10.0	10.0	10.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	60.1	60.1	52.2	52.2	52.2	52.2	16.7	16.7	16.7	16.7	16.7	16.7
Actuated g/C Ratio	0.71	0.71	0.61	0.61	0.61	0.61	0.20	0.20	0.20	0.20	0.20	0.20
v/c Ratio	0.41	0.40	0.21	0.69	0.32	0.32	0.01	0.18	0.52	0.28	0.28	0.28
Control Delay	9.9	5.9	11.5	14.2	11.5	14.2	33.4	26.2	3.4	37.6	8.4	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	5.9	11.5	14.2	11.5	14.2	33.4	26.2	3.4	37.6	8.4	8.4
LOS	A	A	B	B	B	B	C	C	A	A	D	A
Approach Delay	6.3			14.0			18.8				24.6	
Approach LOS	A			B			B				C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	84.9											
Natural Cycle:	85											
Control Type:	Semi Act-Uncoordinated											
Maximum v/c Ratio:	0.69											
Intersection Signal Delay:	12.3											
Intersection Capacity Utilization:	91.8%											
Analysis Period (min):	15											



Queues  
 3: Busway/Wilson Dr & Main St E

200624  
 2031 Background PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	96	1000	70	1480	61	61	4	60	140	112		
v/c Ratio	0.41	0.40	0.21	0.69	0.32	0.01	0.18	0.52	0.28	0.28		
Control Delay	9.9	5.9	11.5	14.2	33.4	26.2	3.4	37.6	8.4	8.4		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	9.9	5.9	11.5	14.2	33.4	26.2	3.4	37.6	8.4	8.4		
Queue Length 50th (m)	4.3	29.7	5.2	84.3	9.0	0.6	0.6	21.5	0.6	0.6		
Queue Length 95th (m)	11.1	50.0	14.5	128.6	20.3	3.2	4.2	39.5	13.5	13.5		
Internal Link Dist (m)		236.1		336.6			119.5					
Turn Bay Length (m)	50.0		40.0				35.0		55.0			
Base Capacity (vph)	234	2484	329	2139	254	483	412	355	490			
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	0.41	0.40	0.21	0.69	0.24	0.01	0.15	0.39	0.23	0.23		
Intersection Summary												

3: Busway/Wilson Dr & Main St E

200624  
2031 Background PM Peak Hour

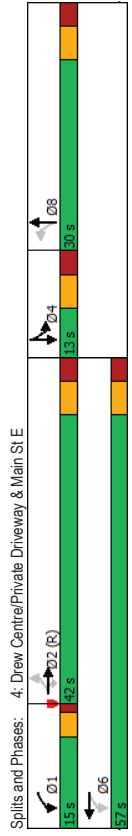
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	96	928	72	70	1257	223	61	4	60	140	4	108
Traffic Volume (veh/h)	96	928	72	70	1257	223	61	4	60	140	4	108
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Cb), veh	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	0.98	1.00
Ped-Bike Adj(A_pbT)	0	0	0	0	0	0	0	0	0	0	0	0
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	1900	1863	1900	1863	1868	1900	1484	1863	1545	1881	1889	1900
Adj Flow Rate, veh/h	96	928	72	70	1257	223	61	4	60	140	4	108
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	2	2	2	2	0	28	2	23	1	2	0
Cap, veh/h	317	2396	186	426	1830	322	209	342	241	331	10	282
Arrive On Green	0.07	0.72	0.70	0.61	0.61	0.61	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1810	3328	258	561	3017	531	1002	1863	1313	1346	57	1535
Grp Volume(V), veh/h	96	493	507	70	735	745	61	4	60	140	0	112
Grp Sat Flow(s),veh/h	1810	1770	1816	561	1775	1773	1002	1863	1313	1346	0	1592
Q Serve(g, s)	1.5	9.0	9.1	4.7	23.2	23.7	4.7	0.1	3.3	7.9	0.0	5.1
Cycle Q Clear(g, s)	1.5	9.0	9.1	4.7	23.2	23.7	9.9	0.1	3.3	8.1	0.0	5.1
Prop In Lane	1.00	0.14	1.00	1.00	0.30	1.00	1.00	1.00	1.00	1.00	0.96	1.00
Lane Grp Cap(c), veh/h	317	1274	1308	426	1077	1075	209	342	241	331	0	293
V/C Ratio(X)	0.30	0.39	0.39	0.16	0.68	0.69	0.29	0.01	0.25	0.42	0.00	0.42
Avail Cap(c, a), veh/h	329	1274	1308	426	1077	1075	289	492	347	439	0	420
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.8	4.5	4.6	7.4	11.0	11.1	34.2	27.8	29.1	31.1	0.0	29.8
Incr Delay (d2), s/veh	0.5	0.9	0.9	0.3	2.0	2.1	1.1	0.0	0.8	1.2	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),veh/m	1.0	4.7	4.9	0.7	11.8	12.0	1.4	0.1	1.2	3.1	0.0	2.4
LnGrp Delay(d),s/veh	10.3	5.4	5.5	7.6	13.0	13.3	35.3	27.8	29.8	32.3	0.0	31.0
LnGrp LOS	B	A	A	A	B	B	D	C	C	C	C	C
Approach Vol, veh/h	1096											
Approach Delay, s/veh	5.9											
Approach LOS	A											
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		5		6		7		8	
Phs Duration (G+Y+Rc), s	64.0		19.3		9.5		54.5		19.3			
Change Period (Y+Rc), s	6.0		6.0		5.0		6.0		6.0			
Max Green Setting (Gmax), s	58.0		20.0		5.0		48.0		20.0			
Max Q Clear Time (g_c+H), s	11.1		10.1		3.5		25.7		11.9			
Green Ext Time (p_c), s	14.9		1.3		0.0		17.0		0.4			
Intersection Summary	12.7											
HCM 2010 Ctrl Delay	B											
HCM 2010 LOS	C											

4: Drew Centre/Private Driveway & Main St E

200624  
2031 Background PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	1030	277	167	803	0	560	0	127	0	0	0
Traffic Volume (vph)	0	1030	277	167	803	0	560	0	127	0	0	0
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Lane Width (m)	15.0	40.0	45.0	0.0	0.0	0.0	0.0	0.0	55.0	0.0	0.0	0.0
Storage Lanes	1	1	1	0	2	0	0	0	0	0	0	0
Taper Length (m)	7.5	7.5	7.5	0.0	0.0	0.0	7.5	0.0	0.0	7.5	0.0	0.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99 0.98											
Flt Protected	0.850											
Satd. Flow (prot)	1837	3610	1521	1694	3610	0	3385	1588	0	0	1900	0
Flt Permitted	0.154											
Satd. Flow (perm)	1837	3610	1451	274	3610	0	3368	1588	0	0	1900	0
Right Turn on Red	Yes											
Satd. Flow (RTOR)	178											
Link Speed (k/h)	50											
Link Distance (m)	360.6											
Travel Time (s)	26.0											
Conf. Peds. (#/hr)	15											
Peak Hour Factor	1.00											
Heavy Vehicles (%)	0%											
Adj. Flow (vph)	0											
Shared Lane Traffic (%)	0											
Lane Group Flow (vph)	0											
Enter Blocked Intersection	No											
Lane Alignment	Left											
Median Width(m)	3.6											
Link Offset(m)	0.0											
Crosswalk Width(m)	4.8											
Two way Left Turn Lane	1.04											
Headway Factor	25											
Turning Speed (k/h)	15											
Number of Detectors	1											
Detector Template	Left											
Leading Detector (m)	2.0											
Trailing Detector (m)	0.0											
Detector 1 Position(m)	0.0											
Detector 1 Size(m)	2.0											
Detector 1 Type	Ch+Ex											
Detector 1 Channel	0.0											
Detector 1 Extend (s)	0.0											
Detector 1 Queue (s)	0.0											
Detector 1 Delay (s)	0.0											
Detector 2 Position(m)	9.4											
Detector 2 Size(m)	0.6											
Detector 2 Type	Ch+Ex											
Detector 2 Channel	0.6											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	NA	NA	NA	NA	NA
Protected Phases										4	4	4
Permitted Phases	2	2	2	2	6	8	8	8	8	4	4	4
Detector Phase	2	2	2	2	1	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	35.0	35.0	35.0	9.5	35.0	27.0	27.0	27.0	27.0	13.0	13.0	13.0
Total Split (s)	42.0	42.0	42.0	15.0	57.0	30.0	30.0	30.0	30.0	13.0	13.0	13.0
Total Split (%)	42.0%	42.0%	42.0%	15.0%	57.0%	30.0%	30.0%	30.0%	30.0%	13.0%	13.0%	13.0%
Maximum Green (s)	35.0	35.0	35.0	11.0	50.0	23.0	23.0	23.0	23.0	6.0	6.0	6.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	0.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flesh Dont Walk (s)	21.0	21.0	21.0	21.0	21.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (Hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	48.6	48.6	62.7	62.7	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
Actuated g/C Ratio	0.49	0.49	0.63	0.63	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.59	0.35	0.53	0.35	0.57	0.57	0.17	0.17	0.17	0.17	0.17	0.17
Control Delay	21.8	8.4	15.1	10.2	31.8	31.8	0.5	0.5	0.5	0.5	0.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	8.4	15.1	10.2	31.8	31.8	0.5	0.5	0.5	0.5	0.5	0.5
LOS	C	A	B	B	C	C	A	A	A	C	C	A
Approach Delay	18.9				11.0							26.0
Approach LOS	B				B							C
Intersection Summary												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	16 (16%), Referenced to phase 2:EBTL, Start of Green											
Natural Cycle:	85											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.59											
Intersection Signal Delay:	18.0											
Intersection Capacity Utilization:	70.4%											
Analysis Period (min):	15											



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group Flow (vph)	1030	277	167	803	560	127
v/c Ratio	0.59	0.35	0.53	0.35	0.57	0.17
Control Delay	21.8	8.4	15.1	10.2	31.8	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	8.4	15.1	10.2	31.8	0.5
Queue Length 50th (m)	76.2	10.7	13.1	38.1	49.5	0.0
Queue Length 95th (m)	119.5	34.3	26.6	59.2	60.4	0.0
Internal Link Dist (m)	336.6		45.0	338.0		232.9
Turn Bay Length (m)						
Base Capacity (vph)	1753	796	339	2263	1009	737
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	0.59	0.35	0.49	0.35	0.56	0.17
Intersection Summary						

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2031 Background PM Peak Hour  
HCM 2010 Signalized Intersection Summary  
4: Drew Centre/Private Driveway & Main St E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (veh/h)	0	1030	277	167	803	0	560	0	127	0	0	0
Future Volume (veh/h)	0	1030	277	167	803	0	560	0	127	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Cb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	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/hln	1900	1900	1810	1845	1900	0	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	1030	277	167	803	0	560	0	127	0	0	0
Adj No. of Lanes	1	2	1	1	2	0	2	1	0	0	1	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, %	0	0	5	3	0	0	0	0	0	0	0	0
Cap, veh/h	72	2173	914	347	2530	0	913	0	352	0	0	0
Arrive On Green	0.00	0.60	0.60	0.06	0.70	0.00	0.22	0.00	0.19	0.00	0.00	0.00
Sat Flow, veh/h	689	3610	1519	1757	3705	0	3510	0	1607	0	0	0
Grp Volume(v), veh/h	0	1030	277	167	803	0	560	0	127	0	0	0
Grp Sat Flow(s), veh/hln	689	1805	1519	1757	1805	0	1755	0	1607	0	0	0
Q Serve(g, s)	0.0	15.9	8.9	3.7	8.6	0.0	14.8	0.0	6.9	0.0	0.0	0.0
Cycle Q Clear(g, c), s	0.0	15.9	8.9	3.7	8.6	0.0	14.8	0.0	6.9	0.0	0.0	0.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Lane Grp Cap(c), veh/h	72	2173	914	347	2530	0	913	0	352	0	0	0
V/C Ratio(X)	0.00	0.47	0.30	0.48	0.32	0.00	0.61	0.00	0.36	0.00	0.00	0.00
Avail Cap(c, a), veh/h	72	2173	914	437	2530	0	1057	0	418	0	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	11.1	9.7	9.4	5.8	0.0	36.3	0.0	34.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.9	1.0	0.1	0.0	0.8	0.0	0.6	0.0	0.0	0.0
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 Back(Q)(50%), veh/ln	0.0	8.1	3.9	1.8	4.3	0.0	7.3	0.0	3.1	0.0	0.0	0.0
LnGrp Delay(d), s/veh	0.0	11.8	10.5	10.4	5.8	0.0	37.1	0.0	35.1	0.0	0.0	0.0
LnGrp LOS		B	B	B	A		D		D			
Approach Vol, veh/h	1307											
Approach Delay, s/veh	11.6											
Approach LOS	B											
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1											
Phs Duration (G+Y+Rc), s	99											
Change Period (Y+Rc), s	64.2											
Max Green Setting (Gmax), s	4.0											
Max Q Clear Time (g_c+H), s	11.0											
Green Ext Time (p_c), s	5.7											
Green Ext Time (p_e), s	9.3											
Intersection Summary	15.8											
HCM 2010 Ctrl Delay	B											
HCM 2010 LOS	B											

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2031 Background PM Peak Hour  
Lanes, Volumes, Timings  
5: Thompson Rd & Main St E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	316	585	234	442	524	59	253	624	243	59	895	164
Future Volume (vph)	316	585	234	442	524	59	253	624	243	59	895	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	60.0	0.0	150.0	0.0	60.0	0.0	60.0	0.0	55.0	0.0	1	0
Storage Lanes	1	0	0	1	0	0	1	0	0	1	0	0
Taper Length (m)	7.5	0.95	0.95	7.5	0.95	0.95	7.5	0.95	7.5	0.95	7.5	0.95
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95
Frt	0.957	0.957	0.957	0.985	0.985	0.957	0.985	0.985	0.957	0.985	0.985	0.985
Flt Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1745	3421	0	1728	3542	0	1728	3439	0	1711	3522	0
Flt Permitted	0.323	0.3421	0	0.138	0.124	0	0.124	0.3439	0	0.172	0.3522	0
Satd. Flow (perm)	583	3421	0	251	3542	0	225	3439	0	310	3522	0
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	52	11	11	50	60	60	56	60	60	60	60	60
Link Speed (k/h)	50	50	50	250.3	278.6	278.6	261.7	278.6	261.7	278.6	261.7	278.6
Link Distance (m)	362.0	26.1	26.1	18.0	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
Travel Time (s)	26.1	18.0	18.0	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
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
Heavy Vehicles (%)	0%	1%	1%	0%	4%	1%	0%	2%	2%	0%	2%	0%
Adj. Flow (vph)	316	585	234	442	524	59	253	624	243	59	895	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	316	819	0	442	583	0	253	867	0	59	1059	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)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Link Offset(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width(m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.00
Turning Speed (k/h)	25	15	15	25	25	25	25	25	25	25	25	25
Number of Detectors	1	2	1	1	2	1	1	2	1	2	1	2
Detector Template	Left	Thru	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Thru
Leading Detector (m)	2.0	10.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	0.6	0.6	2.0	0.6	0.6	2.0	0.6	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Detector 2 Size(m)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA

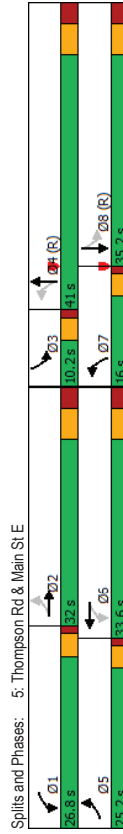


Lanes, Volumes, Timings  
5: Thompson Rd & Main St E

200624  
2031 Background PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2		1	6		7	4				8
Permitted Phases	2		6			4			4	8		
Detector Phase	5	2		1	6		7	4		3		8
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	10.0		5.0		10.0
Minimum Split (s)	9.5	32.0		9.5	32.0		9.5	32.0		9.5		32.0
Total Split (s)	25.2	32.0		26.8	33.6		16.0	41.0		10.2		35.2
Total Split (%)	22.9%	29.1%		24.4%	30.5%		14.5%	37.3%		9.3%		32.0%
Maximum Green (s)	21.2	25.0		22.8	26.6		12.0	34.0		6.2		28.2
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0		4.0
All-Red Time (s)	1.0	3.0		1.0	3.0		1.0	3.0		1.0		3.0
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0		0.0	-3.0		0.0		-3.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		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	Max		None	None		None	C-Max		None		C-Max
Walk Time (s)	7.0			7.0			7.0			7.0		
Flash Dont Walk (s)	18.0			18.0			18.0			18.0		
Pedestrian Calls (#/hr)	0			0			0			0		
Act Effct Green (s)	45.4	28.0		53.9	33.4		47.2	39.0		37.3		31.2
Actuated G/C Ratio	0.41	0.25		0.49	0.30		0.43	0.35		0.34		0.28
v/c Ratio	0.74	0.90		1.03	0.54		0.97	0.69		0.32		1.05
Control Delay	29.1	51.4		82.4	34.2		77.0	32.3		24.1		79.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	29.1	51.4		82.4	34.2		77.0	32.3		24.1		79.4
LOS	C	D		F	C		E	C		C		E
Approach Delay	45.2			55.0			42.4			42.4		76.5
Approach LOS	D			D			D			D		E

Intersection Summary	
Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	0 (0%), Referenced to phase 4:NBL and 8:SBTL, Start of Green
Natural Cycle:	115
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.05
Intersection Signal Delay:	54.7
Intersection Capacity Utilization:	105.5%
Analysis Period (min):	15
ICU Level of Service:	G



Queues  
5: Thompson Rd & Main St E

200624  
2031 Background PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	316	819	442	583	253	867	59	1059				
v/c Ratio	0.74	0.90	1.03	0.54	0.97	0.69	0.32	1.05				
Control Delay	29.1	51.4	82.4	34.2	77.0	32.3	24.1	79.4				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	29.1	51.4	82.4	34.2	77.0	32.3	24.1	79.4				
Queue Length 50th (m)	42.2	89.1	~89.0	56.6	40.0	84.5	7.7	~135.5				
Queue Length 95th (m)	63.4	#125.3	#156.0	78.6	#93.0	108.4	16.0	#178.5				
Internal Link Dist (m)	338.0			226.3		254.6		193.9				
Turn Bay Length (m)	60.0	150.0		60.0		55.0						
Base Capacity (vph)	487	909	429	1083	260	1256	184	1012				
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	0.65	0.90	1.03	0.54	0.97	0.69	0.32	1.05				

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	316	585	234	442	524	59	253	624	243	59	895	164
Future Volume (veh/h)	316	585	234	442	524	59	253	624	243	59	895	164
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Cb), 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	1.00	1.00	1.00	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/hln	1900	1881	1900	1881	1892	1900	1881	1889	1900	1863	1897	1900
Adj Flow Rate, veh/h	316	585	234	442	524	59	253	624	243	59	895	164
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	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, %	0	1	1	1	0	4	1	0	2	2	0	1
Cap, veh/h	469	635	254	437	1002	112	261	897	349	205	863	158
Arrive On Green	0.15	0.25	0.23	0.21	0.31	0.28	0.11	0.35	0.33	0.04	0.28	0.26
Sat Flow, veh/h	1810	2496	997	1792	3260	366	1792	2527	983	1774	3043	558
Grp Volume(V), veh/h	316	419	400	442	288	295	253	443	424	59	530	529
Grp Sat Flow(s), veh/hln	1810	1787	1705	1792	1798	1828	1792	1795	1716	1774	1802	1799
Q Serve(g, s), s	14.4	25.1	25.2	22.8	14.6	14.7	11.4	23.3	23.5	2.7	31.2	31.2
Cycle Q Clear(g, c), s	14.4	25.1	25.2	22.8	14.6	14.7	11.4	23.3	23.5	2.7	31.2	31.2
Prop In Lane	1.00	1.00	0.68	1.00	0.20	1.00	1.00	0.57	1.00	1.00	0.31	1.00
Lane Grp Cap(c), veh/h	469	455	434	437	552	562	261	637	609	205	511	510
V/C Ratio(X)	0.67	0.92	0.92	1.01	0.52	0.52	0.97	0.70	0.70	0.29	1.04	1.04
Avail Cap(c, a), veh/h	538	455	434	437	552	562	261	637	609	238	511	510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	39.9	40.8	32.9	31.4	31.7	29.7	30.4	31.2	29.6	39.4	39.9
Incr Delay (d2), s/veh	2.8	26.3	27.5	46.1	0.9	0.9	47.2	6.2	6.5	0.8	49.6	49.8
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 BackQ(50%), veh/h	7.5	15.7	15.1	18.8	7.3	7.5	11.1	12.5	12.2	1.3	22.5	22.5
LnGrp Delay(d), s/veh	28.8	66.2	68.4	79.0	32.3	32.6	76.9	36.6	37.7	30.3	89.0	89.6
LnGrp LOS	C	E	E	F	C	C	E	D	D	D	C	F
Approach Vol, veh/h	1135			1025			1120			1118		
Approach Delay, s/veh	56.6			52.5			46.1			86.2		
Approach LOS	E			D			D			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	26.8	32.0	8.2	43.0	21.0	37.8	16.0	35.2				
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0				
Max Green Setting (Gmax), s	22.8	25.0	6.2	34.0	21.2	26.6	12.0	28.2				
Max Q Clear Time (g_c+H), s	24.8	27.2	4.7	25.5	16.4	16.7	13.4	33.2				
Green Ext Time (p_c), s	0.0	0.0	0.0	3.9	0.6	2.9	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	60.5											
HCM 2010 LOS	E											

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	EB		EB		WB		WB		NB		NB		SB	
	L	T	R	TR	L	T	TR	L	T	L	T	R	TR	L
Directions Served	47.4	122.6	110.6	40.1	42.5	114.9	118.8	77.3	100.5	101.0	101.0	72.4	47.5	
Maximum Queue (m)	33.0	68.2	56.4	2.2	41.1	107.1	107.1	37.6	61.0	55.2	32.5	41.3		
Average Queue (m)	57.2	113.0	97.8	16.7	47.8	122.6	123.2	68.7	90.1	85.0	62.9	57.8		
95th Queue (m)														
Link Distance (m)														
Upstream Blk Time (%)	1	0	0	0	23	21								
Queueing Penalty (veh)	0	0	0	0	160	149								
Storage Bay Dist (m)	40.0	0	0	35.0	70.0						65.0	40.0		
Storage Blk Time (%)	9	26		38	43				0	3	2	0	15	
Queueing Penalty (veh)	29	55		142	126				0	7	7	1	60	

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	SB		SB		WB		WB		NB		NB		SB	
	T	TR	L	TR	L	T	TR	L	T	L	T	R	TR	L
Directions Served	164.0	150.9	26.7											
Maximum Queue (m)	98.9	85.1	4.2											
Average Queue (m)	165.5	147.0	17.3											
95th Queue (m)														
Link Distance (m)	241.6	241.6	241.6											
Upstream Blk Time (%)	0	0	0											
Queueing Penalty (veh)	0	0	0											
Storage Bay Dist (m)	44													
Storage Blk Time (%)														
Queueing Penalty (veh)	78													

Intersection: 2: Mall Entrance & Main St E

Movement	EB		EB		WB		WB		NB		NB		SB	
	T	TR	L	TR	L	T	TR	L	T	L	T	R	TR	L
Directions Served	86.2	89.7	77.4	217.8	222.6	91.0	88.6	68.6	30.3					
Maximum Queue (m)	36.0	41.1	54.9	140.0	142.4	37.4	37.2	28.5	13.1					
Average Queue (m)	68.1	73.5	97.7	295.7	297.3	168.0	166.7	57.1	23.2					
95th Queue (m)														
Link Distance (m)	108.2	108.2	251.1	251.1	239.2	239.2	127.6	127.6						
Upstream Blk Time (%)	0	0	17	18	1	1								
Queueing Penalty (veh)	0	0	122	130	6	6								
Storage Bay Dist (m)			3	33										
Storage Blk Time (%)			22	59										
Queueing Penalty (veh)														

Intersection: 3: Busway/Wilson Dr & Main St E

Movement	EB		EB		WB		WB		NB		NB		SB	
	L	T	TR	TR	L	T	TR	L	T	L	T	R	TR	L
Directions Served	33.4	60.7	72.4	47.4	115.1	119.5	40.2	7.8	27.7	48.6	34.9			
Maximum Queue (m)	14.2	24.3	33.3	14.3	59.6	62.0	14.7	0.8	9.6	24.6	14.3			
Average Queue (m)	26.5	54.8	66.6	36.3	102.3	105.5	31.8	4.6	22.0	41.1	27.2			
95th Queue (m)														
Link Distance (m)														
Upstream Blk Time (%)					239.2	239.2	335.8	335.8	127.9	127.9				160.4
Queueing Penalty (veh)														
Storage Bay Dist (m)	50.0			40.0							35.0	55.0		
Storage Blk Time (%)									15					0
Queueing Penalty (veh)	1								10					0

Intersection: 4: Drew Centre/Private Driveway & Main St E

Movement	EB		EB		WB		WB		NB		NB		SB	
	T	TR	L	TR	L	T	TR	L	T	L	T	R	TR	L
Directions Served	239.9	260.2	47.5	52.1	75.3	75.4	86.0	79.9	38.4					
Maximum Queue (m)	96.2	102.6	35.7	25.8	31.5	33.8	52.8	42.8	12.7					
Average Queue (m)	196.7	211.1	63.1	46.7	62.7	63.2	76.0	67.6	27.6					
95th Queue (m)														
Link Distance (m)	335.8	335.8			334.9	334.9	239.5	239.5						
Upstream Blk Time (%)														
Queueing Penalty (veh)														
Storage Bay Dist (m)	53	35		1	1	2								
Storage Blk Time (%)														
Queueing Penalty (veh)	0	97		5	5	4								

Intersection: 5: Thompson Rd & Main St E

Movement	EB		EB		WB		WB		NB		NB		SB	
	L	TR	L	TR	L	T	TR	L	T	L	T	R	TR	L
Directions Served	67.5	340.1	340.2	157.4	229.0	216.8	67.4	176.9	163.0	62.4	208.2	208.2		
Maximum Queue (m)	66.0	267.6	269.2	122.6	119.2	98.1	60.2	107.7	97.7	26.3	206.1	206.0		
Average Queue (m)	77.4	404.0	405.9	180.6	262.4	229.3	80.7	199.9	178.0	70.5	207.6	207.0		
95th Queue (m)														
Link Distance (m)														
Upstream Blk Time (%)			5	7	21	2				263.1	263.1		201.3	201.3
Queueing Penalty (veh)			29	41		0							77	89
Storage Bay Dist (m)			60.0		150.0		60.0						55.0	
Storage Blk Time (%)			20	62	29	0	46	4					0	78
Queueing Penalty (veh)			58	196	77	1	143	10					0	46

Network Summary

Network wide Queueing Penalty: 1881

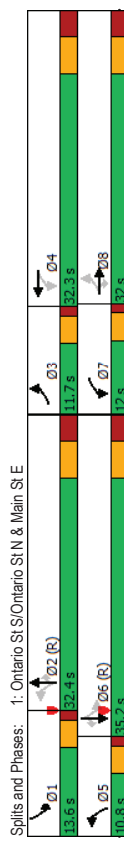
# Appendix H

## Future Total Traffic Operations



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔↔↔	↔↔↔	↔↔↔	↔↔↔	↔↔↔	↔↔↔	↔↔↔	↔↔↔	↔↔↔	↔↔↔	↔↔↔
Traffic Volume (vph)	210	629	107	224	340	171	101	798	327	178	595
Future Volume (vph)	210	629	107	224	340	171	101	798	327	178	595
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5	3.3	3.6
Storage Length (m)	40.0	0.0	35.0	0.0	35.0	0.0	70.0	65.0	40.0	40.0	1
Storage Lanes	1	1	1	0	0	0	1	1	1	1	1
Taper Length (m)	7.5	0.95	1.00	7.5	0.95	1.00	7.5	0.95	1.00	7.5	0.95
Lane Util. Factor	1.00	0.97	0.99	0.99	0.99	1.00	0.98	0.98	1.00	0.98	0.98
Ped Bike Factor	1.00	0.850	0.850	0.950	0.950	0.850	0.850	0.850	0.850	0.850	0.850
Flt Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1728	3539	1581	1662	3285	0	1662	3438	1551	1631	3374
FltP Permitted	0.294	0.195	0.195	0.379	0.379	0.176	0.176	0.176	0.176	0.176	0.176
Satd. Flow (perm)	533	3539	1535	339	3285	0	662	3438	1522	302	3374
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	145	145	145	102	102	301	301	301	301	301	145
Link Speed (km/h)	50	50	50	50	50	50	50	50	50	50	50
Link Distance (m)	147.9	134.8	338.1	134.8	338.1	338.1	338.1	338.1	338.1	338.1	256.3
Travel Time (s)	10.6	9.7	24.3	9.7	24.3	6	6	6	6	6	18.5
Confl. Peds. (#/hr)	16	16	16	8	8	3	3	3	3	3	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
Heavy Vehicles (%)	1%	2%	1%	5%	2%	7%	5%	3%	7%	7%	1%
Adj. Flow (vph)	210	629	107	224	340	171	101	798	327	178	595
Shared Lane Traffic (%)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	210	629	107	224	511	0	101	798	327	178	595
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right
Median Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Link Offset (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width (m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane	1.04	1.00	1.01	1.04	1.00	1.04	1.00	1.04	1.00	1.04	1.00
Headway Factor	25	15	25	15	25	15	25	15	25	15	25
Turning Speed (km/h)	1	2	1	2	1	2	1	2	1	2	1
Number of Detectors	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru
Detector Template	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0
Leading Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4	0.6	9.4	9.4	0.6	9.4	9.4	0.6	9.4	0.6	9.4
Detector 2 Size (m)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Detector 2 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt
Protected Phases	3	8	7	4	7	4	5	2	2	1	6
Permitted Phases	8	8	8	4	7	4	5	2	2	1	6
Detector Phase	3	8	8	7	4	7	4	5	2	2	1
Switch Phase	5	15.0	15.0	7.0	15.0	7.0	5.0	15.0	15.0	5.0	15.0
Minimum Initial (s)	9.5	32.0	32.0	11.0	32.0	11.0	9.5	32.0	32.0	9.5	32.0
Minimum Split (s)	11.7	32.0	32.0	12.0	32.3	10.8	32.4	32.4	32.4	13.6	35.2
Total Split (%)	13.0%	35.6%	35.6%	13.3%	35.9%	12.0%	36.0%	36.0%	36.0%	15.1%	39.1%
Maximum Green (s)	7.7	25.0	25.0	8.0	25.3	6.8	25.4	25.4	25.4	9.6	28.2
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	1.0	3.0	3.0	3.0	1.0	3.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	0.0	-3.0	0.0	-3.0	-3.0	-3.0	0.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Vehicle Extension (s)	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Walk Time (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Flash Dont Walk (s)	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	30.9	23.2	23.2	31.5	23.5	40.1	33.4	33.4	33.4	46.0	37.9
Ad Effct Green (s)	0.34	0.26	0.26	0.35	0.26	0.45	0.37	0.37	0.37	0.51	0.42
Actuated g/C Ratio	0.74	0.69	0.21	0.95	0.55	0.27	0.63	0.43	0.61	0.42	0.13
v/c Ratio	36.2	34.0	2.9	70.7	24.5	14.5	27.0	5.9	22.4	21.1	1.7
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	36.2	34.0	2.9	70.7	24.5	14.5	27.0	5.9	22.4	21.1	1.7
Total Delay	D	C	A	E	C	B	C	A	C	C	A
LOS	D	C	A	E	C	B	C	A	C	C	A
Approach Delay	31.0	38.6	20.3	38.6	20.3	31.0	38.6	20.3	38.6	20.3	31.0
Approach LOS	C	D	C	D	C	C	D	C	D	C	C
Intersection Summary	Other										
Area Type:	Other										
Cycle Length:	90										
Actuated Cycle Length:	90										
Offset:	33.3 (37%), Referenced to phase 2:NBLT and 6:SBLT, Start of Green										
Natural Cycle:	95										
Control Type:	Actuated-Coordinated										
Maximum v/c Ratio:	0.95										
Intersection Signal Delay:	26.3										
Intersection Capacity Utilization:	76.5%										
Analysis Period (min):	15										
ICU Level of Service:	D										



	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	210	629	107	224	511	101	798	327	178	595	98
v/c Ratio	0.74	0.69	0.21	0.95	0.55	0.27	0.63	0.43	0.61	0.42	0.13
Control Delay	36.2	34.0	2.9	70.7	24.5	14.5	27.0	5.9	22.4	21.1	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	34.0	2.9	70.7	24.5	14.5	27.0	5.9	22.4	21.1	1.7
Queue Length 50th (m)	25.9	54.3	0.0	28.1	33.3	8.9	62.5	3.0	16.6	41.0	0.0
Queue Length 95th (m)	#41.7	67.8	6.3	#61.6	45.7	19.5	89.5	23.2	#33.2	61.1	4.3
Internal Link Dist (m)	123.9										
Turn Bay Length (m)	40.0										
Base Capacity (vph)	285										
Starvation Cap Reductn	0										
Spillback Cap Reductn	0										
Storage Cap Reductn	0										
Reduced v/c Ratio	0.74	0.57	0.19	0.95	0.46	0.27	0.63	0.43	0.58	0.42	0.13

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

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑	↑
Traffic Volume (veh/h)	210	629	107	224	340	171	101	798	327	178	595
Future Volume (veh/h)	210	629	107	224	340	171	101	798	327	178	595
Number	3	8	18	7	4	14	5	2	12	1	6
Initial Q (Obs.) veh	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99	1.00	0.99	1.00	0.98	1.00	1.00	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
Adj Sat Flow (veh/h)	1881	1863	1881	1810	1833	1900	1810	1810	1845	1776	1881
Adj Flow Rate, veh/h	210	629	0	224	340	171	101	798	327	178	595
Adj No. of Lanes	1	2	1	1	2	0	1	2	1	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	1	2	1	5	2	7	5	5	3	7	7
Cap. veh/h	321	836	423	289	601	296	377	1312	596	304	1397
Arrive On Green	0.09	0.26	0.00	0.09	0.27	0.23	0.05	0.38	0.38	0.09	0.41
Sat Flow, veh/h	1792	3539	1599	1723	2246	1106	1723	3438	1561	1691	3374
Grp Volume(v), veh/h	210	629	0	224	262	249	101	798	327	178	595
Grp Sat Flow(s), veh/h	1792	1770	1599	1723	1741	1610	1723	1719	1561	1691	1687
Q Serve(g.s), s	7.7	14.3	0.0	8.0	11.7	12.2	3.3	16.8	14.8	5.9	11.3
Cycle Q Clear(g.c), s	7.7	14.3	0.0	8.0	11.7	12.2	3.3	16.8	14.8	5.9	11.3
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.69	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	321	836	423	289	466	431	377	1312	596	304	1397
V/C Ratio(X)	0.65	0.67	0.00	0.78	0.56	0.58	0.27	0.61	0.55	0.59	0.43
Avail Cap(c.a), veh/h	321	1101	497	289	547	506	413	1312	596	337	1397
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
Upstream Filter(I)	1.00	1.00	0.00	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	29.6	0.0	27.2	28.4	29.5	17.5	22.4	21.8	18.2	18.8
Incr Delay (d2), s/veh	3.8	0.8	0.0	11.2	0.4	0.4	0.1	2.1	3.6	1.1	1.0
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
%ile BackOfQ(50%) veh/m	4.3	7.1	0.0	2.6	5.7	5.5	1.6	8.4	7.0	2.8	5.4
LnGrp Delay(d)s/veh	29.3	30.4	0.0	38.5	28.8	29.9	17.6	24.5	25.4	19.3	19.7
LnGrp LOS	C	C	C	D	C	C	B	C	C	B	B
Approach Vol, veh/h	839										
Approach Delay, s/veh	30.1										
Approach LOS	C										
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	11.8	38.4	11.7	28.1	8.9	41.3	12.0	27.8			
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0			
Max Green Setting (Gmax), s	9.6	25.4	7.7	25.3	6.8	28.2	8.0	25.0			
Max Q Clear Time (g_c+H), s	7.9	18.8	9.7	14.2	5.3	13.3	10.0	16.3			
Green Ext Time (p_c), s	0.1	3.1	0.0	2.0	0.0	2.9	0.0	2.4			
Intersection Summary	26.2										
HCM 2010 Ctrl Delay	C										

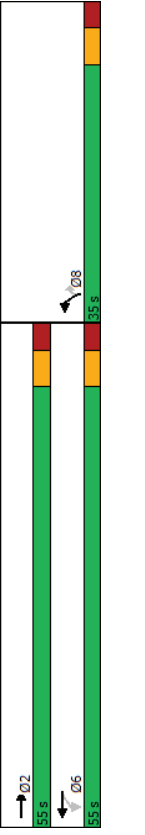
	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	210	629	107	224	511	101	798	327	178	595	98
v/c Ratio	0.74	0.69	0.21	0.95	0.55	0.27	0.63	0.43	0.61	0.42	0.13
Control Delay	36.2	34.0	2.9	70.7	24.5	14.5	27.0	5.9	22.4	21.1	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	34.0	2.9	70.7	24.5	14.5	27.0	5.9	22.4	21.1	1.7
Queue Length 50th (m)	25.9	54.3	0.0	28.1	33.3	8.9	62.5	3.0	16.6	41.0	0.0
Queue Length 95th (m)	#41.7	67.8	6.3	#61.6	45.7	19.5	89.5	23.2	#33.2	61.1	4.3
Internal Link Dist (m)	123.9										
Turn Bay Length (m)	40.0										
Base Capacity (vph)	285										
Starvation Cap Reductn	0										
Spillback Cap Reductn	0										
Storage Cap Reductn	0										
Reduced v/c Ratio	0.74	0.57	0.19	0.95	0.46	0.27	0.63	0.43	0.58	0.42	0.13

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

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	1252	41	32	713	23	18
Future Volume (vph)	1252	41	32	713	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.3	3.6	3.3	3.5
Storage Length (m)	0.0	0.0	70.0	0.0	0.0	0.0
Storage Lanes	0	1	1	1	1	1
Taper Length (m)	0.95	0.95	1.00	0.95	1.00	1.00
Lane Util. Factor	0.995					
FRT	0.950					0.850
FRT Protected			0.950		0.950	
Satd. Flow (prot)	3491	0	1745	3343	1711	1597
FRT Permitted			0.192		0.950	
Satd. Flow (perm)	3491	0	353	3343	1711	1597
Right Turn on Red	Yes					Yes
Satd. Flow (RTOR)	6					18
Link Speed (k/h)	50			50		50
Link Distance (m)	134.8			273.6		144.7
Travel Time (s)	9.7			19.7		10.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	8%	2%	0%
Adj. Flow (Vph)	1252	41	32	713	23	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1293	0	32	713	23	18
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.3		3.3
Link Offset(m)	0.0			0.0		0.0
Crosswalk Width(m)	4.8			4.8		4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.04	1.00	1.04	1.01
Turning Speed (k/h)	15	25	25	25	15	15
Number of Detectors	2		1	2	1	1
Detector Template	Thru	Left	Thru	Left	Right	Right
Leading Detector (m)	10.0	2.0	10.0	2.0	2.0	2.0
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)	0.6	2.0	0.6	2.0	2.0	2.0
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	NA	Perm	NA	Prot	Perm	Perm

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Protected Phases	2					
Permitted Phases			6	6	8	8
Detector Phase	2		6	6	8	8
Switch Phase						
Minimum Initial (s)	30.0	30.0	30.0	30.0	10.0	10.0
Minimum Split (s)	37.0	37.0	37.0	37.0	35.0	35.0
Total Split (s)	55.0	55.0	55.0	55.0	35.0	35.0
Total Split (%)	61.1%	61.1%	61.1%	61.1%	38.9%	38.9%
Maximum Green (s)	48.0	48.0	48.0	28.0	28.0	28.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	None	None	None	None	None
Walk Time (s)	15.0			20.0	20.0	20.0
Flash Dorn Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	62.0	62.0	62.0	13.1	13.1	13.1
Actuated G/C Ratio	0.84	0.84	0.84	0.18	0.18	0.18
v/c Ratio	0.44	0.11	0.26	0.08	0.06	0.06
Control Delay	3.8	4.2	2.9	26.6	12.5	12.5
Queue Delay	0.3	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	4.2	2.9	26.6	12.5	12.5
LOS	A	A	A	C	B	B
Approach Delay	4.2			3.0	20.4	
Approach LOS	A			A	C	
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	74.2					
Natural Cycle:	75					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.44					
Intersection Signal Delay:	4.1					
Intersection Capacity Utilization:	50.9%					
Analysis Period (min):	15					

Splits and Phases: 2: Mail Entrance & Main St E



2. Mail Entrance & Main St E

2. Mail Entrance & Main St E

	EBT	WBL	WBT	NBL	NBR
Lane Group					
Lane Group Flow (vph)	1293	32	713	23	18
v/c Ratio	0.44	0.11	0.26	0.08	0.06
Control Delay	3.8	4.2	2.9	26.6	12.5
Queue Delay	0.3	0.0	0.0	0.0	0.0
Total Delay	4.2	4.2	2.9	26.6	12.5
Queue Length 50th (m)	35.7	1.2	15.8	3.5	0.0
Queue Length 95th (m)	48.2	3.9	22.2	8.7	5.1
Internal Link Dist (m)	110.8		249.6	120.7	
Turn Bay Length (m)	70.0				
Base Capacity (vph)	2916	295	2791	719	682
Starvation Cap Reductn	870	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.63	0.11	0.26	0.03	0.03



	EBT	EBR	WBL	WBT	NBL	NBR
Movement						
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	1252	41	32	713	23	18
Future Volume (veh/h)	1252	41	32	713	23	18
Number	2	12	1	6	3	18
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/m	1846	1900	1900	1759	1863	1900
Adj Flow Rate, veh/h	1252	41	32	713	23	18
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	0	0	8	2	0
Cap. veh/h	2625	86	375	2531	220	200
Arrive On Green	0.76	0.71	0.76	0.76	0.12	0.12
Sat Flow, veh/h	3559	113	433	3431	1774	1615
Grp Volume(v), veh/h	633	660	32	713	23	18
Grp Sat Flow(s), veh/h/m	1764	1826	433	1671	1774	1615
Q Serve(g, s), s	9.2	9.3	2.0	4.4	0.8	0.7
Cycle Q Clear(g, c), s	9.2	9.3	11.4	4.4	0.8	0.7
Prop In Lane	0.06	0.06	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1328	1383	375	2531	220	200
V/C Ratio(X)	0.48	0.48	0.09	0.28	0.10	0.09
Avail Cap(c, a), veh/h	1328	1383	375	2531	816	743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	3.1	3.2	5.3	2.5	26.2	26.1
Incr Delay (d2), s/veh	1.2	1.2	0.1	0.1	0.2	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/m	4.8	5.1	0.3	2.0	0.4	0.3
LnGrp Delay(d), s/veh	4.3	4.3	5.4	2.6	26.4	26.3
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h	1293		745	41		
Approach Delay, s/veh	4.3		2.7	26.4		
Approach LOS	A		A	C		
Timer	1	2	3	4	5	6
Assigned Phs		2				8
Phs Duration (G+Y+Rc), s		55.0				12.4
Change Period (Y+Rc), s		7.0				7.0
Max Green Setting (Gmax), s		48.0				28.0
Max Q Clear Time (g_c+H), s		11.3				13.4
Green Ext Time (p_c), s		14.3				7.5



	EBT	EBR	WBL	WBT	NBL	NBR
Intersection Summary						
HCM 2010 Ctrl Delay				4.2		
HCM 2010 LOS				A		

	EBT	EBR	WBL	WBT	NBL	NBR
Intersection Summary						
HCM 2010 Ctrl Delay				4.2		
HCM 2010 LOS				A		



Lanes, Volumes, Timings  
3: Busway/Wilson Dr & Main St E

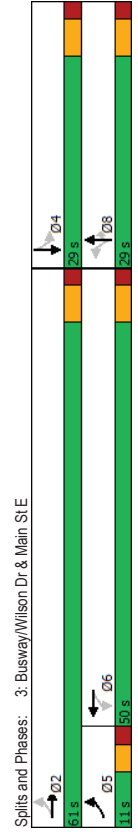
200624  
Future Total 2031 AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	61	1086	43	46	458	71	140	6	171	165	4	93
Future Volume (vph)	61	1086	43	46	458	71	140	6	171	165	4	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.5
Storage Length (m)	50.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	35.0	55.0	0.0	0.0
Storage Lanes	1											
Taper Length (m)	7.5	0.95	0.95	7.5	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.994		0.980					0.850	0.99		0.856
Frt Protected	0.950	0.950		0.950					0.950	0.950		0.950
Satd. Flow (prot)	1646	3518	0	1770	3379	0	1687	1863	1509	1728	1580	0
FltP Permitted	0.398			0.252			0.694			0.754		
Satd. Flow (perm)	688	3518	0	469	3379	0	1232	1863	1509	1355	1580	0
Right Turn on Red		Yes		Yes			Yes		Yes		Yes	
Satd. Flow (RTOR)	9			28			113			93		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	260.1			360.6			65.1			174.4		
Travel Time (s)	18.7			26.0			4.7			12.6		
Confl. Peds. (#/hr)	5			5			8			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 (%)	6%	2%	2%	5%	5%	0%	7%	2%	7%	1%	2%	3%
Adj. Flow (vph)	61	1086	43	46	458	71	140	6	171	165	4	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	1129	0	46	529	0	140	6	171	165	97	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (m)	3.6			3.6			3.6			3.6		3.6
Link Offset (m)	0.0			0.0			0.0			0.0		0.0
Crosswalk Width (m)	4.8			4.8			4.8			4.8		4.8
Two way Left Turn Lane	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.01
Headway Factor	25			15	25		25		15	25		15
Turning Speed (k/h)	1	2		1	2		1	2	1	2		1
Number of Detectors	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Detector Template	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Leading Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4			9.4			9.4			9.4		9.4
Detector 2 Size (m)	0.6			0.6			0.6			0.6		0.6
Detector 2 Type	C+Ex			C+Ex			C+Ex			C+Ex		C+Ex
Detector 2 Channel												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		0.0
Turn Type	pm-pt	NA		Perm	NA		Perm	NA		Perm	NA	NA
Protected Phases	5	2		6			8			8		4
Permitted Phases	2			6			8			8		4
Detector Phase	5	2		6			8			8		4
Switch Phase												
Minimum Initial (s)	5.0	40.0		40.0			5.0			5.0		10.0
Minimum Split (s)	10.0	46.0		46.0			24.0			24.0		26.0
Total Split (s)	11.0	61.0		50.0			29.0			29.0		29.0
Total Split (%)	12.2%	67.8%		55.6%			32.2%			32.2%		32.2%
Maximum Green (s)	6.0	55.0		44.0			23.0			23.0		23.0
Yellow Time (s)	3.0	4.0		4.0			4.0			4.0		4.0
All-Red Time (s)	2.0	2.0		2.0			2.0			2.0		2.0
Lost Time Adjust (s)	-1.0	-2.0		-2.0			-2.0			-2.0		-2.0
Total Lost Time (s)	4.0	4.0		4.0			4.0			4.0		4.0
Lead/Lag		Lead		Lag			Lag			Lag		Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0		4.0			4.0			4.0		4.0
Recall Mode	None	Max		None			None			None		None
Walk Time (s)	30.0			30.0			7.0			7.0		7.0
Flash Dont Walk (s)	10.0			10.0			11.0			11.0		13.0
Pedestrian Calls (#/hr)	0			0			0			0		0
Act Effct Green (s)	57.2	57.2		48.5			18.1			18.1		18.1
Actuated g/C Ratio	0.69	0.69		0.58			0.22			0.22		0.22
v/c Ratio	0.11	0.47		0.17			0.52			0.01		0.41
Control Delay	5.8	7.3		12.8			35.9			24.3		36.5
Queue Delay	0.0	0.0		0.0			0.0			0.0		0.0
Total Delay	5.8	7.3		12.8			35.9			24.3		36.5
LOS	A	A		B			D			C		B
Approach Delay	7.3			10.1			23.6			C		C
Approach LOS	A			B			C			C		C
Intersection Summary	Other											
Area Type	Other											
Cycle Length	90											
Actuated Cycle Length	83.3											
Natural Cycle	85											
Control Type	Semi Act-Uncoordinated											
Maximum v/c Ratio	0.56											
Intersection Signal Delay	12.3											
Intersection Capacity Utilization	73.2%											
Analysis Period (min)	15											



Queue	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	61	1129	46	529	140	6	171	165	97
v/c Ratio	0.11	0.47	0.17	0.27	0.52	0.01	0.41	0.56	0.23
Control Delay	5.8	7.3	12.8	9.9	35.9	24.3	13.5	36.5	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	7.3	12.8	9.9	35.9	24.3	13.5	36.5	7.9
Queue Length 50th (m)	2.9	38.7	3.5	21.4	20.7	0.8	7.9	24.7	0.5
Queue Length 95th (m)	8.3	67.1	11.4	36.8	38.5	3.7	24.3	44.0	11.9
Internal Link Dist (m)	236.1								
Turn Bay Length (m)	50.0								
Base Capacity (vph)	552	2417	273	1979	370	560	533	407	540
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.47	0.17	0.27	0.38	0.01	0.32	0.41	0.18

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	0	1	2	0	0	0	0	1	1	0
Traffic Volume (veh/h)	61	1086	43	46	458	71	140	6	171	165	4	93
Volume (veh/h)	61	1086	43	46	458	71	140	6	171	165	4	93
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Obs.) 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	1.00	0.99	1.00	1.00	1.00	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	1792	1863	1900	1863	1821	1900	1776	1863	1776	1881	1845	1900
Adj Flow Rate, veh/h	61	1086	43	46	458	71	140	6	171	165	4	93
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	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. %	6	2	2	2	5	0	7	2	7	1	2	3
Cap. veh/h	592	2364	94	352	1731	267	296	416	337	354	14	334
Arrive On Green	0.06	0.68	0.66	0.58	0.88	0.58	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1707	3470	137	496	3004	463	1222	1863	1509	1214	64	1498
Grp Volume(v), veh/h	61	554	575	46	263	266	140	6	171	165	0	97
Grp Sat Flow(s), veh/h	1707	1770	1838	496	1730	1737	1222	1863	1509	1214	0	1562
Q Serv(g.s), s	1.1	12.1	12.2	4.0	6.3	6.4	9.0	0.2	8.3	10.3	0.0	4.3
Cycle Q Clear(g.c), s	1.1	12.1	12.2	7.4	6.3	6.4	13.3	0.2	8.3	10.5	0.0	4.3
Prop In Lane	1.00	0.07	1.00	1.00	0.27	1.00	1.00	1.00	1.00	1.00	1.00	0.96
Lane Grp Cap(c), veh/h	592	1206	1252	352	997	1001	296	416	337	354	0	348
V/C Ratio(X)	0.10	0.46	0.46	0.13	0.26	0.27	0.47	0.01	0.51	0.47	0.00	0.28
Avail Cap(c.a), veh/h	637	1206	1252	352	997	1001	388	557	451	446	0	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.9	6.2	6.2	9.9	8.9	8.9	32.4	25.3	28.5	29.4	0.0	26.9
Incr Delay (d2), s/veh	0.1	1.3	1.2	0.2	0.2	0.2	1.7	0.0	1.7	1.4	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%) veh/m	0.5	6.3	6.5	0.6	3.0	3.1	3.2	0.1	3.6	3.6	0.0	1.9
LnGrp Delay(d)s/veh	6.0	7.4	7.4	10.2	9.1	9.1	34.1	25.4	30.2	30.8	0.0	27.5
LnGrp LOS	A	A	A	B	A	A	C	C	C	C	C	C
Approach Vol, veh/h	1190											
Approach Delay, s/veh	7.4											
Approach LOS	A											
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2											
Phs Duration (G+Y+Rc), s	61.0											
Change Period (Y+Rc), s	6.0											
Max Green Setting (Gmax), s	55.0											
Max Q Clear Time (g_c+H), s	14.2											
Green Ext Time (p_c), s	17.0											
Intersection Summary	13.6											
HCM 2010 Ctrl Delay	B											
HCM 2010 LOS	C											

Lanes, Volumes, Timings  
4: Drew Centre/Private Driveway & Main St E

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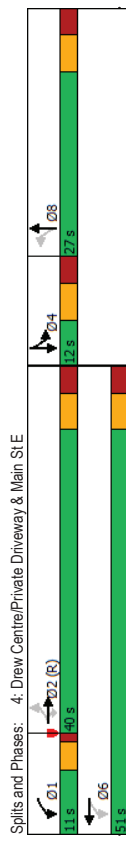
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	905	117	78	587	0	139	0	36	0	0	0
Future Volume (vph)	0	905	117	78	587	0	139	0	36	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Storage Length (m)	15.0	40.0	40.0	45.0	0.0	0.0	0.0	55.0	0.0	0.0	0.0	0.0
Storage Lanes	1	1	1	1	1	0	2	0	0	0	0	0
Taper Length (m)	7.5	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	0.96	1.00	0.98	0.98	0.950	0.850				
Frt		0.850										
Flt Protected		0.950		0.950		0.950		0.950				
Satd. Flow (prot)	1837	3539	1439	1646	3539	0	3395	1583	0	0	1900	0
Flt Permitted		0.258		0.950		0.950		0.950				
Satd. Flow (perm)	1837	3539	1387	446	3539	0	3395	1583	0	0	1900	0
Right Turn on Red		Yes		Yes		Yes		Yes			Yes	
Satd. Flow (RTOR)		182				327						
Link Speed (km/h)	50		50		50		50		50		50	
Link Distance (m)	360.6		362.0		256.9		256.9		51.9		51.9	
Travel Time (s)	26.0		26.1		18.5		18.5		3.7		3.7	
Conf. Peds. (#/hr)	2	10	10	10	2	2	2	2	6	6	6	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
Heavy Vehicles (%)	0%	2%	11%	6%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	905	117	78	587	0	139	0	36	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	905	117	78	587	0	139	36	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (m)	3.6		3.6		3.6		3.6		6.6		6.6	
Link Offset (m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width (m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.01	1.04	1.00	1.04	1.00	1.04	1.01	1.00	1.00	1.00
Turning Speed (km/h)	25	15	25	25	15	25	25	15	25	15	25	15
Number of Detectors	1	2	1	1	2	1	2	1	2	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	10.0	2.0	10.0	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	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size (m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	C+Ex		C+Ex		C+Ex		C+Ex		C+Ex		C+Ex	
Detector 2 Channel												

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Lanes, Volumes, Timings  
4: Drew Centre/Private Driveway & Main St E

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	0.0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA					
Protected Phases				1	6		8			4		4
Permitted Phases	2	2	2	2	1	6	8	8	8	4	4	4
Detector Phase	2	2	2	2	1	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0
Minimum Split (s)	35.0	35.0	35.0	9.5	35.0	27.0	27.0	27.0	27.0	12.0	12.0	12.0
Total Split (s)	40.0	40.0	40.0	11.0	51.0	27.0	27.0	27.0	27.0	13.0	13.0	13.0
Total Split (%)	44.4%	44.4%	44.4%	12.2%	56.7%	30.0%	30.0%	30.0%	30.0%	13.3%	13.3%	13.3%
Maximum Green (s)	33.0	33.0	33.0	7.0	44.0	20.0	20.0	20.0	20.0	5.0	5.0	5.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	0.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0	21.0	21.0	21.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	60.3	60.3	60.3	69.0	69.0	13.0	13.0	13.0	13.0	0.14	0.14	0.14
Act Effct Green Ratio	0.67	0.67	0.67	0.77	0.77	0.14	0.14	0.14	0.14	0.29	0.29	0.29
v/c Ratio	0.38	0.12	0.18	0.22	0.22	0.29	0.07	0.07	0.07	0.35	0.3	0.3
Control Delay	8.0	0.5	3.9	3.3	3.3	35.3	0.3	0.3	0.3	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	0.5	3.9	3.3	3.3	35.3	0.3	0.3	0.3	0.0	0.0	0.0
LOS	A	A	A	A	A	D	A	A	A	D	A	A
Approach Delay	7.1		3.4		3.4		28.1					
Approach LOS	A		A		A		C					
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	18.9 (21%), Referenced to phase 2/EBTL, Start of Green											
Natural Cycle:	95											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.38											
Intersection Signal Delay:	7.8											
Intersection Capacity Utilization:	46.5%											
Analysis Period (min):	15											



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Queues  
 4: Drew Centre/Private Driveway & Main St E

HCM 2010 Signalized Intersection Summary  
 4: Drew Centre/Private Driveway & Main St E

	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group Flow (vph)	905	117	78	587	139	36
v/c Ratio	0.38	0.12	0.18	0.22	0.29	0.07
Control Delay	8.0	0.5	3.9	3.3	35.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	0.5	3.9	3.3	35.3	0.3
Queue Length 50th (m)	36.3	0.0	2.7	12.3	11.8	0.0
Queue Length 95th (m)	55.6	1.7	6.8	20.3	19.7	0.0
Internal Link Dist (m)	338.6			338.0		232.9
Turn Bay Length (m)	40.0	45.0				
Base Capacity (vph)	2372	990	437	2715	865	647
Station 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	0.38	0.12	0.18	0.22	0.16	0.06

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	905	117	78	587	0	139	0	36	0	0
Future Volume (veh/h)	0	905	117	78	587	0	139	0	36	0	0
Number	5	2	12	1	6	16	3	8	18	7	4
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98	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
Adj Sat Flow, veh/h	1900	1863	1712	1792	1863	0	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	905	117	78	587	0	139	0	36	0	0
Adj No. of Lanes	1	2	1	1	2	0	2	1	0	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	0	2	11	6	2	0	0	0	0	0	0
Cap. veh/h	80	2507	1023	465	2833	0	549	0	175	0	0
Arrive On Green	0.00	0.71	0.71	0.05	0.80	0.00	0.11	0.00	0.08	0.00	0.00
Sat Flow, veh/h	842	3539	1445	1707	3632	0	3510	0	1577	0	0
Grp Volume(v), veh/h	0	905	117	78	587	0	139	0	36	0	0
Grp Sat Flow(s), veh/h	842	1770	1445	1707	1770	0	1755	0	1577	0	0
Q Serve(g.s), s	0.0	9.0	2.3	1.1	3.6	0.0	3.3	0.0	1.9	0.0	0.0
Cycle Q Clear(g.c), s	0.0	9.0	2.3	1.1	3.6	0.0	3.3	0.0	1.9	0.0	0.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Lane Grp Cap(c), veh/h	80	2507	1023	465	2833	0	549	0	175	0	0
V/C Ratio(X)	0.00	0.36	0.11	0.17	0.21	0.00	0.25	0.00	0.21	0.00	0.00
Avail Cap(c.a), veh/h	80	2507	1023	516	2833	0	1057	0	403	0	0
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
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.1	4.2	3.9	2.1	0.0	37.1	0.0	37.8	0.0	0.6
Incr Delay (d2), s/veh	0.0	0.4	0.2	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0
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
%ile BackOfQ(50%) veh/m	0.0	4.4	1.0	0.5	1.7	0.0	1.6	0.0	0.9	0.0	0.0
LnGrp Delay(d),s/veh	0.0	5.5	4.4	4.0	2.2	0.0	37.3	0.0	38.4	0.0	0.6
LnGrp LOS	A	A	A	A	A	D	D	D	D	D	D
Approach Vol, veh/h	1022	665				175					
Approach Delay, s/veh	5.4	2.4				37.5					
Approach LOS	A	A				D					
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2				6					
Phs Duration (G+Y+Rc), s	8.3	67.8				76.0					
Change Period (Y+Rc), s	4.0	7.0				7.0					
Max Green Setting (Gmax), s	7.0	33.0				44.0					
Max Q Clear Time (g_c+H), s	3.1	11.0				5.6					
Green Ext Time (p_c), s	0.1	8.5				5.5					
Intersection Summary											
HCM 2010 Cfrl Delay						7.4					
HCM 2010 LOS						A					

Lanes, Volumes, Timings  
5: Thompson Rd & Main St E

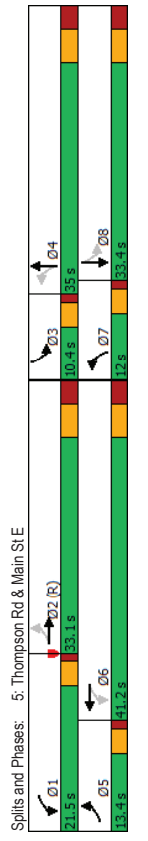
200624  
Future Total 2031 AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	166	704	121	316	434	60	160	663	469	122	333	103
Future Volume (vph)	166	704	121	316	434	60	160	663	469	122	333	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	60.0	0.0	180.0	0.0	60.0	0.0	60.0	0.0	55.0	0.0	0.0	0.0
Taper Length (m)	7.5	0.0	0.0	7.5	0.0	0.0	7.5	0.0	0.0	7.5	0.0	0.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt	0.978			0.982			0.938			0.965		
FIT Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1728	3501	0	1711	3514	0	1711	3339	0	1745	3398	0
FIT Permitted	0.471			0.128			0.360			0.151		
Satd. Flow (perm)	857	3501	0	230	3514	0	648	3339	0	277	3398	0
Right Turn on Red		Yes		Yes			Yes		Yes		Yes	
Satd. Flow (RTOR)	20		17		185		60		42		60	
Link Speed (km/h)	50		50		278.6		217.9		13.1		13.1	
Link Distance (m)	362.0		250.3		278.6		217.9		13.1		13.1	
Travel Time (s)	26.1		18.0		16.7		13.1		3.3		3.3	
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 (%)	1%	1%	0%	2%	1%	0%	2%	1%	2%	0%	3%	1%
Adj. Flow (Vph)	166	704	121	316	434	60	160	663	469	122	333	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	166	825	0	316	494	0	160	1132	0	122	436	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (m)	3.3		3.3		3.3		3.3		3.3		3.3	
Link Offset (m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width (m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.04	1.00	1.04	1.00	1.00	1.04	1.00	1.00	1.00
Turning Speed (km/h)	25	15	25	25	15	25	15	25	15	25	15	15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru	Left	Thru	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	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	0.0	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	0.6	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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size (m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA

Lanes, Volumes, Timings  
5: Thompson Rd & Main St E

200624  
Future Total 2031 AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			3		8
Detector Phase	5	2		1	6		7	4		3		8
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	9.5	32.0		9.5	32.0		9.5	32.0		9.5	32.0	
Total Split (s)	13.4	33.1		21.5	41.2		12.0	35.0		10.4	33.4	
Total Split (%)	13.4%	33.1%		21.5%	41.2%		12.0%	35.0%		10.4%	33.4%	
Maximum Green (s)	9.4	26.1		17.5	34.2		8.0	28.0		6.4	26.4	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0		0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		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	C-Max		None	Max		None	Max		None	Max	
Walk Time (s)	7.0			7.0			7.0			7.0		
Flash Dont Walk (s)	18.0			18.0			18.0			18.0		
Pedestrian Calls (#/hr)	0			0			0			0		
Act Effct Green (s)	39.3	30.3		50.6	37.6		38.9	31.0		35.9	29.5	
Actuated G/C Ratio	0.39	0.30		0.51	0.38		0.39	0.31		0.36	0.30	
v/c Ratio	0.40	0.77		0.88	0.37		0.48	0.97		0.63	0.42	
Control Delay	17.5	36.9		49.7	22.9		24.4	50.2		35.3	27.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.5	36.9		49.7	22.9		24.4	50.2		35.3	27.1	
LOS	B	D		D	C		C	D		D	C	
Approach Delay												
Approach LOS	C	C		C	C		C	C		C	C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	0 (0%), Referenced to phase 2EBTL, Start of Green											
Natural Cycle:	85											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.97											
Intersection Signal Delay:	37.6											
Intersection Capacity Utilization:	94.3%											
Analysis Period (min):	15											
ICU Level of Service F												



5: Thompson Rd & Main St E

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	166	825	316	494	160	1132	122	436
v/c Ratio	0.40	0.77	0.88	0.37	0.48	0.97	0.63	0.42
Control Delay	17.5	36.9	49.7	22.9	24.4	50.2	35.3	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	36.9	49.7	22.9	24.4	50.2	35.3	27.1
Queue Length 50th (m)	17.7	79.8	45.2	36.7	20.7	103.6	15.4	33.7
Queue Length 95th (m)	30.1	103.4	#92.2	50.6	35.4	#151.3	#29.5	48.4
Internal Link Dist (m)	338.0		226.3		254.6		193.9	
Turn Bay Length (m)	60.0	150.0		60.0			55.0	
Base Capacity (vph)	421	1073	375	1332	337	1162	193	1030
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.77	0.84	0.37	0.47	0.97	0.63	0.42

5: Thompson Rd & Main St E

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	T	T	T	T	T	T	T	T
Traffic Volume (veh/h)	166	704	121	316	434	60	160	663
Future Volume (veh/h)	166	704	121	316	434	60	160	663
Number	5	2	12	1	6	16	7	4
Initial Q (Obs.) veh	0	0	0	0	0	0	0	0
Ped-Bike Adj(A..pbT)	1.00	1.00	1.00	1.00	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
Adj Sat Flow (veh/h)	1881	1884	1900	1863	1883	1900	1863	1874
Adj Flow Rate, veh/h	166	704	121	316	434	60	160	663
Adj No. of Lanes	1	2	0	1	2	0	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	1	1	0	2	1	0	2	1
Cap. veh/h	451	988	170	385	1209	166	366	619
Arrive On Green	0.08	0.32	0.29	0.14	0.38	0.35	0.08	0.31
Sat Flow, veh/h	1792	3056	525	1774	3161	435	1774	1997
Grp Volume(v), veh/h	166	412	413	316	245	249	160	591
Grp Sat Flow(s), veh/h	1792	1790	1791	1774	1789	1807	1774	1780
Q Serve(g.s), s	6.4	20.2	20.4	11.8	9.8	10.0	6.5	31.0
Cycle Q Clear(g.c), s	6.4	20.2	20.4	11.8	9.8	10.0	6.5	31.0
Prop In Lane	1.00	0.29	1.00	1.00	0.24	1.00	0.87	1.00
Lane Grp Cap(c), veh/h	451	578	579	385	685	691	366	562
V/C Ratio(X)	0.37	0.71	0.71	0.82	0.36	0.36	0.44	1.07
Avail Cap(c.a), veh/h	470	578	579	442	685	691	366	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter()	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.5	29.8	30.2	22.1	22.1	22.4	24.3	34.5
Incr Delay (d2), s/veh	0.5	7.3	7.3	10.6	1.5	1.5	0.8	58.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%) veh/m	3.2	11.1	11.2	6.8	5.1	5.2	3.2	24.2
LnGrp Delay(d),s/veh	22.0	37.1	37.5	32.6	23.5	23.9	25.1	93.1
LnGrp LOS	C	D	D	C	C	C	C	F
Approach Vol, veh/h	991			810		1292		558
Approach Delay, s/veh	34.7			27.2		86.5		32.3
Approach LOS	C			C		F		C
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.3	36.3	10.4	35.0	12.3	42.3	12.0	33.4
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0
Max Green Setting (Gmax), s	17.5	26.1	6.4	28.0	9.4	34.2	8.0	26.4
Max Q Clear Time (g.c+H), s	13.8	22.4	6.9	33.0	8.4	12.0	8.5	12.4
Green Ext Time (p.c), s	0.5	2.0	0.0	0.0	0.1	3.6	0.0	2.5

Intersection Summary  
HCM 2010 Ctrf Delay

Intersection Summary  
HCM 2010 Ctrf Delay

Intersection Summary  
HCM 2010 LOS

Intersection Summary  
HCM 2010 LOS

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HCM 2010 LOS

Intersection Summary  
HCM 2010 LOS

Intersection Summary  
HCM 2010 LOS

Intersection	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↘	↖	↘	↖	↘
Traffic Volume (vph)	137	0	0	22	0	43
Future Volume (vph)	137	0	0	22	0	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt	0.950					0.865
Flt Protected	1770	0	0	3539	0	1611
Satd. Flow (prot)	0.950					
Flt Permitted	1770	0	0	3539	0	1611
Satd. Flow (perm)	50			50		50
Link Speed (k/h)	59.0			134.6		65.1
Link Distance (m)	4.2			9.7		4.7
Travel Time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	137	0	0	22	0	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	137	0	0	22	0	43
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width (m)	3.6			0.0	0.0	0.0
Link Offset (m)	0.0			0.0	0.0	0.0
Crosswalk Width (m)	4.8			4.8		4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	17.6%					
Analysis Period (min)	15					

Intersection	EBL	EBR	NBL	NBT	SBT	SBR
Int Delay, s/veh	7.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↘	↖	↘	↖	↘
Traffic Vol. veh/h	137	0	0	22	0	43
Future Vol. veh/h	137	0	0	22	0	43
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage. #	0	-	-	0	-	-
Grade, %	0	-	-	0	-	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	137	0	0	22	0	43
Major/Minor	Minor2	Major1				
Conflicting Flow All	11	-	-	-	-	0
Stage 1	0	-	-	-	-	-
Stage 2	11	-	-	-	-	-
Critical Hdwy	6.84	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	-	-	-	-	-
Pot Cap-1 Maneuver	1007	0	0	-	-	-
Stage 1	-	0	0	-	-	-
Stage 2	1010	0	0	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	1007	-	-	-	-	-
Mov Cap-2 Maneuver	1007	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	1010	-	-	-	-	-
Approach	EB	NB				
HCM Control Delay, s	9.1	0				
HCM LOS	A					
Minor Lane/Major Mvmt	NB EBLn1					
Capacity (veh/h)	-	1007				
HCM Lane V/C Ratio	-	0.136				
HCM Control Delay (s)	-	9.1				
HCM Lane LOS	-	A				
HCM 95th %tile Q(veh)	-	0.5				

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	EB	EB	EB	WB	WB	WB	TR	NB	NB	NB	T	R	SB	SB	SB
Directions Served	L	T	T	L	T	T	L	L	T	T	L	R	L	L	T
Maximum Queue (m)	47.4	113.4	90.1	42.4	95.8	94.4	70.5	124.9	105.8	72.5	47.4	88.7	47.4	88.7	88.7
Average Queue (m)	33.7	62.6	49.7	35.8	44.4	46.3	21.0	65.7	57.0	36.1	30.2	30.2	30.2	49.9	49.9
95th Queue (m)	57.7	98.5	79.6	49.9	87.0	78.2	49.8	98.5	87.0	66.3	52.9	77.2	52.9	77.2	77.2
Link Distance (m)	133.0	133.0	133.0	108.2	108.2	108.2	322.4	322.4	322.4	322.4	322.4	322.4	322.4	241.6	241.6
Upstream Blk Time (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Storage Bay Dist (m)	40.0	35.0	35.0	30	4	4	70.0	0	5	3	0	3	0	40.0	40.0
Storage Blk Time (%)	11	20	20	30	4	4	0	5	3	0	3	0	3	13	13
Queuing Penalty (veh)	36	43	43	51	9	9	0	5	9	1	9	23	9	23	23

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	SB	SB	SB	TR	TR	TR	WB	WB	WB	NB	NB	NB	T	R	TR
Directions Served	T	R	R	L	T	T	L	T	T	L	R	L	R	L	T
Maximum Queue (m)	77.0	2.9	2.9	77.0	46.6	14.9	12.4	46.6	14.9	12.4	14.9	12.4	14.9	12.4	12.4
Average Queue (m)	38.7	0.2	0.2	38.7	14.4	5.0	3.8	14.4	5.0	3.8	5.0	3.8	5.0	3.8	3.8
95th Queue (m)	65.7	2.9	2.9	65.7	37.1	12.5	10.9	37.1	12.5	10.9	12.5	10.9	12.5	10.9	10.9
Link Distance (m)	241.6	241.6	241.6	241.6	251.1	127.6	127.6	251.1	127.6	127.6	127.6	127.6	127.6	127.6	127.6
Upstream Blk Time (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Storage Bay Dist (m)	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Storage Blk Time (%)	11	20	20	30	4	4	0	5	3	0	3	0	3	13	13
Queuing Penalty (veh)	36	43	43	51	9	9	0	5	9	1	9	23	9	23	23

Intersection: 2: Mall Entrance & Main St E

Movement	EB	EB	EB	WB	WB	WB	TR	NB	NB	NB	T	R	SB	SB	SB
Directions Served	L	T	T	L	T	T	L	L	T	T	L	R	L	L	T
Maximum Queue (m)	74.2	74.6	19.4	49.8	46.6	14.9	12.4	46.6	14.9	12.4	14.9	12.4	14.9	12.4	12.4
Average Queue (m)	28.8	31.9	5.9	14.4	15.7	5.0	3.8	14.4	5.0	3.8	5.0	3.8	5.0	3.8	3.8
95th Queue (m)	67.2	71.1	15.1	37.1	37.2	12.5	10.9	37.1	12.5	10.9	12.5	10.9	12.5	10.9	10.9
Link Distance (m)	108.2	108.2	108.2	251.1	251.1	127.6	127.6	251.1	127.6	127.6	127.6	127.6	127.6	127.6	127.6
Upstream Blk Time (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Storage Bay Dist (m)	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Storage Blk Time (%)	11	20	20	30	4	4	0	5	3	0	3	0	3	13	13
Queuing Penalty (veh)	36	43	43	51	9	9	0	5	9	1	9	23	9	23	23

Intersection: 3: Busway/Wilson Dr & Main St E

Movement	EB	EB	EB	WB	WB	WB	TR	NB	NB	NB	T	R	SB	SB	SB
Directions Served	L	T	T	L	T	T	L	L	T	T	L	R	L	L	T
Maximum Queue (m)	42.7	83.5	88.6	22.9	45.9	38.4	39.1	14.9	32.9	54.3	23.9	54.3	23.9	54.3	54.3
Average Queue (m)	9.1	32.6	39.2	7.5	16.6	16.4	22.7	1.8	17.3	27.7	11.2	27.7	11.2	27.7	27.7
95th Queue (m)	26.8	66.5	74.2	17.9	34.8	33.9	37.7	10.6	30.4	45.5	19.9	45.5	19.9	45.5	45.5
Link Distance (m)	240.2	240.2	240.2	335.2	335.2	335.2	40.7	40.7	40.7	40.7	40.7	40.7	40.7	160.4	160.4
Upstream Blk Time (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Storage Bay Dist (m)	50.0	40.0	40.0	40.0	0	0	35.0	0	0	0	0	0	0	55.0	55.0
Storage Blk Time (%)	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Intersection: 4: Drew Centre/Private Driveway & Main St E

Movement	EB	EB	EB	WB	WB	WB	TR	NB	NB	NB	T	R	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	L	T	T	L	R	L	L	T
Maximum Queue (m)	62.0	70.8	42.7	28.0	43.2	49.6	34.4	19.7	15.0	15.0	19.7	15.0	15.0	15.0	15.0
Average Queue (m)	24.6	28.4	9.9	12.4	13.5	15.8	19.5	5.6	4.1	4.1	5.6	4.1	4.1	4.1	4.1
95th Queue (m)	49.9	55.3	31.0	23.8	32.2	37.2	30.8	14.7	10.7	10.7	14.7	10.7	10.7	10.7	10.7
Link Distance (m)	335.2	335.2	335.2	334.9	334.9	334.9	239.5	239.5	239.5	239.5	239.5	239.5	239.5	239.5	239.5
Upstream Blk Time (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Storage Bay Dist (m)	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Storage Blk Time (%)	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection: 5: Thompson Rd & Main St E

Movement	EB	EB	EB	WB	WB	WB	TR	NB	NB	NB	T	R	SB	SB	SB
Directions Served	L	T	T	L	T	T	L	L	T	T	L	R	L	L	T
Maximum Queue (m)	67.4	139.8	145.4	91.2	59.9	52.6	67.4	274.7	275.3	52.4	57.2	46.5	57.2	46.5	46.5
Average Queue (m)	39.0	77.3	81.4	49.1	34.5	29.2	56.5	239.1	244.9	22.7	31.9	24.5	31.9	24.5	24.5
95th Queue (m)	76.2	126.6	127.1	79.7	55.8	49.6	88.8	315.6	311.6	42.3	50.9	44.3	50.9	44.3	44.3
Link Distance (m)	334.9	334.9	334.9	233.6	233.6	233.6	263.1	263.1	263.1	263.1	201.3	201.3	201.3	201.3	201.3
Upstream Blk Time (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Storage Bay Dist (m)	60.0	150.0	150.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Storage Blk Time (%)	0	22	22	0	0	0	1	66	66	1	0	0	1	0	0
Queuing Penalty (veh)	0	37	37	0	2	2	105	105	105	1	0	0	1	0	0



Intersection: 6: Busway & Site Driveway

Movement	EB	NB	WB	SB
Directions Served	L			
Maximum Queue (m)	24.4			
Average Queue (m)	10.2			
95th Queue (m)	18.3			
Link Distance (m)	51.3			
Upstream Blk. Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

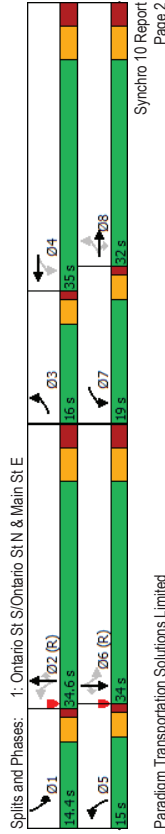
Network wide Queuing Penalty: 338

	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Group	EBL	EBT	EBR	WBL	WBR	NBL	NBR	SBL
Lane Configurations	←	←	←	←	←	←	←	←
Traffic Volume (vph)	206	679	244	308	759	247	683	336
Future Volume (vph)	206	679	244	308	759	247	683	336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.3	3.6	3.3
Storage Length (m)	40.0	0.0	35.0	0.0	70.0	0.0	65.0	40.0
Storage Lanes	1	1	1	1	1	1	1	1
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.96	0.99	0.99	1.00	0.99	1.00	0.98
Frt	0.850	0.850	0.963	0.963	0.850	0.850	0.850	0.850
Flt Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1728	3574	1566	1694	3417	0	1728	3438
Flt Permitted	0.165	0.144	0.144	0.137	0.137	0.224	0.224	0.224
Satd. Flow (perm)	289	3574	1495	255	3417	0	249	3438
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	244	244	46	46	50	336	336	180
Link Speed (k/h)	50	50	50	50	50	50	50	50
Link Distance (m)	147.9	134.8	134.8	134.8	338.1	256.3	256.3	256.3
Travel Time (s)	10.6	10.6	9.7	9.7	24.3	18.5	18.5	18.5
Confl. Peds. (#/hr)	15	28	28	28	15	9	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	2%	3%	1%	1%	5%	1%	3%
Adj. Flow (vph)	206	679	244	308	759	247	683	336
Shared Lane Traffic (%)								
Lane Group Flow (vph)	206	679	244	308	1006	0	207	683
Enter Blocked Intersection	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right
Median Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Link Offset (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width (m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane								
Headway Factor	1.04	1.00	1.01	1.04	1.00	1.04	1.01	1.04
Turning Speed (k/h)	25	15	25	25	25	25	15	25
Number of Detectors	1	2	1	1	2	1	1	2
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Right
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	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+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	9.4	9.4	9.4	9.4
Detector 2 Size (m)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Detector 2 Type	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX
Detector 2 Channel								

Lanes, Volumes, Timings  
 1: Ontario St S/Ontario St N & Main St E

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	3	8	8	7	4	5	2	2	2	1	6	6
Permitted Phases	8	8	8	4	4	2	2	2	2	6	6	6
Detector Phase	3	8	8	7	4	5	2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	7.0	15.0	5.0	15.0	15.0	5.0	15.0	15.0	15.0
Minimum Split (s)	9.5	32.0	32.0	11.0	32.0	9.5	32.0	32.0	11.0	32.0	32.0	32.0
Total Split (s)	16.0	32.0	32.0	19.0	35.0	15.0	34.6	34.6	14.4	34.0	34.0	34.0
Total Split (%)	16.0%	32.0%	32.0%	19.0%	35.0%	15.0%	34.6%	34.6%	14.4%	34.0%	34.0%	34.0%
Maximum Green (s)	12.0	25.0	25.0	15.0	28.0	11.0	27.6	27.6	10.4	27.0	27.0	27.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	0.0	-3.0	0.0	-3.0	-3.0	0.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	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	7.0	7.0
Flesh Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (Hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	38.2	27.3	27.3	45.5	31.2	42.6	32.2	32.2	41.2	31.5	31.5	31.5
Actuated g/C Ratio	0.38	0.27	0.27	0.46	0.31	0.43	0.32	0.32	0.41	0.32	0.32	0.32
v/c Ratio	0.76	0.70	0.42	0.94	0.92	0.80	0.62	0.46	0.67	0.73	0.29	0.29
Control Delay	38.5	36.9	6.1	61.0	45.8	43.3	32.1	5.2	29.5	35.6	5.4	5.4
Queue Delay	0.0	0.0	0.0	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	36.9	6.1	61.0	54.1	43.3	32.1	5.2	29.5	35.6	5.4	5.4
LOS	D	D	A	E	D	D	C	A	C	D	A	A
Approach Delay	30.5			55.7			26.7			30.0		
Approach LOS	C			E			C			C		
Intersection Summary												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	49 (49%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green											
Natural Cycle:	85											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.94											
Intersection Signal Delay:	36.3											
Intersection Capacity Utilization:	87.7%											
Analysis Period (min):	15											



Queues  
 1: Ontario St S/Ontario St N & Main St E

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 Future Total 2031 PM Peak Hour

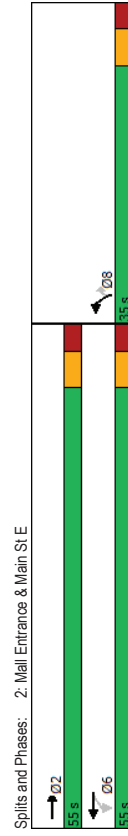
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	206	679	244	308	1006	207	683	336	195	806	180	180
v/c Ratio	0.76	0.70	0.42	0.94	0.92	0.80	0.62	0.46	0.67	0.73	0.29	0.29
Control Delay	38.5	36.9	6.1	61.0	45.8	43.3	32.1	5.2	29.5	35.6	5.4	5.4
Queue Delay	0.0	0.0	0.0	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	36.9	6.1	61.0	54.1	43.3	32.1	5.2	29.5	35.6	5.4	5.4
Queue Length 50th (m)	24.4	64.6	0.0	44.6	99.7	25.6	63.2	0.0	24.0	78.3	0.0	0.0
Queue Length 95th (m)	#53.1	85.0	18.1	#97.0	#140.8	#60.7	83.3	19.8	#39.9	101.4	15.4	15.4
Internal Link Dist (m)		123.9		110.8			314.1			232.3		
Turn Bay Length (m)	40.0			35.0			70.0		65.0	40.0		
Base Capacity (vph)	289	1000	594	331	1102	270	1107	730	304	1104	615	615
Starvation Cap Reductn	0	0	0	0	84	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.68	0.41	0.93	0.99	0.77	0.62	0.46	0.64	0.73	0.29	0.29
Intersection Summary												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (veh/h)	206	679	244	308	759	247	207	683	336	195	806	180
Future Volume (veh/h)	206	679	244	308	759	247	207	683	336	195	806	180
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Cb), veh	1.00	1.00	0.99	1.00	0.97	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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	1881	1881	1863	1845	1881	1900	1881	1810	1881	1863	1845	1900
Adj Flow Rate, veh/h	206	679	0	308	759	247	207	683	336	195	806	0
Adj No. of Lanes	1	2	1	1	2	0	1	2	1	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	2	3	1	1	1	5	1	1	2	3
Cap. veh/h	261	961	426	380	815	265	314	1132	522	314	1139	525
Arrive On Green	0.11	0.27	0.00	0.15	0.31	0.28	0.10	0.33	0.33	0.10	0.33	0.00
Sat Flow, veh/h	1792	3574	1583	1757	2630	856	1792	3438	1586	1774	3505	1615
Grp Volume(v), veh/h	206	679	0	308	516	490	207	683	336	195	806	0
Grp Sat Flow(s), veh/h	1792	1787	1583	1757	1787	1699	1792	1719	1586	1774	1752	1615
Q Serve(g. s)	8.5	17.1	0.0	12.6	28.0	28.0	7.9	16.6	18.0	7.5	20.2	0.0
Cycle Q Clear(g. c)	8.5	17.1	0.0	12.6	28.0	28.0	7.9	16.6	18.0	7.5	20.2	0.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	261	961	426	380	554	527	314	1132	522	314	1139	525
V/C Ratio(X)	0.79	0.71	0.00	0.81	0.93	0.93	0.66	0.60	0.64	0.62	0.71	0.00
Avg Cap(c. a), veh/h	287	1001	443	386	554	527	333	1132	522	330	1139	525
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	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.1	33.0	0.0	24.2	33.5	34.2	23.7	28.1	28.6	22.9	29.6	0.0
Incr Delay (d2), s/veh	11.1	1.8	0.0	9.8	19.9	20.6	3.3	2.4	6.0	2.3	3.7	0.0
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 Back(Q)(50%), veh/m	5.0	8.7	0.0	7.1	16.8	16.1	4.1	8.2	8.7	3.8	10.3	0.0
LnGrp Delay(d), s/veh	38.2	34.8	0.0	34.0	53.3	54.8	27.0	30.5	34.6	25.2	33.3	0.0
LnGrp LOS	D	C	C	C	D	D	C	C	C	C	C	C
Approach Vol, veh/h	885			1314			1226				1001	
Approach Delay, s/veh	35.6			49.3			31.0				31.7	
Approach LOS	D			D			C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.5	36.9	14.6	35.0	13.9	36.5	18.7	30.9				
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0				
Max Green Setting (Gmax), s	10.4	27.6	12.0	28.0	11.0	27.0	15.0	25.0				
Max Q Clear Time (g_c+H), s	9.5	20.0	10.5	30.0	9.9	22.2	14.6	19.1				
Green Ext Time (p_c), s	0.0	3.1	0.1	0.0	0.1	2.0	0.0	2.0				

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM 2010 Ctrl Delay												
HCM 2010 LOS												

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	←	←	←	←	←	←
Traffic Volume (vph)	1037	130	180	1296	139	126
Future Volume (vph)	1037	130	180	1296	139	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.3	3.6	3.3	3.5
Storage Length (m)	0.0	0.0	70.0	0.0	0.0	0.0
Taper Length (m)	0	0	1	0	1	1
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.983					0.850
Flt Protected	3517	0	1745	3610	1745	1597
Flt Permitted	3517	0	205	3610	1745	1597
Satd. Flow (perm)	Yes	Yes				Yes
Right Turn on Red	25					96
Satd. Flow (RTOR)	50					50
Link Speed (k/h)	134.8					144.7
Link Distance (m)	9.7					10.4
Travel Time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Peak Hour Factor	1%	0%	0%	0%	0%	0%
Heavy Vehicles (%)	1037	130	180	1296	139	126
Adj. Flow (vph)						
Shared Lane Traffic (%)	1167	0	180	1296	139	126
Lane Group Flow (vph)	No	No	No	No	No	No
Enter Blocked Intersection	Left	Right	Left	Left	Left	Right
Lane Alignment	3.3					3.3
Median Width(m)	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width(m)	4.8					4.8
Two way Left Turn Lane	1.00	1.00	1.04	1.00	1.04	1.01
Headway Factor	15	25	25	25	25	15
Turning Speed (k/h)	2	1	2	1	1	1
Number of Detectors	Thru	Left	Thru	Left	Left	Right
Detector Template	10.0	0.0	10.0	2.0	10.0	2.0
Leading Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.6	0.6	0.6	0.6	0.6	0.6
Detector 1 Size(m)	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0
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	Ch+Ex					Ch+Ex
Detector 2 Channel	0.0					0.0
Detector 2 Extend (s)	NA					NA
Turn Type	NA	Perm	NA	Prot	Perm	Perm

	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Protected Phases	2				8	8
Permitted Phases			6	6	8	8
Detector Phase	2	6	6	6	8	8
Switch Phase						
Minimum Initial (s)	30.0	30.0	30.0	30.0	10.0	10.0
Minimum Split (s)	37.0	37.0	37.0	35.0	35.0	35.0
Total Split (s)	55.0	55.0	55.0	35.0	35.0	35.0
Total Split (%)	61.1%	61.1%	61.1%	38.9%	38.9%	38.9%
Maximum Green (s)	48.0	48.0	48.0	28.0	28.0	28.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	None	None	None	None	None
Walk Time (s)	15.0	20.0	20.0	20.0	20.0	20.0
Flash Dont Walk (s)	7.0	7.0	7.0	7.0	7.0	7.0
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	51.1	51.1	51.1	14.8	14.8	14.8
Actuated G/C Ratio	0.69	0.69	0.69	0.20	0.20	0.20
v/c Ratio	0.48	0.69	0.52	0.40	0.32	0.32
Control Delay	6.2	25.7	6.7	29.2	11.1	11.1
Queue Delay	0.5	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	25.7	6.7	29.2	11.1	11.1
LOS	A	C	A	A	C	B
Approach Delay	6.7	9.0	9.0	20.6		
Approach LOS	A	A	A	C		
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	73.9					
Natural Cycle:	90					
Control Type:	Semi Act/Uncoord					
Maximum v/c Ratio:	0.69					
Intersection Signal Delay:	9.1					
Intersection Capacity Utilization:	76.1%					
Analysis Period (min):	15					



Splits and Phases: 2: Mail Entrance & Main St E

	EBT	WBL	WBT	NBL	NBR
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1167	180	1296	139	126
v/c Ratio	0.48	0.69	0.52	0.40	0.32
Control Delay	6.2	25.7	6.7	29.2	11.1
Queue Delay	0.5	0.0	0.0	0.0	0.0
Total Delay	6.7	25.7	6.7	29.2	11.1
Queue Length 50th (m)	31.7	12.3	38.0	17.8	3.6
Queue Length 95th (m)	54.3	#56.6	63.6	33.4	16.8
Internal Link Dist (m)	110.8	249.6	120.7		
Turn Bay Length (m)	70.0				
Base Capacity (vph)	2437	260	2494	733	726
Starvation Cap Reductn	739	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.69	0.69	0.52	0.19	0.17
Intersection Summary					
# 95th percentile volume exceeds capacity, queue may be longer.					
Queue shown is maximum after two cycles.					

2: Mail Entrance & Main St E

Future Total 2031 PM Peak Hour

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HCM 2010 Signalized Intersection Summary

	EBT	EBR	WBL	WBT	NBL	NBR
Movement						
Lane Configurations	1037	130	180	1296	139	126
Traffic Volume (veh/h)	1037	130	180	1296	139	126
Future Volume (veh/h)	1037	130	180	1296	139	126
Number	2	12	1	6	3	18
Initial Q (Cb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1883	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	1037	130	180	1296	139	126
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	0	0	0	0	0
Cap, veh/h	2269	284	376	2559	326	291
Arrive On Green	0.71	0.67	0.71	0.71	0.18	0.18
Sat Flow, veh/h	3295	401	489	3705	1810	1615
Grp Volume(v), veh/h	579	588	180	1296	139	126
Grp Sat Flow(s), veh/h	1788	1813	488	1805	1810	1615
Q Serve(g, s), s	10.0	10.3	16.2	11.7	4.9	5.0
Cycle Q Clear(g, c), s	10.0	10.3	28.5	11.7	4.9	5.0
Prop In Lane	1.00	0.22	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1268	1285	376	2559	326	291
V/C Ratio(X)	0.46	0.46	0.48	0.51	0.43	0.43
Avail Cap(c, a), veh/h	1268	1285	376	2559	326	291
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.5	4.7	10.7	4.8	26.2	26.2
Incr Delay (d2), s/veh	1.2	1.2	0.9	0.2	0.9	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/m	5.2	5.4	2.5	5.8	2.5	2.3
LnGrp Delay(d), s/veh	5.7	5.9	11.7	4.9	27.1	27.3
LnGrp LOS	A	A	B	A	C	C
Approach Vol, veh/h	1167		1476	265		
Approach Delay, s/veh	5.8		5.7	27.2		
Approach LOS	A		A	C		
Timer	1	2	3	4	5	6
Assigned Phs	2					8
Phs Duration (G+Y+Rc), s	55.0					16.9
Change Period (Y+Rc), s	7.0					7.0
Max Green Setting (Gmax), s	48.0					48.0
Max Q Clear Time (g_c+H), s	12.3					30.5
Green Ext Time (p_c), s	12.3					12.1
Intersection Summary						
HCM 2010 Ctrl Delay			7.7			
HCM 2010 LOS			A			

3: Busway/Wilson Dr & Main St E

Future Total 2031 PM Peak Hour

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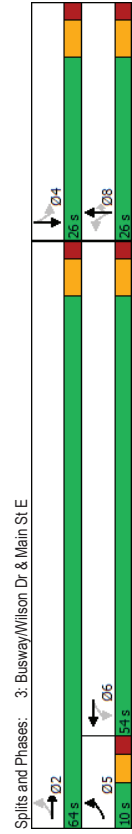
Lanes, Volumes, Timings

	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Group									
Lane Configurations	96	927	131	1257	223	99	7	102	140
Traffic Volume (vph)	96	927	131	1257	223	99	7	102	140
Future Volume (vph)	96	927	131	1257	223	99	7	102	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6
Storage Length (m)	50.0	0.0	40.0	0.0	0.0	0.0	35.0	55.0	0.0
Storage Lanes	1	0	1	0	1	0	1	1	0
Taper Length (m)	7.5	0.95	7.5	0.95	7.5	0.95	1.00	7.5	0.95
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00		1.00		0.97
Frt	0.981		0.977		0.950		0.850		0.860
Flt Protected	0.950		0.950		0.950		0.950		0.950
Satd. Flow (prot)	1745	3472	0	1770	3455	0	1543	1417	1728
Flt Permitted	0.095		0.269		0.651		0.753		0.753
Satd. Flow (perm)	174	3472	0	501	3455	0	1863	1417	1364
Right Turn on Red		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	38		36		102		50		108
Link Speed (k/h)	50		50		64.9		50		50
Link Distance (m)	260.1		360.6		64.9		260.1		174.4
Travel Time (s)	18.7		26.0		4.7		18.7		12.6
Confl. Peds. (#/hr)	4		4		3		4		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	2%	0%	17%	2%	14%	1%	2%
Adj. Flow (vph)	96	927	131	1257	223	99	7	102	140
Shared Lane Traffic (%)									
Lane Group Flow (vph)	96	1062	0	131	1480	0	99	7	102
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Right	Left	Right
Median Width(m)	3.6		3.6		3.6		3.6		3.6
Link Offset(m)	0.0		0.0		0.0		0.0		0.0
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8
Two way Left Turn Lane									
Headway Factor	1.04	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.01
Turning Speed (k/h)	25	15	25	25	25	25	15	25	15
Number of Detectors	1	2	1	2	1	2	1	2	1
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	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
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	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+Ex	C+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		9.4
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6
Detector 2 Type	C+Ex		C+Ex		C+Ex		C+Ex		C+Ex
Detector 2 Channel									

Lanes, Volumes, Timings  
 3: Busway/Wilson Dr & Main St E

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm-pt	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	5	2		6	6		8	8		8	4	4
Permitted Phases	2		2	6	6	6	8	8	8	8	4	4
Detector Phase	5	2		6	6	6	8	8	8	8	4	4
Switch Phase												
Minimum Initial (s)	5.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	10.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Total Split (s)	10.0	6.0	6.0	6.0	6.0	6.0	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	11.1%	71.1%		60.0%	60.0%	60.0%	28.9%	28.9%	28.9%	28.9%	28.9%	28.9%
Maximum Green (s)	5.0	58.0	48.0	48.0	48.0	48.0	20.0	20.0	20.0	20.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Recall Mode	None	Max	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	30.0	30.0	30.0	30.0	30.0	30.0	7.0	7.0	7.0	7.0	7.0	7.0
Flesh Dont Walk (s)	10.0	10.0	10.0	10.0	10.0	10.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	60.1	60.1	52.2	52.2	52.2	52.2	16.7	16.7	16.7	16.7	16.7	16.7
Actuated g/C Ratio	0.71	0.71	0.61	0.61	0.61	0.61	0.20	0.20	0.20	0.20	0.20	0.20
v/c Ratio	0.41	0.43	0.43	0.69	0.48	0.48	0.48	0.02	0.28	0.52	0.29	0.29
Control Delay	9.9	6.0	6.0	16.1	14.2	14.2	38.0	26.6	8.2	37.7	8.9	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	6.0	6.0	16.1	14.2	14.2	38.0	26.6	8.2	37.7	8.9	8.9
LOS	A	A	A	B	B	B	D	C	A	D	A	A
Approach Delay	6.3			14.3			23.0				24.6	
Approach LOS	A			B			C				C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	84.9											
Natural Cycle:	85											
Control Type:	Semi Act-Uncooord											
Maximum v/c Ratio:	0.69											
Intersection Signal Delay:	12.8											
Intersection Capacity Utilization:	91.8%											
Analysis Period (min):	15											



Queues  
 3: Busway/Wilson Dr & Main St E

200624  
 Future Total 2031 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	96	1062	131	1480	99	7	102	140	116			
v/c Ratio	0.41	0.43	0.43	0.69	0.48	0.02	0.28	0.52	0.29			
Control Delay	9.9	6.0	16.1	14.2	38.0	26.6	8.2	37.7	8.9			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay	9.9	6.0	16.1	14.2	38.0	26.6	8.2	37.7	8.9			
Queue Length 50th (m)	4.3	31.8	11.3	84.3	15.1	1.0	0.0	21.5	1.1			
Queue Length 95th (m)	11.1	53.4	30.9	128.6	30.5	4.5	12.3	39.5	14.2			
Internal Link Dist (m)	236.1			336.6			40.9					
Turn Bay Length (m)	50.0			40.0			35.0		55.0			
Base Capacity (vph)	234	2470	308	2139	274	483	443	354	492			
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	0.41	0.43	0.43	0.69	0.36	0.01	0.23	0.40	0.24			
Intersection Summary												

3: Busway/Wilson Dr & Main St E

200624  
Future Total 2031 PM Peak Hour

4: Drew Centre/Private Driveway & Main St E

200624  
Future Total 2031 PM Peak Hour

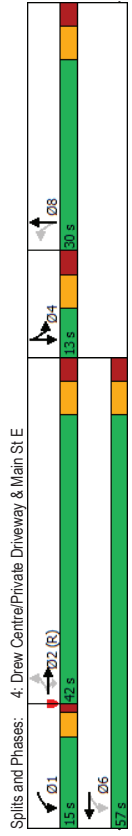
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑↑	↑	↑↑	↑↑	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	96	927	135	131	1257	223	99	7	102	140	8	108
Future Volume (veh/h)	96	927	135	131	1257	223	99	7	102	140	8	108
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Cb), veh	0	0	0	0	0	0	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	1.00	1.00	1.00	0.98	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/hln	1900	1863	1900	1863	1868	1900	1624	1863	1667	1881	1897	1900
Adj Flow Rate, veh/h	96	927	135	131	1257	223	99	7	102	140	8	108
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh. %	0	2	2	2	2	0	17	2	14	1	2	0
Cap. veh/h	301	2167	315	384	1775	312	244	387	294	348	23	310
Arrive On Green	0.06	0.70	0.68	0.59	0.89	0.59	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1810	3100	451	529	3017	531	1094	1863	1417	1292	111	1492
Grp Volume(V), veh/h	96	529	533	131	735	745	99	7	102	140	0	116
Grp Sat Flow(S), veh/hln	1810	1770	1782	529	1775	1772	1094	1863	1417	1292	0	1603
Q Serve(g.s), s	1.6	11.0	11.2	12.2	25.0	25.6	7.3	0.3	5.3	8.3	0.0	5.3
Cycle Q Clear(g. c), s	1.6	11.0	11.2	13.9	25.0	25.6	12.6	0.3	5.3	8.6	0.0	5.3
Prop In Lane	1.00	0.25	1.00	1.00	0.30	1.00	1.00	1.00	1.00	1.00	0.93	1.00
Lane Grp Cap(c), veh/h	301	1237	1245	384	1044	1043	244	387	294	348	0	333
V/C Ratio(X)	0.32	0.43	0.43	0.34	0.70	0.71	0.41	0.02	0.35	0.40	0.00	0.35
Avail Cap(c. a), veh/h	311	1237	1245	384	1044	1043	297	477	363	411	0	411
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.2	5.5	5.7	10.6	12.4	12.5	34.4	27.0	29.0	30.4	0.0	29.0
Incr Delay (d2), s/veh	0.6	1.1	1.1	0.7	2.4	2.6	1.5	0.0	1.0	1.1	0.0	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 BackQ(50%), veh/hln	1.0	5.7	5.8	1.8	12.7	13.2	2.3	0.1	2.1	3.1	0.0	2.4
LnGrp Delay(d), s/veh	11.8	6.6	6.8	11.4	14.8	15.1	36.0	27.1	30.0	31.5	0.0	29.9
LnGrp LOS	B	A	A	B	B	B	D	C	C	C	C	C
Approach Vol, veh/h	1158			1611			208				256	
Approach Delay, s/veh	7.1			14.7			32.7				30.8	
Approach LOS	A			B			C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2			4	5	6	7	8				
Phs Duration (G+Y+Rc), s	64.0			21.8	9.5	54.5	21.8					
Change Period (Y+Rc), s	6.0			6.0	5.0	6.0	6.0					
Max Green Setting (Gmax), s	58.0			20.0	5.0	48.0	20.0					
Max Q Clear Time (g_c+H), s	13.2			10.6	3.6	27.6	14.6					
Green Ext Time (p_c), s	16.2			1.3	0.0	16.4	0.6					
Intersection Summary												
HCM 2010 Ctrl Delay	14.4											
HCM 2010 LOS	B											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	0	1071	277	167	167	864	0	560	0	127	0	0
Future Volume (vph)	0	1071	277	167	167	864	0	560	0	127	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.5	3.3	3.6	3.6	3.3	3.6	3.5	3.6	3.6	3.6
Storage Length (m)	15.0		40.0	45.0	45.0	0.0	0.0	0.0	55.0	0.0	0.0	0.0
Storage Lanes	1		1	1	1	0	2	0	0	0	0	0
Taper Length (m)	7.5		7.5	7.5	7.5	0	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.95				0.99	0.98				
Frt			0.850				0.850					
Frt Protected			0.950				0.950					
Satd. Flow (prot)	1837	3610	1521	1694	3610	0	3385	1588	0	0	1900	0
Frt Permitted			0.141				0.950					
Satd. Flow (perm)	1837	3610	1451	251	3610	0	3368	1588	0	0	1900	0
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)			171				371					
Link Speed (k/h)			50			50		50			50	
Link Distance (m)			360.6			362.0		256.9			51.9	
Travel Time (s)			26.0			26.1		18.5			3.7	
Confl. Peds. (#/hr)			15			15		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
Heavy Vehicles (%)	0%	0%	5%	3%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1071	277	167	167	864	0	560	0	127	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1071	277	167	167	864	0	560	127	0	0	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	Left	Right	Left	Right
Median Width (m)			3.6			3.6			6.6			6.6
Link Offset (m)			0.0			0.0			0.0			0.0
Crosswalk Width (m)			4.8			4.8			4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.01	1.04	1.00	1.00	1.04	1.00	1.01	1.00	1.00	1.00
Turning Speed (k/h)	25	1	15	25	1	15	25	1	15	25	1	15
Number of Detectors	1	2	1	1	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Right	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	10.0	2.0	10.0	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	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)									9.4			9.4
Detector 2 Size (m)									0.6			0.6
Detector 2 Type									Ch+Ex			Ch+Ex
Detector 2 Channel									Ch+Ex			Ch+Ex

Lanes, Volumes, Timings  
 4: Drew Centre/Private Driveway & Main St E

200624  
 Future Total 2031 PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	NA	NA	NA	NA	NA
Protected Phases				1	6		8		8	4	4	
Permitted Phases	2	2	2	2	1	6	8	8	8	4	4	
Detector Phase	2	2	2	2	1	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	35.0	35.0	35.0	9.5	35.0	9.5	27.0	27.0	27.0	13.0	13.0	13.0
Total Split (s)	42.0	42.0	42.0	15.0	57.0	15.0	30.0	30.0	30.0	13.0	13.0	13.0
Total Split (%)	42.0%	42.0%	42.0%	15.0%	57.0%	15.0%	30.0%	30.0%	30.0%	13.0%	13.0%	13.0%
Maximum Green (s)	35.0	35.0	35.0	11.0	50.0	11.0	23.0	23.0	23.0	6.0	6.0	6.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	0.0	-3.0	0.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flesh Dont Walk (s)	21.0	21.0	21.0	21.0	21.0	21.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (Hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	48.6	48.6	48.6	62.7	62.7	62.7	29.3	29.3	29.3	29.3	29.3	29.3
Actuated g/C Ratio	0.49	0.49	0.63	0.63	0.63	0.63	0.29	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.61	0.35	0.55	0.38	0.57	0.57	0.57	0.17	0.17	0.17	0.17	0.17
Control Delay	22.3	8.8	16.4	10.4	31.8	31.8	0.5	0.5	0.5	0.5	0.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	8.8	16.4	10.4	31.8	31.8	0.5	0.5	0.5	0.5	0.5	0.5
LOS	C	A	B	B	B	B	C	A	A	C	A	A
Approach Delay	19.5			11.4			26.0					
Approach LOS	B			B			C					
Intersection Summary												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	16 (16%), Referenced to phase 2:EBTL, Start of Green											
Natural Cycle:	85											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.61											
Intersection Signal Delay:	18.2											
Intersection Capacity Utilization:	71.5%											
Analysis Period (min):	15											



Queues  
 4: Drew Centre/Private Driveway & Main St E

200624  
 Future Total 2031 PM Peak Hour

	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT
Lane Group Flow (vph)	1071	277	167	864	560	127
v/c Ratio	0.61	0.35	0.55	0.38	0.57	0.17
Control Delay	22.3	8.8	16.4	10.4	31.8	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	8.8	16.4	10.4	31.8	0.5
Queue Length 50th (m)	80.4	11.5	13.1	42.0	49.5	0.0
Queue Length 95th (m)	126.0	35.6	28.3	64.7	60.4	0.0
Internal Link Dist (m)	336.6		45.0	338.0		232.9
Turn Bay Length (m)						
Base Capacity (vph)	1753	792	327	2263	1009	735
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	0.61	0.35	0.51	0.38	0.56	0.17
Intersection Summary						



200624  
 Future Total 2031 PM Peak Hour  
 HCM 2010 Signalized Intersection Summary  
 4: Drew Centre/Private Driveway & Main St E

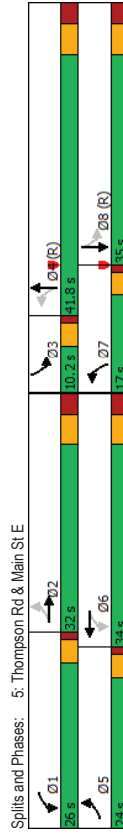
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	0	1071	277	167	864	0	560	0	127	0	0	0
Future Volume (veh/h)	0	1071	277	167	864	0	560	0	127	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Cb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	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	1900	1900	1810	1845	1900	0	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	1071	277	167	864	0	560	0	127	0	0	0
Adj No. of Lanes	1	2	1	1	2	0	2	1	0	0	1	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. %	0	0	5	3	0	0	0	0	0	0	0	0
Cap. veh/h	72	2173	914	337	2530	0	913	0	352	0	0	0
Arrive On Green	0.00	0.60	0.60	0.06	0.70	0.00	0.22	0.00	0.19	0.00	0.00	0.00
Sat Flow, veh/h	650	3610	1519	1757	3705	0	3510	0	1607	0	0	0
Grp Volume(V), veh/h	0	1071	277	167	864	0	560	0	127	0	0	0
Grp Sat Flow(s)/veh/h	650	1805	1519	1757	1805	0	1755	0	1607	0	0	0
Q Serve(g. s)	0.0	16.8	8.9	3.7	9.4	0.0	14.8	0.0	6.9	0.0	6.9	0.0
Cycle Q Clear(g. c), s	0.0	16.8	8.9	3.7	9.4	0.0	14.8	0.0	6.9	0.0	6.9	0.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Lane Grp Cap(c), veh/h	72	2173	914	337	2530	0	913	0	352	0	0	0
V/C Ratio(X)	0.00	0.49	0.30	0.50	0.34	0.00	0.61	0.00	0.36	0.00	0.00	0.00
Avail Cap(c. a), veh/h	72	2173	914	427	2530	0	1057	0	418	0	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	11.3	9.7	9.8	5.9	0.0	36.3	0.0	34.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.9	1.1	0.1	0.0	0.8	0.0	0.6	0.0	0.0	0.0
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 Back(Q)(50%), veh/m	0.0	8.6	3.9	1.8	4.7	0.0	7.3	0.0	3.1	0.0	0.0	0.0
LnGrp Delay(d), s/veh	0.0	12.1	10.5	10.9	6.0	0.0	37.1	0.0	35.1	0.0	0.0	0.0
LnGrp LOS	B	B	B	A	A	D	D	D	D	D	D	D
Approach Vol, veh/h	1348	1031	687	887								
Approach Delay, s/veh	11.7	6.8	36.7									
Approach LOS	B	A	D									
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2										
Phs Duration (G+Y+Rc), s	99	64.2	74.1	25.9								
Change Period (Y+Rc), s	4.0	7.0	7.0	7.0								
Max Green Setting (Gmax), s	11.0	35.0	50.0	23.0								
Max Q Clear Time (g_c+H), s	5.7	18.8	11.4	16.8								
Green Ext Time (p_c), s	0.3	9.3	9.0	2.0								
Intersection Summary	15.7											
HCM 2010 Ctrl Delay	B											
HCM 2010 LOS	B											

200624  
 Future Total 2031 PM Peak Hour  
 Lanes, Volumes, Timings  
 5: Thompson Rd & Main St E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	327	595	254	442	539	59	282	624	243	59	895	181
Future Volume (vph)	327	595	254	442	539	59	282	624	243	59	895	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6	3.3	3.6	3.6
Storage Length (m)	60.0	0.0	150.0	0.0	60.0	0.0	60.0	0.0	55.0	0.0	0.0	0.0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95
Ft	0.955	0.955	0.955	0.985	0.985	0.958	0.958	0.958	0.958	0.958	0.975	0.975
Flt Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1745	3413	0	1728	3542	0	1728	3439	0	1711	3514	0
Flt Permitted	0.287	0.287	0.287	0.138	0.138	0.125	0.125	0.125	0.125	0.186	0.186	0.186
Satd. Flow (perm)	527	3413	0	251	3542	0	227	3439	0	335	3514	0
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	58	10	57	10	57	60	60	60	60	60	60	60
Link Speed (k/h)	50	50	50	50	50	50	50	50	50	50	50	50
Link Distance (m)	362.0	250.3	278.6	278.6	278.6	278.6	278.6	278.6	278.6	278.6	278.6	278.6
Travel Time (s)	26.1	18.0	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
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
Heavy Vehicles (%)	0%	1%	1%	0%	0%	4%	1%	0%	2%	2%	0%	1%
Adj. Flow (vph)	327	595	254	442	539	59	282	624	243	59	895	181
Shared Lane Traffic (%)												
Lane Group Flow (vph)	327	849	0	442	598	0	282	867	0	59	1076	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Right	Right	Left	Left	Right	Left	Right	Right
Median Width(m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Link Offset(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width(m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.04	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25	25	15	25	25	15	25	15	25	15
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	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	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	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Detector 2 Size(m)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		6			4			4	8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	9.5	32.0		9.5	32.0		9.5	32.0		9.5	32.0	
Total Split (s)	24.0	32.0		26.0	34.0		17.0	41.8		10.2	35.0	
Total Split (%)	21.8%	29.1%		23.6%	30.9%		15.5%	38.0%		9.3%	31.8%	
Maximum Green (s)	20.0	25.0		22.0	27.0		13.0	34.8		6.2	28.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.0	3.0		1.0	3.0	
Lost Time Adjust (s)	0.0	-3.0		0.0	-3.0		0.0	-3.0		0.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		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	Max		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0			7.0			7.0			7.0		
Flash Dont Walk (s)	18.0			18.0			18.0			18.0		
Pedestrian Calls (#/hr)	0			0			0			0		
Act Effct Green (s)	45.7	28.0		53.0	32.3		48.0	39.8		37.1	31.0	
Actuated G/C Ratio	0.42	0.25		0.48	0.29		0.44	0.36		0.34	0.28	
v/c Ratio	0.79	0.93		1.06	0.57		1.02	0.68		0.31	1.07	
Control Delay	33.4	55.0		92.2	35.5		88.2	31.3		23.4	87.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.4	55.0		92.2	35.5		88.2	31.3		23.4	87.0	
LOS	C	D		F	D		F	C		C	F	
Approach Delay		49.0			59.6			45.3			83.7	
Approach LOS		D			E			D			F	

Intersection Summary	
Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	0 (0%), Referenced to phase 4:NBL and 8:SBTL, Start of Green
Natural Cycle:	115
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.07
Intersection Signal Delay:	59.2
Intersection Capacity Utilization:	108.5%
Analysis Period (min):	15
ICU Level of Service:	G



Splits and Phases: 5: Thompson Rd & Main St E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	327	849	442	598	282	867	59	1076		59	1076	
v/c Ratio	0.79	0.93	1.06	0.57	1.02	0.68	0.31	1.07		0.31	1.07	
Control Delay	33.4	55.0	92.2	35.5	88.2	31.3	23.4	87.0		23.4	87.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	33.4	55.0	92.2	35.5	88.2	31.3	23.4	87.0		23.4	87.0	
Queue Length 50th (m)	44.7	93.0	~93.0	60.2	~50.2	83.3	7.6	~140.6		7.6	~140.6	
Queue Length 95th (m)	68.0	#132.5	#158.6	80.4	#104.9	106.9	15.8	#183.8		15.8	#183.8	
Internal Link Dist (m)	338.0			226.3			254.6			254.6		
Turn Bay Length (m)	60.0	150.0		60.0			55.0			55.0		
Base Capacity (vph)	451	912	416	1048	276	1282	190	1005		190	1005	
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	0.73	0.93	1.06	0.57	1.02	0.68	0.31	1.07		0.31	1.07	

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

5. Thompson Rd & Main StE

HCM 2010 Signalized Intersection Summary

Future Total 2031 PM Peak Hour

200624

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	327	595	254	442	539	59	282	624	243	59	885
Traffic Volume (veh/h)	327	595	254	442	539	59	282	624	243	59	885
Future Volume (veh/h)	5	2	12	1	6	16	7	4	14	3	8
Number	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Cb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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
Adj Sat Flow, veh/h	1900	1881	1900	1881	1893	1900	1881	1889	1900	1863	1897
Adj Flow Rate, veh/h	327	595	254	442	539	59	282	624	243	59	885
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	0	4	1	0	2	2	0
Cap. veh/h	459	622	265	424	970	106	277	915	356	211	842
Arrive On Green	0.16	0.25	0.23	0.20	0.30	0.27	0.12	0.36	0.33	0.04	0.28
Sat Flow, veh/h	1810	2443	1042	1792	3270	357	1792	2527	983	1774	2988
Grp Volume(v), veh/h	327	435	414	442	296	302	282	443	424	59	540
Grp Sat Flow(s), veh/h	1810	1787	1697	1792	1798	1830	1792	1795	1716	1774	1802
Q Serve(g, s)	14.9	26.4	26.5	22.0	15.2	15.4	13.0	23.0	23.3	2.7	31.0
Cycle Q Clear(g, s)	14.9	26.4	26.5	22.0	15.2	15.4	13.0	23.0	23.3	2.7	31.0
Prop In Lane	1.00	1.00	0.61	1.00	0.20	1.00	0.20	0.57	1.00	0.34	1.00
Lane Grp Cap(c), veh/h	459	455	432	424	533	543	277	660	621	211	508
V/C Ratio(X)	0.71	0.96	0.96	1.04	0.55	0.56	1.02	0.68	0.68	0.28	1.06
Adj Cap(c), veh/h	502	455	432	424	533	543	277	660	621	244	508
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
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	40.4	41.3	32.9	32.6	32.9	31.1	29.7	30.5	29.5	39.5
Incr Delay (d2), s/veh	4.3	32.6	34.0	55.4	1.3	1.3	58.6	5.7	6.0	0.7	57.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
%ile Back(Q)(50%) veh/m	7.9	17.2	16.5	19.3	7.7	7.9	12.9	12.4	12.1	1.3	23.5
LnGrp Delay(d), s/veh	30.5	73.0	75.3	88.2	33.8	34.1	89.8	35.4	36.5	30.2	97.1
LnGrp LOS	C	E	E	F	C	C	F	D	D	C	F
Approach Vol, veh/h	1176			1040			1149				1135
Approach Delay, s/veh	62.0			57.0			49.2				94.0
Approach LOS	E			E			D				F
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	3	4	5	6	7	8			
Phs Duration (G+Y+Rc), s	26.0	32.0	8.2	43.8	21.4	36.6	17.0	35.0			
Change Period (Y+Rc), s	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0			
Max Green Setting (Gmax), s	22.0	25.0	6.2	34.8	20.0	27.0	13.0	28.0			
Max Q Clear Time (g_c+H), s	24.0	28.5	4.7	25.3	16.9	17.4	15.0	33.0			
Green Ext Time (p_c), s	0.0	0.0	0.0	4.3	0.4	3.0	0.0	0.0			
Intersection Summary											
Area Type:	Other										
Control Type:	Unsignalized										
Intersection Capacity Utilization:	14.6%										
ICU Level of Service:	A										
Analysis Period (min):	15										

6. Busway & Site Driveway

Lanes, Volumes, Timings

Future Total 2031 PM Peak Hour

200624

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	83	0	0	31	0	128
Traffic Volume (vph)	83	0	0	31	0	128
Future Volume (vph)	83	0	0	31	0	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Fit Protected	0.950					0.865
Satd. Flow (prot)	1770	0	0	1805	0	1611
Fit Permitted	0.950					
Satd. Flow (perm)	1770	0	0	1805	0	1611
Link Speed (k/h)	50			50		50
Link Distance (m)	59.9			58.4		64.9
Travel Time (s)	4.3			4.2		4.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	100%	2%	2%
Adj. Flow (vph)	83	0	0	31	0	128
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	0	0	31	0	128
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0		0.0
Link Offset(m)	0.0			0.0		0.0
Crosswalk Width(m)	4.8			4.8		4.8
Two way Left Turn Lane	1.00	1.00	1.00	1.00	1.00	1.00
Headway Factor	25	15	25	Free	Free	15
Turning Speed (k/h)	Stop					
Sign Control	Stop			Free	Free	Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization:	14.6%					
ICU Level of Service:	A					
Analysis Period (min):	15					

Intersection	EBL	EBR	NBL	NBT	SBT	SBR
Int Delay, s/veh	6.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	83	0	0	31	0	128
Future Vol, veh/h	83	0	0	31	0	128
Conflicting Peds, #/hr	0					
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	-	-
Grade, %	0	-	-	0	-	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	100	2	2
Mvmt Flow	83	0	0	31	0	128
Major/Minor	Minor2	Major1				
Conflicting Flow All	16	-	-	-	0	
Stage 1	0	-	-	-	-	
Stage 2	16	-	-	-	-	
Critical Hdwy	6.84	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	5.84	-	-	-	-	
Follow-up Hdwy	3.52	-	-	-	-	
Pot Cap-1 Maneuver	1000	0	0	-	-	
Stage 1	-	0	0	-	-	
Stage 2	1004	0	0	-	-	
Platoon blocked, %	-					
Mov Cap-1 Maneuver	1000	-	-	-	-	
Mov Cap-2 Maneuver	1000	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	1004	-	-	-	-	
Approach	EB	NB				
HCM Control Delay, s	8.9	0				
HCM LOS	A					
Minor Lane/Major Mvmt	NBT EBLn1					
Capacity (veh/h)	- 1000					
HCM Lane V/C Ratio	- 0.083					
HCM Control Delay (s)	- 8.9					
HCM Lane LOS	- A					
HCM 95th %ile Q(veh)	- 0.3					

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	TR	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	R	L	T	R
Maximum Queue (m)	47.5	133.8	111.6	37.4	42.5	116.5	119.3	76.8	101.0	103.6	72.4	47.5	47.5	41.7	58.9
Average Queue (m)	41.7	76.3	64.2	3.0	41.5	110.4	110.5	39.7	61.1	56.3	38.2	41.7	41.7	41.7	58.9
95th Queue (m)	57.2	125.2	105.0	18.9	46.8	113.3	114.5	71.3	90.6	87.2	70.2	58.9	58.9	58.9	58.9
Link Distance (m)	133.0	133.0	133.0	133.0	108.2	108.2	108.2	108.2	322.4	322.4	322.4	322.4	322.4	322.4	322.4
Upstream Blk Time (%)	0	0	0	0	30	29	29	29	210	210	210	210	210	210	210
Queuing Penalty (veh)	40.0	19	27	41	47	155	144	2	8	9	3	68	68	68	68
Storage Blk Time (s)	64	56	56	56	144	144	144	144	2	2	2	2	2	2	2
Queuing Penalty (veh)	64	56	56	56	144	144	144	144	2	2	2	2	2	2	2

Intersection: 1: Ontario St S/Ontario St N & Main St E

Movement	SB	SB	SB	SB	WB	WB	WB	WB	B15	B15	NB	NB	NB	SB	SB
Directions Served	T	T	R	T	T	R	T	T	T	T	L	R	L	T	R
Maximum Queue (m)	162.2	144.7	26.3	162.2	144.7	26.3	162.2	144.7	26.3	162.2	144.7	26.3	162.2	144.7	26.3
Average Queue (m)	96.9	83.6	3.3	96.9	83.6	3.3	96.9	83.6	3.3	96.9	83.6	3.3	96.9	83.6	3.3
95th Queue (m)	147.6	132.1	15.7	147.6	132.1	15.7	147.6	132.1	15.7	147.6	132.1	15.7	147.6	132.1	15.7
Link Distance (m)	241.6	241.6	241.6	241.6	241.6	241.6	241.6	241.6	241.6	241.6	241.6	241.6	241.6	241.6	241.6
Upstream Blk Time (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
Storage Blk Time (s)	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Queuing Penalty (veh)	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89

Intersection: 2: Mall Entrance & Main St E

Movement	EB	EB	EB	WB	WB	WB	WB	B15	B15	NB	NB	NB	NB	SB	SB
Directions Served	T	TR	L	T	T	T	T	T	T	L	R	L	R	T	R
Maximum Queue (m)	76.4	82.7	77.4	272.4	272.1	153.5	153.9	92.8	290	76.4	82.7	77.4	272.1	153.5	153.9
Average Queue (m)	37.8	42.9	68.8	199.3	200.3	56.3	56.6	39.1	12.6	37.8	42.9	68.8	199.3	200.3	56.3
95th Queue (m)	70.1	75.5	99.1	324.0	324.7	202.5	201.9	79.0	23.3	70.1	75.5	99.1	324.0	324.7	202.5
Link Distance (m)	108.2	108.2	108.2	251.1	251.1	240.3	240.3	127.6	127.6	108.2	108.2	108.2	251.1	251.1	240.3
Upstream Blk Time (%)	0	0	0	30	33	1	1	0	0	0	0	0	30	33	1
Queuing Penalty (veh)	222	244	8	8	8	8	8	0	0	222	244	8	8	8	8
Storage Blk Time (s)	10	52	52	52	52	52	52	52	52	10	52	52	52	52	52
Queuing Penalty (veh)	62	94	94	94	94	94	94	94	94	62	94	94	94	94	94

Intersection: 3: Busway/Wilson Dr & Main St E

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB	TR
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	R	L	T	TR	
Maximum Queue (m)	47.6	96.7	112.0	47.4	139.7	134.5	40.8	11.6	29.3	47.0	34.0					
Average Queue (m)	17.1	35.4	42.2	26.3	58.2	59.2	20.9	1.6	13.2	22.9	14.1					
95th Queue (m)	37.7	91.1	99.4	51.2	105.0	105.6	36.9	7.4	25.2	39.7	24.9					
Link Distance (m)	240.3		240.3	335.1		335.1	40.2	40.2	160.4							
Upstream Blk Time (%)				2		2										
Queuing Penalty (veh)				1		1			35.0	55.0						
Storage Bay Dist (m)	0		4	1		13			0	0	0	0	0	0	0	0
Storage Blk Time (%)	0		4	8		17			0	0	0	0	0	0	0	0
Queuing Penalty (veh)	0		4	8		17			0	0	0	0	0	0	0	0

Intersection: 4: Drew Centre/Private Driveway & Main St E

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB	TR
Directions Served	T	T	R	L	T	T	T	L	L	L	TR					
Maximum Queue (m)	291.9	297.2	47.5	52.3	74.4	77.4	86.1	74.1	52.9							
Average Queue (m)	154.9	159.0	38.4	25.9	32.0	35.7	53.5	42.0	16.4							
95th Queue (m)	318.5	325.4	63.9	46.9	62.5	64.5	75.8	65.9	37.0							
Link Distance (m)	335.1		335.1	334.9		334.9	239.5	239.5	239.5							
Upstream Blk Time (%)	2		2													
Queuing Penalty (veh)	9		12													
Storage Bay Dist (m)	61		47	0		0	3									
Storage Blk Time (%)	0		129	3		2	5									
Queuing Penalty (veh)	0		129	3		2	5									

Intersection: 5: Thompson Rd & Main St E

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB	TR
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	R	L	T	TR	
Maximum Queue (m)	67.5	342.7	339.4	157.4	244.4	240.4	67.4	239.5	231.3	62.4	208.8	209.0				
Average Queue (m)	65.9	299.1	300.9	139.9	184.8	164.6	64.5	164.2	149.1	33.7	206.0	206.0				
95th Queue (m)	76.1	410.5	408.5	194.9	323.4	305.6	76.4	287.9	261.4	79.1	207.5	207.6				
Link Distance (m)	334.9		334.9	233.6		233.6	263.1	263.1	263.1	201.3	201.3					
Upstream Blk Time (%)	8		13	52		5	1	0	0	76	88					
Queuing Penalty (veh)	48		80	0		0	0	0	0	0	0					
Storage Bay Dist (m)	60.0		60.0	150.0		0	60.0			55.0						
Storage Blk Time (%)	24		59	61		1	67	3		0	78					
Queuing Penalty (veh)	72		194	164		4	210	10		0	46					

Intersection: 6: Busway & Site Driveway

Movement	EB	NB	T
Directions Served	L	T	
Maximum Queue (m)	18.3	5.9	
Average Queue (m)	8.4	0.3	
95th Queue (m)	14.7	3.4	
Link Distance (m)	51.7		50.9
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 2682

# Appendix I

## City of Kitchener's TDM Checklist





# PARTS TDM: City of Kitchener TDM Checklist

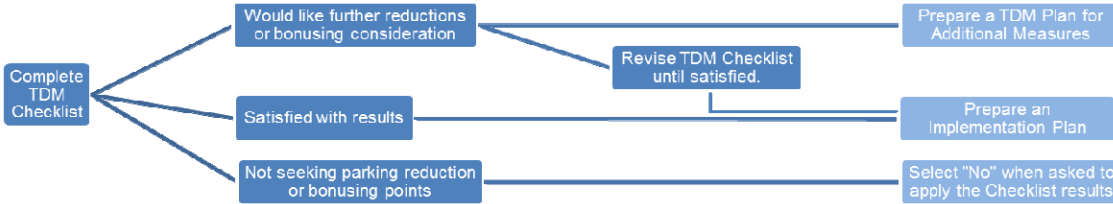
**Applicant Name:** \_\_\_\_\_ **Date of Application (YY-MM-DD):** \_\_\_\_\_  
**Site Location:** \_\_\_\_\_ **Landowner / Developer Name:** \_\_\_\_\_  
**Zone:** \_\_\_\_\_ **TDM Checklist No. (filled by staff):** \_\_\_\_\_

## Using the TDM Report Checklist

The TDM Checklist is one component of submitting a TDM Report, and a tool intended for Developers' use when determining potential parking reductions in exchange for certain TDM measures. Derived from the Region of Waterloo's TDM Checklist and Parking Management Worksheet, this City of Kitchener TDM Checklist applies to all developments within Station Areas with the exception of residential developments with 6 units or less. Currently, this Checklist applies to the downtown area and the lands located within the Station Study Areas identified in PARTS Phase 1, and supersedes the Region's Checklist and Parking Management Worksheet for any developments within those defined areas.

### TDM Report Reference Guide

A Reference Guide has been prepared for submission of a TDM Report, and can be found appended to the PARTS Phase 2: TDM Strategy. The general process behind completing a TDM Report is depicted by the diagram below.



\* Specific requirements for an Implementation Plan or TDM Plan are included within the Reference Guide.

### Instructions to Complete the TDM Checklist

To complete the TDM Checklist, fill out Table A and Table B. Once completed, review the Summary Results in Table C and Table D.

Table A is broken down into two sections. Please complete Table A1 with any applicable parking and bicycle parking requirements from Schedule 6 of the Zoning By-law for your site. Mixed-use developments may also be eligible for shared parking space reductions where the development will use unassigned parking spaces; if in Table A1 you specify parking requirements for multiple land uses, Table A2 will automatically calculate shared parking rates and a percent parking reduction.

Table B indicates optional TDM measures that can included by the developer in exchange for potential parking reductions. Complete Table B for a potential parking reduction.

TABLE A		SHARED PARKING REQUIREMENTS									
Mixed-use developments may be eligible for parking space reductions based on shared parking ratios between uses. Please fill out the yellow boxes in the table below based on the Zoning By-Law requirements for parking and bicycle parking for your land use(s). Orange boxes will automatically show your results.											
TABLE A1. Zoning By-law Requirements			TABLE A2. Shared Parking Rate Breakdown								
Land Use	Parking	Class A Bike Parking	Morning		Noon		Afternoon		Evening		
			Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	
Office	0	0	0	0	0	0	0	0	0	0	
Medical	0	0	0	0	0	0	0	0	0	0	
Real Estate	0	0	0	0	0	0	0	0	0	0	
Financial Institution	0	0	0	0	0	0	0	0	0	0	
Retail	16	0	8	8	8	12	12	16	12	2	
Personal Services	0	0									
Art Gallery	0	0									
Museum	0	0									
Repair Establishment	0	0									
Restaurant/Take-out Restaurant	0	0	0	0	0	0	0	0	0	0	
Hotel (rooms)	0	0	0	0	0	0	0	0	0	0	
Hotel (Function Space)	0	0	0	0	0	0	0	0	0	0	
Residential - Resident	456	0	411	411	297	297	411	411	456	456	
Residential - Visitor	114	0	23	23	23	23	57	69	114	114	
Other	0	0	0	0	0	0	0	0	0	0	
<b>Total Required Parking</b>	<b>586</b>	<b>0</b>	<b>442</b>	<b>442</b>	<b>328</b>	<b>332</b>	<b>480</b>	<b>496</b>	<b>582</b>	<b>572</b>	
<b>Shared / Unassigned Required Parking</b>	<b>582</b>		<b>Parking Reduction (Individual Uses)</b>		<b>4</b>	<b>% Reduction Over Unshared Parking (Individual Uses)</b>		<b>0.7</b>			
Plaza Complex or Mixed-Office-Residential <sup>T</sup>	0	0	<b>Parking Reduction (Plaza / Mixed<sup>TT</sup>)</b>		<b>0</b>	<b>% Reduction Over Unshared Parking (Plaza / Mixed<sup>TT</sup>)</b>		<b>#DIV/0!</b>			

<sup>T</sup> Note: See Zoning By-Law S.6 to calculate parking requirement for Plaza / Mixed uses. | <sup>TT</sup> Note: For further potential reductions, apply individual use rates in Table A1.

Shared Parking Summary	Yes or No ?	Resultant Parking Required
Would you like to apply Table A shared rates for a parking reduction?	No	586.0 Spaces

Note: to apply these rates, 100% of parking must be shared between uses and unassigned. If you would like to use shared parking rates for only a portion of the required parking spaces, you must provide the proposed shared parking rates and applicable reductions in an Implementation Plan or TDM Plan within the TDM Report.



## PARTS TDM: City of Kitchener TDM Checklist

OPTIONAL TDM MEASURES									
Certain TDM measures are required by the Zoning By-Law. Exceeding these minimum requirements is optional and can lead to parking reductions based on the discretion of the City of Kitchener. To complete this form, please fill out the yellow boxes in the table below with details about your development proposal. Please refer to the Urban Design Manual for feature design standards.									
Measure	Features	Parking Reduction Available	To a Maximum Reduction of		Developer Proposes Provision of		Maximum Reduction Allowable	Bonusing Points (TBD)	
			Amount	Unit	Amount	Unit			
B1	Provision of indoor secure bicycle parking spaces beyond the minimum amount required by the Zoning By-law.	1 car space reduction per 5 bicycle spaces beyond minimum Zoning By-law requirement.	10%	of total parking required		Bicycle Spaces beyond minimum required	0		
B2	Non-residential uses: provision of shower and change facilities at an amount of not less than 13sqm in equal proportion of male and female facilities (Note: maximum reduction amount calculated based on required bicycle parking).	2 car space reduction for each additional shower facility provided at (13sqm).	0	parking space(s)	0	sqm of shower / change facilities	0		
B3*	Non-residential (office) uses: Provision of 1 car share vehicle and dedicated parking space in a priority location that is publicly accessible for a development with at least 25 required parking spaces, and 1 additional car share vehicle and dedicated parking space for every 50 additional required parking spaces. (Note: maximum reduction amount calculated based on required parking).	4 car space reduction for each car share vehicle and dedicated parking space provided	0	parking space(s)	0	Non-residential car share vehicle(s) and Space(s)	0		
	Residential uses: Provision of 1 car share vehicle and dedicated parking space in a priority location that is publicly accessible unless it is a private shared vehicle for every 75 dwelling units. (Note: maximum reduction amount calculated based on required parking).	4 car space reduction for each car share vehicle and dedicated parking space provided	28	parking space(s)		Residential car share vehicle(s) and Space(s)	0		
B4	Non-residential uses: Provision of ride share parking spaces in a priority location.	3 car space reduction for each ride share space provided	5%	of total parking required	0	Priority Car Pool Spaces	0		
B5	Provision of active uses at-grade along street frontages.	1% car space reduction	1%	of total parking required	<input checked="" type="checkbox"/> Yes	Check "Yes" (left) if you will provide	4		
B6*	The building owner/occupant will provide fully subsidized transit passes for all occupants for a period of two years.	10% car space reduction	10%	of total parking required	<input type="checkbox"/> Yes	Check "Yes" (left) if you will provide	0		
B7	Building owner/occupant agrees to charge for parking as a separate cost to occupants.	10% car space reduction	10%	of total parking required	<input checked="" type="checkbox"/> Yes	Check "Yes" (left) if you will provide	47		
B8*	Employment Uses: Building owner/occupant agrees to join Travelwise (TMA) that provides ride matching services for car/vanpooling and emergency ride home options.	10% car space reduction	10%	of total parking required	<input type="checkbox"/> Yes	Check "Yes" (left) if you will provide	0		
B9	Enhanced bus shelters with seating are provided at the transit stop immediately adjacent to the development in consultation with the City of Kitchener and the Region of Waterloo.	Not Applicable for parking reduction	Can only be applied to bonusing consideration		<input type="checkbox"/> Yes	Check "Yes" (left) if you will provide	0		
B10	Provide television monitors in visible and accessible locations on site and in adjacent transit stops to allow to City of Kitchener and the Region of Waterloo to display information regarding public transportation.	Not Applicable for parking reduction	Can only be applied to bonusing consideration		<input type="checkbox"/> Yes	Check "Yes" (left) if you will provide	0		
B11	Provision of bicycle self-service station equipped with tools necessary to perform basic repairs and maintenance	Not Applicable for parking reduction	Can only be applied to bonusing consideration		<input type="checkbox"/> Yes	Check "Yes" (left) if you will provide	0		
B12	25% to 49% of required parking is located underground or in a structure	Not Applicable for parking reduction	Can only be applied to bonusing consideration		<input type="checkbox"/> Yes	Check "Yes" (left) if you will provide	0		
	50% - 74% of required parking is located underground or in a structure				<input type="checkbox"/> Yes	Check "Yes" (left) if you will provide	0		
	A minimum of 75% of required parking is located underground or in a structure				<input type="checkbox"/> Yes	Check "Yes" (left) if you will provide	0		
B13	Non-residential use: Implements paid parking system, where price is set greater than the cost of a monthly transit pass, on all or part of the site (e.g. parking permits, paid parking near main entrances, enabled by gate and transponder access, or Pay & Display stations).	1% car space reduction for every 10% of parking spaces under a paid parking system	10%	of total parking required	0%	% of total parking spaces under paid parking system	0		

\* If you have selected Measures B3, B6 or B8 for a parking reduction, you must demonstrate to the satisfaction of the Director of Transportation Services that you will be able to achieve the proposed TDM measure, including any ongoing programming or management that may be required for program success.

TABLE C POTENTIAL PARKING REDUCTION SUMMARY		
Displayed below are the potential reductions to required parking spaces available based on the amounts entered into Table A and Table B above.		
Original # Parking Spaces Required:	586	0
Shared Parking Reduction <sup>P</sup> :	0	0
Parking Reduction for TDM Measures B1-B12:	51	0
Total Parking Reduction:	51	0
Resultant Parking Requirement:	535	0
<b>PERCENT REDUCTION</b>	<b>9</b>	<b>#DIV/0!</b>

<sup>P</sup> Note: If applicable, Parking Reductions for Plaza / Mixed-Use are noted in brown

TABLE D BONUSING POINT SCORE SUMMARY <sup>*</sup>	
If you achieved a Bonusing Points score greater than X, you may be eligible for bonusing. Please contact City of Kitchener staff for more details.	
Total Bonusing Points Achieved	0
Eligible for Bonusing Consideration?	No

\*Approach to bonusing to be determined by City staff

**NEXT STEPS**

Thank you for completing the TDM Checklist. Please select whether you would like to apply for a potential parking reduction at the bottom of this page. Refer to the TDM Report Reference Guide for submission requirements to City of Kitchener Staff. If you would like to achieve a greater parking reduction than may be considered through the TDM Checklist, you may develop a TDM Plan as set out in the TDM Report Reference Guide.

Would you like to apply Table C rates for a parking reduction?

Select an Option

Yes



If you selected No, please submit your completed Checklist to City staff for review.

If you selected Yes, please refer to the TDM Report Reference Guide for submission requirements of an Implementation Plan or TDM Plan.