Final Report

Transportation Impact Study – 7085 Goreway Drive, Mississauga

Prepared for Redwood Properties
by IBI Group
May 27, 2020

Document Control Page

CLIENT:	Redwood Properties
PROJECT NAME:	7085 Goreway Drive, Mississauga
REPORT TITLE:	Transportation Impact Study – 7085 Goreway Drive, Mississauga
IBI REFERENCE:	120212
VERSION:	4.0
DIGITAL MASTER:	J:\120212_7085_Goreway
ORIGINATOR:	Andrae Griffith, Jeff Pascua
REVIEWER:	Peter Richards, Fadi Madi
AUTHORIZATION:	Peter Richards
CIRCULATION LIST:	
HISTORY:	1.0 Draft Report – April 2020 2.0 Final Report – April 2020 3.0 Final Report – May 2020 4.0 Final Report – May 2020

Table of Contents

Table of Contents (continued)

List of Exhibits

Table of Contents (continued)

Table of Contents (continued)

List of Appendices

1 Introduction

IBI Group was retained by Redwood Properties to undertake a transportation impact study for a proposed residential development, located at 7085 Goreway Drive in the City of Mississauga, Ontario. The proposed development site is located on the northeast corner of the Goreway Drive and Dorcas Street intersection, and currently contains a vacant commercial building.

The proposed development consists of two residential apartment buildings of 18 and 16 storeys, with 138 and 121 units, respectively (259 residential apartment dwelling units overall). In addition, 12 townhouse units are proposed, resulting in an overall total of 271 dwelling units. Existing structures on the site are proposed to be removed.

The purpose of this report is to analyze the impact that the proposed development may have on the surrounding transportation network, and takes into account the impacts of background traffic growth in the area. The study also consists of a parking study, a transportation demand management (TDM) options memorandum, a site access conceptual design review, and examines functional circulation for vehicular traffic.

This report is outlined as follows:

- Sections 2 to 4 discuss the transportation impact study;
- Section 5 discusses the parking study;
- Section 6 examines the options for TDM;
- Section 7 outlines the site access conceptual design review;
- Section 8 discusses the vehicle swept path analysis; and
- Section 9 summarizes the conclusions made based on the preceding sections.

This report adheres to the scope of investigation developed by IBI Group, which was presented to and confirmed by the City of Mississauga (City) staff on January 24, 2020. This correspondence is presented in **Appendix A**.

1.1 Study Area

As discussed, the proposed development is located on the northeast corner of the Goreway Drive and Dorcas Street intersection, as illustrated in **Exhibit 1-1**.

Exhibit 1-1: Development Study Area

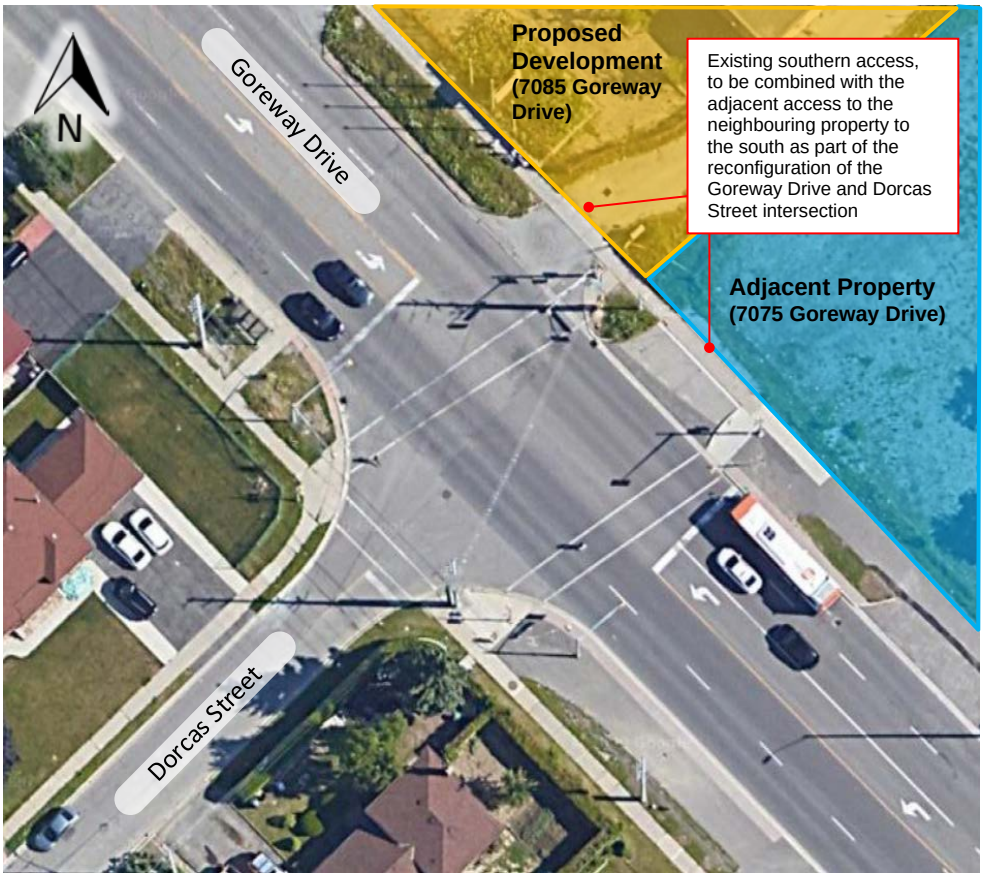
Base Map Source: City of Mississauga. Retrieved April 2, 2020 from http://www6.mississauga.ca/missmaps/maps.aspx#map=17/-8864795.24/5421497.5/0

The study area intersections which will be most impacted by the proposed development site traffic consist of the following locations, as shown in **Exhibit 1-1**:

- Goreway Drive and Derry Road East (Regional Road 5) (signalized);
- Goreway Drive and Dorcas Street (signalized); and
- Goreway Drive and Etude Drive (signalized).

Presently, the south access to 7085 Goreway Drive is located in between the southbound stop bar and the northern pedestrian crosswalk, approximately 10 metres to the north of the Dorcas Street centreline, as illustrated in **Exhibit 1-2**.

Exhibit 1-2: Existing Goreway Drive and Dorcas Street Configuration



Base Map Source: Google Earth. Retrieved April 21, 2020 from https://goo.gl/maps/gDPR3VhrMeeDBxeA9

The access to 7075 Goreway Drive, the property immediately adjacent to the south, is located within the Goreway Drive and Dorcas Street intersection, offset approximately 6 metres to the south of the Dorcas Street centreline. Both of these accesses are barricaded, with no traffic volumes observed under existing conditions. The development proposes to consolidate these accesses, as discussed in **Section 4.1.1**.

For the purposes of analysis, the intersection of Goreway Drive was modeled as a four-legged intersection with no east-leg volumes under existing and future background conditions.

The area surrounding the proposed development is primarily residential to the west, with retail uses located to the north and south. The Malton Greenway, a multi-use trail, is located to the east of the proposed development site. A context plan of the proposed development site is provided in **Exhibit 1-3**.

Exhibit 1-3: Proposed Development Context Plan

1.2 Analysis Periods

Based on the proposed development's residential land uses, the following analysis periods were used in this study:

- AM Peak Period – 7:00 a.m. to 9:00 a.m. on a typical weekday; and
- PM Peak Period – 4:00 p.m. to 6:00 p.m. on a typical weekday.

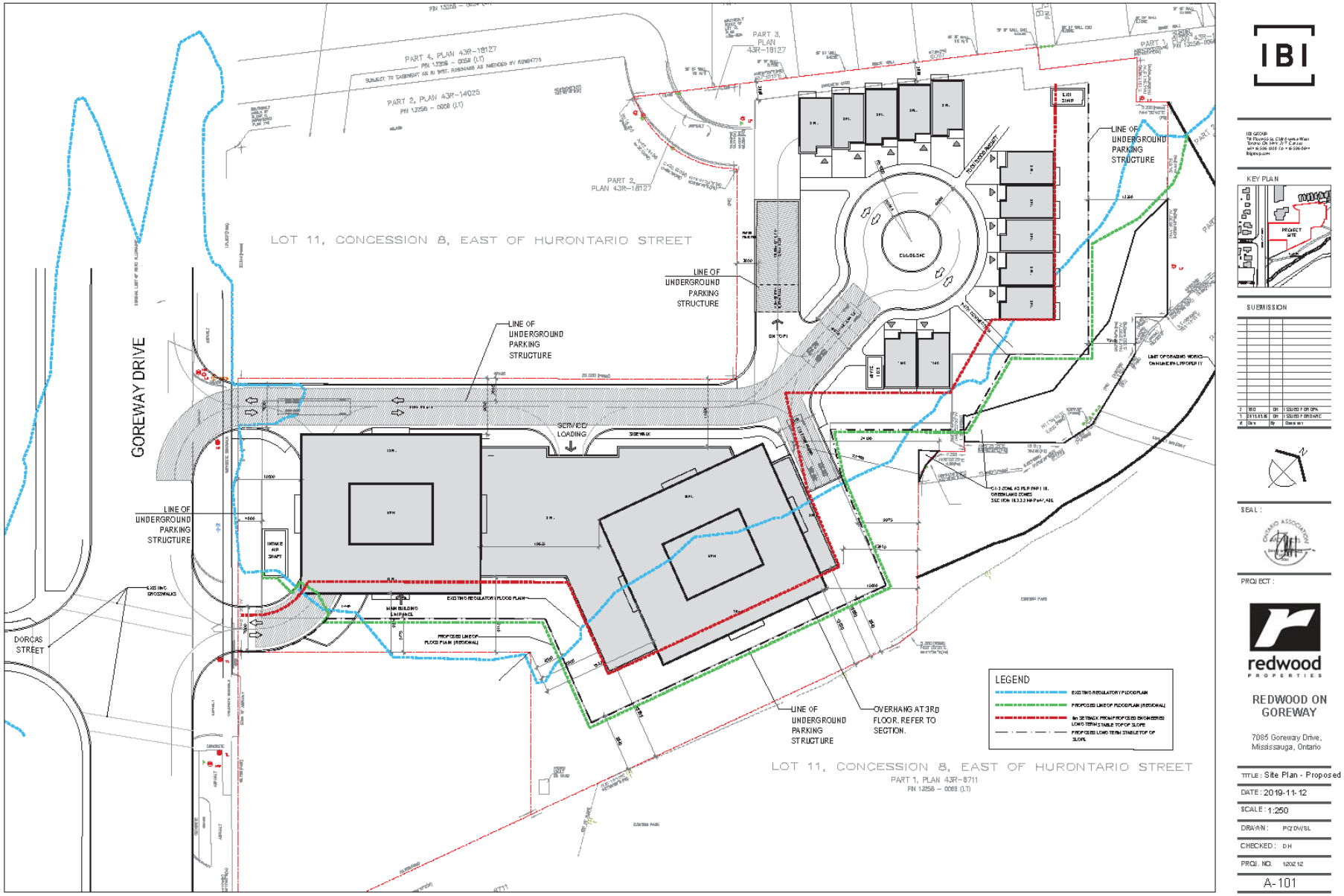
1.3 Proposed Development

Redwood Properties is proposing to construct two residential apartment building of 18 and 16 storeys, with 138 and 121 units, respectively (259 residential apartment dwelling units overall). In addition, 12 townhouse units are also proposed, resulting in an overall development total of 271 units. Parking is to be provided primarily in a three-level, 372-space underground garage. Two accesses are proposed on Goreway Drive:

- The south access (South Site Access) would be via a reconfigured existing access opposite Dorcas Street to better align with the existing traffic control signal, as mentioned in **Section 1.1** and discussed further in **Section 4.1.1**. Full-movement access would be provided, and this location would be considered the primary access to the property; and
- The north access (North Site Access) would be via an existing full-movement access to the property, and would accommodate left-turn and right-turn inbound movements, as well as right-out only access from the property. Outbound left-turns are proposed to be restricted. This access would be considered a secondary access to the site.

The proposed site plan is illustrated in **Exhibit 1-4**. It must be noted that small changes in building sizes may occur as this development moves through the approval process. However, the assumptions in this report are conservative, and differences in traffic operations from these changes are expected to be negligible.

Exhibit 1-4: Proposed Site Plan



2 2020 Existing Conditions

This section documents the transportation network in the study area in 2020, including existing roadways, traffic control measures, intersection performance, and transit operations.

2.1 Existing Road Network

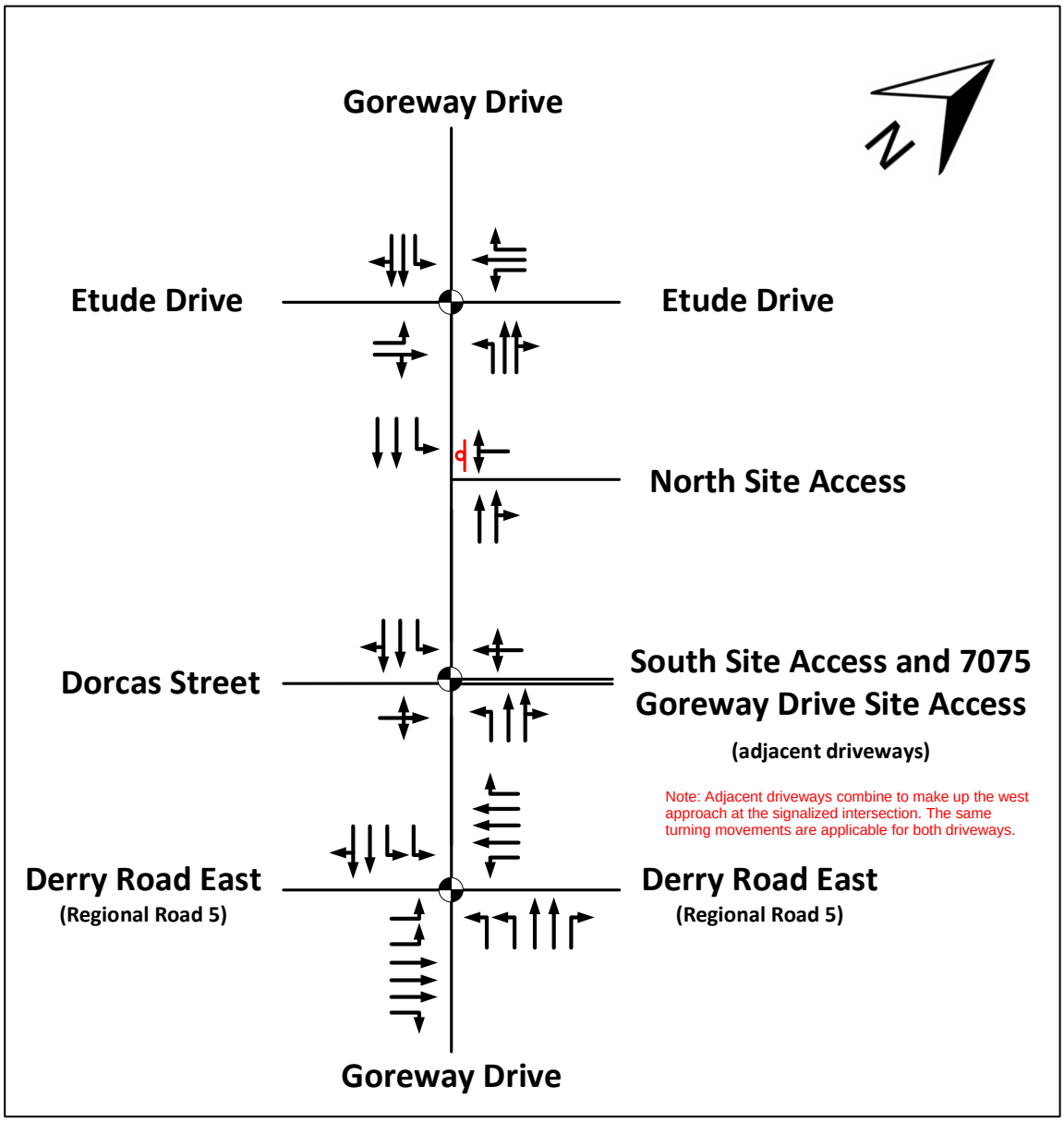
The existing study area roadways are illustrated in **Exhibit 2-1**.

Exhibit 2-1: Study Area Existing Road Network

Street Name	Class.	Orientation	Road Width (Lanes)	Traffic Direction	From	To	On-Street Parking	Speed Limit
Goreway Drive	Major Collector	North / South	4	Two-way	North City Limit	Highway 427 (East City Limit)	Prohibited	60 km/h
Derry Road East (Regional Road 5)	Regional	East / West	6	Two-way	Highway 427 (East City Limit)	Highway 407 (West City Limit)	Prohibited	60 km/h
Dorcas Street	Local	East / West	2	Two-way	Goreway Drive	Minotola Avenue / Justine Drive	Permitted	40 km/h
Etude Drive	Minor Collector	East / West	2	Two-way	Darcel Avenue	100 metres west of Lancaster Avenue	Prohibited	40 km/h west of Goreway Drive, 50 km/h east of Goreway Drive

Lane configurations for the study area intersections are illustrated in **Exhibit 2-2**.

Exhibit 2-2: Existing Study Area Lane Configurations



As illustrated in **Exhibit 2-2**, access is currently provided to both the South Site Access of 7085 Goreway Drive and the neighbouring 7075 Goreway Driveway site access, at the existing Goreway Drive and Dorcas Street intersection. Access to both driveways is currently controlled by the existing traffic signal. As previously mentioned, both of these accesses are barricaded, with no traffic volumes observed under existing conditions. The development proposes to consolidate these accesses, as discussed in **Section 4.1.1**.

For the purposes of analysis, the intersection of Goreway Drive was modeled as a four-legged intersection with no east-leg volumes under existing and future background conditions.

2.2 Existing Transit Network

The proposed development site is directly served by several surface transit routes provided by MiWay and Brampton Transit. Transit services within an approximate 800 metre radius of the proposed development site are illustrated in **Exhibit 2-3**, while service patterns and destinations of the routes operating in close proximity are presented in **Exhibit 2-4**.

Exhibit 2-3: Existing Transit Network

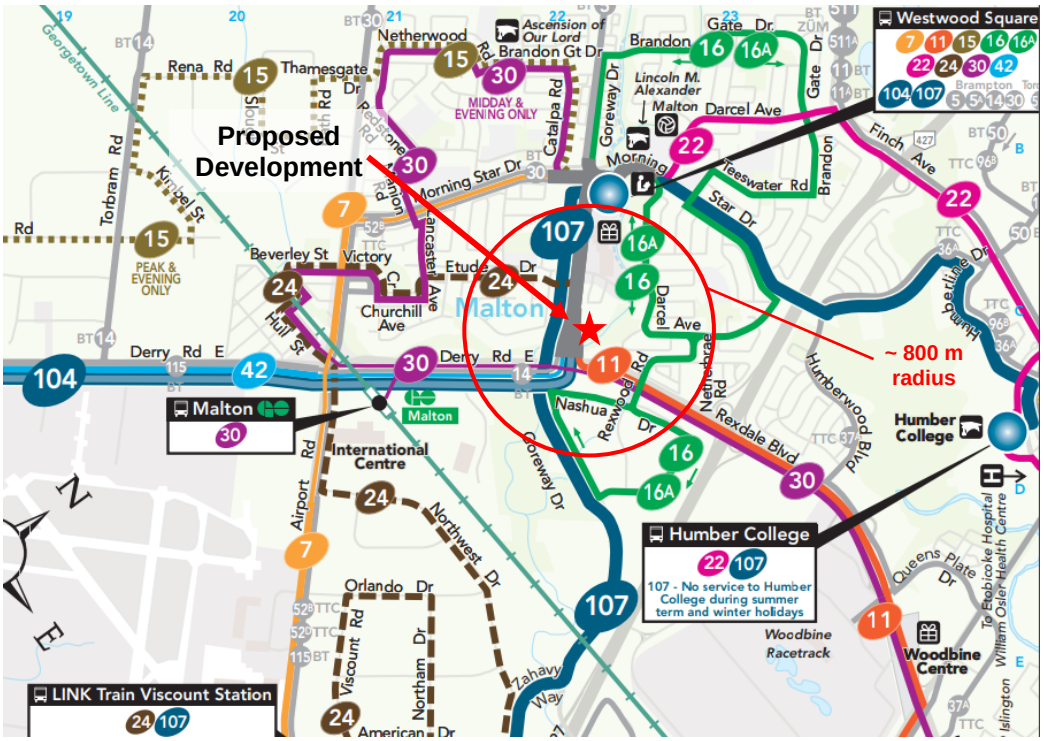


Image Source: MiWay. Retrieved April 7, 2020 from https://web.mississauga.ca/wp-content/uploads/sites/6/2020/02/19143559/SystemMap_Weekday.pdf

Exhibit 2-4: Existing Transit Service Patterns

Service Provider	Route	Onward Transit Connections	Walking Distance to Nearest Stop[1]	Average Peak Hour Frequency
MiWay	11 – Westwood	Westwood Square Bus Terminal, Woodbine Centre, Islington Subway Station (TTC Subway Line 2)	< 60 m (< 1 minute)	10 minutes
	24 – Northwest	Westwood Square Bus Terminal, Viscount Station (Toronto Pearson Airport LINK Train)	350 m (< 5 minutes)	30 minutes
	42 – Derry	Westwood Square Bus Terminal, Meadowvale Town Centre Bus Terminal	< 60 m (< 1 minute)	13 minutes
	104 – Derry Express	Westwood Square Bus Terminal, Meadowvale Town Centre Bus Terminal	130 m (< 2 minutes)	15 minutes
	107 – Malton Express	Westwood Square Bus Terminal, City Centre Transit Terminal (Square One), Humber College North Campus, Viscount Station (Toronto Pearson Airport LINK Train)	130 m (< 2 minutes)	10 minutes
Brampton Transit	14 – Torbram	Westwood Square Bus Terminal	< 60 m (< 1 minute)	10 minutes

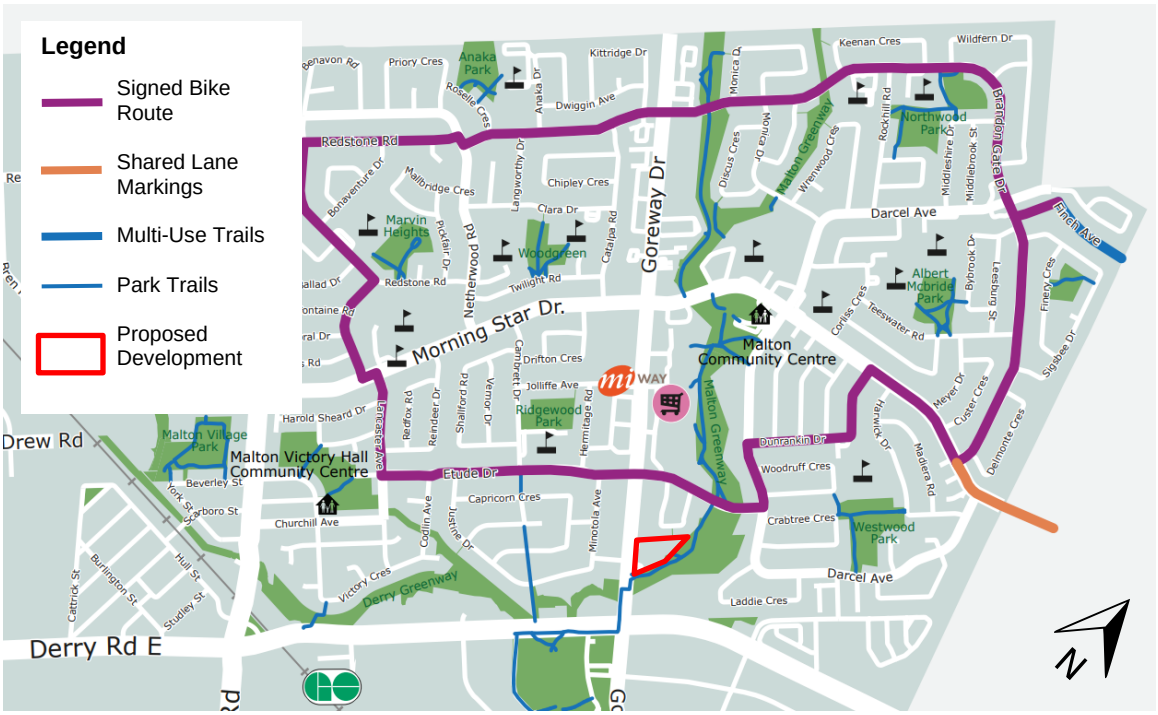
As shown in **Exhibit 2-3** and **Exhibit 2-4**, the proposed development site is located within 800 metres of multiple bus routes operated by MiWay. All of the identified transit routes connect to the Westwood Square Bus Terminal, located approximately 1.0 kilometre north of the proposed development site. Further connections to other major transit hubs from the Westwood Square Bus Terminal are provided, such as the Mississauga City Centre Transit Terminal (Square One) and the Malton GO Station (located along the Kitchener GO Line).

2.3 Existing Cycling Network

The proposed development site is located in close proximity to a circuitous signed bicycle route that primarily runs along Etude Drive and Redstone Road. This signed bicycle route also connects to the West Humber Multi-Use Trail within the City of Toronto. The proposed development site is also located adjacent to the Malton Greenway Trail, which consists of park trails that connect to the Malton Community Centre. This is illustrated in **Exhibit 2-5**.

[1] Walking times are based on a walking speed of 1.2 m/s, as per the City's Traffic Impact Study Guidelines.

Exhibit 2-5: Study Area Cycle Routes

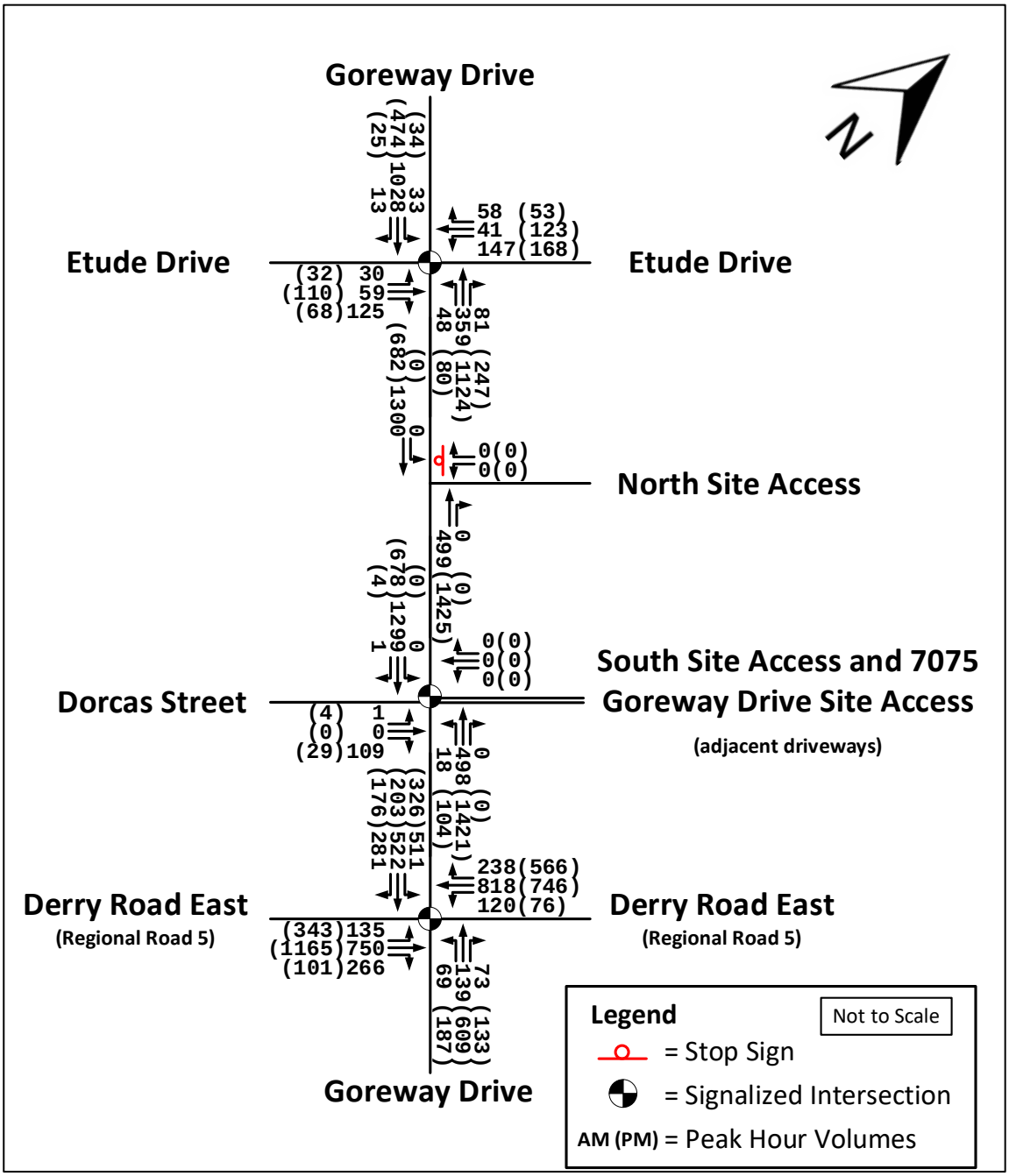


Base Map Source: City of Mississauga. Retrieved April 7, 2020 from https://www.mississaugabikes.ca/wp-content/uploads/2018/07/Mississauga-Cycling-Map-2018-web-with-panels.pdf

2.4 Turning Movement Counts

Horizon Data Services Ltd. (HDSL) was retained by IBI Group to conduct intersection turning movement counts. Data was collected on Tuesday, February 25, 2020 at the study area intersections. A summary of the balanced 2020 existing conditions traffic volumes is presented in **Exhibit 2-6**, with full turning movement count data presented in **Appendix B**.

Exhibit 2-6: 2020 Existing Conditions Traffic Volumes



Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

2.5 2020 Existing Conditions Analysis

Using the turning movement counts described in **Section 2.4**, and signal timing plans obtained from the City and the Region of Peel (Region) staff (See **Appendix C**), the study area intersections were analyzed using the Synchro software package, which is based on the **Highway Capacity Manual** methodology.

Based on the Region's **Traffic Impact Study Guidelines**, the following criteria were used in identifying critical operations at signalized intersections under the jurisdiction of the Region:

- Volume to capacity ratio (v/c ratio) reaches or exceeds 0.90 for overall intersection operations, through movements, or shared through/turning movements;
- v/c ratio for exclusive movements exceed 1.00; and
- 95th percentile queue lengths for an individual movement exceed available storage.

Furthermore, based on the City's **Traffic Impact Study Guidelines**, the following criteria were used in identifying critical operations at signalized intersections under the jurisdiction of the City:

- v/c ratio increases to 0.85 or above for overall intersection operations, through movements, or shared through/turning movements;
- v/c ratios for exclusive movements exceed 0.90; and
- 95th percentile queue lengths for an individual movements exceed available storage.

With regards to unsignalized intersections under the jurisdiction of the City, the following criteria were referenced:

- Level of service (LOS), based on average delay per vehicle, on individual movements exceeds LOS "E" ; and
- 95th percentile queue lengths for an individual movement exceed available storage.

It should be noted that the intersection of Goreway Drive and Derry Road East and its associated movements have been analyzed considering the Region's guidelines, given the regional road designation of Derry Road East.

The results of the 2020 existing conditions traffic operations analysis for the weekday AM and PM peak hours at the study area signalized intersections are presented in **Exhibit 2-7**.

Exhibit 2-7: 2020 Existing Condition Traffic Operations – Signalized Intersection Summary

Intersection	Intersection Summary			Individual Movement					
	LOS	Delay	v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
Weekday AM Peak Hour									
Goreway Drive and Derry Road East	D	47.7	0.63	EBL	E	73.4	0.51	33	120
				EBT	D	40.2	0.47	83	-
				EBR	D	35.6	0.19	20	100
				WBL	C	34.6	0.44	36	78
				WBT	D	44.6	0.52	95	-
				WBR	D	39.2	0.18	21	90
				NBL	E	73.2	0.36	19	82
				NBT	D	48.7	0.17	29	-
				NBR	D	47.4	0.06	-	73
				SBL	E	68.9	0.79	99	101
				SBTR	D	46.3	0.67	129	-
Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access	A	8.5	0.54	EBLR	D	53.2	0.56	31	-
				NBL	A	3.7	0.09	4	60
				NBT	A	3.1	0.21	24	-
				SBTR	A	6.1	0.54	108	-
Goreway Drive and Etude Drive	C	22.5	0.61	EBL	D	38.0	0.12	14	70
				EBTR	D	38.8	0.35	39	-
				WBL	F	92.0	0.93	57	37
				WBT	D	36.2	0.11	16	-
				WBR	D	37.2	0.05	9	33
				NBL	A	8.9	0.17	8	53
				NBTR	A	7.2	0.20	30	-
				SBL	A	10.0	0.07	10	30
				SBTR	B	14.4	0.56	119	-

Intersection	Intersection Summary			Individual Movement					
	LOS	Delay	v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
Weekday PM Peak Hour									
Goreway Drive and Derry Road East	E	55.8	0.72	EBL	F	136	1.05	94	120
				EBT	D	42.8	0.63	133	-
				EBR	C	32.6	0.08	9	100
				WBL	C	33.9	0.40	23	78
				WBT	D	43.6	0.48	85	-
				WBR	D	53.2	0.67	117	90
				NBL	E	72.8	0.58	43	82
				NBT	E	56.4	0.69	125	-
				NBR	D	44.5	0.12	21	73
				SBL	E	70.7	0.69	66	101
				SBTR	D	44.9	0.41	64	-
Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access	A	3.8	0.47	EBLR	D	53.3	0.12	6	120
				NBL	A	2.8	0.23	10	-
				NBT	A	2.9	0.50	55	100
				SBTR	A	1.3	0.28	11	78
Goreway Drive and Etude Drive	C	21.1	0.72	EBL	D	37.3	0.21	16	70
				EBTR	D	38.5	0.45	46	-
				WBL	F	94.6	0.95	76	37
				WBT	D	36.5	0.29	41	-
				WBR	D	35.4	0.04	9	33
				NBL	A	6.0	0.17	8	53
				NBTR	B	11.1	0.65	136	-
				SBL	B	17.0	0.28	13	30
				SBTR	B	12.8	0.33	51	-

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 2-7**, the signalized study area intersections are observed to operate within capacity overall during the weekday AM and PM peak hours.

With regards to specific movements during the weekday AM peak hour, the following is noted:

- The westbound left-turn movement at the Goreway Drive and Etude Drive intersection is operating above critical capacity thresholds (v/c ratio of 0.93), with a queue storage spillover of up to three car lengths.

During the weekday PM peak hour, the following observations are noted:

- The eastbound left-turn movement at the Goreway Drive and Derry Road East intersection is operating above capacity (v/c ratio of 1.05);
- The westbound right-turn movement at the Goreway Drive and Derry Road East intersection is exceeding storage capacity by up to four car lengths; and
- The westbound left movement at the Goreway Drive and Etude Drive intersection is operating above critical capacity thresholds (v/c ratio of 0.95), with a queue storage spillover of up to six car lengths.

It should be noted that, as the site accesses are presently unused, no vehicle volumes were observed. Full Highway Capacity Manual analysis for the 2020 existing conditions scenario is presented in **Appendix D**.

3 2025 Future Background Conditions

This section discusses the development horizon year, the future transportation network, other developments impacting the study area, and future traffic conditions without the proposed development.

3.1 Horizon Year

As per the City's **Traffic Impact Study Guidelines**, and as confirmed by City staff, a horizon year of 2025 was considered, which represents 5 years from the date of this transportation impact study.

3.2 Growth Rate

Through correspondence with City and Region staff, compounded annual traffic growth rates along Goreway Drive and Derry Road East were identified for the time period between 2020 and 2025. **Exhibit 3-1** summarizes the identified traffic growth rates.

Exhibit 3-1: Summary of Compounded Annual Traffic Growth Rates

Street Name	Peak Hour	Direction	Compounded Annual Traffic Growth Rate
Goreway Drive	Weekday AM	NB	1.5%
		SB	0.0%
	Weekday PM	NB	0.0%
		SB	0.0%
Derry Road East	Weekday AM and PM	EB and WB	1.5% (2020 to 2021) 1.0% (2021 to 2025)

The compounded annual growth rates were applied to respective through movements along Goreway Drive and Derry Road East. These rates result in absolute increases in traffic volumes along Goreway Drive (only for northbound traffic during the weekday AM peak hour) and Derry Road East (eastbound through and westbound through traffic during the weekday AM and PM peak hours) of approximately 7.7% and 5.6% from 2020 to 2025, respectively.

3.3 Future Transportation Network

Based on a review of the City of Mississauga's Roads and Stormwater Capital Plan (April 2019), various transportation plans and strategies, and other documents, no significant road network improvements in the study area are anticipated by 2025. Incremental transit service improvements to surface transit routes in the study area are likely by 2025, but no significant changes to services (e.g. dedicated transit lanes, grade separation, etc.) are anticipated.

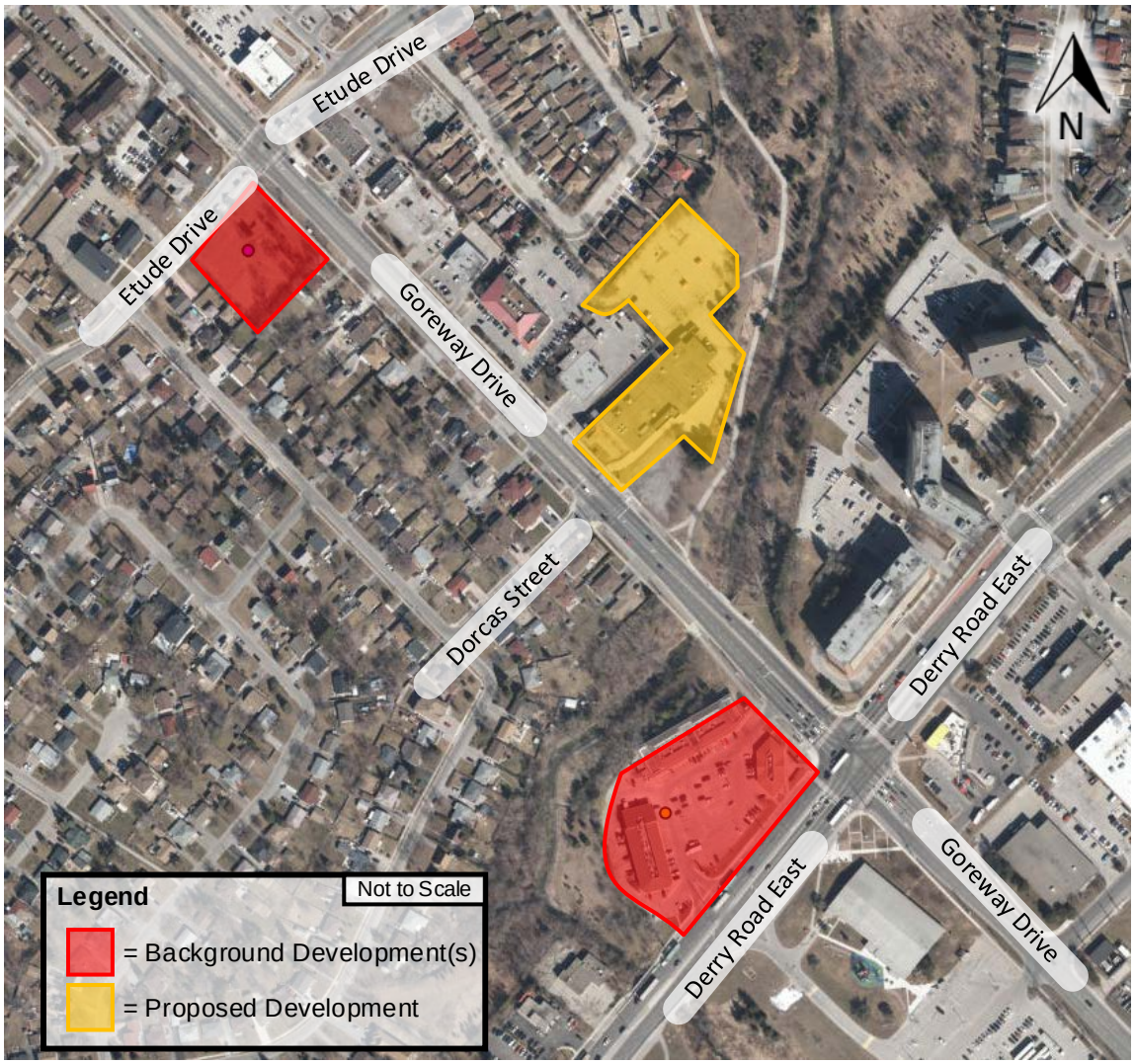
3.4 Background Developments

A review of the City of Mississauga development applications online map indicated that there are two developments in the vicinity of the study area which are likely to generate notable numbers of new automobile trips. Details of the two background developments are summarized in **Exhibit 3-2**, and are illustrated geographically in **Exhibit 3-3**.

Exhibit 3-2: Summary of Background Developments

#	Address	Size and Nature of Development	Status
1	3427 Derry Road East	389.1 m^2, commercial uses	Withheld
2	7170 Goreway Drive	14 dwelling units, residential uses	Withheld

Exhibit 3-3: Background Developments

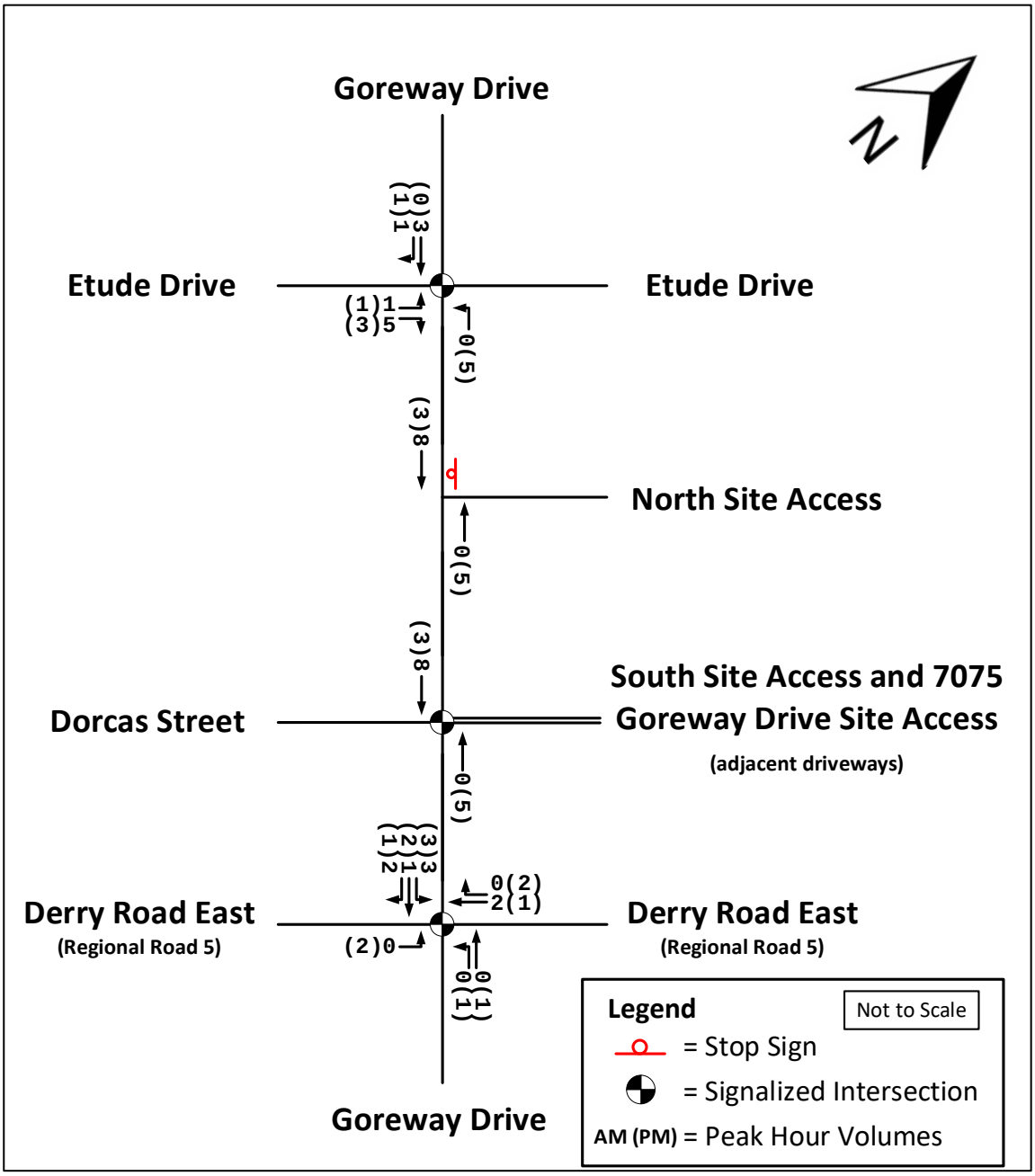


Base Map Source: City of Mississauga. Retrieved April 2, 2020 from
http://www6.mississauga.ca/missmaps/maps.aspx#map=17/-8864795.24/5421497.5/0

In lieu of any transportation impact studies for the two background developments shown in **Exhibit 3-3**, background development site trips were estimated using trip generation rates from the Institute of Transportation Engineers **Trip Generation Manual, 10th Edition** (September 2017) publication and assigned to the road network based on logical travel patterns. For the 3427 Derry Road East development, vehicles were assumed to access the site via existing commercial accesses. For the 7170 Goreway Drive development, access was assumed to be via Etude Drive.

Based on the above analysis, net new automobile trips added to the study area from background developments are illustrated in **Exhibit 3-4**.

Exhibit 3-4: Background Development Site Trips

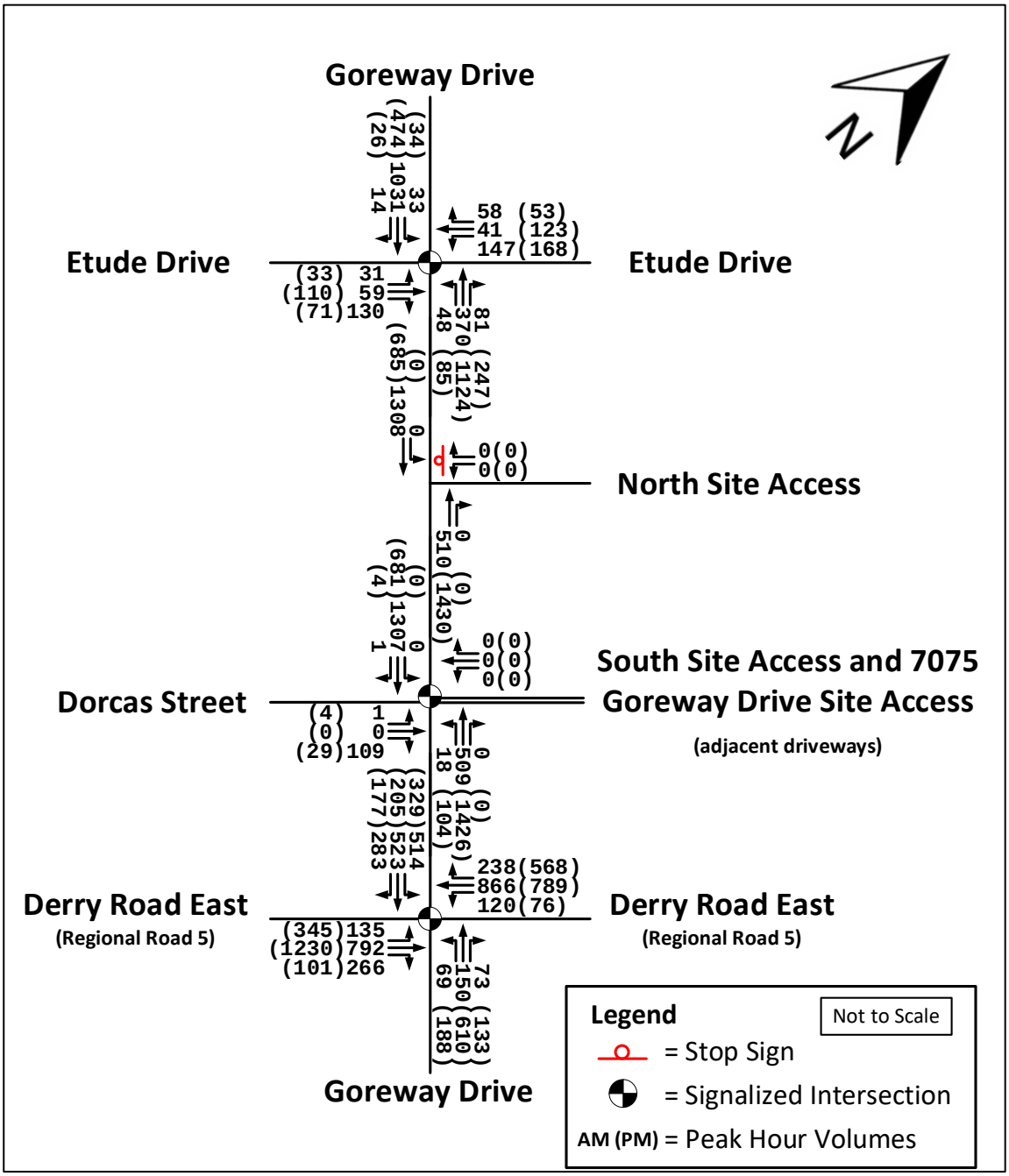


Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

3.5 2025 Future Background Analysis

New trips resulting from background growth were added to the existing conditions scenario, producing the 2025 future background traffic volumes illustrated in **Exhibit 3-5**.

Exhibit 3-5: 2025 Future Background Conditions Traffic Volumes



Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

Using the 2025 Future Background traffic volumes illustrated in **Exhibit 3-5**, traffic operations analysis was conducted to determine future intersection performance without the impact of the proposed development for the 2025 Future Background Conditions. The results of the signalized intersection traffic operations analysis is presented in **Exhibit 3-6**.

Exhibit 3-6: 2025 Future Background Conditions Traffic Operations – Signalized Intersection Summary

Intersection	Intersection Summary			Individual Movement					
	LOS	Delay	v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
Weekday AM Peak Hour									
Goreway Drive and Derry Road East	D	47.9	0.65	EBL	E	73.4	0.51	33	120
				EBT	D	40.8	0.50	88	-
				EBR	D	35.6	0.19	20	100
				WBL	D	35.0	0.46	36	78
				WBT	D	45.3	0.55	101	-
				WBR	D	39.2	0.18	21	90
				NBL	E	73.2	0.36	19	82
				NBT	D	48.9	0.18	31	-
				NBR	D	47.4	0.06	-	73
				SBL	E	69.2	0.79	99	101
				SBTR	D	46.3	0.67	129	-
Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access	A	8.5	0.54	EBLR	D	53.1	0.56	31	-
				NBL	A	3.8	0.09	4	60
				NBT	A	3.2	0.21	24	-
				SBTR	A	6.1	0.54	109	-
Goreway Drive and Etude Drive	C	22.8	0.62	EBL	D	37.8	0.13	14	70
				EBTR	D	38.8	0.35	40	-
				WBL	F	94.9	0.94	58	37
				WBT	D	36.1	0.11	16	-
				WBR	D	37.0	0.05	9	33
				NBL	A	9.0	0.18	8	53
				NBTR	A	7.3	0.20	31	-
				SBL	B	10.1	0.07	10	30
				SBTR	B	14.6	0.56	120	-

Intersection	Intersection Summary			Individual Movement					
	LOS	Delay	v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
Weekday PM Peak Hour									
Goreway Drive and Derry Road East	E	55.8	0.72	EBL	F	138	1.06	94	120
				EBT	D	43.9	0.67	143	-
				EBR	C	32.6	0.08	9	100
				WBL	C	34.8	0.42	23	78
				WBT	D	44.2	0.51	90	-
				WBR	D	53.4	0.67	117	90
				NBL	E	72.7	0.58	43	82
				NBT	D	54.6	0.64	114	-
				NBR	D	44.3	0.10	18	73
				SBL	E	70.5	0.69	67	101
				SBTR	D	43.0	0.31	46	-
Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access	A	3.4	0.46	EBLR	D	53.2	0.10	6	120
				NBL	A	2.5	0.19	8	-
				NBT	A	2.8	0.49	50	100
				SBTR	A	1.2	0.26	10	78
Goreway Drive and Etude Drive	C	21.7	0.72	EBL	D	36.2	0.17	14	70
				EBTR	D	38.3	0.47	50	-
				WBL	F	97.3	0.96	78	37
				WBT	D	35.7	0.27	39	-
				WBR	C	34.8	0.04	10	33
				NBL	A	6.2	0.17	8	53
				NBTR	B	11.5	0.65	134	-
				SBL	B	17.9	0.28	13	30
				SBTR	B	13.7	0.33	49	-

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 3-6**, the signalized study area intersections are anticipated to operate within capacity overall during the weekday AM and PM peak hours during the 2025 Future Background Traffic Conditions.

With regards to specific movements during the weekday AM peak hour, the following is noted:

- The westbound left-turn movement at the Goreway Drive and Etude Drive intersection is expected to continue operating above critical capacity thresholds (v/c ratio of 0.94), with a queue storage spillover of up to three car lengths.

During the weekday PM peak hour, the following observations are noted:

- The eastbound left-turn movement at the Goreway Drive and Derry Road East intersection is anticipated to continue operating above capacity (v/c ratio of 1.06);
- The westbound right-turn movement at the Goreway Drive and Derry Road East intersection is expected to continue experiencing queue storage spillovers (of up to four car lengths), similar to the 2020 existing conditions scenario; and
- The westbound left-turn movement at the Goreway Drive and Etude Drive intersection is anticipated to operate above critical capacity thresholds (v/c ratio of

0.96), with similar queue storage spillovers (up to six car lengths) as to those observed under existing conditions.

Possible measures to mitigate these constraints include signal timing adjustments and lane conversions. Measures to mitigate constraints anticipated under 2025 Future Background Traffic Conditions are discussed further with the addition of site traffic under 2025 Future Total Conditions in **Section 4.4**.

It should be noted that, as the site accesses would remain unused under future background conditions, no vehicle volumes would be observed. Full Highway Capacity Manual analysis for the 2025 future background conditions scenario is presented in **Appendix E**.

4 2025 Future Total Conditions

This section of the report analyzes the impact of the proposed development on the 2025 future transportation network.

4.1 Site Access and Lane Configuration

As discussed in **Section 1.3**, vehicular traffic is proposed to access the proposed development via one of two existing accesses from Goreway Drive. The proposed development will see a left-turn outbound restriction at the North Site Access. No other changes to the lane configurations are anticipated at either of the two site accesses.

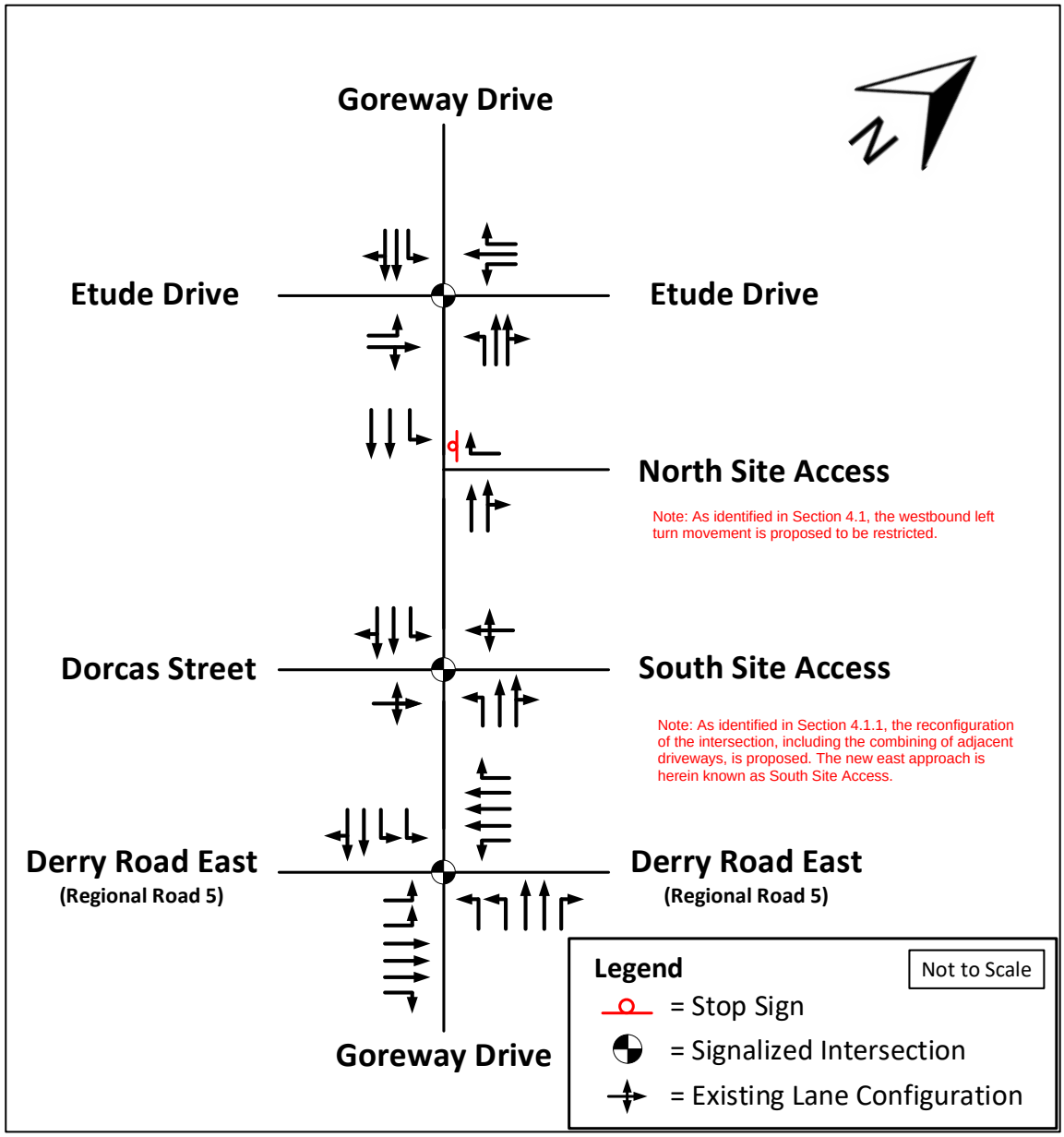
4.1.1 Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access Intersection Geometric Reconfiguration

As per discussions with City staff, the Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access intersection is proposed to be reconfigured to address various vehicle and pedestrian safety concerns. Part of the proposed intersection reconfiguration involves the east leg (i.e. combining the two adjacent driveways into one) to provide better alignment with the west leg (i.e. Dorcas Street). This proposed adjustment requires that the north approach's stop bar be re-aligned, due to a longer vehicle crossing distance. This reconfiguration will subsequently result in an increase of the northbound/southbound all-red interval by 1.0 second, as per clearance interval guidance provided in **Ontario Traffic Manual Book 12: Traffic Signals**. It should be noted that the northbound/southbound amber times remain unchanged. The 2025 future total traffic conditions scenario incorporates the proposed 1.0 second all-red interval adjustment.

The proposed study area lane configurations are illustrated in **Exhibit 4-1.** It should be noted that the proposed reconfiguration of the South Site Access and 7075 Goreway Drive Site Access will herein be identified as 'South Site Access'.

The specific geometric changes to the Goreway Drive and Dorcas Street / South Site Access intersection are discussed in further detail in **Section 7.1**.

Exhibit 4-1: Proposed Study Area Lane Configurations



4.2 Trip Generation

The vehicle trips expected to be generated by the proposed development are examined in this section. These trips were then assigned and distributed to the study area road network.

4.2.1 Gross Trip Generation

Trip generation rates from the Institute of Transportation Engineers ***Trip Generation Manual, 10th Edition*** (September 2017) publication were used to estimate future automobile trips associated with the proposed development. Based on the nature of the proposed development and its location context, fitted curve data for Land Use Codes (LUCs) 220: Multifamily Housing (Low-Rise), General Urban / Suburban and 222: Multifamily Housing (High-Rise), General Urban / Suburban were used.

4.2.2 Trip Generation Summary

The estimated automobile trips, and the net new inbound and outbound vehicle trips for the proposed development are presented in **Exhibit 4-2**. It should be noted that the following trip generation estimates and subsequent traffic analysis are based from an earlier development concept which had consisted of 245 condominium dwelling units and 16 townhouse units (14 fewer condominium dwelling units and four additional townhouse units when compared to the current concept). However, the total number of trips presented in **Exhibit 4-2** differs from the 271-dwelling concept by only two vehicle trips per hour. Therefore, the two concepts are expected to produce virtually indistinguishable traffic operations.

Exhibit 4-2: Trip Generation Summary

7085 Goreway Drive					
LUC 220: Multifamily Housing (Low-Rise) - General Urban / Suburban – 16 Dwelling Units					
Term	**Unit**	**Weekday AM Peak Hour**		**Weekday PM Peak Hour**	
Trip Generation Equation	-	Ln(T) = 0.95 Ln(X) - 0.51		Ln(T) = 0.89 Ln(X) - 0.02	
Trip Generation Rate	vehicle trips / unit	0.50		0.75	
Total Trips	vehicle trips / hour	**8**		**12**	
New Inbound Trips	vehicles / hour	2	23%	7	63%
New Outbound Trips	vehicles / hour	6	77%	5	37%
LUC 222 Multifamily Housing (High-Rise) - General Urban / Suburban – 245 Dwelling Units					
Term	**Unit**	**Weekday AM Peak Hour**		**Weekday PM Peak Hour**	
Trip Generation Equation	-	T = 0.28(X) + 12.86		T = 0.34(X) + 8.56	
Trip Generation Rate	vehicle trips / unit	0.33		0.37	
Total Trips	vehicle trips / hour	**81**		**92**	
New Inbound Trips	vehicles / hour	19	24%	56	61%
New Outbound Trips	vehicles / hour	62	76%	36	39%
Net New Trips					
Term	**Unit**	**Weekday AM Peak Hour**		**Weekday PM Peak Hour**	
Total Net New Trips	vehicle trips / hour	**89**		**104**	
Net New Inbound Trips	vehicles / hour	21		63	
Net New Outbound Trips	vehicles / hour	68		41	

Based on 245 condominium dwelling units and 16 townhouse units, the proposed development site is expected to produce up to 89 net new vehicle trips during the weekday AM peak hour (21 inbound trips and 68 outbound trips) and up to 104 net new vehicle trips during the weekday PM peak hour (63 inbound trips and 41 outbound trips).

4.2.3 Trip Distribution and Assignment

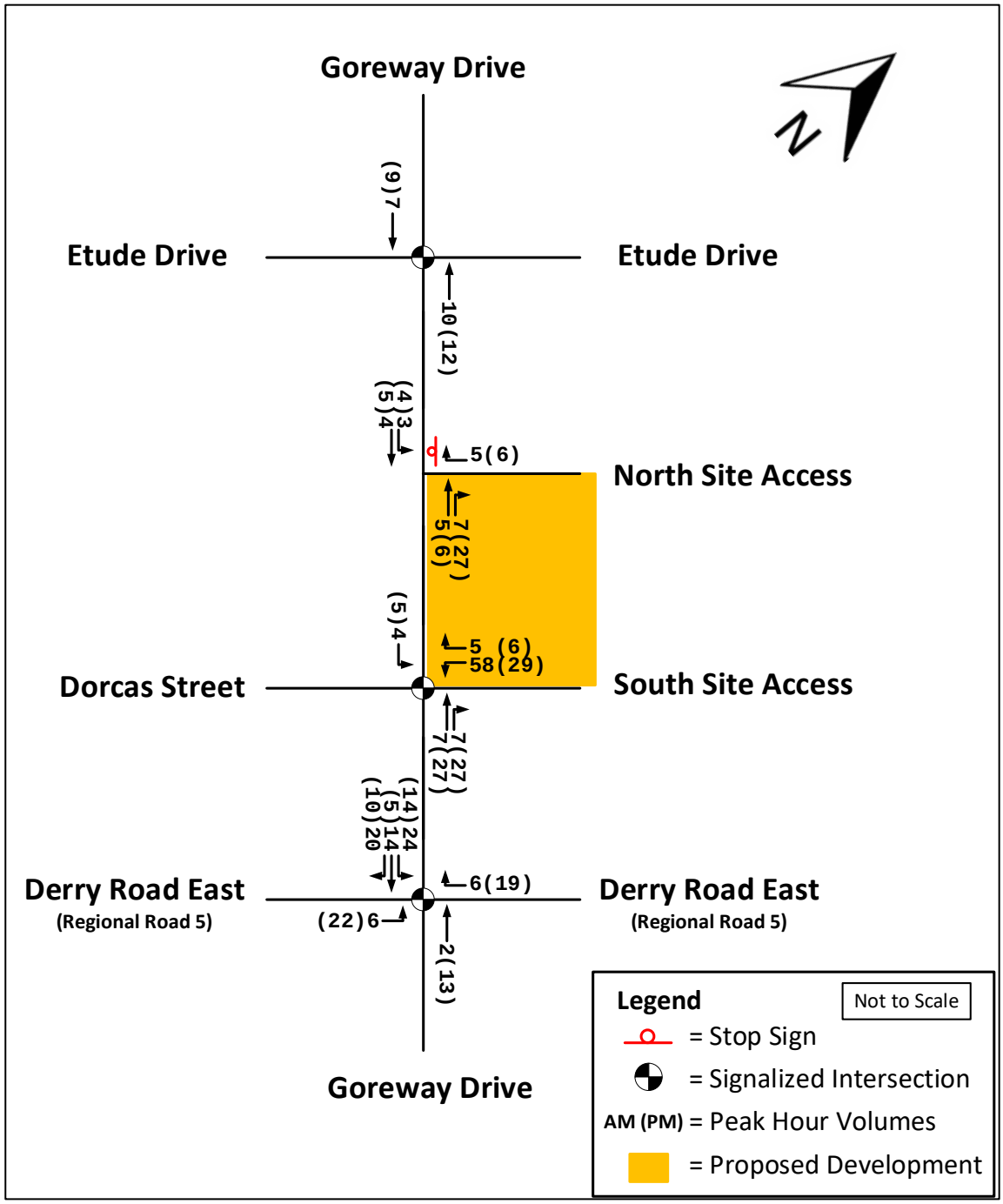
The trip distribution for site trips was based on the travel patterns of existing traffic at the study area intersections, and is presented in **Exhibit 4-3**.

Exhibit 4-3: Site Trip Distribution

Inbound Trips			Outbound Trips		
From	Weekday AM Peak Hour	Weekday PM Peak Hour	To	Weekday AM Peak Hour	Weekday PM Peak Hour
Goreway Drive (north)	35%	15%	Goreway Drive (north)	15%	30%
Goreway Drive (south)	5%	20%	Goreway Drive (south)	20%	10%
Derry Road East (east)	30%	30%	Derry Road East (east)	35%	35%
Derry Road East (west)	30%	35%	Derry Road East (west)	30%	25%
Total	**100%**	**100%**	**Total**	**100%**	**100%**

Site trips were assigned to the study area roadways based on logical travel patterns, as illustrated in **Exhibit 4-4**.

Exhibit 4-4: Net New Site Traffic Volumes

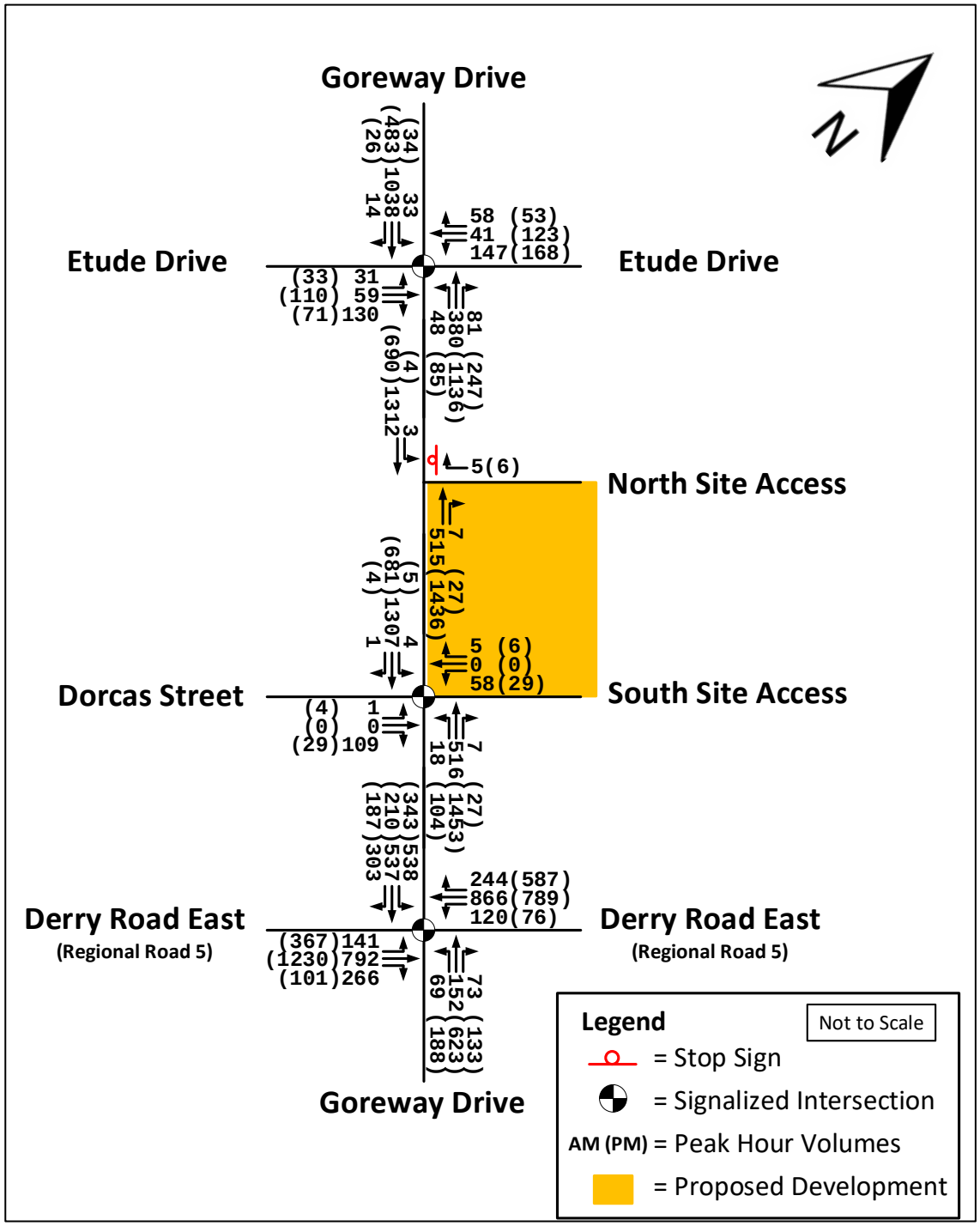


Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

4.3 2025 Future Total Conditions Analysis

New trips resulting from the construction of the proposed development were added to the 2025 future background conditions scenario, producing the 2025 future total traffic volumes illustrated in **Exhibit 4-5**.

Exhibit 4-5: 2025 Future Total Conditions Traffic Volumes



Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

Using the 2025 Future Total traffic volumes illustrated in **Exhibit 4-5**, traffic operations analysis was conducted to determine future intersection performance with the impact of the proposed development for the 2025 Future Total Conditions. The results of the signalized intersection traffic operations analysis is presented in **Exhibit 4-6**. It should be noted that the trip generation estimates for the proposed development are based on an earlier development concept with a slightly different dwelling unit count (within two vehicle trips of the trip generation estimates from the previous development concept, as discussed in **Section 4.2.2**). Therefore, conditions experienced by road users are expected to be virtually indistinguishable.

Exhibit 4-6: 2025 Future Total Condition Traffic Operations – Signalized Intersection Summary

Intersection	Intersection Summary			Individual Movement					
	LOS	Delay	v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
Weekday AM Peak Hour									
Goreway Drive and Derry Road East	D	48.5	0.66	EBL	E	73.6	0.53	34	120
				EBT	D	41.2	0.50	88	-
				EBR	D	35.9	0.18	20	100
				WBL	D	35.5	0.47	36	78
				WBT	D	46.0	0.56	101	-
				WBR	D	39.7	0.18	21	90
				NBL	E	73.2	0.36	19	82
				NBT	D	49.2	0.19	31	-
				NBR	D	47.6	0.06	-	73
				SBL	E	69.5	0.81	104	101
				SBT	D	46.8	0.69	135	-
Goreway Drive and Dorcas Street / South Site Access	A	9.9	0.54	EBT	D	53.1	0.56	31	-
				WBT	E	57.7	0.55	24	-
				NBL	A	3.8	0.09	4	60
				NBT	A	3.2	0.22	25	-
				SBL	A	1.1	0.01	0	34
				SBT	A	6.1	0.54	106	-
Goreway Drive and Etude Drive	C	22.7	0.62	EBL	D	37.8	0.13	14	70
				EBT	D	38.8	0.35	40	-
				WBL	F	94.9	0.94	58	37
				WBT	D	36.1	0.11	16	-
				WBR	D	37.0	0.05	9	33
				NBL	A	9.0	0.18	8	53
				NBT	A	7.4	0.21	32	-
				SBL	B	10.1	0.07	10	30
				SBT	B	14.7	0.57	121	-

Intersection	Intersection Summary			Individual Movement					
	LOS	Delay	v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
Weekday PM Peak Hour									
Goreway Drive and Derry Road East	E	58.4	0.74	EBL	F	160	1.13	102	120
				EBT	D	43.9	0.67	143	-
				EBR	C	32.6	0.08	9	100
				WBL	C	34.8	0.42	23	78
				WBT	D	44.2	0.51	90	-
				WBR	E	55.7	0.71	129	90
				NBL	E	72.7	0.58	43	82
				NBT	E	55.8	0.66	117	-
				NBR	D	44.9	0.11	19	73
				SBL	E	70.5	0.70	69	101
				SBT	D	43.3	0.32	48	-
Goreway Drive and Dorcas Street / South Site Access	A	4.3	0.48	EBT	D	53.2	0.10	6	-
				WBT	D	53.7	0.15	13	-
				NBL	A	2.5	0.19	8	60
				NBT	A	2.9	0.51	54	-
				SBL	A	1.1	0.02	0	34
				SBT	A	1.2	0.26	10	-
Goreway Drive and Etude Drive	C	21.7	0.73	EBL	D	36.2	0.17	14	70
				EBT	D	38.3	0.47	50	-
				WBL	F	97.3	0.96	78	37
				WBT	D	35.7	0.27	39	-
				WBR	C	34.8	0.04	10	33
				NBL	A	6.2	0.17	8	53
				NBT	B	11.6	0.65	136	-
				SBL	B	18.1	0.28	13	30
				SBT	B	13.7	0.33	50	-

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 4-6**, the signalized study area intersections are expected to operate within capacity overall during the weekday AM and PM peak hours for the 2025 Future Total Conditions.

With regards to specific movements during the weekday AM peak hour, the following is noted:

- The southbound left-turn movement at the Goreway Drive and Derry Road East is anticipated to experience a queue storage spillover of up to one car length.
- During the weekday PM peak hour, the following observations are noted:
- The eastbound left-turn movement at the Goreway Drive and Derry Road East intersection is anticipated to operate above capacity (v/c ratio of 1.13).
- The westbound right-turn movement at the Goreway Drive and Derry Road East intersection is anticipated to continue experiencing queue storage spillovers (up to six car lengths), as anticipated under 2025 future background conditions.

- The westbound left-turn movement at the Goreway Drive and Etude Drive intersection is anticipated to continue operating above critical capacity thresholds (v/c ratio of 0.96), with similar queue storage spillovers (up to six car lengths) as anticipated under 2025 future background conditions.

With respect to unsignalized intersections, the results of the 2025 future total traffic operations analysis is presented in **Exhibit 4-7**.

Exhibit 4-7: 2025 Future Total Conditions Traffic Operations – Unsignalized Intersection Summary

Intersection	Intersection Delay (s)	Lane	Lane LOS	Lane Delay (s)	Lane V/C Ratio	Lane 95th Percentile Queue (m)	Lane Storage Capacity (m)
Weekday AM Peak Hour							
Goreway Drive and North Site Access	0.0	WBR	A	9.4	0.01	0	-
		SBL	A	8.4	0.00	0	-
Weekday PM Peak Hour							
Goreway Drive and North Site Access	0.1	WBR	B	12.9	0.02	0	-
		SBL	B	13.3	0.01	0	-

As shown in **Exhibit 4-7**, the analysis indicates that the unsignalized intersection of Goreway Drive and the North Site Access is expected to operate well within capacity and with minimal delays during the weekday AM and PM peak hours.

Full Highway Capacity Manual analysis for the future total conditions scenario is presented in **Appendix F**.

4.4 Mitigation Measures

In the previous section, several critical movements at the signalized study area intersections were noted under future total traffic conditions. This section discusses measures to mitigate these critical movements, where feasible.

4.4.1 Goreway Drive and Derry Road East

Under 2025 future total conditions, the southbound left-turn movement at the Goreway Drive and Derry Road East intersection is expected to experience a queue storage spillover of up to one car length during the weekday AM peak hour (as noted in **Exhibit 4-6**). This estimated queue storage spillover is based on 95th percentile queue lengths, and is statistically unlikely to be experienced by motorists on average. It should also be noted that under 2025 Future Background Conditions (i.e. without the proposed development), queues at the southbound left-turn movement during the weekday AM peak hour are expected to occupy all the available storage capacity, despite not surpassing critical thresholds. Furthermore, the impact of one additional vehicle within the available storage lanes is expected to be minimal on traffic operations. Therefore, as this queuing constraint is expected under future background conditions, no mitigation measures specific to the Goreway Drive and Derry Road East intersection's southbound left-turn movement during the weekday AM peak hour are recommended.

During the weekday PM peak hour, this intersection's eastbound left-turn movement was found to operate above capacity during existing, future background, and future total traffic conditions (v/c ratios of 1.05, 1.06, and 1.13, respectively). To mitigate this capacity constraint, 3.0 seconds of green time from the westbound through movement have been transferred to the eastbound left-turn movement during the weekday PM peak hour. Mitigated future background and future

total traffic operations at the Goreway Drive and Derry Road East intersection resulting from this signal timing adjustment are summarized in **Exhibit 4-8**.

Exhibit 4-8: 2025 Future Background and Future Total Conditions Traffic Operations (Weekday PM Peak Hour, Mitigated) – Goreway Drive and Derry Road East

Intersection	Intersection Summary			Individual Movement					
	LOS	Delay	v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
Weekday PM Peak Hour (2025 Future Background)									
Goreway Drive and Derry Road East	D	53.5	0.71	EBL	F	92.5	0.89	84	120
				EBT	D	43.9	0.67	143	-
				EBR	C	32.6	0.08	9	100
				WBL	D	36.3	0.42	23	78
				WBT	D	46.9	0.54	93	-
				WBR	E	57.9	0.71	126	90
				NBL	E	72.7	0.58	43	82
				NBT	D	54.6	0.64	114	-
				NBR	D	44.2	0.09	12	73
				SBL	E	70.5	0.69	67	101
				SBTR	D	43.0	0.31	46	-
Weekday PM Peak Hour (2025 Future Total)									
Goreway Drive and Derry Road East	E	55.1	0.74	EBL	F	103	0.95	92	120
				EBT	D	43.9	0.67	143	-
				EBR	C	32.6	0.08	9	100
				WBL	D	36.3	0.42	23	78
				WBT	D	46.9	0.54	93	-
				WBR	E	61.0	0.76	150	90
				NBL	E	72.7	0.58	43	82
				NBT	E	55.8	0.66	117	-
				NBR	D	44.6	0.09	12	73
				SBL	E	70.5	0.70	69	101
				SBTR	D	43.3	0.32	48	-

Red text indicates a movement which exceeds critical thresholds.

When compared to unmitigated traffic operations, the v/c ratio for the Goreway Drive and Derry Road East intersection's eastbound left-turn movement under the signal timing adjustment is anticipated to decrease from 1.06 to 0.89 for future background conditions, and from 1.13 to 0.95 for future total conditions. Overall, the transfer of 3.0 seconds of green time from the westbound through movement split to the eastbound left-turn movement split during the weekday PM peak hour is expected to result in all movements at this intersection operating within capacity.

It should be noted that, due to the aforementioned signal timing adjustment for the eastbound left-turn movement, the queue storage spillover associated with the westbound right-turn movement is anticipated to increase from up to six car lengths (before signal timing adjustments) to up to nine car lengths (after signal timing adjustments) during the weekday PM peak hour, under future total traffic conditions. Notwithstanding, these queue storage spillovers are observed under existing conditions and are expected to continue under future conditions

regardless of the proposed development, as illustrated in **Exhibit 4-9**. It should be noted that the recommended signal timing adjustment has been accounted for.

Exhibit 4-9: Goreway Drive and Derry Road East Intersection Queue Comparison

Intersection	Peak Hour	Movement	2020 Existing Conditions			2025 Future Background Conditions *(with recommended signal timing adjustment)*			2025 Future Total Conditions *(with recommended signal timing adjustment)*			Storage Capacity (m)
			Delay	v/c Ratio	95th Percentile Queue Length (m)	Delay	v/c Ratio	95th Percentile Queue Length (m)	Delay	v/c Ratio	95th Percentile Queue Length (m)	
Goreway Drive and Derry Road East	AM	WBR	39.2	0.18	21	39.2	0.18	21	39.7	0.18	21	90
	PM		53.2	0.67	117	57.9	0.71	126	61.0	0.76	150	

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 4-9**, the impact of the proposed development on the westbound right-turn queue lengths is expected to be between two and five car lengths, depending on the implementation of signal timing adjustments. This increase is unlikely to be perceived by the average road user, especially because it would only be apparent under 95th percentile volume conditions, which are statistically unlikely to occur. Furthermore, there are sufficient westbound through lanes along Derry Road East such that infrequent blockage of the westbound curbside through lane due to queue spillovers from the westbound right-turn lane will likely have minor impacts on overall intersection operations.

When comparing traffic operations of the eastbound left-turn and westbound right-turn movements, a trade-off can be observed. As the eastbound left-turn movement is expected to operate over capacity under future background conditions, the decision of mitigating the eastbound left-turn movement's capacity constraints at the cost of a minimal queue length increase of the westbound right-turn movement is sensible.

Full Highway Capacity Manual analysis for the mitigated 2025 future background and future total conditions scenarios is presented in **Appendix G**.

4.4.2 Goreway Drive and Etude Drive

For the Goreway Drive and Etude Drive intersection, capacity and queuing constraints were observed for the westbound left-turn movement during the weekday AM and PM peak hours under 2020 Existing Conditions. These constraints are anticipated to continue under 2025 Future Background conditions. It should be noted that there are no development site trips assigned to the constrained movement, resulting in minimal impacts as a result of the proposed development. This is illustrated in **Exhibit 4-10**.

Exhibit 4-10: Goreway Drive and Etude Drive Intersection Traffic Operations Comparison

Intersection	Peak Hour	Movement	2020 Existing Conditions			2025 Future Background Conditions			2025 Future Total Conditions			Storage Capacity (m)
			Delay	v/c Ratio	95th Percentile Queue Length (m)	Delay	v/c Ratio	95th Percentile Queue Length (m)	Delay	v/c Ratio	95th Percentile Queue Length (m)	
Goreway Drive and Etude Drive	AM	WBL	92.0	0.93	57	94.9	0.94	58	94.9	0.94	58	37
	PM		94.6	0.95	76	97.3	0.96	78	97.3	0.96	78	

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 4-10**, the 95th percentile queue at the westbound left-turn lane is anticipated to increase by up to 2 metres (less than one vehicle) between 2020 Existing Conditions and 2025 Future Background Conditions. Furthermore, since no site trips are anticipated to be added to this approach, no increase in queuing is anticipated under 2025 Future Total Conditions with the proposed development in place. Similarly, the v/c ratio at the westbound left-turn lane is anticipated to remain the same between future background and future total conditions in 2025. Consequently, the proposed development is not anticipated to impact the future traffic operations at this lane.

It should be noted that the westbound left-turn lane capacity constraints may be mitigated by the implementation of a protected westbound left-turn phase. However, given that the existing signal head for the westbound approach does not consist of a left-turn arrow display, it is recommended that further analysis to investigate the feasibility of this mitigation measure be undertaken.

4.5 Proposed Development Access Modifications

This section discusses various modifications for the proposed development site accesses, and their respective implications on traffic operations.

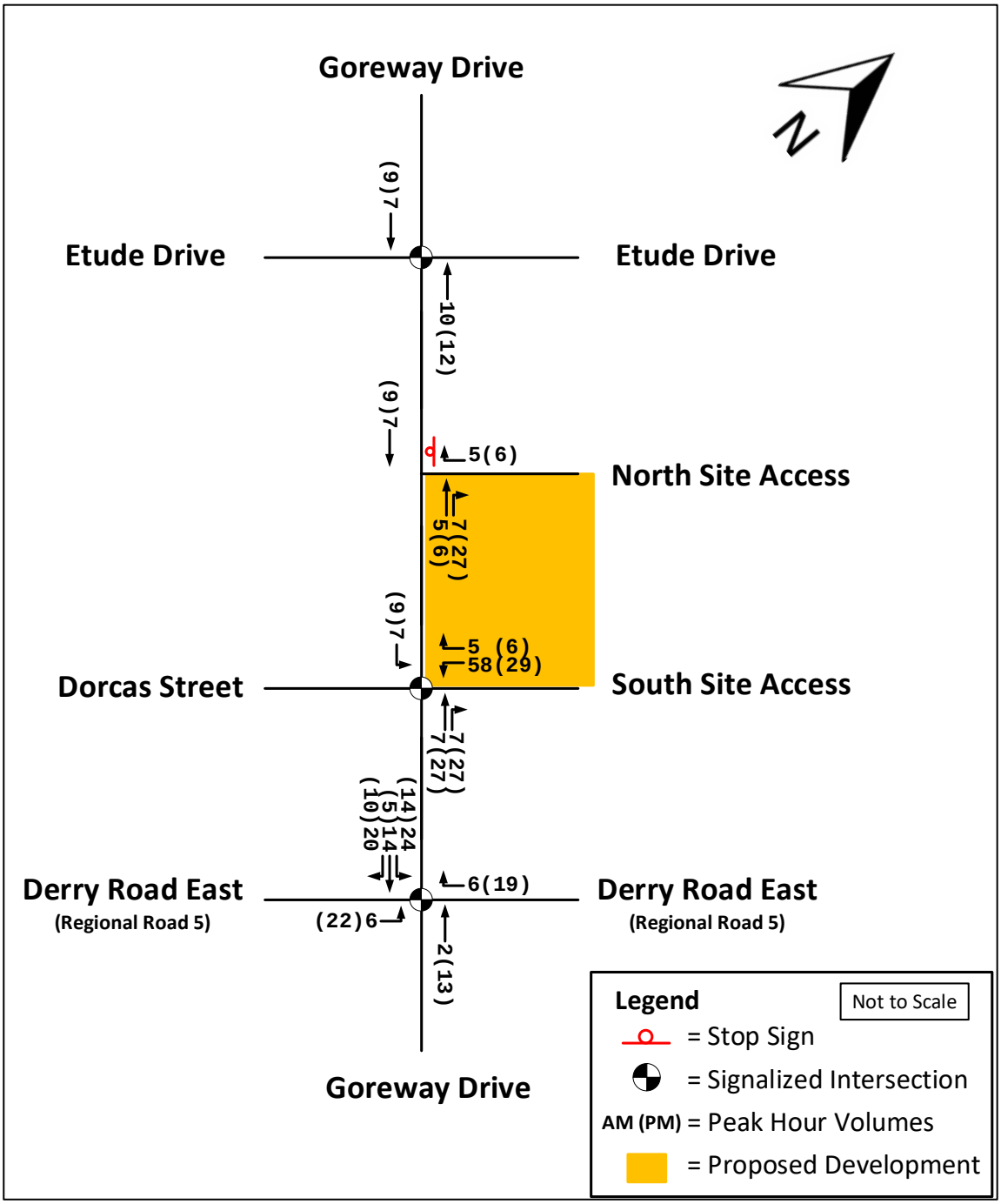
4.5.1 Alternative Site Access Movement Sensitivity Analysis

As noted in **Section 1.3**, the North Site Access would provide left-turn and right-turn movements into the proposed development site, while only providing a right-turn movement out of the development and onto Goreway Drive (i.e., left- and right-in / right-out).

Based on the relatively low southbound left-turn site traffic volumes assigned to the proposed site accesses (as illustrated in **Exhibit 4-4**), the North Site Access is unlikely to be impacted by the southbound left-turn movement at the Goreway Drive and Dorcas Street / South Site Access intersection.

To substantiate this, a sensitivity analysis was undertaken to assess traffic operations under a right-in / right-out access configuration at the north access (i.e. restricting the southbound left-turn movement at the North Site Access). Under this configuration, inbound site traffic from the north must turn into the site at the Goreway Drive and Dorcas Street / South Site Access intersection. This is illustrated in **Exhibit 4-11**.

Exhibit 4-11: Sensitivity Analysis Site Traffic Volumes



Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

Results from the sensitivity analysis are provided in **Exhibit 4-12** and **Exhibit 4-13** for the Dorcas Street / South Site Access and the North Site Access at Goreway Drive, respectively.

Exhibit 4-12: Sensitivity Analysis Summary for Right-In / Right-Out Configuration at South Site Access

Intersection	Intersection Summary			Individual Movement					
	LOS	Delay	v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
Weekday AM Peak Hour									
Goreway Drive and Dorcas Street / South Site Access	A	9.9	0.54	EBT	D	53.1	0.56	31	-
				WBT	E	57.7	0.55	24	-
				NBL	A	3.8	0.09	4	60
				NBT	A	3.2	0.22	25	-
				SBL	A	1.2	0.01	0	34
				SBTR	A	6.1	0.54	106	-
Weekday PM Peak Hour									
Goreway Drive and Dorcas Street / South Site Access	A	4.3	0.48	EBT	D	53.2	0.10	6	-
				WBT	D	53.7	0.15	13	-
				NBL	A	2.5	0.19	8	60
				NBT	A	2.9	0.51	54	-
				SBL	A	1.3	0.04	1	34
				SBTR	A	1.2	0.26	10	-

Exhibit 4-13: Sensitivity Analysis Summary for Right-In / Right-Out Configuration at North Site Access

Intersection	Intersection Delay (s)	Lane	Lane LOS	Lane Delay (s)	Lane V/C Ratio	Lane 95th Percentile Queue (m)	Lane Storage Capacity (m)
Weekday AM Peak Hour							
Goreway Drive and North Site Access	0.0	WBL	A	9.4	0.01	0	-
Weekday PM Peak Hour							
Goreway Drive and North Site Access	0.1	WBL	B	12.9	0.02	0	-

Based on the sensitivity analysis results illustrated in **Exhibit 4-12** and **Exhibit 4-13**, traffic operations at the proposed development site accesses are anticipated to operate within capacity. No significant benefits to traffic operations or safety are expected when compared to the left- and right-in / right-out access configuration for the North Site Access at Goreway Drive, as initially proposed.

4.6 Traffic Analysis Summary

The traffic operations analysis indicates that the addition of development site traffic to the study area is expected to have a minimal impact on the study area roadways. In comparison to 2025 future background traffic conditions, the only new critical movement detected under future total conditions is the southbound left-turn movement at the Goreway Drive and Derry Road East intersection during the weekday AM peak hour. This movement is expected to experience a queue storage spillover of up to one car length. However, the impact of one additional vehicle within the available storage lanes is expected to be minimal on traffic operations.

The eastbound left-turn movement at the Goreway Drive and Derry Road East intersection was observed to operate above capacity during the weekday PM peak hour (v/c ratio of 1.05), and is expected to continue doing so under future traffic conditions (v/c ratios of 1.06 and 1.13 under future background and future total conditions, respectively). To mitigate this capacity constraint, 3.0 seconds of green time from the westbound through movement split have been transferred to the eastbound left-turn movement. This results in all movements at this intersection expected to operate within capacity during the weekday PM peak hour.

Due to the above noted signal timing adjustment at the Goreway Drive and Derry Road East intersection, queues associated with the westbound right-turn movement are anticipated to increase from up to six car lengths to up to nine car lengths during the weekday PM peak hour. Notwithstanding, these queue storage spillovers are observed under existing conditions and are expected to continue under future conditions regardless of the proposed development. When comparing traffic operations of the eastbound left-turn and westbound right-turn movements, a trade-off can be observed as a result of the aforementioned signal timing adjustment. As the eastbound left-turn movement is expected to operate over capacity under future background conditions, the decision of mitigating the eastbound left-turn movement's capacity constraints at the cost of a relatively minor queue length increase of the westbound right-turn movement is sensible.

Capacity and queuing constraints during the weekday AM and PM peak hours were noted for the westbound left-turn movement at the Goreway Drive and Etude Drive intersection under existing and future traffic conditions. As no development site trips have been assigned to the westbound left-turn movement at the Goreway Drive and Etude Drive intersection, further analyses to assess the feasibility of these mitigation measures is recommended.

A sensitivity analysis was undertaken to assess traffic operations under a right-in / right-out access configuration at the North Site Access at Goreway Drive. Results from this sensitivity analysis indicate that there is no significant benefit in traffic operations if left-turn inbound were to be prohibited at the access.

It should be noted that the future total conditions scenario includes re-located stop bar and re-aligned pedestrian crosswalks at the north approach of the Goreway Drive and Dorcas Street / South Site Access intersection. Due to a longer vehicle crossing distance, the all red interval was increased by 1.0 seconds as per guidance provided in Ontario Traffic Manual Book 12: Traffic Signals. Further details regarding the proposed reconfiguration of the Goreway Drive and Dorcas Street / South Site Access intersection are provided in **Section 7**.

5 Parking Study

As discussed in **Section 1.3**, the development proposes to provide 372 parking spaces for 271 dwelling units. The suitability of this parking supply, based on zoning by-law requirements, comparable developments in the City of Mississauga, and the regulations in other municipalities, and transportation demand management options, is discussed in this section.

5.1 Zoning By-law Requirements

The development site is presently governed by the City of Mississauga Zoning By-law 0225-2007 (ZBL), and would be classified as having 259 apartment dwelling units and 12 townhouse dwelling units. If the dwelling units were to be leased as rental suites, the relevant ZBL vehicle parking requirements would be as illustrated in **Exhibit 5-1**.

Exhibit 5-1: ZBL 0225-2007 Parking Requirements for Rental Dwelling Units

Land Use	Proposed Units	Parking Rate Requirement (per unit)	Required Spaces
Resident Parking Requirements			
Rental Apartment			
One-Bedroom Unit	64	1.18	76
Two-Bedroom Unit	131	1.36	178
Three-Bedroom Unit	64	1.50	96
Rental Townhouse			
Two-Bedroom Unit	12	1.25	15
Visitor Parking Requirements			
Rental Apartment			
Visitor parking requirement	259	0.20	52
Rental Townhouse			
Visitor parking requirement	12	0.25	3
Total			
		Required Residential	365
		Required Visitor	55
		Total Required	420
		Proposed Supply	372
		Surplus/Deficiency	**-48**

Alternatively, if the dwelling units were to be considered as condominium units, the corresponding ZBL vehicle parking requirements, would be as illustrated in **Exhibit 5-2**.

Exhibit 5-2: ZBL 0225-2007 Parking Requirements for Condominium Dwelling Units

Land Use	Proposed Units	Parking Rate Requirement (per unit)	Required Spaces
Resident Parking Requirements			
Condominium Apartment			
One-Bedroom Unit	64	1.25	80
Two-Bedroom Unit	131	1.40	183
Three-Bedroom Unit	64	1.75	112
Condominium Townhouse			
Two-Bedroom Unit	12	2.00	24
Visitor Parking Requirements			
Condominium Apartment			
Visitor parking requirement	259	0.20	52
Condominium Townhouse			
Visitor parking requirement	12	0.25	3
Total			
		Required Residential	399
		Required Visitor	55
		Total Required	454
		Proposed Supply	372
		Surplus/Deficiency	**-82**

As shown in **Exhibit 5-1**, a ZBL deficiency of 48 spaces is anticipated if the dwelling units are to be leased as rental suites. If the dwellings were sold as condominium units, a ZBL deficiency of 82 spaces is expected, as shown in **Exhibit 5-2**.

Based on discussions with City of Mississauga Staff, it is our understanding that a visitor parking supply of 0.15 spaces per dwelling unit is a generally supported variance from the ZBL requirement of 0.20 spaces per dwelling unit. If this reduction were applied to the proposed development, then the ZBL requirement would be 407 spaces if dwellings are leased as rental suites, and 441 spaces if dwellings are sold as condominium units. This translates to a ZBL deficiency of 35 and 69 parking spaces, respectively.

5.2 Comparisons to Regulations in Other Municipalities

The development, located within the Malton neighbourhood of Mississauga, is located approximately 1.0 km from the boundary between the City of Toronto and City of Mississauga border. Though many areas of Toronto are served by 24-hour high-frequency transit services, have a diversity of land uses, and are equipped with high-quality cycling infrastructure, the City of Toronto zoning by-law 569-2013 applies to many areas which lack these features. For example, the Humberwood neighbourhood in Toronto, located in the vicinity of Rexdale Boulevard and Humberwood Boulevard, is a largely residential area with only a small commercial plaza within walking distance.

The area, as illustrated in **Exhibit 5-3**, is served by a single transit route – 37A Islington – operating every 24 minutes during the AM peak hour.

Exhibit 5-3: Toronto Transit Commission Route Map

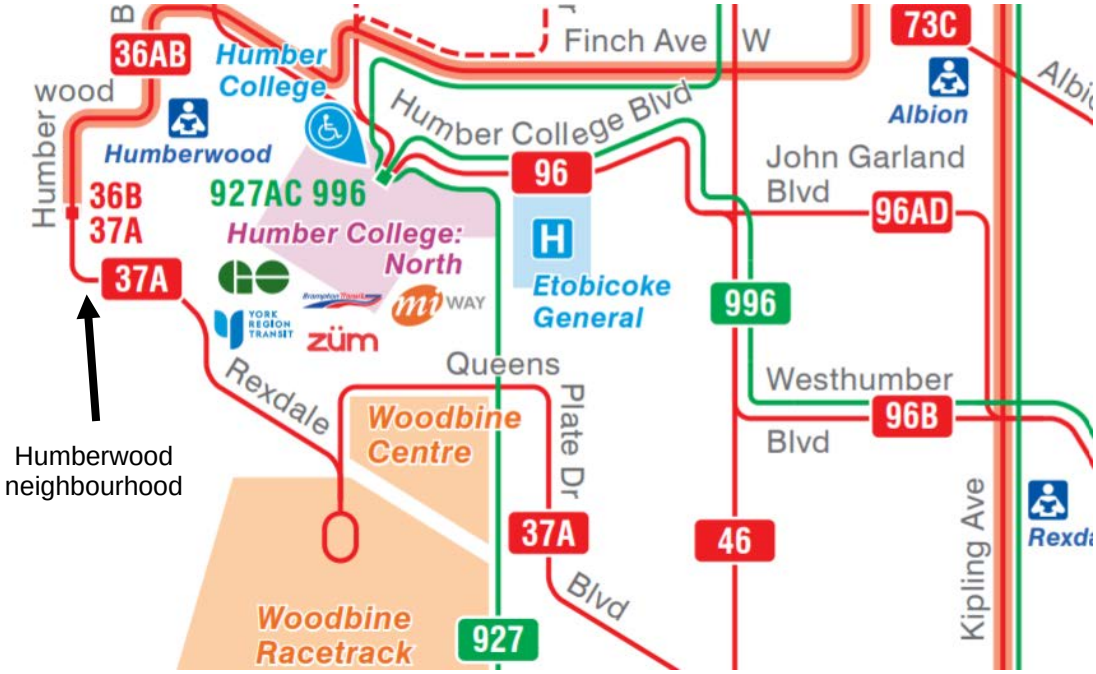


Image Source: Toronto Transit Commission. Retrieved April 14, 2020 from http://ttc.ca/PDF/Maps/TTC_SystemMap.pdf

Parking regulations for multi-family residential developments in the Humberwood neighbourhood range from 0.9 resident spaces per dwelling unit to 1.2 resident spaces per dwelling unit, depending on number of bedrooms. This is considered appropriate - despite the relatively poor access to sustainable transportation options - and would be approved as-of-right on an appropriately zoned parcel in Humberwood[2].

If the 7085 Goreway Drive development were located in the Humberwood neighbourhood, a total of 330 parking spaces would be required, as illustrated in **Exhibit 5-4**.

[2] 700 Humberwood Boulevard and 600 Rexdale Boulevard stand as precedent for multi-family residential development in Humberwood which is comparable to the 7085 Goreway Drive proposal.

Exhibit 5-4: Toronto ZBL 569-2013 Parking Requirements – Rest of City

Land Use	Proposed Units	Parking Rate Requirement (per unit)	Required Spaces
Resident Parking Requirements			
Apartment			
One-Bedroom Unit	64	0.9	58
Two-Bedroom Unit	131	1.0	131
Three-Bedroom Unit	64	1.2	77
Townhouse			
Two-Bedroom Unit	12	1.0	12
Visitor Parking Requirements			
Apartment			
Visitor parking requirement	259	0.2	52
Townhouse			
Visitor parking requirement	12	-	-
Total			
		Required Residential	278
		Required Visitor	52
		Total Required (ZBL 569-2013)	330
		Proposed Supply	372
		Surplus/Deficiency (ZBL 569-2013)	**+42**

In comparison to the above, the 7085 Goreway Drive development is located within walking a 10 minute walk of a major shopping centre. As well, transit services in close proximity to the site offer a departure every 2-3 minutes during the AM peak hour. However, parking requirements range from 1.18 resident spaces per dwelling unit to 1.50 resident spaces per dwelling unit, depending on number of bedrooms. This translates to a Mississauga parking requirement of 404 vehicle parking spaces, and means that a development west of the municipal boundary must provide 28% more parking despite having transit service which operates 700% more frequently than the above noted Humberwood neighbourhood area. This suggests that the ZBL 0225-2007 requirements do not adequately account for the excellent transit service along Goreway Drive in Malton, and indicates that a one-size-fits-all approach to parking regulations can result in an over-supply of parking in areas with convenient transit service, high-quality active transportation infrastructure, and land use patterns which feature good urban design and a mixture of uses in close proximity.

In addition, attitudes towards automobile usage are changing at both the personal and policy-maker level. Modern consumers are beginning to recognize that alternative forms of transportation are viable for many trips, and that car share systems and traditional taxis and ride-sharing is an option for times when automobile travel is unavoidable. In addition, the high cost of automobile ownership is difficult to justify in the face of rising housing costs in desirable neighbourhoods.

5.3 Comparisons to Precedents in Mississauga

While new multi-family development in Mississauga has largely been concentrated in the City Centre area, along the Hurontario Street corridor, and at higher-order transit nodes (such as GO Transit rail stations), there are notable examples of multi-family residential developments outside of these areas which have been approved with parking supplies which are below the typical zoning by-law requirements. The Daniels Erin Mills complex, located at on the southwest corner of the Eglinton Avenue West and Erin Mills Parkway, is one such example which is comparable due to its proximity to diverse land uses – in this case, Erin Mills Town Centre and Credit Valley Hospital – and its proximity to high-quality transit services and to a major transit terminal. This is illustrated in **Exhibit 5-5**.

Exhibit 5-5: Existing Transit Network

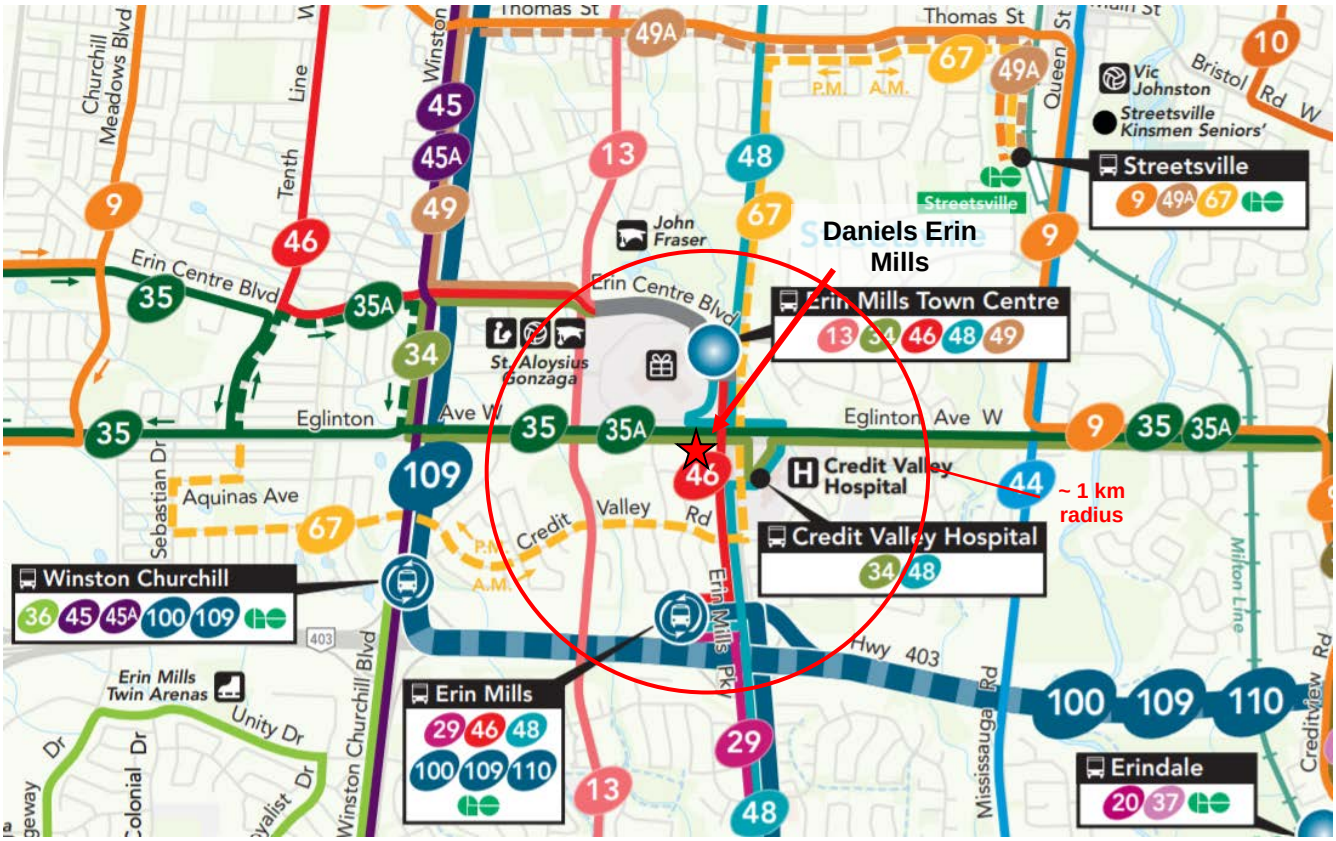


Image Source: MiWay. Retrieved April 7, 2020 from https://web.mississauga.ca/wp-content/uploads/sites/6/2020/02/19143559/SystemMap_Weekday.pdf

Based on information presented in City of Mississauga development applications OZ 13/005 W8, a comparison between the parking supply at the Daniels Erin Mills complex and the 7085 Goreway Drive development is presented in **Exhibit 5-5**.

Exhibit 5-6: Parking Supply Comparison

Development	Status	Dwelling Units	Parking Spaces	Parking Supply Ratio
Daniels Erin Mills – West Tower & North Tower	Occupied	606	689	1.14 parking spaces / dwelling unit
Daniels Erin Mills – East Tower & Townhouses	Approved	348	365	1.05 parking spaces / dwelling unit
7085 Goreway Drive	Proposed	261	360	1.38 parking spaces / dwelling unit

As shown in **Exhibit 5-6**, the 7085 Goreway Drive proposes to provide up to 31% more parking than comparable developments in the City of Mississauga. This indicates that the proposed parking supply exceeds established precedents in the City, and suggests that the proposed parking supply is appropriate for developments outside of Mississauga's core intensification areas.

5.4 Parking Analysis Summary

The proposed 7085 Goreway Drive development proposes to provide 372 parking spaces for 271 dwelling units – 48 spaces fewer than required by the City of Mississauga ZBL if the dwelling units are leased as rental suites, or 82 spaces fewer than required if the dwelling units are sold as condominium units. Based on discussions with City of Mississauga Staff, it is our understanding that a visitor parking supply of 0.15 spaces per dwelling unit is a generally supported variance from the ZBL requirement of 0.20 spaces per dwelling unit. If this reduction were applied to the proposed development, then the ZBL requirement would be 407 spaces if dwellings are leased as rental suites, and 441 spaces if dwellings are sold as condominium units. This translates to a ZBL deficiency of 35 and 69 parking spaces, respectively.

A one-size-fits-all approach to parking regulations can result in an over-supply of parking in areas with convenient transit service, high-quality active transportation infrastructure, and land use patterns which feature good urban design and a mixture of uses in close proximity. This is evident when the Mississauga ZBL requirements are compared to nearby areas in the City of Toronto where transit service is less frequent and amenities less plentiful. As per the Mississauga ZBL, the proposed development is required to provide 28% more parking despite nearby transit operating 700% more frequently than in the Humberwood neighbourhood in Toronto – approximately 1.0 kilometres to the east of the proposed development site. This indicates that the Mississauga ZBL regulations do not account for high quality transit service along the Goreway Drive corridor, and suggests that ZBL 0225-2007 may not be an appropriate regulation for the site context.

While new multi-family developments in Mississauga have largely been concentrated in the City Centre area, along the Hurontario Street corridor, and at higher-order transit nodes (such as GO Transit rail stations), there are notable examples of multi-family residential developments outside of these areas which have been approved with parking supplies which are below the typical zoning by-law requirements. The Daniels Erin Mills complex, located at on the southwest corner of the Eglinton Avenue West and Erin Mills Parkway, is one such example where parking is provided at ratios ranging from 1.05 to 1.14 parking spaces per dwelling unit – 31% less than 7085 Goreway Drive.

Based on these factors, as well as the Transportation Demand Management considerations discussed in **Section 6**, the proposed parking supply of 372 parking spaces is expected to be sufficient to accommodate anticipated demand. This supply translates to 1.37 parking spaces per dwelling unit, is more parking than is required in areas with comparatively poor transit

service, and is more parking than was required at comparable developments in the City of Mississauga.

6 Transportation Demand Management Options

Transportation Demand Management (TDM) refers to policies, design features, and incentives which encourage sustainable transportation choices. TDM can reduce the intensity of peak hour trips by encouraging deferred travel, can reduce automobile trips by encourage the use of non-automobile transportation modes, and can reduce the demand for parking by reducing the need to own and operate a personal vehicle.

A Transportation Demand Management Options memorandum in support of the 7085 Goreway Drive development is presented in **Appendix H**. The memorandum notes that the development proposes to provide approximately 292 secure bicycle parking spaces and excellent pedestrian connections to nearby amenities. In addition, the development is well served by transit, which provides for an easy connection to the existing GO Transit rail station at Malton, and to the future Finch West LRT station at Humber College. Together, these features encourage sustainable transportation choice by residents, and can reduce parking demand by making an auto-free lifestyle viable.

7 Site Access Conceptual Design

As discussed in **Section 1**, the development site presently contains a vacant commercial building whose south access is offset approximately 10 metres to the north of Dorcas Street. In addition, a vacant commercial property (7075 Goreway Drive) immediately south of the development site has an access offset approximately 6 metres to the south of Dorcas Street. This configuration is illustrated in **Exhibit 7-1** and **Exhibit 7-2**.

Exhibit 7-1: Existing Site Plan

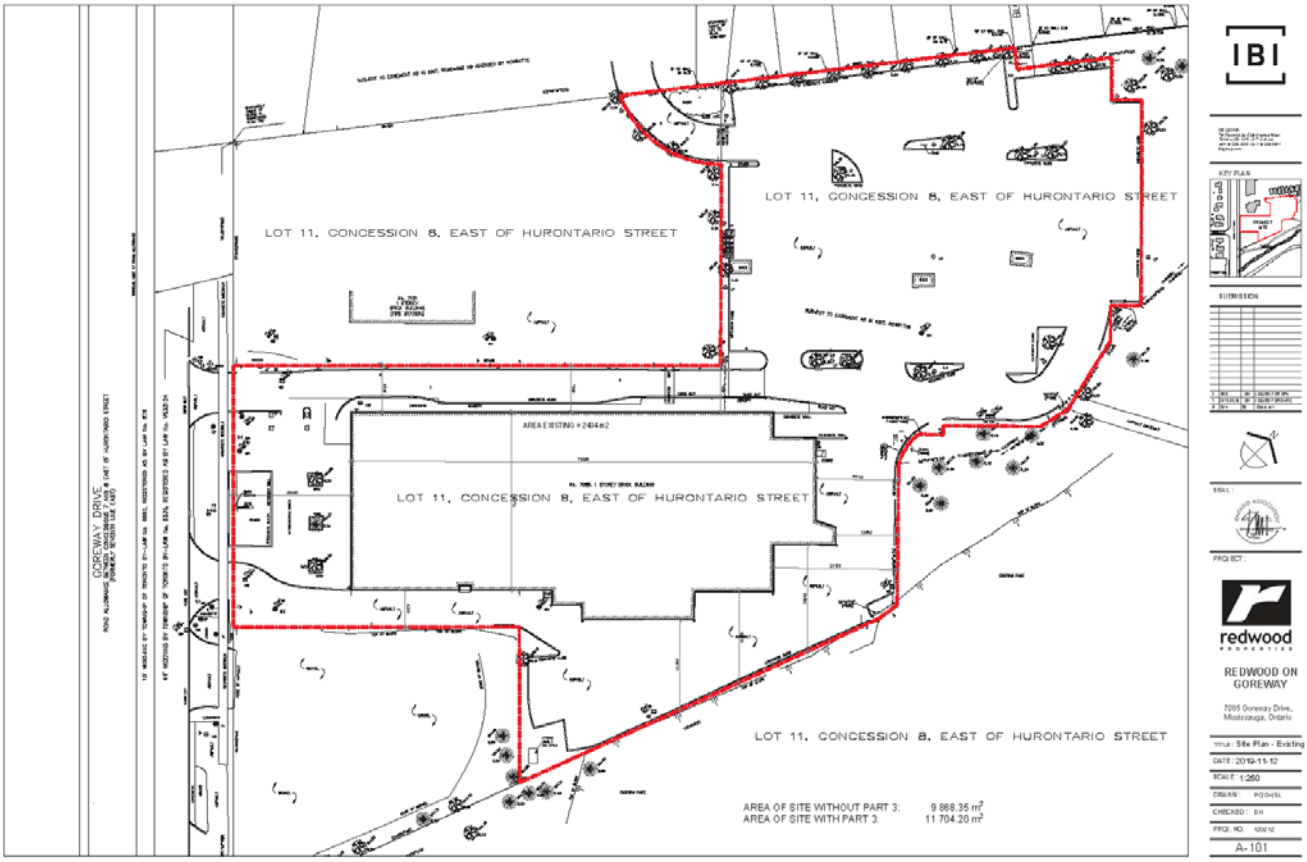
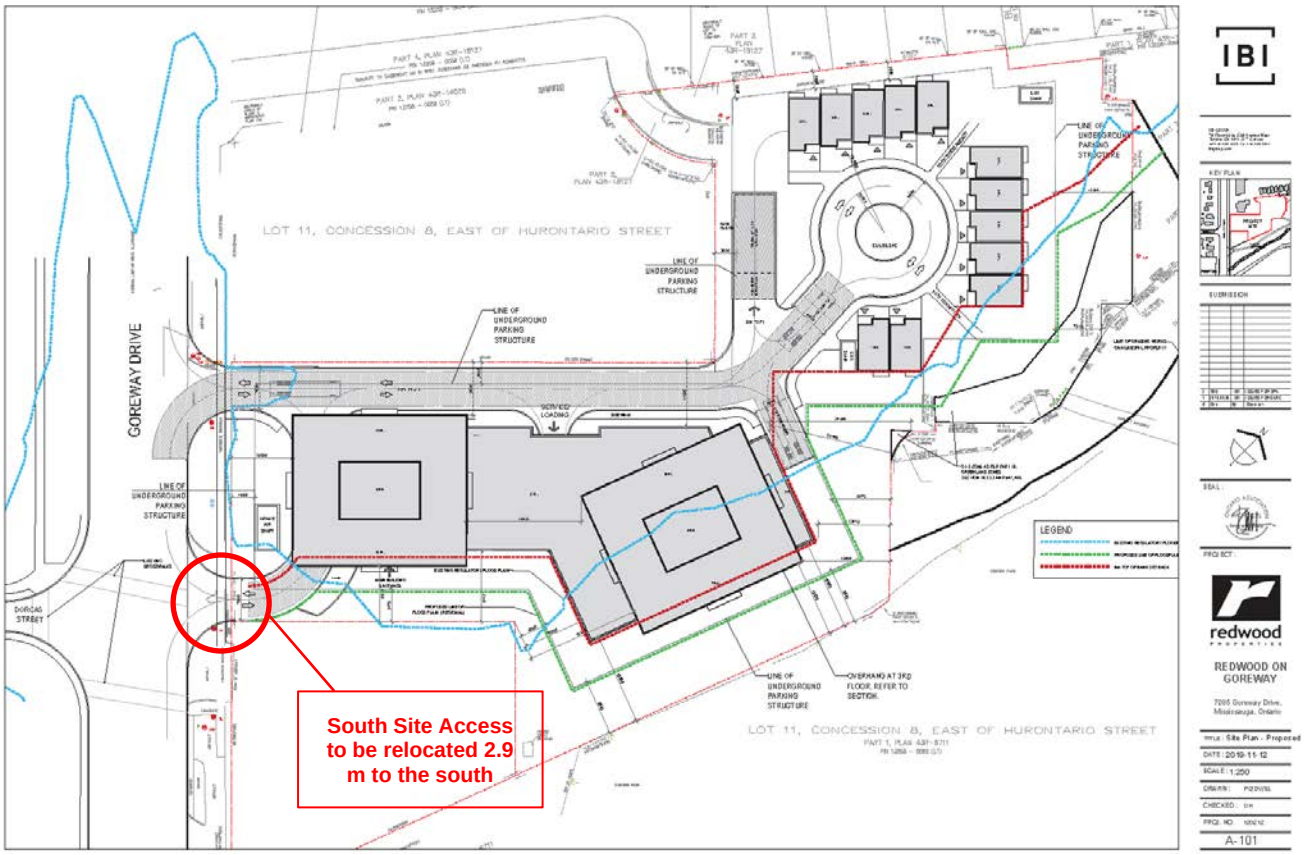


Exhibit 7-2: Existing Site Access Configuration

In order to rationalize the configuration of the Goreway Drive and Dorcas Street intersection, the development site access is proposed to be relocated to the south. Future conditions at the intersection are anticipated to consist of a signalized site access, which is offset from Dorcas Street by approximately 2.9 metres, as illustrated in **Exhibit 7-3**.

Exhibit 7-3: Proposed Site Plan



The operational implications of this configurations, as well as related changes to the intersection and configuration and pavement markings, are discussed in this section.

7.1 Offset Intersection

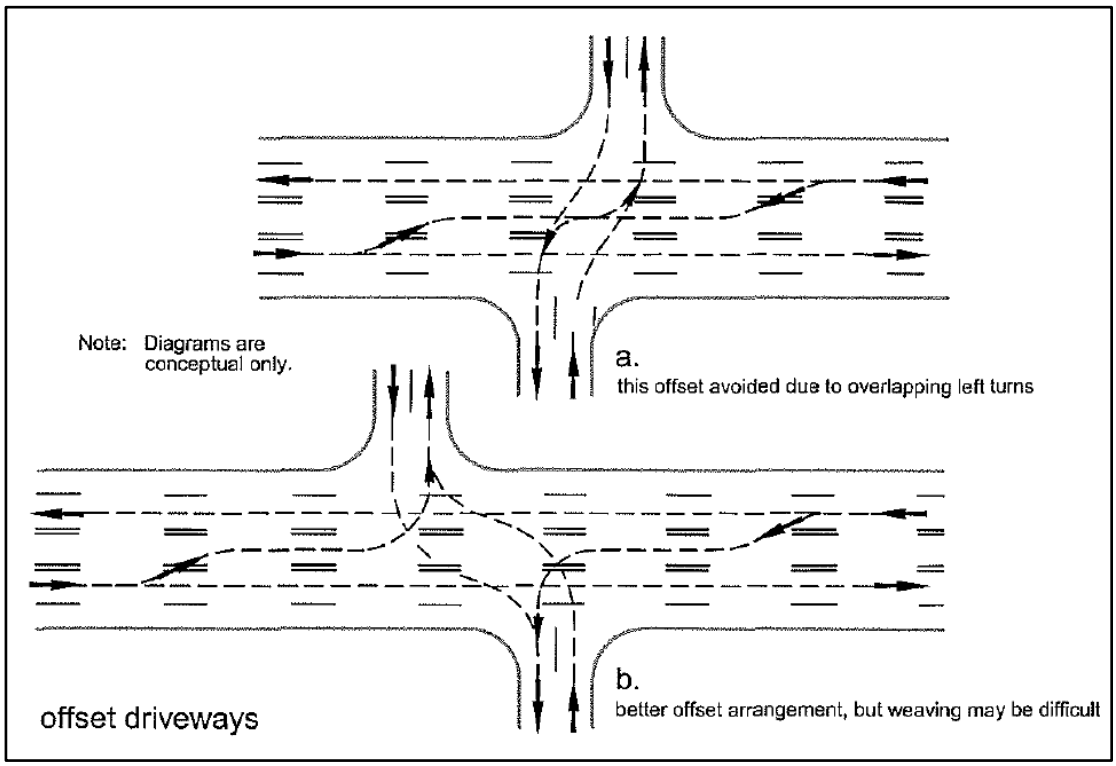
Signalized, offset intersections are not uncommon in redevelopment areas with pre-existing road alignments. Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (June 2017) indicates that offset intersection and offset access design must have regard for several factors:

- TAC chapter 8.9.9 states that "for low volume roadways, such as locals and most collectors, the spatial relationship between driveways on opposite sides of the road is not a necessary design consideration. Similarly, if one or both of the driveways are low volume, this relationship does not impact traffic operations."
    - As the development's 271 units[3] are only estimated to produce 89 new inbound and outbound weekday AM peak hour trips and 104 new inbound and outbound weekday PM peak hour trips [less than 2 new trips per minute, as per Institute of Transportation Engineers Trip Generation Manual, 10th Edition (September 2017)], volumes are such that impacts to traffic operations are expected to be low.

[3] As noted in **Section 4.2.2**, the trip generation estimates presented in this report are based on an earlier development concept which had consisted of 14 fewer condominium units and four additional townhouses. The total number of trips generated under the current development concept is expected to be slightly higher (i.e. within 2%) than what is reported.

- TAC chapter 8.9.9 states that "when the roadway has a moderate to high volume, and the driveway volumes are moderate to high… 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."
    - Offset intersections, compared to aligned intersections, can introduce additional conflict points due to overlapping turning paths and "straight through" moves which involve weaving. These potential conflicts are illustrated in **Exhibit 7-4**, which provides guidance on offset intersection design. The proposed offset at the south access is consistent with option "b", which eliminates overlapping left-turn conflicts from the major roadway;
    - With respect to inter-development traffic flow (i.e. straight through movements from Dorcas Street into the development), these volumes – and associated conflicts – are expected to be very low;
    - Potential conflicts could be further reduced by signal timing plans which separate Dorcas Street movements from development movements. This is commonly known as "split phasing", and is typically used at offset intersections with significant offsets. However, transportation impact analysis is necessary to determine the appropriateness of this measure.

Exhibit 7-4: TAC Figure 8.9.3: Spacing Considerations for Opposing Driveways

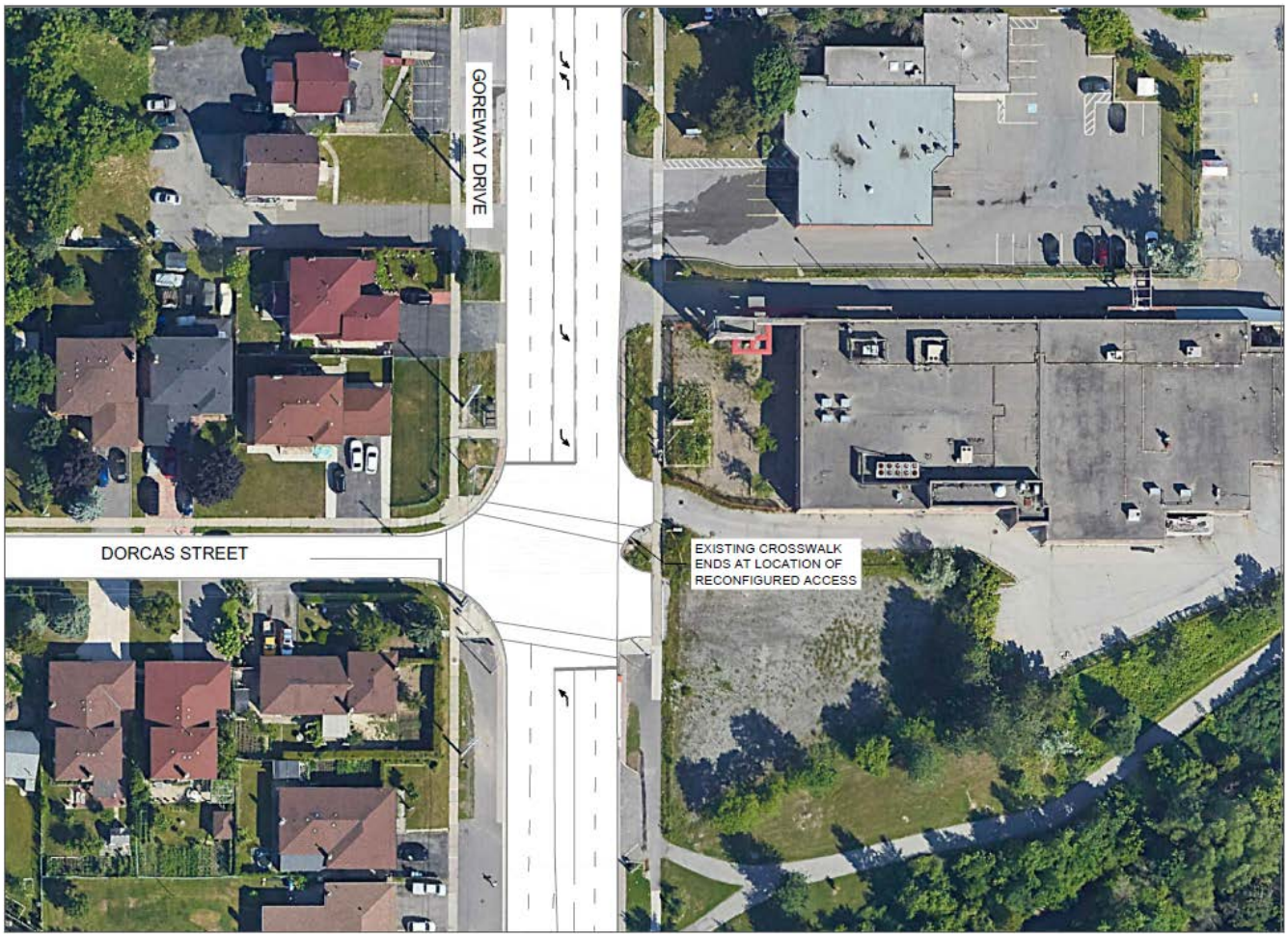


Based on the above factors, the proposed offset of 2.9 metres is preferable to maintaining the existing configuration. Volumes, particularly development site to Dorcas Street volumes, are expected to be low, and the proposed design eliminates overlapping main street left-turns.

7.2 Pavement Markings

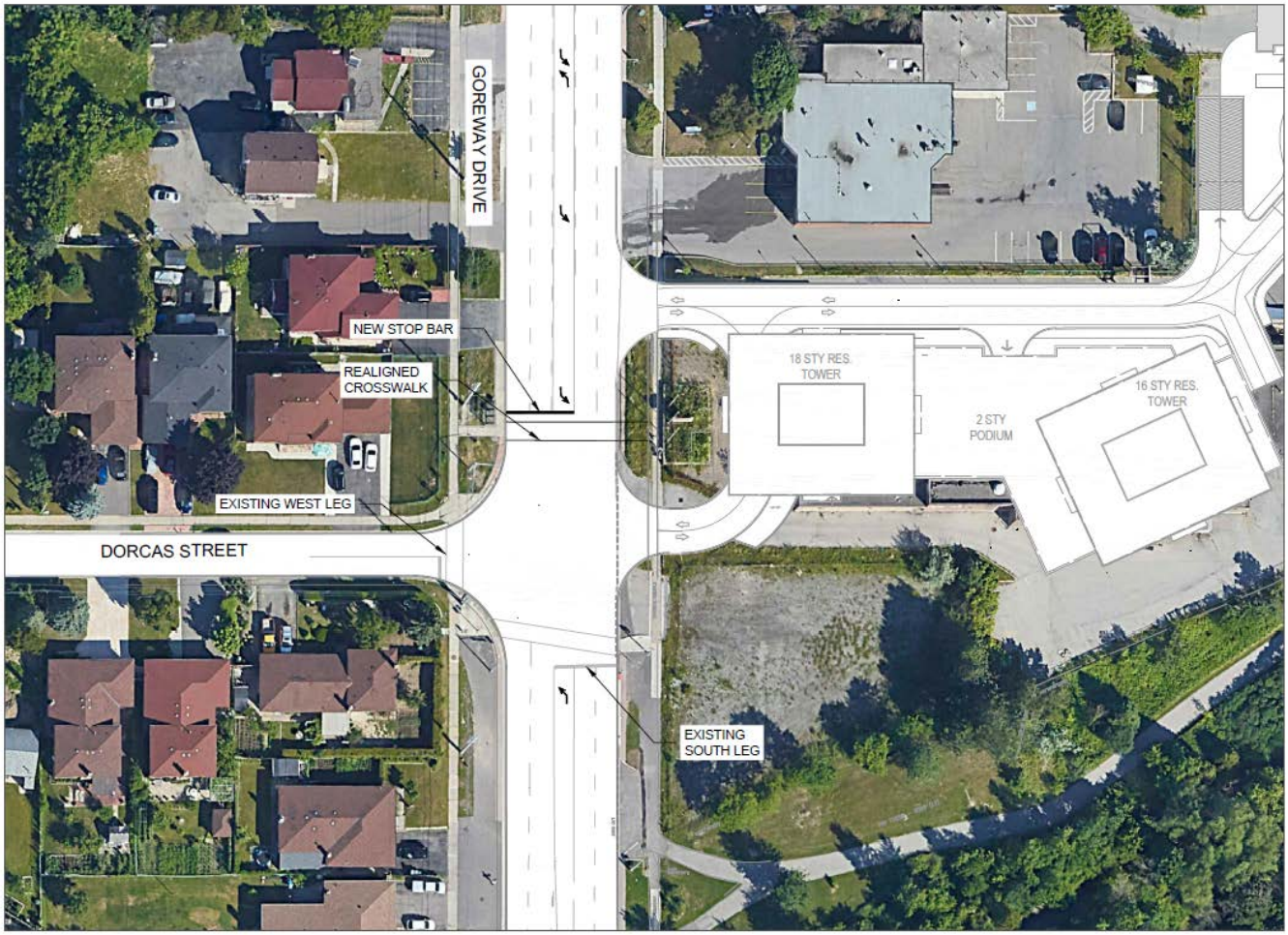
As illustrated in **Exhibit 7-5**, the existing north approach pavement markings are incompatible with the location of the proposed development access.

Exhibit 7-5: Goreway Drive and Dorcas Street Existing Lane Markings



As shown in **Exhibit 7-5**, the existing eastern pedestrian landing for the north approach crosswalk coincides with the location of the relocated access. In order to accommodate the development, and to allow for a more conventional intersection configuration, a conceptual design illustrating development opening day conditions is presented in **Exhibit 7-6**.

Exhibit 7-6: Goreway Drive and Dorcas Street Conceptual Lane Markings



As shown in **Exhibit 7-6**, modifications to pavement markings which accommodate the development site access include a re-aligned northern pedestrian crosswalk, and a relocated southbound stop bar. For pedestrians, this configuration provides for a more familiar configuration, and reduces the crossing distance from approximately 23 metres to approximately 18 metres – though it should be noted that the existing pedestrian clearance time was maintained in the analysis presented in **Section 4**. In addition, the proposed alignment increases connectivity to the southbound transit stop on the west side of Goreway Drive. For motorists, this configuration is expected to result in an approximate 1.0 second increase to the northbound and southbound all-red interval. This is expected to have a minimal impact on perceived traffic operations, and was taken into consideration in the analysis in this report.

8 Vehicle Swept Path Analysis

A vehicle swept path analysis was conducted using AutoTurn to demonstrate that waste collection, delivery, and emergency response vehicles can enter and exit the site in a forward motion, and that access to loading and waste collection areas are functional. The vehicle swept path analysis is presented in **Appendix I**. In order to reduce conflicts between passenger vehicles entering and exiting the underground parking garage, the following measures are recommended:

- A convex mirror be installed at the top and bottom of the ramp to the underground parking garage, and at the top and bottom of the ramps connecting the various levels of the underground parking garage.

9 Conclusions

This section summarizes the key findings of this transportation impact study.

9.1 Traffic Operations Analysis

- Under existing traffic conditions, several signalized movements within the study area intersections were observed to operate above critical capacity and/or queuing thresholds during the weekday AM and PM peak hours, including the eastbound left-turn and westbound right-turn movements at the Goreway Drive and Derry Road East intersection during the weekday PM peak hour, and the westbound left-turn movement at the Goreway Drive and Etude Drive intersection during both the weekday AM and PM peak hours.
- Under 2025 future background conditions, the identified operational constraints under existing conditions are expected to be exacerbated due to background traffic growth. No new critical movements are expected under future background conditions.
- Trip generation estimates and the corresponding future total traffic analysis are based from an earlier development concept, which consisted of 14 fewer condominium dwelling units and four additional townhouse units over the current development concept of 259 condominium dwelling units and 12 townhouse units). Based on 245 condominium dwelling units and 16 townhouse units (259 total dwellings), the proposed development is anticipated to produce up to 89 new vehicle trips during the weekday AM peak hour (21 inbound trips and 68 outbound trips) and up to 104 new vehicle trips during the weekday PM peak hour (63 inbound trips and 41 outbound trips). The current 271-dwelling development concept is expected to produce virtually indistinguishable traffic operations, as the concepts differ by approximately 2 vehicle trips per hour.
- Under 2025 future total conditions, the identified operational constraints under existing and future background conditions are expected to continue. The only new critical movement identified is the southbound left-turn movement at the Goreway Drive and Derry Road East intersection during the weekday AM peak hour. This movement is expected to experience a queue storage spillover of up to one car length. However, the impact of one additional vehicle within the available storage lanes is expected to be minimal on traffic operations.
- The eastbound left-turn capacity constraint at the Goreway Drive and Derry Road East intersection during the weekday PM peak hour may be mitigated by transferring 3.0 seconds of green time from the westbound through movement to the eastbound left-turn movement. This would result in all movements at this intersection expected to operate within capacity.
- Due to the above noted signal timing adjustment, queues associated with the westbound right-turn movement are anticipated to increase from up to six car lengths to up to nine car lengths during the weekday PM peak hour. Notwithstanding, these queue storage spillovers are observed under existing conditions and are expected to continue under future conditions regardless of the proposed development.
- Capacity and queuing constraints at the Goreway Drive and Etude Drive intersection's westbound left-turn movement during the weekday AM and PM peak hours were noted under existing and future traffic conditions. These queuing

constraints may be mitigated by converting the painted median on Etude Drive to a two-way left-turn lane between Goreway Drive and Dalewood Drive. This would provide additional storage capacity for westbound left-turning vehicles. Furthermore, the noted capacity constraints may be mitigated by the implementation of a protected westbound left-turn phase. As no development site trips have been assigned to the westbound left-turn movement at the Goreway Drive and Etude Drive intersection, further analyses to assess the feasibility of these mitigation measures is recommended.

- A sensitivity analysis was undertaken to assess traffic operations under a right-in / right-out access configuration at the North Site Access at Goreway Drive. Results from this sensitivity analysis indicate that there is no significant benefit in traffic operations if left-turn inbound were to be prohibited at the access.

9.2 Parking Study

- Based on a comparison to regulations in other municipalities, and to comparable developments elsewhere in the City of Mississauga, the proposed parking supply of 372 parking spaces is expected to be sufficient to accommodate anticipated demand from 271 residential dwellings. This supply translates to 1.37 parking spaces per dwelling unit, is more parking than is required in areas with comparatively poor transit service, and is more parking than was required at comparable developments in the City of Mississauga.
- A Transportation Demand Management Options memorandum in support of the 7085 Goreway Drive development is presented in **Appendix H**.

9.3 Transportation Demand Management Options

- A Transportation Demand Management Options memorandum in support of the development notes that the secure bicycle parking, excellent pedestrian connectivity, and proximity to transit will encourage sustainable transportation choices and can reduce parking demand from future residents.

9.4 Site Access Conceptual Design

- In order to rationalize the configuration of the Goreway Drive and Dorcas Street / South Site Access intersection, the development site access is proposed to be relocated approximately 7.1 metres to the south. This would result in a single east leg of the intersection with an offset of approximately 2.9 metres to the north of the Dorcas Street centreline. Signalized, offset intersections are not uncommon in redevelopment areas with pre-existing road alignments, and the proposed configuration is consistent with guidance provided in TAC Geometric Design Guide for Canadian Roads (June 2017).
- Modifications to pavement markings which accommodate the reconfigured intersection include a re-aligned northern pedestrian crosswalk, and a relocated southbound stop bar. For pedestrians, this configuration provides for a more familiar intersection configuration, and reduces the crossing distance. For motorists, this configuration is expected to result in an approximate 1.0 second increase to the northbound and southbound all-red interval and a minimal impact on perceived traffic operations.

9.5 Vehicle Swept Path Analysis

- A vehicle swept path analysis was conducted using AutoTurn to demonstrate that vehicles can enter and exit the site in a forward motion, and that access to loading and waste collection areas are functional. In order to reduce conflicts between passenger vehicles entering and exiting the underground parking garage, the following measures are recommended:
  - A convex mirror be installed at the top and bottom of the ramp to the underground parking garage, and at the top and bottom of the ramps connecting the various levels of the underground parking garage.

9.6 Recommendations

The following measures are recommended to mitigate the capacity and queuing constraints identified in the traffic operations analysis:

- At the Goreway Drive and Derry Road East intersection, transfer 3.0 seconds of green time from the westbound through movement to the eastbound left-turn movement during the weekday PM peak hour. This would result in all movements at this intersection anticipated to operate within capacity under future conditions.
- At the intersection of Goreway Drive and Etude Drive, investigate the feasibility of implementing an advanced westbound left-turn phase during the weekday AM and PM peak hours. This would improve traffic operations for the westbound left-turn movement to levels below critical capacity thresholds. Further analysis to assess the feasibility of this measure is recommended.

Appendix A

Scope of Investigation

From:	Andrae Griffith
To:	Greg Borys
Cc:	Fadi Madi
Subject:	RE: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive
Date:	Wednesday, January 29, 2020 11:37:00 AM
Attachments:	image001.png

Hi Greg,

Thank you for your comments. With regards to the Goreway Drive & Dorcas Street intersection, we understand that the City has noted that, due to the offset, a feasibility design for intersection improvements to improve vehicle and pedestrian safety should be provided with the transportation study. With respect to mentioned safety analysis, we propose to conduct a qualitative assessment based on on-site observations, and a review of the proposed development concept (which is likely to evolve as it approaches submission).

Thank you again for reviewing our terms of reference and providing comments.

Sincerely,

Andrae Griffith

IBI GROUP
7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61450 fax +1 416 596 0644

From: Fadi Madi <fadi.madi@ibigroup.com>
Sent: Friday, January 24, 2020 12:21 PM
To: Greg Borys <Gregory.Borys@mississauga.ca>; Andrae Griffith <andrae.griffith@ibigroup.com>
Subject: RE: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive

Thanks Greg! We truly appreciate your time and consideration.

Can you please provide some information on your expectations for the safety and operations analysis? Would this be a qualitative assessment identifying the potential issues?

Fadi

From: Greg Borys [mailto:Gregory.Borys@mississauga.ca]
Sent: Friday, January 24, 2020 10:27 AM
To: Fadi Madi <fadi.madi@ibigroup.com>; Andrae Griffith <andrae.griffith@ibigroup.com>
Subject: RE: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive

Good morning Fadi,

Thank you for your patience, traffic planning has reviewed the proposed Terms of Reference for

7085 Goreway Drive and have the following comments:

- Based on the concept plan shown in DARC, the proposed site access at Goreway Drive and Dorcas Street will be offset with the pedestrian crosswalk leading into the access. Traffic Impact Study required to analyze the safety and operations of that intersection and prepare a feasibility design for improvements to the intersection to improve vehicle and pedestrian safety due to the new access.

Regards,

Gregory Borys, C.E.T.
Transportation Planning Technologist, Transportation & Works
T 905-615-3200 ext.3597
gregory.borys@mississauga.ca

City of Mississauga | Transportation & Works Department
Transportation and Infrastructure Planning Division

From: Fadi Madi <fadi.madi@ibigroup.com>
Sent: Thursday, January 23, 2020 4:16 PM
To: Andrae Griffith <andrae.griffith@ibigroup.com>; Greg Borys <Gregory.Borys@mississauga.ca>
Subject: RE: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive

Hi Greg,

Just a friendly follow-up regarding our proposed scope of work, below.

We are hoping to get started as soon as possible and would really appreciate your comment at your earliest convenience.

Warm Regards,
Fadi

Fadi Madi P. ENG.

IBI GROUP
7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61867 fax +1 416 596 0644

From: Andrae Griffith
Sent: Friday, January 17, 2020 5:33 PM
To: Greg Borys <Gregory.Borys@mississauga.ca>
Cc: Fadi Madi <fadi.madi@ibigroup.com>
Subject: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive

Dear Mr. Borys,

IBI Group is working with a client who wishes to construct a residential development at 7085 Goreway Drive. The development would be located on the east side of Goreway Drive, opposite Dorcas Street, and would consist of two residential towers (18 and 16-storeys; 261 units) and 16 at-grade townhouses. Existing uses on the site are proposed to be removed.

As per discussions with the City of Mississauga during the DARC process, a transportation impact study has been requested to accompany this planning application. Below is our proposed scope of investigation for your review and acceptance, and we are happy to discuss this matter further if required.

Work Plan – Transportation Impact Study

The tasks that will be completed for the transportation impact study are as follows:

1. **Analysis Time Periods and Intersections:** Based on the proposed development's residential land uses and size, we plan to analyze the development peak hours, which will occur during the weekday AM peak period (between 7:00 a.m. and 9:00 a.m.) and the weekday PM peak period (between 4:00 p.m. and 6:00 p.m.).

   The following intersections will be included in this analysis:

   a. Goreway Drive & Etude Drive (signalized);
   b. Goreway Drive & Proposed North Site Access (unsignalized);
   c. Goreway Drive & Dorcas Street / Proposed South Site Access (unsignalized); and
   d. Goreway Drive & Derry Road (Regional Road 5) (signalized).

2. **2020 Existing Conditions:** The 2020 existing traffic operations will be analyzed using the software program Synchro (version 9) for the weekday AM and weekday PM peak periods, for the intersections listed above. Traffic counts at the study area intersections will be obtained from the City of Mississauga and / Region of Peel, if available. If the City is unable to provide updated turning movement counts for these intersections, new turning movement counts will be collected.
3. **2025 Background Traffic Conditions:** The 2025 background traffic volumes will be determined for the study area intersections, which coincides with 5 years after the 2020 date of the transportation impact study. We will identify an applicable background traffic growth rate and other area developments which may introduce traffic into the

study area, based on a discussion with City of Mississauga staff. Any future road network or intersection changes proposed by the City, or outlined in the capital works program, will be taken into consideration.

The 2025 background traffic analysis will identify and determine the impacts of the adjacent developments without the proposed site traffic under existing and future roadway conditions.

4. **Site Traffic Generation and Trip Distribution:** The trip generation for the proposed development will be based the information presented in the Institute of Transportation Engineers ("ITE") publication, *Trip Generation, 10th Edition*. A review of the modal split will also be undertaken to account for the trips being made by non-auto modes of travel. The City's Transportation Master Plan will be used as tools for this review.

   The trip distribution for the proposed site will be based on a review of existing travel patterns, the 2016 Transportation Tomorrow Survey (TTS), and the available road network. 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 logical travel routes and available traffic capacity.

5. **2025 Total Traffic Conditions:** The estimated site traffic volumes will be combined with the 2025 background traffic volumes to determine the 2025 total traffic volumes for the study area intersections.

   Intersection operations analysis will be undertaken for the weekday peak periods. Any necessary road improvements required to accommodate total traffic volumes will be identified if necessary, such as additional turning lanes, storage length modifications, or traffic control measures.

6. **Vehicle Swept Path Analysis:** Using AutoTurn, we will confirm that SU-9 garbage truck traffic can enter/exit the site, and that access to the loading areas are functional. We will illustrate truck turning movements with one continuous path with AutoTurn on separate plans, and insert the design vehicles on the plan.

If you have any questions regarding the proposed scope of work for the 7085 Goreway Drive development, please do not hesitate to contact me. Please note that, as the city has requested a parking justification as well, we propose to submit a combined transportation, parking, and TDM report.

Sincerely,

Andrae Griffith

IBI GROUP
7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61450 fax +1 416 596 0644

Appendix B

Turning Movement Counts

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

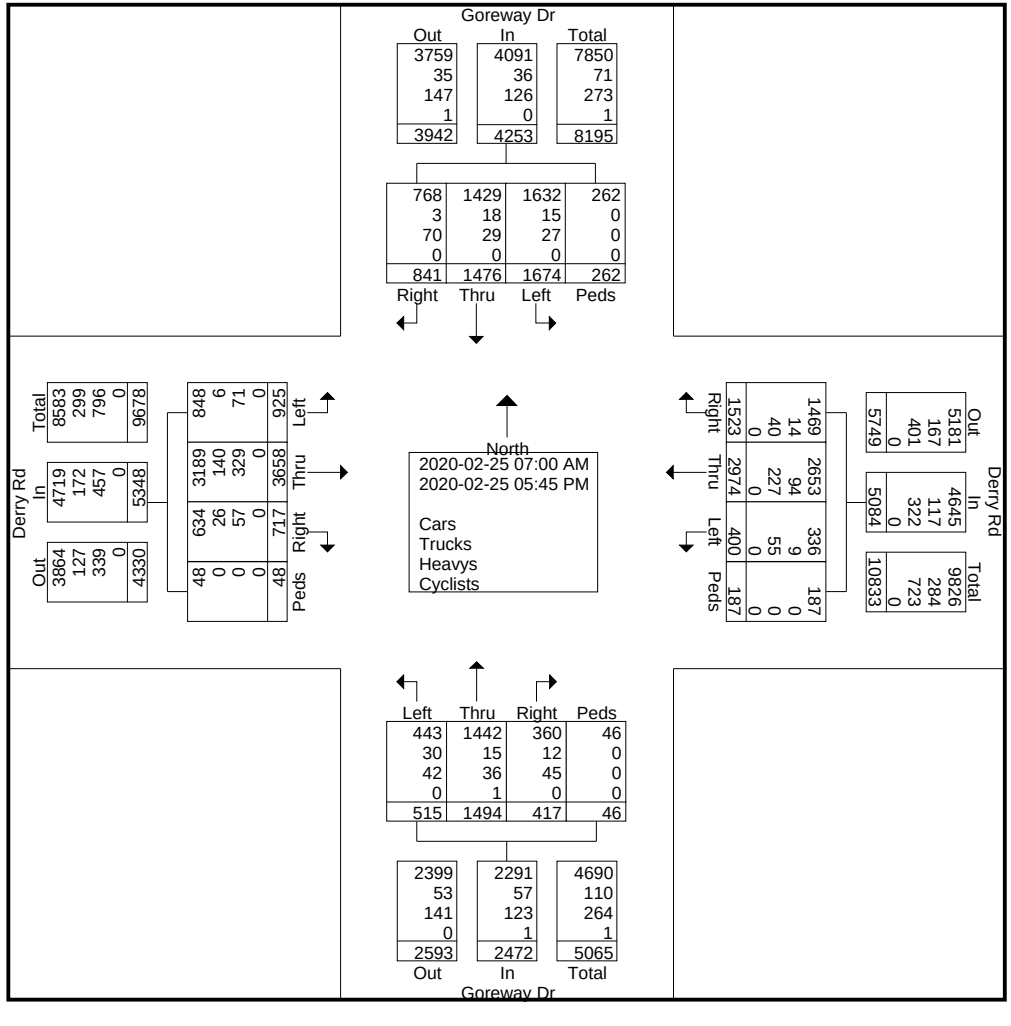
	Goreway Dr Southbound					Derry Rd Westbound					Goreway Dr Northbound					Derry Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	55	98	82	16	251	37	212	26	8	283	15	29	17	1	62	56	169	45	1	271	867
07:15 AM	45	112	131	9	297	44	198	34	8	284	17	42	29	0	88	58	165	38	1	262	931
07:30 AM	80	135	170	27	412	39	240	21	7	307	17	23	11	3	54	63	199	24	3	289	1062
07:45 AM	97	148	105	10	360	55	225	33	9	322	12	40	15	0	67	78	183	44	0	305	1054
Total	277	493	488	62	1320	175	875	114	32	1196	61	134	72	4	271	255	716	151	5	1127	3914
08:00 AM	71	121	126	15	333	69	167	37	6	279	21	47	28	2	98	56	182	30	0	268	978
08:15 AM	33	118	110	20	281	75	186	29	5	295	23	29	15	0	67	69	186	37	1	293	936
08:30 AM	54	126	126	17	323	56	156	32	7	251	21	40	25	2	88	72	177	36	4	289	951
08:45 AM	41	179	145	21	386	47	156	52	12	267	32	56	16	2	106	72	166	29	3	270	1029
Total	199	544	507	73	1323	247	665	150	30	1092	97	172	84	6	359	269	711	132	8	1120	3894
04:00 PM	49	71	88	12	220	124	176	21	20	341	44	160	67	3	274	22	277	66	5	370	1205
04:15 PM	42	33	81	20	176	154	194	20	13	381	31	109	36	7	183	25	319	94	6	444	1184
04:30 PM	43	51	86	13	193	129	175	24	14	342	35	183	57	6	281	30	259	85	4	378	1194
04:45 PM	43	53	75	11	182	160	180	18	12	370	34	151	47	8	240	27	309	69	8	413	1205
Total	177	208	330	56	771	567	725	83	59	1434	144	603	207	24	978	104	1164	314	23	1605	4788
05:00 PM	48	66	84	18	216	123	197	14	22	356	33	167	47	7	254	19	278	95	5	397	1223
05:15 PM	50	76	87	20	233	166	149	13	19	347	34	168	42	2	246	25	234	57	1	317	1143
05:30 PM	29	52	94	24	199	132	178	16	9	335	26	139	43	2	210	23	302	85	2	412	1156
05:45 PM	61	37	84	9	191	113	185	10	16	324	22	111	20	1	154	22	253	91	4	370	1039
Total	188	231	349	71	839	534	709	53	66	1362	115	585	152	12	864	89	1067	328	12	1496	4561
Grand Total	841	1476	1674	262	4253	1523	2974	400	187	5084	417	1494	515	46	2472	717	3658	925	48	5348	17157
Apprch %	19.8	34.7	39.4	6.2		30	58.5	7.9	3.7		16.9	60.4	20.8	1.9		13.4	68.4	17.3	0.9		
Total %	4.9	8.6	9.8	1.5	24.8	8.9	17.3	2.3	1.1	29.6	2.4	8.7	3	0.3	14.4	4.2	21.3	5.4	0.3	31.2	
Cars	768	1429	1632	262	4091	1469	2653	336	187	4645	360	1442	443	46	2291	634	3189	848	48	4719	15746
% Cars	91.3	96.8	97.5	100	96.2	96.5	89.2	84	100	91.4	86.3	96.5	86	100	92.7	88.4	87.2	91.7	100	88.2	91.8
Trucks	3	18	15	0	36	14	94	9	0	117	12	15	30	0	57	26	140	6	0	172	382
% Trucks	0.4	1.2	0.9	0	0.8	0.9	3.2	2.2	0	2.3	2.9	1	5.8	0	2.3	3.6	3.8	0.6	0	3.2	2.2
Heavys	70	29	27	0	126	40	227	55	0	322	45	36	42	0	123	57	329	71	0	457	1028
% Heavys	8.3	2	1.6	0	3	2.6	7.6	13.8	0	6.3	10.8	2.4	8.2	0	5	7.9	9	7.7	0	8.5	6
Cyclists	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25
Page No : 2



Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25

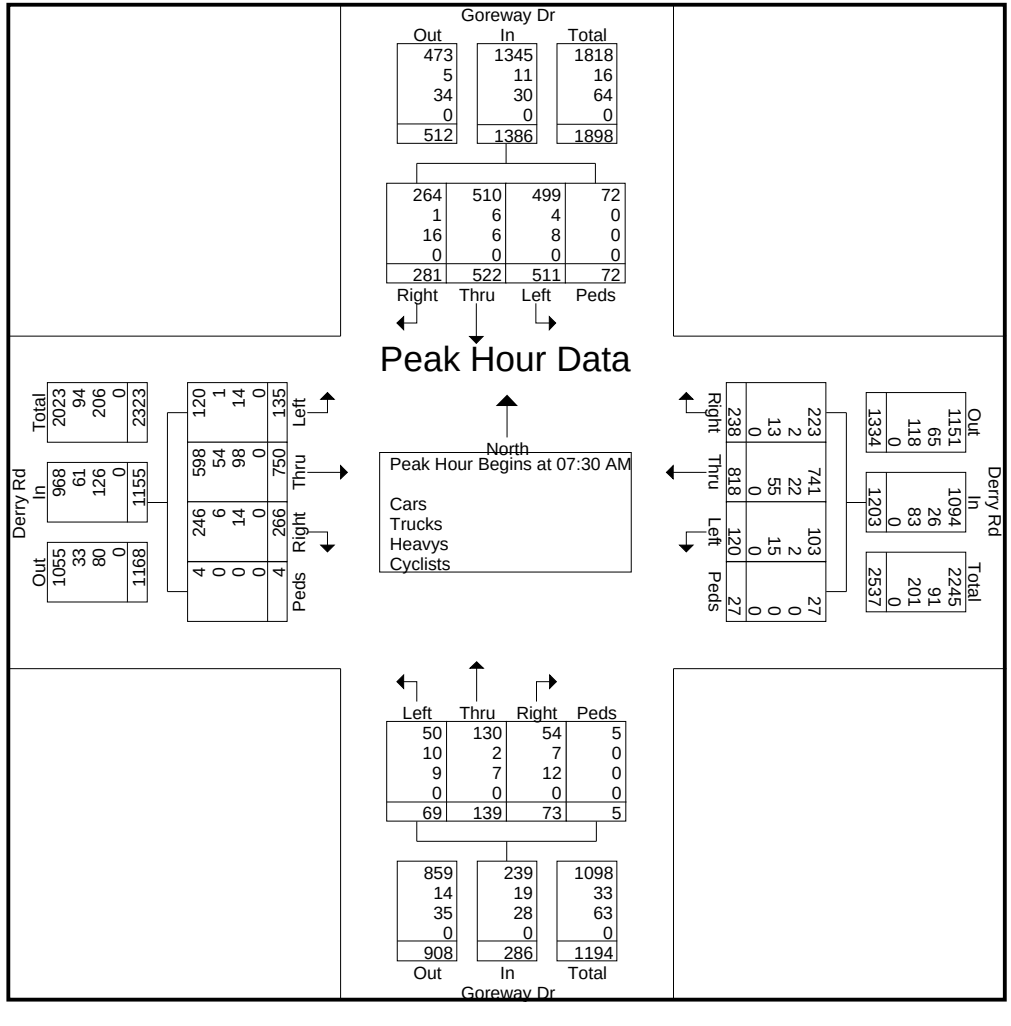
	Goreway Dr Southbound					Derry Rd Westbound					Goreway Dr Northbound					Derry Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	80	135	**170**	**27**	**412**	39	**240**	21	7	307	17	23	11	**3**	54	63	**199**	24	**3**	289	**1062**
07:45 AM	**97**	**148**	105	10	360	55	225	33	**9**	**322**	12	40	15	0	67	**78**	183	**44**	0	**305**	1054
08:00 AM	71	121	126	15	333	69	167	**37**	6	279	21	**47**	**28**	2	**98**	56	182	30	0	268	978
08:15 AM	33	118	110	20	281	**75**	186	29	5	295	**23**	29	15	0	67	69	186	37	1	293	936
Total Volume	281	522	511	72	1386	238	818	120	27	1203	73	139	69	5	286	266	750	135	4	1155	4030
% App. Total	20.3	37.7	36.9	5.2		19.8	68	10	2.2		25.5	48.6	24.1	1.7		23	64.9	11.7	0.3		
PHF	.724	.882	.751	.667	.841	.793	.852	.811	.750	.934	.793	.739	.616	.417	.730	.853	.942	.767	.333	.947	.949
Cars	264	510	499	72	1345	223	741	103	27	1094	54	130	50	5	239	246	598	120	4	968	3646
% Cars	94.0	97.7	97.7	100	97.0	93.7	90.6	85.8	100	90.9	74.0	93.5	72.5	100	83.6	92.5	79.7	88.9	100	83.8	90.5
Trucks	1	6	4	0	11	2	22	2	0	26	7	2	10	0	19	6	54	1	0	61	117
% Trucks	0.4	1.1	0.8	0	0.8	0.8	2.7	1.7	0	2.2	9.6	1.4	14.5	0	6.6	2.3	7.2	0.7	0	5.3	2.9
Heavys	16	6	8	0	30	13	55	15	0	83	12	7	9	0	28	14	98	14	0	126	267
% Heavys	5.7	1.1	1.6	0	2.2	5.5	6.7	12.5	0	6.9	16.4	5.0	13.0	0	9.8	5.3	13.1	10.4	0	10.9	6.6
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25
Page No : 4

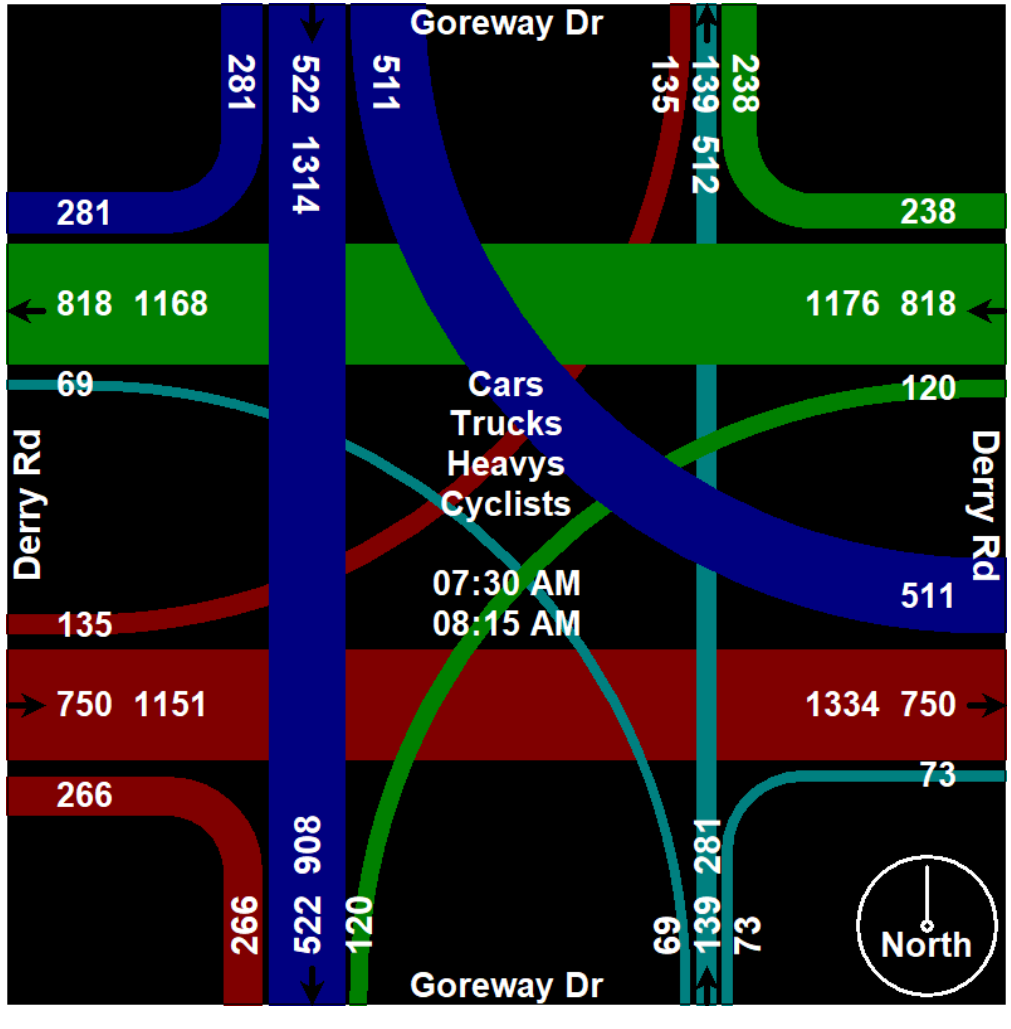


Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25
Page No : 5



Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25

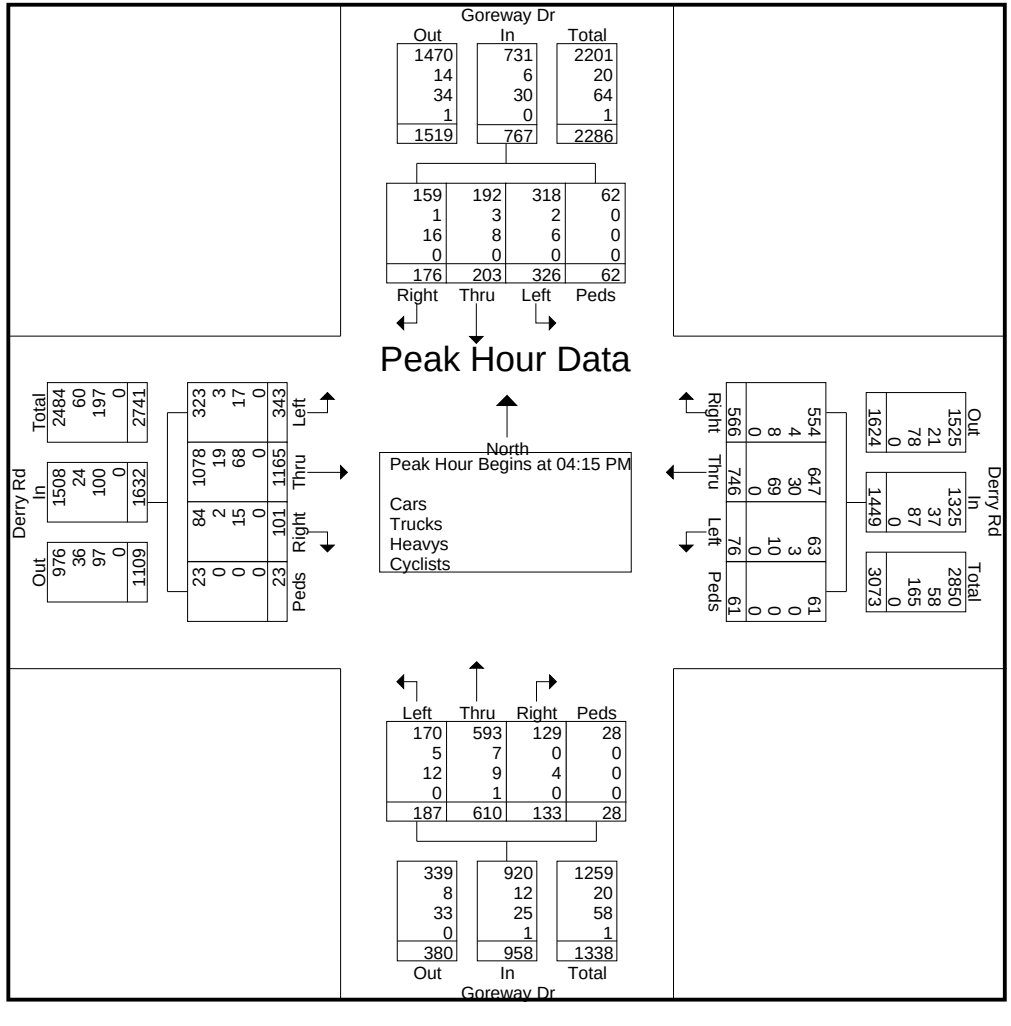
	Goreway Dr Southbound					Derry Rd Westbound					Goreway Dr Northbound					Derry Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	42	33	81	**20**	176	154	194	20	13	**381**	31	109	36	7	183	25	**319**	94	6	**444**	1184
04:30 PM	43	51	**86**	13	193	129	175	**24**	14	342	**35**	**183**	**57**	6	**281**	**30**	259	85	4	378	1194
04:45 PM	43	53	75	11	182	**160**	180	18	12	370	34	151	47	**8**	240	27	309	69	**8**	413	1205
05:00 PM	**48**	**66**	84	18	**216**	123	**197**	14	**22**	356	33	167	47	7	254	19	278	**95**	5	397	**1223**
Total Volume	176	203	326	62	767	566	746	76	61	1449	133	610	187	28	958	101	1165	343	23	1632	4806
% App. Total	22.9	26.5	42.5	8.1		39.1	51.5	5.2	4.2		13.9	63.7	19.5	2.9		6.2	71.4	21	1.4		
PHF	.917	.769	.948	.775	.888	.884	.947	.792	.693	.951	.950	.833	.820	.875	.852	.842	.913	.903	.719	.919	.982
Cars	159	192	318	62	731	554	647	63	61	1325	129	593	170	28	920	84	1078	323	23	1508	4484
% Cars	90.3	94.6	97.5	100	95.3	97.9	86.7	82.9	100	91.4	97.0	97.2	90.9	100	96.0	83.2	92.5	94.2	100	92.4	93.3
Trucks	1	3	2	0	6	4	30	3	0	37	0	7	5	0	12	2	19	3	0	24	79
% Trucks	0.6	1.5	0.6	0	0.8	0.7	4.0	3.9	0	2.6	0	1.1	2.7	0	1.3	2.0	1.6	0.9	0	1.5	1.6
Heavys	16	8	6	0	30	8	69	10	0	87	4	9	12	0	25	15	68	17	0	100	242
% Heavys	9.1	3.9	1.8	0	3.9	1.4	9.2	13.2	0	6.0	3.0	1.5	6.4	0	2.6	14.9	5.8	5.0	0	6.1	5.0
Cyclists	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.1	0	0	0	0	0	0.0

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25
Page No : 7

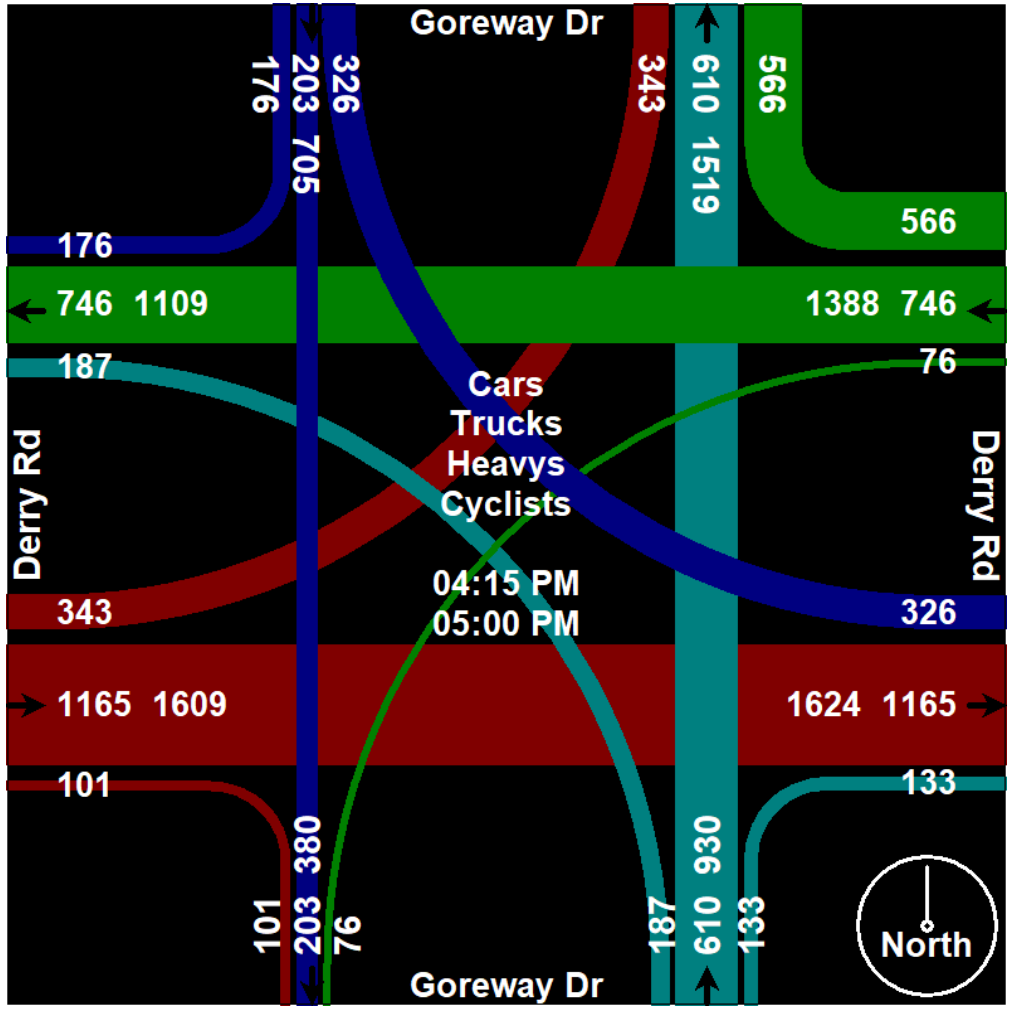


Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25
Page No : 8



Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

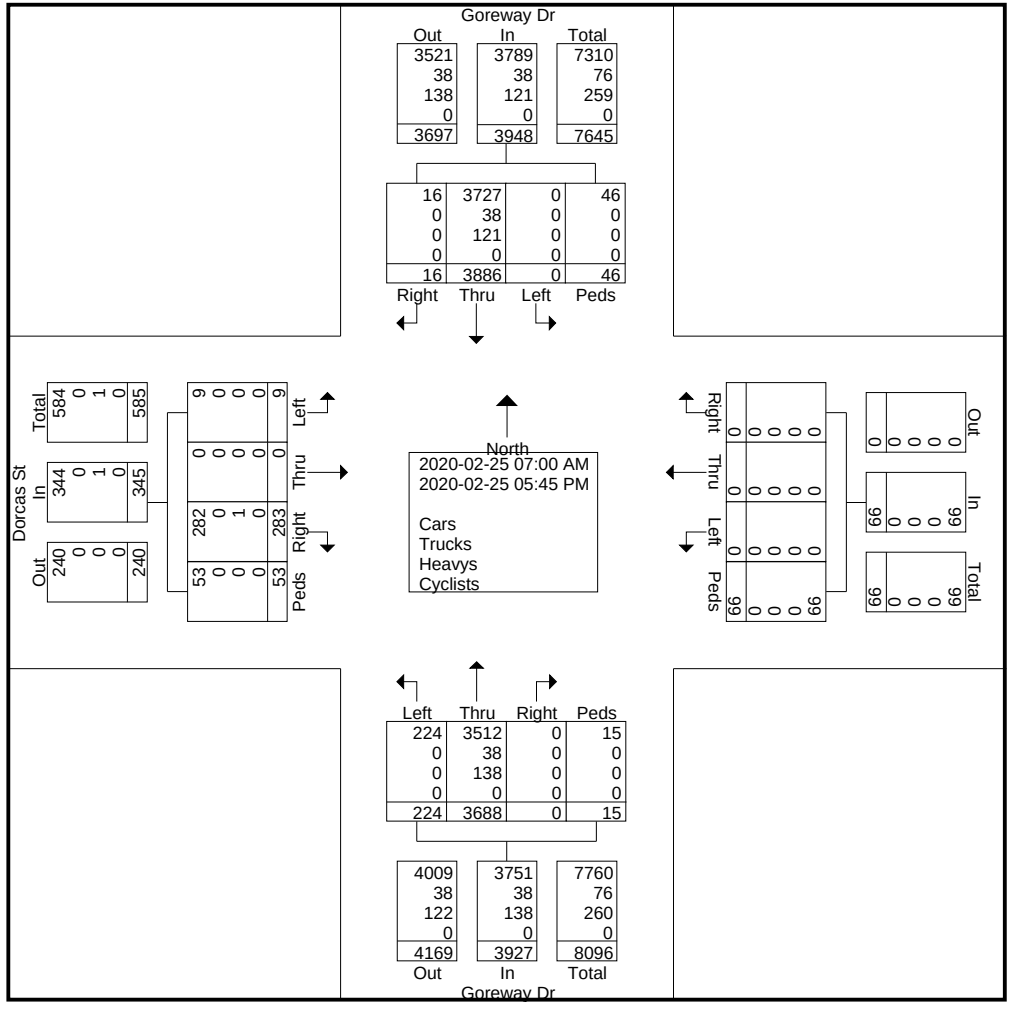
	Goreway Dr Southbound					Westbound					Goreway Dr Northbound					Dorcas St Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	266	0	2	269	0	0	0	2	2	0	108	2	1	111	20	0	0	3	23	405
07:15 AM	1	273	0	0	274	0	0	0	3	3	0	114	2	0	116	14	0	1	3	18	411
07:30 AM	0	380	0	2	382	0	0	0	1	1	0	86	5	1	92	37	0	1	5	43	518
07:45 AM	0	376	0	2	378	0	0	0	4	4	0	137	2	2	141	25	0	0	1	26	549
Total	2	1295	0	6	1303	0	0	0	10	10	0	445	11	4	460	96	0	2	12	110	1883
08:00 AM	0	292	0	3	295	0	0	0	4	4	0	139	6	1	146	32	0	0	0	32	477
08:15 AM	1	251	0	2	254	0	0	0	5	5	0	136	5	0	141	15	0	0	0	15	415
08:30 AM	1	349	0	1	351	0	0	0	1	1	0	122	7	1	130	18	0	0	1	19	501
08:45 AM	1	297	0	1	299	0	0	0	6	6	0	116	4	0	120	30	0	0	5	35	460
Total	3	1189	0	7	1199	0	0	0	16	16	0	513	22	2	537	95	0	0	6	101	1853
04:00 PM	4	194	0	5	203	0	0	0	14	14	0	326	14	0	340	16	0	0	5	21	578
04:15 PM	0	152	0	3	155	0	0	0	14	14	0	335	19	1	355	7	0	0	4	11	535
04:30 PM	2	168	0	4	174	0	0	0	12	12	0	371	30	1	402	10	0	1	3	14	602
04:45 PM	0	158	0	6	164	0	0	0	4	4	0	348	27	3	378	6	0	2	4	12	558
Total	6	672	0	18	696	0	0	0	44	44	0	1380	90	5	1475	39	0	3	16	58	2273
05:00 PM	2	200	0	2	204	0	0	0	3	3	0	367	28	2	397	6	0	1	7	14	618
05:15 PM	0	187	0	9	196	0	0	0	7	7	0	355	33	1	389	17	0	1	5	23	615
05:30 PM	2	170	0	0	172	0	0	0	10	10	0	334	19	0	353	14	0	1	3	18	553
05:45 PM	1	173	0	4	178	0	0	0	9	9	0	294	21	1	316	16	0	1	4	21	524
Total	5	730	0	15	750	0	0	0	29	29	0	1350	101	4	1455	53	0	4	19	76	2310
Grand Total	16	3886	0	46	3948	0	0	0	99	99	0	3688	224	15	3927	283	0	9	53	345	8319
Apprch %	0.4	98.4	0	1.2		0	0	0	100		0	93.9	5.7	0.4		82	0	2.6	15.4		
Total %	0.2	46.7	0	0.6	47.5	0	0	0	1.2	1.2	0	44.3	2.7	0.2	47.2	3.4	0	0.1	0.6	4.1	
Cars	16	3727	0	46	3789	0	0	0	99	99	0	3512	224	15	3751	282	0	9	53	344	7983
% Cars	100	95.9	0	100	96	0	0	0	100	100	0	95.2	100	100	95.5	99.6	0	100	100	99.7	96
Trucks	0	38	0	0	38	0	0	0	0	0	0	38	0	0	38	0	0	0	0	0	76
% Trucks	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0.9
Heavys	0	121	0	0	121	0	0	0	0	0	0	138	0	0	138	1	0	0	0	1	260
% Heavys	0	3.1	0	0	3.1	0	0	0	0	0	0	3.7	0	0	3.5	0.4	0	0	0	0.3	3.1
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 2



Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25

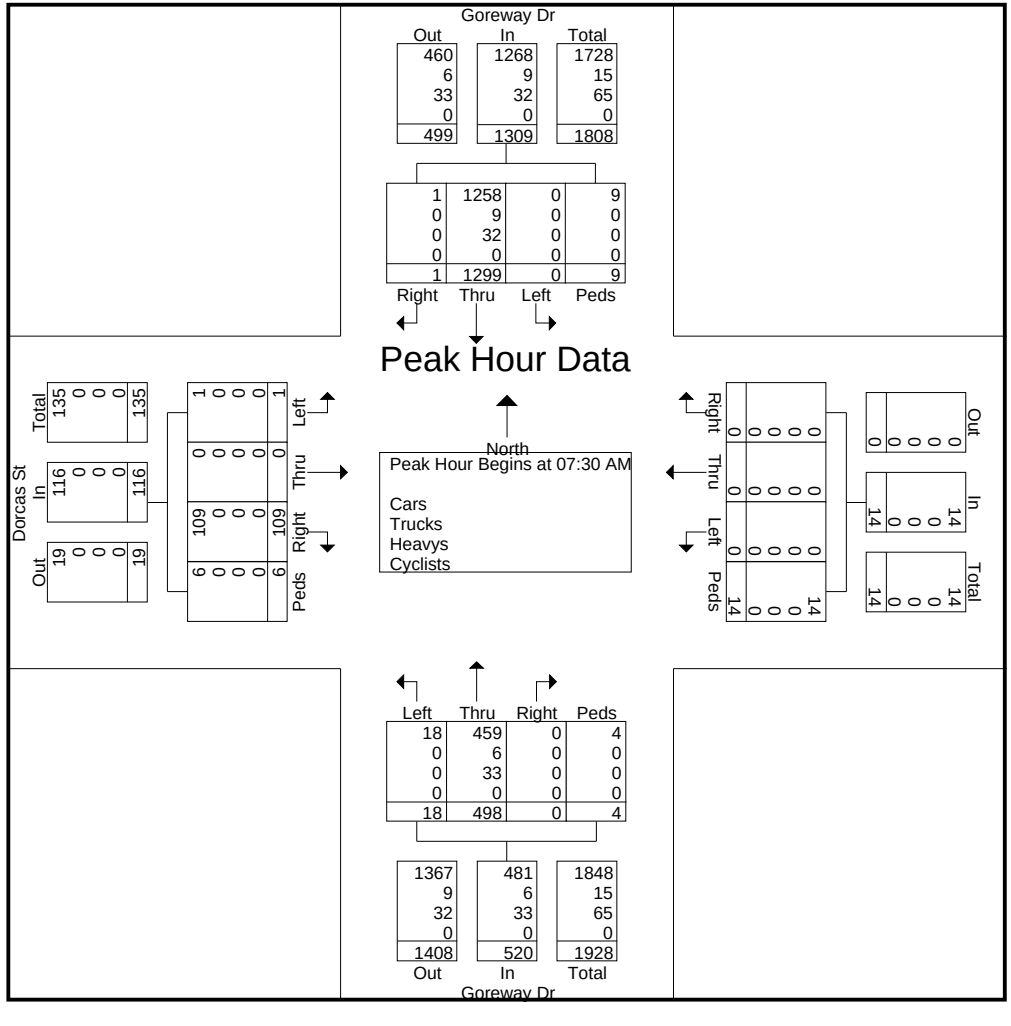
	Goreway Dr Southbound					Westbound					Goreway Dr Northbound					Dorcas St Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	**380**	0	2	**382**	0	0	0	1	1	0	86	5	1	92	**37**	0	**1**	**5**	**43**	518
07:45 AM	0	376	0	2	378	0	0	0	4	4	0	137	2	**2**	141	25	0	0	1	26	**549**
08:00 AM	0	292	0	**3**	295	0	0	0	4	4	0	**139**	**6**	1	**146**	32	0	0	0	32	477
08:15 AM	**1**	251	0	2	254	0	0	0	**5**	**5**	0	136	5	0	141	15	0	0	0	15	415
Total Volume	1	1299	0	9	1309	0	0	0	14	14	0	498	18	4	520	109	0	1	6	116	1959
% App. Total	0.1	99.2	0	0.7		0	0	0	100		0	95.8	3.5	0.8		94	0	0.9	5.2		
PHF	.250	.855	.000	.750	.857	.000	.000	.000	.700	.700	.000	.896	.750	.500	.890	.736	.000	.250	.300	.674	.892
Cars	1	1258	0	9	1268	0	0	0	14	14	0	459	18	4	481	109	0	1	6	116	1879
% Cars	100	96.8	0	100	96.9	0	0	0	100	100	0	92.2	100	100	92.5	100	0	100	100	100	95.9
Trucks	0	9	0	0	9	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	15
% Trucks	0	0.7	0	0	0.7	0	0	0	0	0	0	1.2	0	0	1.2	0	0	0	0	0	0.8
Heavys	0	32	0	0	32	0	0	0	0	0	0	33	0	0	33	0	0	0	0	0	65
% Heavys	0	2.5	0	0	2.4	0	0	0	0	0	0	6.6	0	0	6.3	0	0	0	0	0	3.3
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 4

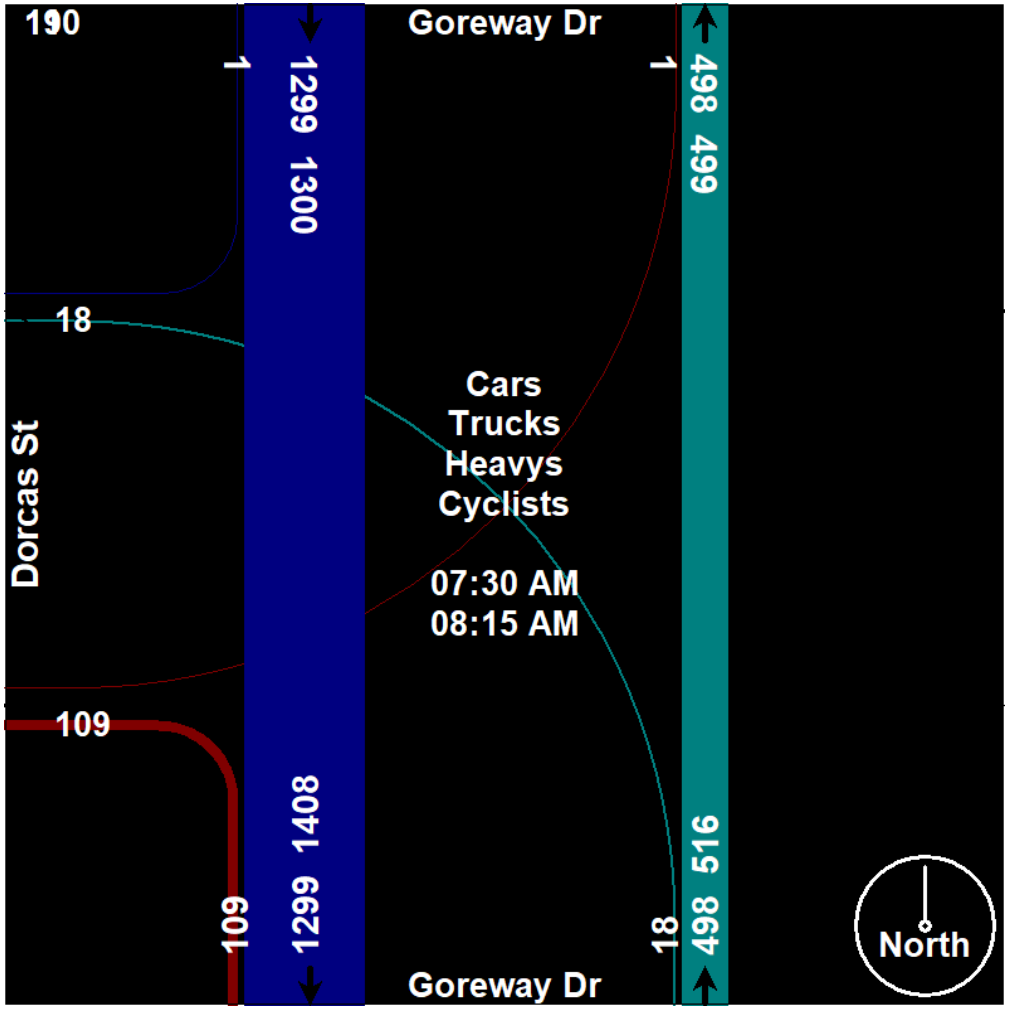


Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 5



Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25

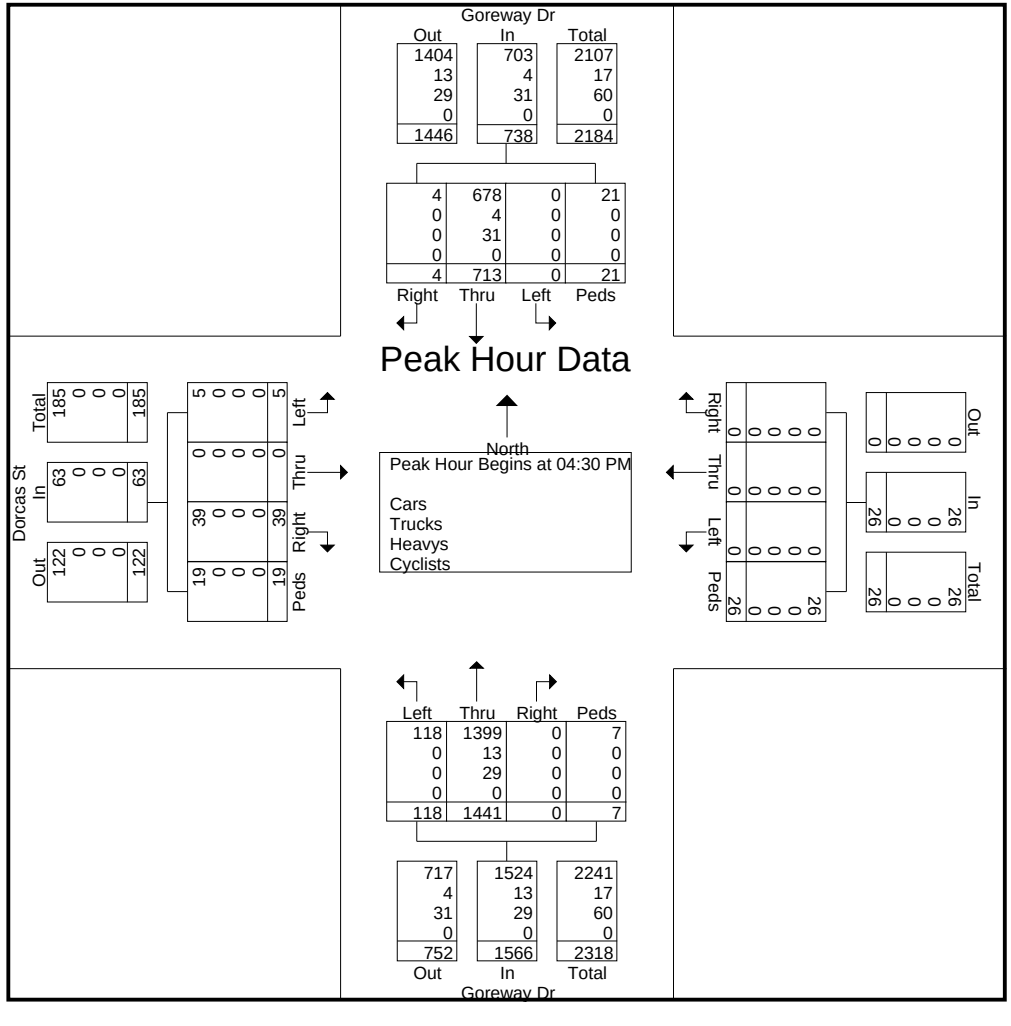
	Goreway Dr Southbound					Westbound					Goreway Dr Northbound					Dorcas St Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**2**	168	0	4	174	0	0	0	**12**	**12**	0	**371**	30	1	**402**	10	0	1	3	14	602
04:45 PM	0	158	0	6	164	0	0	0	4	4	0	348	27	**3**	378	6	0	**2**	4	12	558
05:00 PM	2	**200**	0	2	**204**	0	0	0	3	3	0	367	28	2	397	6	0	1	**7**	14	**618**
05:15 PM	0	187	0	**9**	196	0	0	0	7	7	0	355	**33**	1	389	**17**	0	1	5	**23**	615
Total Volume	4	713	0	21	738	0	0	0	26	26	0	1441	118	7	1566	39	0	5	19	63	2393
% App. Total	0.5	96.6	0	2.8		0	0	0	100		0	92	7.5	0.4		61.9	0	7.9	30.2		
PHF	.500	.891	.000	.583	.904	.000	.000	.000	.542	.542	.000	.971	.894	.583	.974	.574	.000	.625	.679	.685	.968
Cars	4	678	0	21	703	0	0	0	26	26	0	1399	118	7	1524	39	0	5	19	63	2316
% Cars	100	95.1	0	100	95.3	0	0	0	100	100	0	97.1	100	100	97.3	100	0	100	100	100	96.8
Trucks	0	4	0	0	4	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	17
% Trucks	0	0.6	0	0	0.5	0	0	0	0	0	0	0.9	0	0	0.8	0	0	0	0	0	0.7
Heavys	0	31	0	0	31	0	0	0	0	0	0	29	0	0	29	0	0	0	0	0	60
% Heavys	0	4.3	0	0	4.2	0	0	0	0	0	0	2.0	0	0	1.9	0	0	0	0	0	2.5
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 7

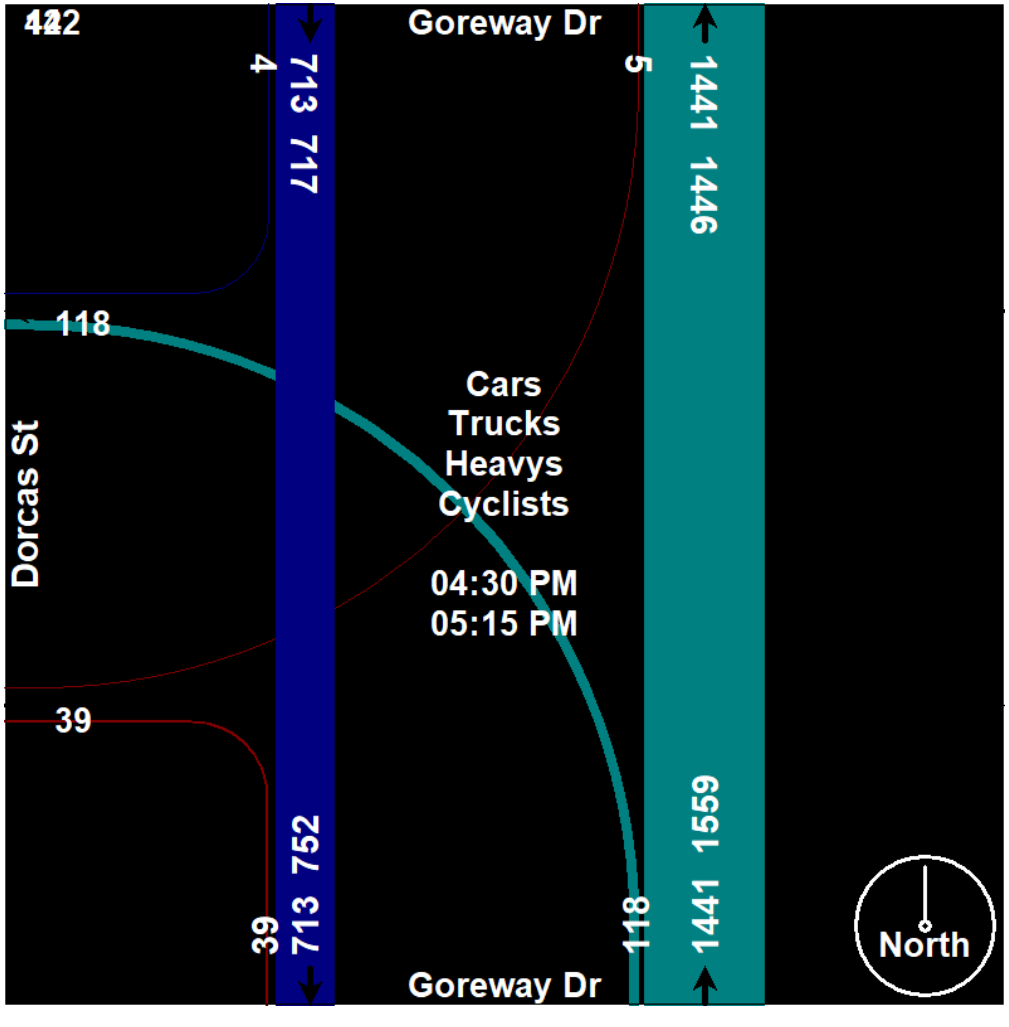


Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 8



Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

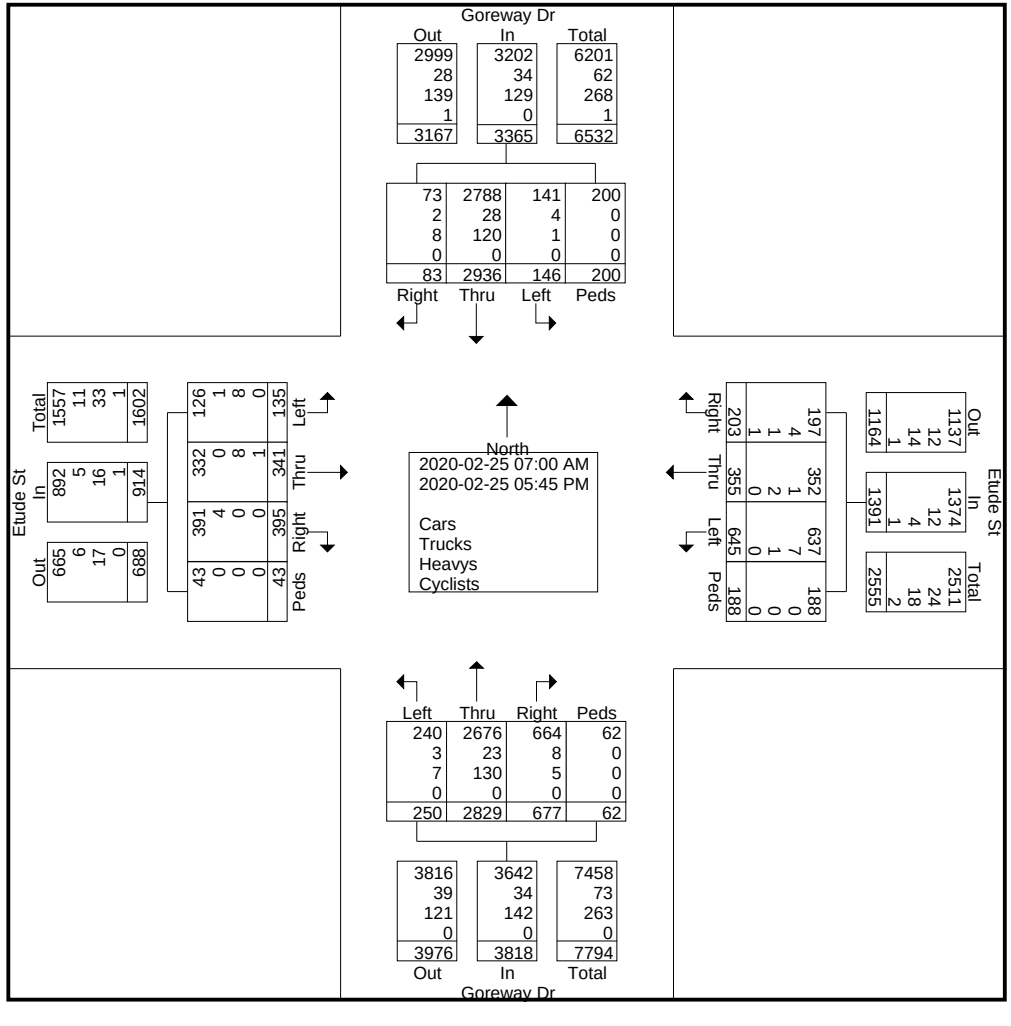
	Goreway Dr Southbound					Etude St Westbound					Goreway Dr Northbound					Etude St Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	217	5	9	232	4	5	30	1	40	22	77	4	2	105	22	9	6	1	38	415
07:15 AM	6	214	7	4	231	4	9	27	2	42	20	96	7	1	124	31	11	8	1	51	448
07:30 AM	2	310	4	11	327	17	7	40	3	67	12	65	9	2	88	33	15	3	1	52	534
07:45 AM	2	293	11	10	316	11	9	47	6	73	26	97	9	4	136	36	10	7	5	58	583
Total	11	1034	27	34	1106	36	30	144	12	222	80	335	29	9	453	122	45	24	8	199	1980
08:00 AM	1	228	9	7	245	19	10	32	9	70	17	103	15	0	135	29	23	7	3	62	512
08:15 AM	8	197	9	7	221	11	15	28	6	60	26	94	15	0	135	27	11	13	1	52	468
08:30 AM	2	275	15	11	303	12	23	44	2	81	25	84	13	1	123	36	21	7	0	64	571
08:45 AM	6	228	4	12	250	9	22	42	8	81	20	91	12	4	127	43	23	11	1	78	536
Total	17	928	37	37	1019	51	70	146	25	292	88	372	55	5	520	135	78	38	5	256	2087
04:00 PM	7	145	9	12	173	16	31	51	18	116	73	240	15	4	332	12	35	4	2	53	674
04:15 PM	4	100	10	19	133	17	29	41	20	107	60	267	22	6	355	17	35	9	2	63	658
04:30 PM	9	115	8	18	150	16	26	48	22	112	56	295	16	8	375	14	19	8	9	50	687
04:45 PM	7	98	6	20	131	8	41	46	25	120	58	280	19	6	363	23	36	10	2	71	685
Total	27	458	33	69	587	57	127	186	85	455	247	1082	72	24	1425	66	125	31	15	237	2704
05:00 PM	5	161	10	15	191	12	27	33	14	86	73	282	23	4	382	14	21	5	6	46	705
05:15 PM	2	119	11	18	150	16	36	41	18	111	78	257	24	7	366	26	18	15	2	61	688
05:30 PM	13	127	10	13	163	10	34	40	18	102	56	268	20	7	351	12	27	7	3	49	665
05:45 PM	8	109	18	14	149	21	31	55	16	123	55	233	27	6	321	20	27	15	4	66	659
Total	28	516	49	60	653	59	128	169	66	422	262	1040	94	24	1420	72	93	42	15	222	2717
Grand Total	83	2936	146	200	3365	203	355	645	188	1391	677	2829	250	62	3818	395	341	135	43	914	9488
Apprch %	2.5	87.3	4.3	5.9		14.6	25.5	46.4	13.5		17.7	74.1	6.5	1.6		43.2	37.3	14.8	4.7		
Total %	0.9	30.9	1.5	2.1	35.5	2.1	3.7	6.8	2	14.7	7.1	29.8	2.6	0.7	40.2	4.2	3.6	1.4	0.5	9.6	
Cars	73	2788	141	200	3202	197	352	637	188	1374	664	2676	240	62	3642	391	332	126	43	892	9110
% Cars	88	95	96.6	100	95.2	97	99.2	98.8	100	98.8	98.1	94.6	96	100	95.4	99	97.4	93.3	100	97.6	96
Trucks	2	28	4	0	34	4	1	7	0	12	8	23	3	0	34	4	0	1	0	5	85
% Trucks	2.4	1	2.7	0	1	2	0.3	1.1	0	0.9	1.2	0.8	1.2	0	0.9	1	0	0.7	0	0.5	0.9
Heavys	8	120	1	0	129	1	2	1	0	4	5	130	7	0	142	0	8	8	0	16	291
% Heavys	9.6	4.1	0.7	0	3.8	0.5	0.6	0.2	0	0.3	0.7	4.6	2.8	0	3.7	0	2.3	5.9	0	1.8	3.1
Cyclists	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2
% Cyclists	0	0	0	0	0	0.5	0	0	0	0.1	0	0	0	0	0	0	0.3	0	0	0.1	0

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 2



Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25

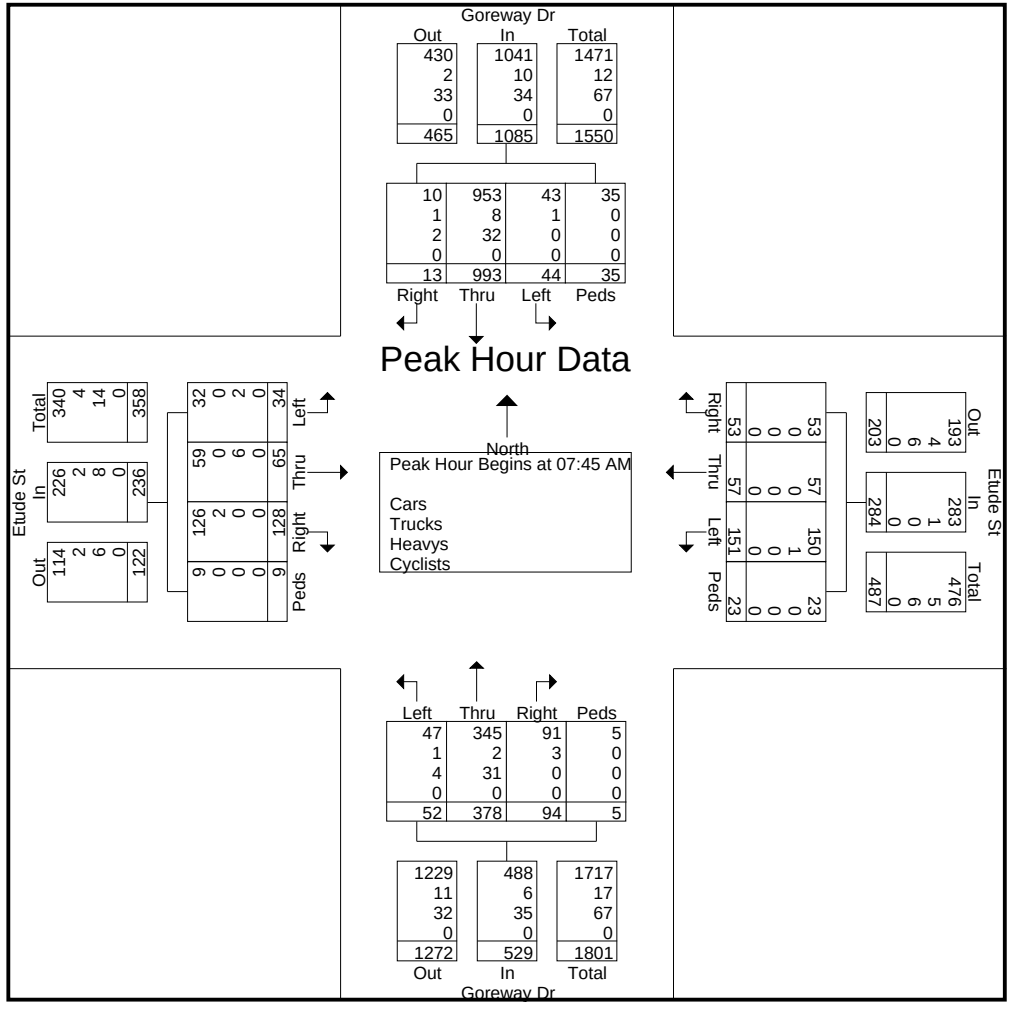
	Goreway Dr Southbound					Etude St Westbound					Goreway Dr Northbound					Etude St Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	2	**293**	11	10	**316**	11	9	**47**	6	73	**26**	97	9	**4**	**136**	**36**	10	7	**5**	58	**583**
08:00 AM	1	228	9	7	245	**19**	10	32	**9**	70	17	**103**	**15**	0	135	29	**23**	7	3	62	512
08:15 AM	**8**	197	9	7	221	11	15	28	6	60	26	94	15	0	135	27	11	**13**	1	52	468
08:30 AM	2	275	**15**	**11**	303	12	**23**	44	2	**81**	25	84	13	1	123	36	21	7	0	**64**	571
Total Volume	13	993	44	35	1085	53	57	151	23	284	94	378	52	5	529	128	65	34	9	236	2134
% App. Total	1.2	91.5	4.1	3.2		18.7	20.1	53.2	8.1		17.8	71.5	9.8	0.9		54.2	27.5	14.4	3.8		
PHF	.406	.847	.733	.795	.858	.697	.620	.803	.639	.877	.904	.917	.867	.313	.972	.889	.707	.654	.450	.922	.915
Cars	10	953	43	35	1041	53	57	150	23	283	91	345	47	5	488	126	59	32	9	226	2038
% Cars	76.9	96.0	97.7	100	95.9	100	100	99.3	100	99.6	96.8	91.3	90.4	100	92.2	98.4	90.8	94.1	100	95.8	95.5
Trucks	1	8	1	0	10	0	0	1	0	1	3	2	1	0	6	2	0	0	0	2	19
% Trucks	7.7	0.8	2.3	0	0.9	0	0	0.7	0	0.4	3.2	0.5	1.9	0	1.1	1.6	0	0	0	0.8	0.9
Heavys	2	32	0	0	34	0	0	0	0	0	0	31	4	0	35	0	6	2	0	8	77
% Heavys	15.4	3.2	0	0	3.1	0	0	0	0	0	0	8.2	7.7	0	6.6	0	9.2	5.9	0	3.4	3.6
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 4

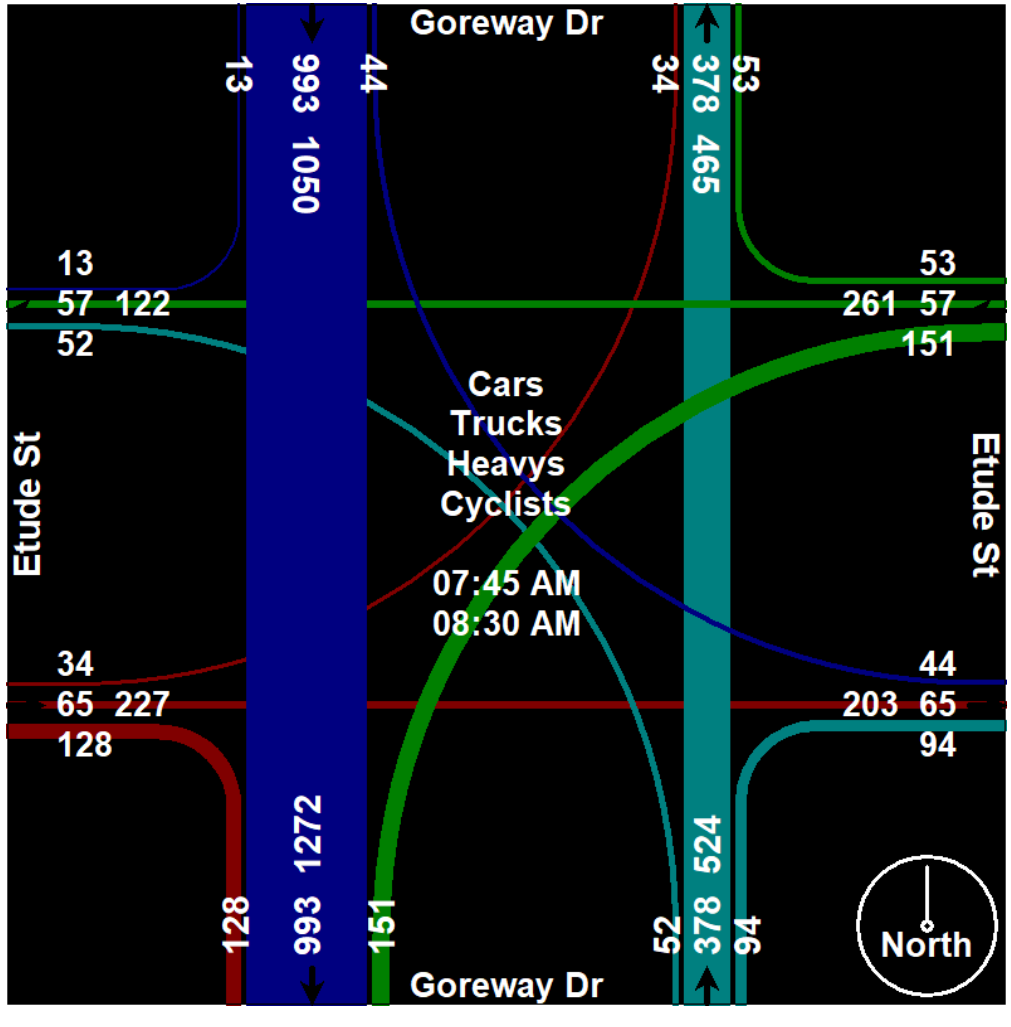


Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 5



Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25

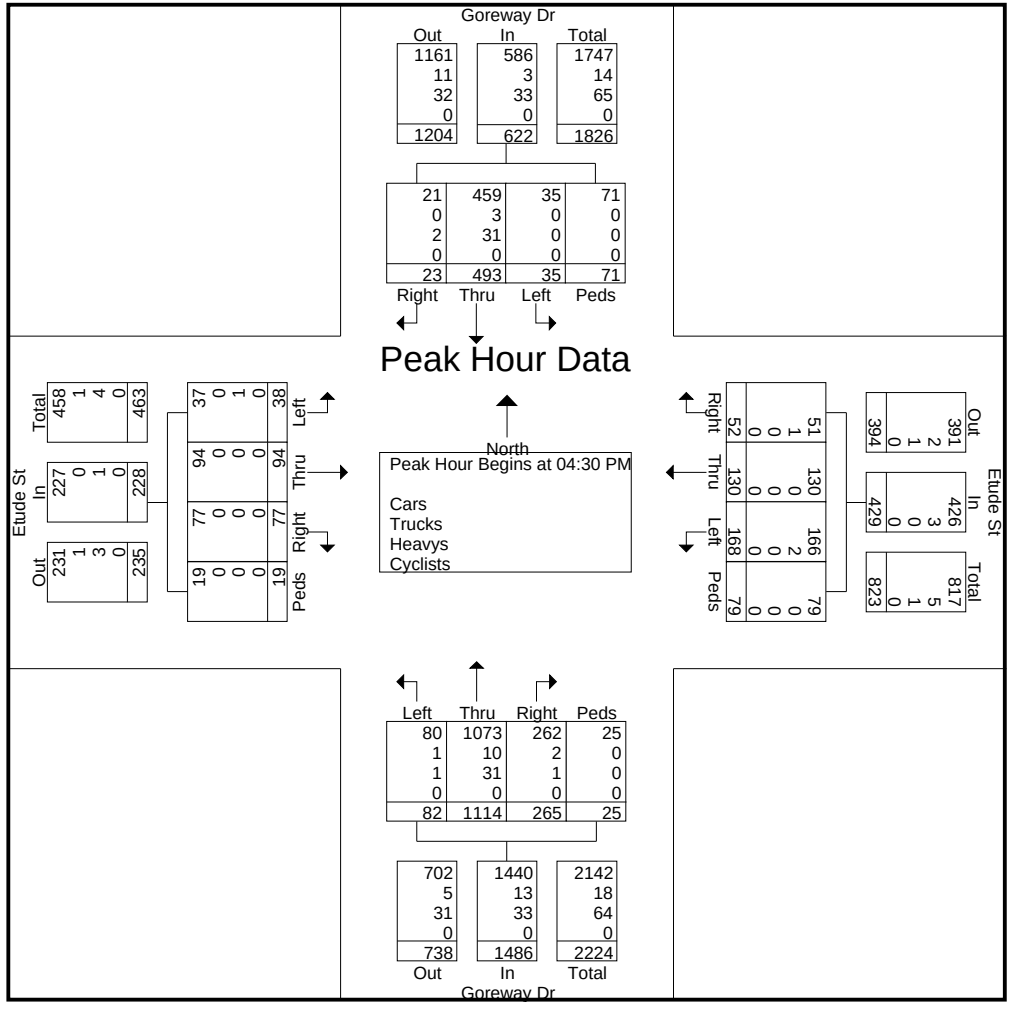
	Goreway Dr Southbound					Etude St Westbound					Goreway Dr Northbound					Etude St Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**9**	115	8	18	150	**16**	26	**48**	22	112	56	**295**	16	**8**	375	14	19	8	**9**	50	687
04:45 PM	7	98	6	**20**	131	8	**41**	46	**25**	**120**	58	280	19	6	363	23	**36**	10	2	**71**	685
05:00 PM	5	**161**	10	15	**191**	12	27	33	14	86	73	282	23	4	**382**	14	21	5	6	46	**705**
05:15 PM	2	119	**11**	18	150	16	36	41	18	111	**78**	257	**24**	7	366	**26**	18	**15**	2	61	688
Total Volume	23	493	35	71	622	52	130	168	79	429	265	1114	82	25	1486	77	94	38	19	228	2765
% App. Total	3.7	79.3	5.6	11.4		12.1	30.3	39.2	18.4		17.8	75	5.5	1.7		33.8	41.2	16.7	8.3		
PHF	.639	.766	.795	.888	.814	.813	.793	.875	.790	.894	.849	.944	.854	.781	.973	.740	.653	.633	.528	.803	.980
Cars	21	459	35	71	586	51	130	166	79	426	262	1073	80	25	1440	77	94	37	19	227	2679
% Cars	91.3	93.1	100	100	94.2	98.1	100	98.8	100	99.3	98.9	96.3	97.6	100	96.9	100	100	97.4	100	99.6	96.9
Trucks	0	3	0	0	3	1	0	2	0	3	2	10	1	0	13	0	0	0	0	0	19
% Trucks	0	0.6	0	0	0.5	1.9	0	1.2	0	0.7	0.8	0.9	1.2	0	0.9	0	0	0	0	0	0.7
Heavys	2	31	0	0	33	0	0	0	0	0	1	31	1	0	33	0	0	1	0	1	67
% Heavys	8.7	6.3	0	0	5.3	0	0	0	0	0	0.4	2.8	1.2	0	2.2	0	0	2.6	0	0.4	2.4
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 7

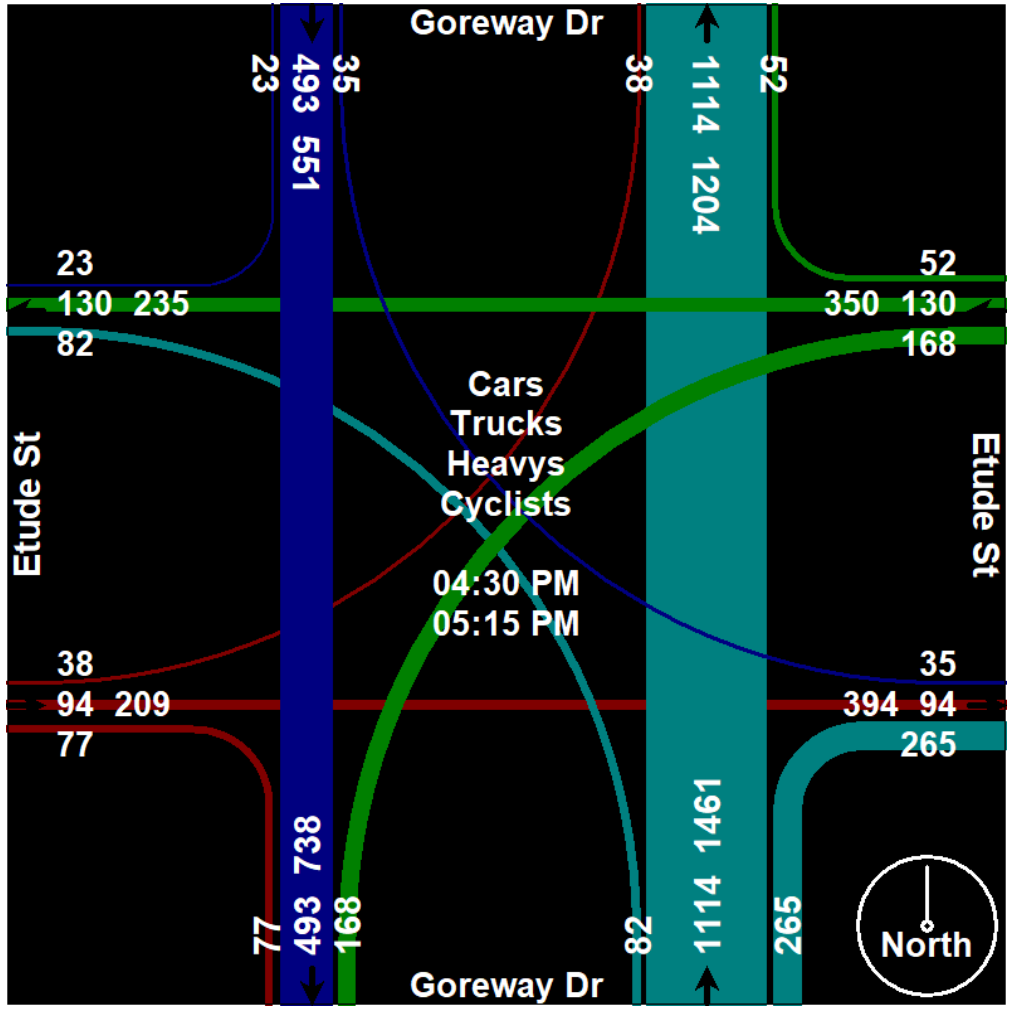


Horizon Data Services Ltd

318 Simonston Boulevard
Thornhill ON L3T 4T5
(416) 840-6619

"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 8



Appendix C

Signal Timing Plans

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	**March 19, 2020**		**Prepared Date**	**March 19, 2020**
Database Rev	**iNET**		**Completed By**	**BL**
Timing Card / Field rev	**32**		**Checked By**	**MA**

Location **Derry Road @ Goreway Drive**

Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s) (Green+Amber+All Red)		
			WALK	FDWALK			AM SPLITS	OFF SPLITS	PM SPLITS
1	Derry Road - W/B P.P LT	5	0	0	3	0	13	16	16
2	Derry Road - E/B	8	14	21	4.0	3.6	63	73	63
3	Goreway Drive - S/B Prot. LT	8	0	0	3.0	2.0	39	26	36
4	Goreway Drive - N/B	8	14	23	4.0	3.4	45	45	45
5	Derry Road - E/B Prot. LT	8	0	0	3.0	2.0	20	21	21
6	Derry Road - W/B	8	14	21	4.0	3.6	56	68	58
7	Goreway Drive - N/B Prot. LT	8	0	0	3.0	2.0	20	24	24
8	Goreway Drive - S/B	8	14	23	4.0	3.4	64	47	57

System Control
Yes

Semi-Actuated Mode
Yes

TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)
06:00 - 09:30	AM	160	106
09:30 - 15:00 19:30 - 00:00	OFF	160	75
15:00 - 19:30	PM	160	128

Signal Timing Report

Runtime: 2020-03-23 10:52:38

Device: 4710

Region: Mississauga **Signal ID:** 4710 **Location:** Goreway Drive N at Dorcas Street

Phase	Units	1	2	3	4	5	6	7	8
Walk	Sec	0	8	0	11	0	0	0	0
Ped Clear	Sec	0	8	0	16	0	0	0	0
Min Green	Sec	0	8	0	8	0	0	0	0
Passage	Sec	0.0	3.0	0.0	3.0	0.0	0.0	0.0	0.0
Maximum 1	Sec	0	32	0	30	0	0	0	0
Maximum 2	Sec	0	32	0	30	0	0	0	0
Yellow Change	Sec	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Red Clearance	Sec	0.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0
Red Revert	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Added Initial	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	Sec	0	0	0	0	0	0	0	0
Time Before	Sec	0	0	0	0	0	0	0	0
Cars Before	Veh	0	0	0	0	0	0	0	0
Time To Reduce	Sec	0	0	0	0	0	0	0	0
Reduce By	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Gap	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dynamic Max Limit	Sec	0	0	0	0	0	0	0	0
Dynamic Max Step	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[P2] Start Up	Enum	other	redClear	other	phaseNotOn	other	other	other	other
[P2] Options	Bit	0	Enabled Non-Actuated 1 Max Veh Recall Ped Recall Act Rest In Walk	0	Enabled Non Lock Det	0	0	0	0
[P2] Ring	Ring	0	1	0	1	0	0	0	0
[P2] Concurrency	Phase (,)	()	()	()	()	()	()	()	()

Coord Pattern	Units	1	2	3	4	5	6	7	8
Cycle Time	Sec	120	120	120	0	0	0	0	0
Offset	Sec	114	112	91	0	0	0	0	0
Split	Split	1	2	3	4	5	6	7	8
Sequence	Sequence	1	1	1	1	1	1	1	1

Coord Split	Units	1	2	3	4	5	6	7	8
Split 1 - Mode	Enum	none	none	none	none	none	none	none	none
Split 1 - Time	Sec	0	84	0	36	0	0	0	0
Split 1 - Coord	Enum	false	true	false	false	false	false	false	false
Split 2 - Mode	Enum	none	none	none	none	none	none	none	none
Split 2 - Time	Sec	0	84	0	36	0	0	0	0
Split 2 - Coord	Enum	false	true	false	false	false	false	false	false
Split 3 - Mode	Enum	none	none	none	none	none	none	none	none
Split 3 - Time	Sec	0	84	0	36	0	0	0	0
Split 3 - Coord	Enum	false	true	false	false	false	false	false	false

TB Schedule	Units	1	2	3	4	5	6	7	8
Month	Bit	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	J----------	-F---------	---A--------	----M-------	------J-----
Day of Week	Bit	-MTWTF-	S------	------S	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS
Day of Month	Bit	123456789012345678901234567890 1	123456789012345678901234567890 1	123456789012345678901234567890 1	1------	---------7-------	---------0--------	----------8------	1------
Day Plan	Number	1	3	2	3	3	3	3	3

TB Schedule	Units	9	10	11	12	13	14	15	16
Month	Bit	-------A----	--------S---	---------O--	----------D	----------D	----------D	0	0
Day of Week	Bit	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS
Day of Month	Bit	--3------	------7-------	----------2----------	5------	--8---	4-------	0	0
Day Plan	Number	3	3	3	3	3	3	0	0

TB Dayplan	Units	1	2	3	4	5	6	7	8
Plan 1 Hour	Hour	0	7	9	16	18	3	0	0
Plan 1 Minute	Min	0	0	0	0	30	0	0	0
Plan 1 Action	Number	8	1	2	3	8	7	0	0
Plan 2 Hour	Hour	0	3	0	0	0	0	0	0
Plan 2 Minute	Min	0	0	0	0	0	0	0	0
Plan 2 Action	Number	8	7	0	0	0	0	0	0
Plan 3 Hour	Hour	0	3	0	0	0	0	0	0
Plan 3 Minute	Min	0	0	0	0	0	0	0	0
Plan 3 Action	Number	8	7	0	0	0	0	0	0

TB Action	Units	1	2	3	4	5	6	7	8
Pattern	Enum	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6	Free	Free

Aux. Functions	Bit	0	0	0	0	0	0	0	0
Spec. Functions	Bit	0	0	0	0	0	0	0	0

Signal Timing Report

Runtime: 2020-03-23 10:56:02

Device: 4709

Region: Mississauga **Signal ID:** 4709 **Location:** GOREWAY DRIVE N at Etude Drive

Phase	Units	1	2	3	4	5	6	7	8
Walk	Sec	0	9	0	13	0	0	0	0
Ped Clear	Sec	0	14	0	19	0	0	0	0
Min Green	Sec	5	8	0	8	0	0	0	0
Passage	Sec	2.0	3.0	0.0	3.0	0.0	0.0	0.0	0.0
Maximum 1	Sec	10	33	0	30	0	0	0	0
Maximum 2	Sec	10	33	0	30	0	0	0	0
Yellow Change	Sec	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Red Clearance	Sec	0.0	2.5	0.0	3.0	0.0	0.0	0.0	0.0
Red Revert	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Added Initial	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	Sec	0	0	0	0	0	0	0	0
Time Before	Sec	0	0	0	0	0	0	0	0
Cars Before	Veh	0	0	0	0	0	0	0	0
Time To Reduce	Sec	0	0	0	0	0	0	0	0
Reduce By	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Gap	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dynamic Max Limit	Sec	0	0	0	0	0	0	0	0
Dynamic Max Step	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[P2] Start Up	Enum	phaseNotOn	redClear	other	phaseNotOn	other	other	other	other
[P2] Options	Bit	Enabled Non Lock Det	Enabled Non-Actuated 1 Max Veh Recall Ped Recall Act Rest In Walk	0	Enabled Non Lock Det	0	0	0	0
[P2] Ring	Ring	1	1	0	1	0	0	0	0
[P2] Concurrency	Phase (,)	()	()	()	()	()	()	()	()

Coord Pattern	Units	1	2	3	4	5	6	7	8
Cycle Time	Sec	120	120	120	0	0	0	0	0
Offset	Sec	80	55	102	0	0	0	0	0
Split	Split	1	2	3	4	5	6	7	8
Sequence	Sequence	1	1	1	1	1	1	1	1

Coord Split	Units	1	2	3	4	5	6	7	8
Split 1 - Mode	Enum	none	none	none	none	none	none	none	none
Split 1 - Time	Sec	14	64	0	42	0	0	0	0
Split 1 - Coord	Enum	false	true	false	false	false	false	false	false
Split 2 - Mode	Enum	none	none	none	none	none	none	none	none
Split 2 - Time	Sec	14	64	0	42	0	0	0	0
Split 2 - Coord	Enum	false	true	false	false	false	false	false	false
Split 3 - Mode	Enum	none	none	none	none	none	none	none	none
Split 3 - Time	Sec	14	64	0	42	0	0	0	0
Split 3 - Coord	Enum	false	true	false	false	false	false	false	false

TB Schedule	Units	1	2	3	4	5	6	7	8
Month	Bit	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	J----------	-F---------	---A--------	----M-------	------J-----
Day of Week	Bit	-MTWTF-	S------	------S	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS
Day of Month	Bit	123456789012345678901234567890 1	123456789012345678901234567890 1	123456789012345678901234567890 1	1------	---------7-------	---------0---------	----------8------	1------
Day Plan	Number	1	3	2	3	3	3	3	3

TB Schedule	Units	9	10	11	12	13	14	15	16
Month	Bit	-------A----	-------S---	--------O--	----------D	----------D	----------D	0	0
Day of Week	Bit	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS	SMTWTFS
Day of Month	Bit	--3------	------7-------	----------2----------	5------	--8---	4-------	0	0
Day Plan	Number	3	3	3	3	3	3	0	0

TB Dayplan	Units	1	2	3	4	5	6	7	8
Plan 1 Hour	Hour	0	7	9	16	18	3	0	0
Plan 1 Minute	Min	0	0	0	0	30	0	0	0
Plan 1 Action	Number	8	1	2	3	8	7	0	0
Plan 2 Hour	Hour	0	3	0	0	0	0	0	0
Plan 2 Minute	Min	0	0	0	0	0	0	0	0
Plan 2 Action	Number	8	7	0	0	0	0	0	0
Plan 3 Hour	Hour	0	3	0	0	0	0	0	0
Plan 3 Minute	Min	0	0	0	0	0	0	0	0
Plan 3 Action	Number	8	7	0	0	0	0	0	0

TB Action	Units	1	2	3	4	5	6	7	8
Pattern	Enum	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6	Free	Free

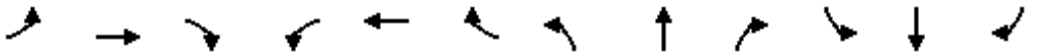
Aux. Functions	Bit	0	0	0	0	0	0	0	0
Spec. Functions	Bit	0	0	0	0	0	0	0	0

Appendix D

2020 Existing Conditions Synchro Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	135	750	266	120	818	238	69	139	73	511	803
v/c Ratio	0.51	0.47	0.38	0.42	0.52	0.40	0.36	0.17	0.18	0.79	0.68
Control Delay	77.0	40.7	5.5	30.3	45.5	6.6	75.5	49.2	1.0	70.8	42.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.0	40.7	5.5	30.3	45.5	6.6	75.5	49.2	1.0	70.8	42.8
Queue Length 50th (m)	21.4	67.4	0.0	21.6	78.1	0.0	10.9	18.7	0.0	80.0	104.3
Queue Length 95th (m)	32.8	82.6	19.9	35.9	95.0	20.7	19.2	28.6	0.0	98.7	128.6
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	292	1587	692	286	1582	601	253	824	406	721	1184
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	0.46	0.47	0.38	0.42	0.52	0.40	0.27	0.17	0.18	0.71	0.68

Intersection Summary



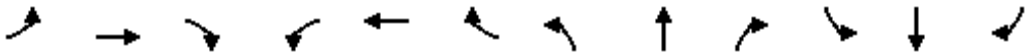
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	750	266	120	818	238	69	139	73	511	522	281
Future Volume (vph)	135	750	266	120	818	238	69	139	73	511	522	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.89	1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3120	4371	1439	1565	4812	1343	2705	3444	1209	3395	3172	
Flt Permitted	0.95	1.00	1.00	0.32	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3120	4371	1439	527	4812	1343	2705	3444	1209	3395	3172	
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)	135	750	266	120	818	238	69	139	73	511	522	281
RTOR Reduction (vph)	0	0	169	0	0	160	0	0	56	0	44	0
Lane Group Flow (vph)	135	750	97	120	818	78	69	139	17	511	759	0
Confl. Peds. (#/hr)	72		5	5		72	4		27	27		4
Heavy Vehicles (%)	11%	20%	8%	14%	9%	6%	28%	6%	26%	2%	2%	6%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	13.5	58.1	58.1	62.6	52.6	52.6	11.4	38.3	38.3	30.6	57.5	
Effective Green, g (s)	13.5	58.1	58.1	62.6	52.6	52.6	11.4	38.3	38.3	30.6	57.5	
Actuated g/C Ratio	0.08	0.36	0.36	0.39	0.33	0.33	0.07	0.24	0.24	0.19	0.36	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	263	1587	522	271	1581	441	192	824	289	649	1139	
v/s Ratio Prot	c0.04	0.17		0.03	c0.17		0.03	0.04		c0.15	c0.24	
v/s Ratio Perm			0.07	0.15		0.06			0.01			
v/c Ratio	0.51	0.47	0.19	0.44	0.52	0.18	0.36	0.17	0.06	0.79	0.67	
Uniform Delay, d1	70.1	39.2	34.8	32.2	43.4	38.3	70.8	48.2	47.0	61.6	43.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	1.0	0.8	2.4	1.2	0.9	2.4	0.4	0.4	7.3	3.1	
Delay (s)	73.4	40.2	35.6	34.6	44.6	39.2	73.2	48.7	47.4	68.9	46.3	
Level of Service	E	D	D	C	D	D	E	D	D	E	D	
Approach Delay (s)		43.0			42.5			54.4			55.0	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	47.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	102.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	152	20	560	1511
v/c Ratio	0.64	0.09	0.21	0.54
Control Delay	45.2	4.9	3.5	6.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	45.2	4.9	3.5	6.8
Queue Length 50th (m)	23.3	0.9	13.4	107.9
Queue Length 95th (m)	30.5	3.6	23.7	108.2
Internal Link Dist (m)	104.2		208.0	20.6
Turn Bay Length (m)		60.0		
Base Capacity (vph)	458	220	2692	2822
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.09	0.21	0.54

Intersection Summary

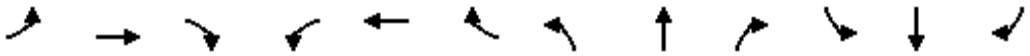


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	109	0	0	0	18	498	0	0	1299	1
Future Volume (vph)	1	0	109	0	0	0	18	498	0	0	1299	1
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0					6.0	5.0			5.0	
Lane Util. Factor		1.00					1.00	0.95			0.95	
Frpb, ped/bikes		0.98					1.00	1.00			1.00	
Flpb, ped/bikes		1.00					1.00	1.00			1.00	
Frt		0.87					1.00	1.00			1.00	
Flt Protected		1.00					0.95	1.00			1.00	
Satd. Flow (prot)		1634					1822	3380			3543	
Flt Permitted		1.00					0.15	1.00			1.00	
Satd. Flow (perm)		1633					279	3380			3543	
Peak-hour factor, PHF	0.72	0.72	0.72	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	1	0	151	0	0	0	20	560	0	0	1510	1
RTOR Reduction (vph)	0	43	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	109	0	0	0	0	20	560	0	0	1511	0
Confl. Peds. (#/hr)	9		4	4		9	6		14	14		6
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.4					94.6	94.6			94.6	
Effective Green, g (s)		14.4					94.6	95.6			95.6	
Actuated g/C Ratio		0.12					0.79	0.80			0.80	
Clearance Time (s)		6.0					6.0	6.0			6.0	
Vehicle Extension (s)		3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)		195					219	2692			2822	
v/s Ratio Prot								0.17			c0.43	
v/s Ratio Perm		c0.07					0.07					
v/c Ratio		0.56					0.09	0.21			0.54	
Uniform Delay, d1		49.8					2.9	3.0			4.3	
Progression Factor		1.00					1.00	1.00			1.26	
Incremental Delay, d2		3.4					0.8	0.2			0.6	
Delay (s)		53.2					3.7	3.1			6.1	
Level of Service		D					A	A			A	
Approach Delay (s)		53.2			0.0			3.2			6.1	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	206	177	49	70	49	454	38	1210
v/c Ratio	0.12	0.45	0.93	0.11	0.18	0.16	0.20	0.07	0.56
Control Delay	35.4	22.9	94.4	33.5	8.6	8.3	7.4	13.3	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	22.9	94.4	33.5	8.6	8.3	7.4	13.3	16.1
Queue Length 50th (m)	6.5	22.1	40.9	9.0	0.0	3.1	17.3	3.6	84.7
Queue Length 95th (m)	13.7	39.3	57.4	15.9	8.6	8.4	29.7	9.9	119.1
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	365	577	255	592	488	363	2228	555	2176
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	0.09	0.36	0.69	0.08	0.14	0.13	0.20	0.07	0.56

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	59	125	147	41	58	48	359	81	33	1028	13
Future Volume (vph)	30	59	125	147	41	58	48	359	81	33	1028	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	0.98		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1643	1666		1799	1921	1505	1685	3245		1764	3493	
Flt Permitted	0.73	1.00		0.46	1.00	1.00	0.17	1.00		0.49	1.00	
Satd. Flow (perm)	1254	1666		877	1921	1505	297	3245		910	3493	
Peak-hour factor, PHF	0.89	0.89	0.89	0.83	0.83	0.83	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	34	66	140	177	49	70	49	370	84	38	1195	15
RTOR Reduction (vph)	0	70	0	0	0	55	0	13	0	0	0	0
Lane Group Flow (vph)	34	136	0	177	49	15	49	441	0	38	1210	0
Confl. Peds. (#/hr)	35		6	6		35	10		24	24		10
Heavy Vehicles (%)	7%	7%	0%	1%	0%	3%	6%	9%	2%	0%	4%	23%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	26.1	26.1		26.1	26.1	26.1	80.4	80.4		72.7	72.7	
Effective Green, g (s)	26.1	28.1		26.1	28.1	26.1	82.4	81.9		72.7	74.2	
Actuated g/C Ratio	0.22	0.23		0.22	0.23	0.22	0.69	0.68		0.61	0.62	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	272	390		190	449	327	281	2214		551	2159	
v/s Ratio Prot		0.08			0.03		0.01	c0.14			c0.35	
v/s Ratio Perm	0.03			c0.20		0.01	0.11			0.04		
v/c Ratio	0.12	0.35		0.93	0.11	0.05	0.17	0.20		0.07	0.56	
Uniform Delay, d1	37.8	38.3		46.1	36.1	37.1	8.2	7.0		9.7	13.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.08	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		46.0	0.1	0.1	0.1	0.2		0.2	1.1	
Delay (s)	38.0	38.8		92.0	36.2	37.2	8.9	7.2		10.0	14.4	
Level of Service	D	D		F	D	D	A	A		A	B	
Approach Delay (s)		38.7			69.8			7.4			14.3	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	499	0	0	1300
Future Volume (Veh/h)	0	0	499	0	0	1300
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	542	0	0	1413
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.82	0.96			0.96	
vC, conflicting volume	1248	271			542	
vC1, stage 1 conf vol	542					
vC2, stage 2 conf vol	706					
vCu, unblocked vol	661	166			447	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	521	824			1082	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	361	181	0	706	706
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.21	0.11	0.00	0.42	0.42
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					

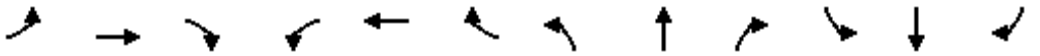
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	343	1165	101	76	746	566	187	665	133	326	447
v/c Ratio	1.05	0.64	0.18	0.38	0.48	0.78	0.58	0.69	0.28	0.69	0.45
Control Delay	130.8	43.6	4.2	28.5	44.2	24.4	75.8	56.9	11.0	72.9	35.6
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	130.8	43.6	4.2	28.5	44.2	24.4	75.8	56.9	11.0	72.9	35.6
Queue Length 50th (m)	~61.0	112.1	0.0	12.8	69.5	59.3	29.6	100.2	3.1	51.6	46.9
Queue Length 95th (m)	#93.6	133.2	9.1	23.4	84.9	116.7	42.5	125.1	20.7	66.0	63.6
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	326	1832	555	214	1541	722	377	961	470	657	1001
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.64	0.18	0.36	0.48	0.78	0.50	0.69	0.28	0.50	0.45

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.

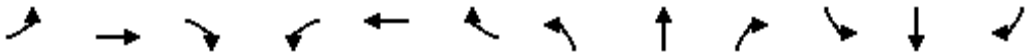


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	1165	101	76	746	566	187	665	133	326	271	176
Future Volume (vph)	343	1165	101	76	746	566	187	665	133	326	271	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.90	1.00	1.00	0.91	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3267	4902	1287	1525	4641	1416	3177	3544	1411	3395	3013	
Flt Permitted	0.95	1.00	1.00	0.16	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3267	4902	1287	254	4641	1416	3177	3544	1411	3395	3013	
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)	343	1165	101	76	746	566	187	665	133	326	271	176
RTOR Reduction (vph)	0	0	63	0	0	252	0	0	87	0	67	0
Lane Group Flow (vph)	343	1165	38	76	746	314	187	665	46	326	380	0
Confl. Peds. (#/hr)	62		28	28		62	23		61	61		23
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	6%	7%	17%	17%	13%	2%	9%	3%	3%	2%	5%	10%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	16.0	59.9	59.9	64.5	53.2	53.2	16.2	43.4	43.4	22.4	49.6	
Effective Green, g (s)	16.0	59.9	59.9	64.5	53.2	53.2	16.2	43.4	43.4	22.4	49.6	
Actuated g/C Ratio	0.10	0.37	0.37	0.40	0.33	0.33	0.10	0.27	0.27	0.14	0.31	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	326	1835	481	192	1543	470	321	961	382	475	934	
v/s Ratio Prot	c0.10	0.24		0.03	0.16		0.06	c0.19		c0.10	0.13	
v/s Ratio Perm			0.03	0.13		c0.22			0.03			
v/c Ratio	1.05	0.63	0.08	0.40	0.48	0.67	0.58	0.69	0.12	0.69	0.41	
Uniform Delay, d1	72.0	41.1	32.3	31.1	42.5	45.8	68.7	52.3	43.9	65.5	43.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	64.2	1.7	0.3	2.8	1.1	7.4	4.1	4.1	0.6	5.2	1.3	
Delay (s)	136.2	42.8	32.6	33.9	43.6	53.2	72.8	56.4	44.5	70.7	44.9	
Level of Service	F	D	C	C	D	D	E	E	D	E	D	
Approach Delay (s)		62.0			47.0			57.9			55.8	
Approach LOS		E			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	55.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	72	122	1501	829
v/c Ratio	0.39	0.22	0.49	0.27
Control Delay	21.6	3.2	3.0	1.3
Queue Delay	0.0	0.0	0.2	0.0
Total Delay	21.6	3.2	3.3	1.3
Queue Length 50th (m)	1.8	4.5	37.7	9.3
Queue Length 95th (m)	5.7	10.2	54.6	10.9
Internal Link Dist (m)	104.2		208.0	20.6
Turn Bay Length (m)		60.0		
Base Capacity (vph)	457	549	3079	3017
Starvation Cap Reductn	0	0	737	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.22	0.64	0.27

Intersection Summary



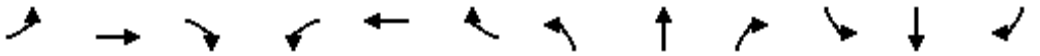
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	39	0	0	0	118	1456	0	0	734	4
Future Volume (vph)	5	0	39	0	0	0	118	1456	0	0	734	4
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0					6.0	5.0			5.0	
Lane Util. Factor		1.00					1.00	0.95			0.95	
Frpb, ped/bikes		0.98					1.00	1.00			1.00	
Flpb, ped/bikes		1.00					0.98	1.00			1.00	
Frt		0.88					1.00	1.00			1.00	
Flt Protected		0.99					0.95	1.00			1.00	
Satd. Flow (prot)		1646					1787	3544			3473	
Flt Permitted		0.96					0.34	1.00			1.00	
Satd. Flow (perm)		1589					634	3544			3473	
Peak-hour factor, PHF	0.61	0.61	0.61	0.92	0.92	0.92	0.97	0.97	0.97	0.89	0.89	0.89
Adj. Flow (vph)	8	0	64	0	0	0	122	1501	0	0	825	4
RTOR Reduction (vph)	0	60	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	12	0	0	0	0	122	1501	0	0	829	0
Confl. Peds. (#/hr)	15		7	7		15	18		33	33		18
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.9					101.1	101.1			101.1	
Effective Green, g (s)		7.9					101.1	102.1			102.1	
Actuated g/C Ratio		0.07					0.84	0.85			0.85	
Clearance Time (s)		6.0					6.0	6.0			6.0	
Vehicle Extension (s)		3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)		104					534	3015			2954	
v/s Ratio Prot								c0.42			0.24	
v/s Ratio Perm		c0.01					0.19					
v/c Ratio		0.12					0.23	0.50			0.28	
Uniform Delay, d1		52.8					1.8	2.3			1.8	
Progression Factor		1.00					1.00	1.00			0.60	
Incremental Delay, d2		0.5					1.0	0.6			0.2	
Delay (s)		53.3					2.8	2.9			1.3	
Level of Service		D					A	A			A	
Approach Delay (s)		53.3			0.0			2.9			1.3	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	50	225	183	141	57	85	1421	45	661
v/c Ratio	0.21	0.48	0.95	0.29	0.14	0.16	0.65	0.28	0.32
Control Delay	36.2	34.2	97.7	36.2	8.5	6.4	11.8	22.4	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	34.2	97.7	36.2	8.5	6.4	11.8	22.4	14.1
Queue Length 50th (m)	9.4	37.3	42.0	26.4	0.0	4.5	96.1	5.3	40.8
Queue Length 95th (m)	15.9	45.5	#76.2	41.0	9.4	8.1	135.7	13.3	50.7
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	299	567	238	592	474	567	2187	162	2038
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	0.17	0.40	0.77	0.24	0.12	0.15	0.65	0.28	0.32

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 (vph)	38	94	77	168	130	52	82	1114	265	35	493	23
Future Volume (vph)	38	94	77	168	130	52	82	1114	265	35	493	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.91	1.00	0.96		1.00	1.00	
Flpb, ped/bikes	0.94	1.00		0.98	1.00	1.00	0.99	1.00		0.98	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1612	1760		1741	1921	1484	1725	3272		1789	3408	
Flt Permitted	0.61	1.00		0.45	1.00	1.00	0.36	1.00		0.15	1.00	
Satd. Flow (perm)	1027	1760		820	1921	1484	650	3272		277	3408	
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.97	0.97	0.97	0.78	0.78	0.78
Adj. Flow (vph)	50	124	101	183	141	57	85	1148	273	45	632	29
RTOR Reduction (vph)	0	26	0	0	0	44	0	15	0	0	2	0
Lane Group Flow (vph)	50	199	0	183	141	13	85	1406	0	45	659	0
Confl. Peds. (#/hr)	72		24	24		72	19		81	81		19
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	6%	0%	0%	3%	0%	0%	3%	4%	2%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	28.3	28.3		28.3	28.3	28.3	78.2	78.2		69.6	69.6	
Effective Green, g (s)	28.3	30.3		28.3	30.3	28.3	80.2	79.7		69.6	71.1	
Actuated g/C Ratio	0.24	0.25		0.24	0.25	0.24	0.67	0.66		0.58	0.59	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	242	444		193	485	349	502	2173		160	2019	
v/s Ratio Prot		0.11			0.07		0.01	c0.43			0.19	
v/s Ratio Perm	0.05			c0.22		0.01	0.10			0.16		
v/c Ratio	0.21	0.45		0.95	0.29	0.04	0.17	0.65		0.28	0.33	
Uniform Delay, d1	36.8	37.8		45.1	36.2	35.4	7.2	11.9		12.6	12.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.82	0.82		1.00	1.00	
Incremental Delay, d2	0.4	0.7		49.4	0.3	0.0	0.1	1.4		4.3	0.4	
Delay (s)	37.3	38.5		94.6	36.5	35.4	6.0	11.1		17.0	12.8	
Level of Service	D	D		F	D	D	A	B		B	B	
Approach Delay (s)		38.3			64.2			10.8			13.1	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	1461	0	0	738
Future Volume (Veh/h)	0	0	1461	0	0	738
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1588	0	0	802
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.91	0.88			0.88	
vC, conflicting volume	1989	794			1588	
vC1, stage 1 conf vol	1588					
vC2, stage 2 conf vol	401					
vCu, unblocked vol	1624	505			1403	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	168	458			436	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	1059	529	0	401	401
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.62	0.31	0.00	0.24	0.24
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					

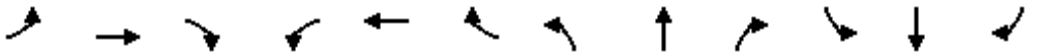
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix E

2025 Future Background Conditions Synchro Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	135	792	266	120	866	238	69	150	73	514	806
v/c Ratio	0.51	0.50	0.38	0.44	0.55	0.40	0.36	0.18	0.18	0.79	0.68
Control Delay	77.0	41.3	5.5	30.9	46.2	6.6	75.5	49.4	1.0	71.0	42.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.0	41.3	5.5	30.9	46.2	6.6	75.5	49.4	1.0	71.0	42.8
Queue Length 50th (m)	21.4	72.1	0.0	21.6	83.8	0.0	10.9	20.2	0.0	80.5	104.6
Queue Length 95th (m)	32.8	87.7	19.9	35.9	101.2	20.7	19.2	30.5	0.0	99.4	129.0
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	292	1587	692	273	1581	601	253	824	406	721	1184
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	0.46	0.50	0.38	0.44	0.55	0.40	0.27	0.18	0.18	0.71	0.68

Intersection Summary



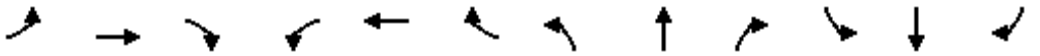
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	792	266	120	866	238	69	150	73	514	523	283
Future Volume (vph)	135	792	266	120	866	238	69	150	73	514	523	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.89	1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3120	4371	1439	1565	4812	1343	2705	3444	1209	3395	3171	
Flt Permitted	0.95	1.00	1.00	0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3120	4371	1439	491	4812	1343	2705	3444	1209	3395	3171	
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)	135	792	266	120	866	238	69	150	73	514	523	283
RTOR Reduction (vph)	0	0	169	0	0	160	0	0	56	0	45	0
Lane Group Flow (vph)	135	792	97	120	866	78	69	150	17	514	761	0
Confl. Peds. (#/hr)	72		5	5		72	4		27	27		4
Heavy Vehicles (%)	11%	20%	8%	14%	9%	6%	28%	6%	26%	2%	2%	6%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	13.5	58.1	58.1	62.6	52.6	52.6	11.4	38.3	38.3	30.6	57.5	
Effective Green, g (s)	13.5	58.1	58.1	62.6	52.6	52.6	11.4	38.3	38.3	30.6	57.5	
Actuated g/C Ratio	0.08	0.36	0.36	0.39	0.33	0.33	0.07	0.24	0.24	0.19	0.36	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	263	1587	522	259	1581	441	192	824	289	649	1139	
v/s Ratio Prot	c0.04	0.18		0.03	c0.18		0.03	0.04		c0.15	c0.24	
v/s Ratio Perm			0.07	0.15		0.06			0.01			
v/c Ratio	0.51	0.50	0.19	0.46	0.55	0.18	0.36	0.18	0.06	0.79	0.67	
Uniform Delay, d1	70.1	39.6	34.8	32.3	44.0	38.3	70.8	48.4	47.0	61.7	43.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	1.1	0.8	2.7	1.4	0.9	2.4	0.5	0.4	7.5	3.1	
Delay (s)	73.4	40.8	35.6	35.0	45.3	39.2	73.2	48.9	47.4	69.2	46.3	
Level of Service	E	D	D	D	D	D	E	D	D	E	D	
Approach Delay (s)		43.3			43.1			54.3			55.2	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	47.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	102.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	152	20	572	1521
v/c Ratio	0.64	0.09	0.21	0.54
Control Delay	45.5	4.9	3.5	6.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	45.5	4.9	3.5	6.8
Queue Length 50th (m)	23.5	0.9	13.9	108.9
Queue Length 95th (m)	30.7	3.6	24.3	109.1
Internal Link Dist (m)	104.2		208.0	20.6
Turn Bay Length (m)		60.0		
Base Capacity (vph)	457	216	2689	2820
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.09	0.21	0.54

Intersection Summary

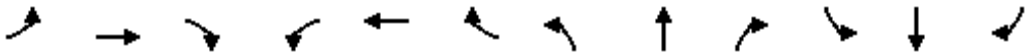


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	109	0	0	0	18	509	0	0	1307	1
Future Volume (vph)	1	0	109	0	0	0	18	509	0	0	1307	1
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0					6.0	5.0			5.0	
Lane Util. Factor		1.00					1.00	0.95			0.95	
Frpb, ped/bikes		0.98					1.00	1.00			1.00	
Flpb, ped/bikes		1.00					1.00	1.00			1.00	
Frt		0.87					1.00	1.00			1.00	
Flt Protected		1.00					0.95	1.00			1.00	
Satd. Flow (prot)		1634					1822	3380			3543	
Flt Permitted		1.00					0.14	1.00			1.00	
Satd. Flow (perm)		1633					275	3380			3543	
Peak-hour factor, PHF	0.72	0.72	0.72	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	1	0	151	0	0	0	20	572	0	0	1520	1
RTOR Reduction (vph)	0	42	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	110	0	0	0	0	20	572	0	0	1521	0
Confl. Peds. (#/hr)	9		4	4		9	6		14	14		6
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.5					94.5	94.5			94.5	
Effective Green, g (s)		14.5					94.5	95.5			95.5	
Actuated g/C Ratio		0.12					0.79	0.80			0.80	
Clearance Time (s)		6.0					6.0	6.0			6.0	
Vehicle Extension (s)		3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)		197					216	2689			2819	
v/s Ratio Prot								0.17			c0.43	
v/s Ratio Perm		c0.07					0.07					
v/c Ratio		0.56					0.09	0.21			0.54	
Uniform Delay, d1		49.7					2.9	3.0			4.4	
Progression Factor		1.00					1.00	1.00			1.25	
Incremental Delay, d2		3.4					0.8	0.2			0.6	
Delay (s)		53.1					3.8	3.2			6.1	
Level of Service		D					A	A			A	
Approach Delay (s)		53.1			0.0			3.2			6.1	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	35	212	177	49	70	49	465	38	1215
v/c Ratio	0.13	0.45	0.94	0.11	0.18	0.16	0.21	0.07	0.56
Control Delay	35.4	22.6	97.1	33.3	8.6	8.4	7.6	13.4	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	22.6	97.1	33.3	8.6	8.4	7.6	13.4	16.2
Queue Length 50th (m)	6.6	22.4	41.0	9.0	0.0	3.1	17.9	3.6	85.9
Queue Length 95th (m)	13.9	40.1	57.9	15.9	8.6	8.4	30.6	9.9	119.6
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	365	579	250	592	488	361	2223	548	2169
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	0.10	0.37	0.71	0.08	0.14	0.14	0.21	0.07	0.56

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	59	130	147	41	58	48	370	81	33	1031	14
Future Volume (vph)	31	59	130	147	41	58	48	370	81	33	1031	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1643	1664		1799	1921	1505	1685	3248		1765	3492	
Flt Permitted	0.73	1.00		0.45	1.00	1.00	0.17	1.00		0.48	1.00	
Satd. Flow (perm)	1254	1664		858	1921	1505	294	3248		901	3492	
Peak-hour factor, PHF	0.89	0.89	0.89	0.83	0.83	0.83	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	35	66	146	177	49	70	49	381	84	38	1199	16
RTOR Reduction (vph)	0	73	0	0	0	55	0	13	0	0	1	0
Lane Group Flow (vph)	35	139	0	177	49	15	49	452	0	38	1214	0
Confl. Peds. (#/hr)	35		6	6		35	10		24	24		10
Heavy Vehicles (%)	7%	7%	0%	1%	0%	3%	6%	9%	2%	0%	4%	23%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	26.3	26.3		26.3	26.3	26.3	80.2	80.2		72.5	72.5	
Effective Green, g (s)	26.3	28.3		26.3	28.3	26.3	82.2	81.7		72.5	74.0	
Actuated g/C Ratio	0.22	0.24		0.22	0.24	0.22	0.69	0.68		0.60	0.62	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	274	392		188	453	329	279	2211		544	2153	
v/s Ratio Prot		0.08			0.03		0.01	c0.14			c0.35	
v/s Ratio Perm	0.03			c0.21		0.01	0.11			0.04		
v/c Ratio	0.13	0.35		0.94	0.11	0.05	0.18	0.20		0.07	0.56	
Uniform Delay, d1	37.6	38.2		46.1	36.0	37.0	8.3	7.1		9.8	13.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.08	1.01		1.00	1.00	
Incremental Delay, d2	0.2	0.6		48.8	0.1	0.1	0.1	0.2		0.2	1.1	
Delay (s)	37.8	38.8		94.9	36.1	37.0	9.0	7.3		10.1	14.6	
Level of Service	D	D		F	D	D	A	A		B	B	
Approach Delay (s)		38.6			71.5			7.5			14.5	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	510	0	0	1308
Future Volume (Veh/h)	0	0	510	0	0	1308
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	554	0	0	1422
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.82	0.96			0.96	
vC, conflicting volume	1265	277			554	
vC1, stage 1 conf vol	554					
vC2, stage 2 conf vol	711					
vCu, unblocked vol	670	168			456	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	516	820			1072	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	369	185	0	711	711
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.22	0.11	0.00	0.42	0.42
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					

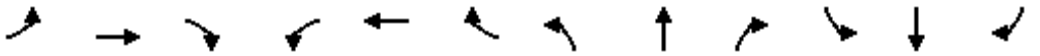
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	345	1230	101	76	789	568	188	610	133	329	382
v/c Ratio	1.06	0.67	0.18	0.41	0.51	0.79	0.58	0.64	0.28	0.69	0.38
Control Delay	132.2	44.7	4.2	29.5	44.8	24.4	75.8	55.1	9.1	72.8	27.6
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	132.2	44.7	4.2	29.5	44.8	24.4	75.8	55.1	9.1	72.8	27.6
Queue Length 50th (m)	~61.7	120.4	0.0	12.8	74.3	59.5	29.8	90.4	0.9	52.1	31.0
Queue Length 95th (m)	#94.2	142.6	9.1	23.4	90.3	116.9	42.6	114.0	18.1	66.5	46.1
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	326	1830	555	203	1540	723	377	960	476	657	1014
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.06	0.67	0.18	0.37	0.51	0.79	0.50	0.64	0.28	0.50	0.38

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.

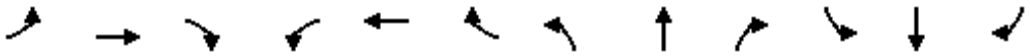


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	1230	101	76	789	568	188	610	133	329	205	177
Future Volume (vph)	345	1230	101	76	789	568	188	610	133	329	205	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.90	1.00	1.00	0.91	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3267	4902	1287	1525	4641	1416	3177	3544	1411	3395	2962	
Flt Permitted	0.95	1.00	1.00	0.14	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3267	4902	1287	221	4641	1416	3177	3544	1411	3395	2962	
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)	345	1230	101	76	789	568	188	610	133	329	205	177
RTOR Reduction (vph)	0	0	63	0	0	253	0	0	94	0	97	0
Lane Group Flow (vph)	345	1230	38	76	789	315	188	610	39	329	285	0
Confl. Peds. (#/hr)	62		28	28		62	23		61	61		23
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	6%	7%	17%	17%	13%	2%	9%	3%	3%	2%	5%	10%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	16.0	59.8	59.8	64.4	53.1	53.1	16.3	43.3	43.3	22.6	49.6	
Effective Green, g (s)	16.0	59.8	59.8	64.4	53.1	53.1	16.3	43.3	43.3	22.6	49.6	
Actuated g/C Ratio	0.10	0.37	0.37	0.40	0.33	0.33	0.10	0.27	0.27	0.14	0.31	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	326	1832	481	181	1540	469	323	959	381	479	918	
v/s Ratio Prot	c0.11	c0.25		0.03	0.17		0.06	c0.17		c0.10	0.10	
v/s Ratio Perm			0.03	0.14		0.22			0.03			
v/c Ratio	1.06	0.67	0.08	0.42	0.51	0.67	0.58	0.64	0.10	0.69	0.31	
Uniform Delay, d1	72.0	41.9	32.3	31.5	43.0	45.9	68.6	51.4	43.8	65.3	42.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	66.0	2.0	0.3	3.3	1.2	7.5	4.1	3.2	0.5	5.2	0.9	
Delay (s)	138.0	43.9	32.6	34.8	44.2	53.4	72.7	54.6	44.3	70.5	43.0	
Level of Service	F	D	C	C	D	D	E	D	D	E	D	
Approach Delay (s)		62.6			47.4			56.8			55.8	
Approach LOS		E			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	55.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	55	107	1470	769
v/c Ratio	0.33	0.18	0.48	0.25
Control Delay	22.8	2.8	2.9	1.2
Queue Delay	0.0	0.0	0.2	0.0
Total Delay	22.8	2.8	3.2	1.2
Queue Length 50th (m)	1.6	3.8	36.3	8.5
Queue Length 95th (m)	5.8	8.2	50.2	10.1
Internal Link Dist (m)	104.2		208.0	20.6
Turn Bay Length (m)		60.0		
Base Capacity (vph)	444	586	3083	3021
Starvation Cap Reductn	0	0	753	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.12	0.18	0.63	0.25

Intersection Summary



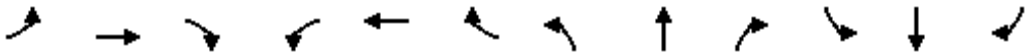
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	29	0	0	0	104	1426	0	0	681	4
Future Volume (vph)	4	0	29	0	0	0	104	1426	0	0	681	4
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0					6.0	5.0			5.0	
Lane Util. Factor		1.00					1.00	0.95			0.95	
Frpb, ped/bikes		0.98					1.00	1.00			1.00	
Flpb, ped/bikes		1.00					0.98	1.00			1.00	
Frt		0.88					1.00	1.00			1.00	
Flt Protected		0.99					0.95	1.00			1.00	
Satd. Flow (prot)		1649					1783	3544			3473	
Flt Permitted		0.95					0.36	1.00			1.00	
Satd. Flow (perm)		1583					675	3544			3473	
Peak-hour factor, PHF	0.61	0.61	0.61	0.92	0.92	0.92	0.97	0.97	0.97	0.89	0.89	0.89
Adj. Flow (vph)	7	0	48	0	0	0	107	1470	0	0	765	4
RTOR Reduction (vph)	0	45	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	10	0	0	0	0	107	1470	0	0	769	0
Confl. Peds. (#/hr)	15		7	7		15	18		33	33		18
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.8					101.2	101.2			101.2	
Effective Green, g (s)		7.8					101.2	102.2			102.2	
Actuated g/C Ratio		0.06					0.84	0.85			0.85	
Clearance Time (s)		6.0					6.0	6.0			6.0	
Vehicle Extension (s)		3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)		102					569	3018			2957	
v/s Ratio Prot								c0.41			0.22	
v/s Ratio Perm		c0.01					0.16					
v/c Ratio		0.10					0.19	0.49			0.26	
Uniform Delay, d1		52.8					1.8	2.3			1.7	
Progression Factor		1.00					1.00	1.00			0.59	
Incremental Delay, d2		0.4					0.7	0.6			0.2	
Delay (s)		53.2					2.5	2.8			1.2	
Level of Service		D					A	A			A	
Approach Delay (s)		53.2			0.0			2.8			1.2	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	238	183	134	58	88	1414	44	641
v/c Ratio	0.17	0.49	0.96	0.27	0.14	0.17	0.65	0.28	0.33
Control Delay	34.8	35.7	99.6	35.3	8.6	6.6	12.2	22.8	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	35.7	99.6	35.3	8.6	6.6	12.2	22.8	14.8
Queue Length 50th (m)	7.9	41.0	41.7	24.6	0.0	4.7	99.0	5.3	40.4
Queue Length 95th (m)	14.1	49.8	#78.3	39.2	9.5	8.3	134.4	13.0	49.0
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	307	568	230	592	474	569	2176	158	1966
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	0.14	0.42	0.80	0.23	0.12	0.15	0.65	0.28	0.33

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 (vph)	33	110	71	168	123	53	85	1124	247	34	474	26
Future Volume (vph)	33	110	71	168	123	53	85	1124	247	34	474	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.91	1.00	0.96		1.00	1.00	
Flpb, ped/bikes	0.94	1.00		0.98	1.00	1.00	0.99	1.00		0.98	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	1781		1742	1921	1484	1725	3286		1788	3402	
Flt Permitted	0.62	1.00		0.43	1.00	1.00	0.36	1.00		0.15	1.00	
Satd. Flow (perm)	1054	1781		791	1921	1484	661	3286		281	3402	
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.97	0.97	0.97	0.78	0.78	0.78
Adj. Flow (vph)	43	145	93	183	134	58	88	1159	255	44	608	33
RTOR Reduction (vph)	0	21	0	0	0	44	0	14	0	0	3	0
Lane Group Flow (vph)	43	217	0	183	134	14	88	1400	0	44	638	0
Confl. Peds. (#/hr)	72		24	24		72	19		81	81		19
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	6%	0%	0%	3%	0%	0%	3%	4%	2%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	29.1	29.1		29.1	29.1	29.1	77.4	77.4		67.7	67.7	
Effective Green, g (s)	29.1	31.1		29.1	31.1	29.1	79.4	78.9		67.7	69.2	
Actuated g/C Ratio	0.24	0.26		0.24	0.26	0.24	0.66	0.66		0.56	0.58	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	461		191	497	359	514	2160		158	1961	
v/s Ratio Prot		0.12			0.07		0.01	c0.43			0.19	
v/s Ratio Perm	0.04			c0.23		0.01	0.10			0.16		
v/c Ratio	0.17	0.47		0.96	0.27	0.04	0.17	0.65		0.28	0.33	
Uniform Delay, d1	35.9	37.5		44.8	35.4	34.8	7.5	12.3		13.5	13.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.82	0.83		1.00	1.00	
Incremental Delay, d2	0.3	0.8		52.4	0.3	0.0	0.1	1.4		4.3	0.4	
Delay (s)	36.2	38.3		97.3	35.7	34.8	6.2	11.5		17.9	13.7	
Level of Service	D	D		F	D	C	A	B		B	B	
Approach Delay (s)		38.0			65.6			11.2			13.9	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	1430	0	0	685
Future Volume (Veh/h)	0	0	1430	0	0	685
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1554	0	0	745
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.91	0.89			0.89	
vC, conflicting volume	1926	777			1554	
vC1, stage 1 conf vol	1554					
vC2, stage 2 conf vol	372					
vCu, unblocked vol	1599	500			1374	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	175	464			450	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	1036	518	0	372	372
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.61	0.30	0.00	0.22	0.22
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					

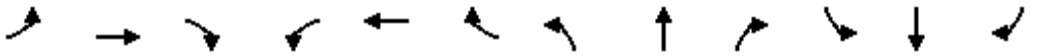
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F

2025 Future Total Conditions Synchro Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	141	792	266	120	866	244	69	152	73	538	840
v/c Ratio	0.53	0.50	0.39	0.44	0.55	0.41	0.36	0.19	0.18	0.81	0.70
Control Delay	77.3	41.7	5.5	31.2	46.7	6.6	75.5	49.6	1.0	71.5	43.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.3	41.7	5.5	31.2	46.7	6.6	75.5	49.6	1.0	71.5	43.2
Queue Length 50th (m)	22.4	72.9	0.0	21.9	84.9	0.0	10.9	20.5	0.0	84.2	109.0
Queue Length 95th (m)	34.2	87.7	19.9	35.9	101.2	21.0	19.2	30.8	0.0	104.3	135.4
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	292	1575	688	271	1563	601	253	817	403	721	1194
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	0.48	0.50	0.39	0.44	0.55	0.41	0.27	0.19	0.18	0.75	0.70

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	792	266	120	866	244	69	152	73	538	537	303
Future Volume (vph)	141	792	266	120	866	244	69	152	73	538	537	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.89	1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3120	4371	1439	1565	4812	1343	2705	3444	1209	3395	3165	
Flt Permitted	0.95	1.00	1.00	0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3120	4371	1439	492	4812	1343	2705	3444	1209	3395	3165	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	792	266	120	866	244	69	152	73	538	537	303
RTOR Reduction (vph)	0	0	170	0	0	165	0	0	56	0	48	0
Lane Group Flow (vph)	141	792	96	120	866	79	69	152	17	538	792	0
Confl. Peds. (#/hr)	72		5	5		72	4		27	27		4
Heavy Vehicles (%)	11%	20%	8%	14%	9%	6%	28%	6%	26%	2%	2%	6%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	13.7	57.6	57.6	61.9	51.9	51.9	11.4	38.0	38.0	31.4	58.0	
Effective Green, g (s)	13.7	57.6	57.6	61.9	51.9	51.9	11.4	38.0	38.0	31.4	58.0	
Actuated g/C Ratio	0.09	0.36	0.36	0.39	0.32	0.32	0.07	0.24	0.24	0.20	0.36	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	267	1573	518	257	1560	435	192	817	287	666	1147	
v/s Ratio Prot	c0.05	0.18		0.03	c0.18		0.03	0.04		c0.16	c0.25	
v/s Ratio Perm			0.07	0.15		0.06			0.01			
v/c Ratio	0.53	0.50	0.18	0.47	0.56	0.18	0.36	0.19	0.06	0.81	0.69	
Uniform Delay, d1	70.1	40.0	35.1	32.7	44.5	38.8	70.8	48.7	47.2	61.4	43.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.6	1.2	0.8	2.8	1.4	0.9	2.4	0.5	0.4	8.1	3.4	
Delay (s)	73.6	41.2	35.9	35.5	46.0	39.7	73.2	49.2	47.6	69.5	46.8	
Level of Service	E	D	D	D	D	D	E	D	D	E	D	
Approach Delay (s)		43.8			43.7			54.4			55.7	
Approach LOS		D			D			D			E	

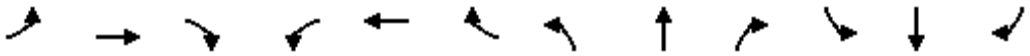
Intersection Summary			
HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	152	68	20	588	5	1521
v/c Ratio	0.64	0.61	0.09	0.22	0.01	0.54
Control Delay	45.5	48.5	5.3	3.6	1.8	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	48.5	5.3	3.6	1.8	6.8
Queue Length 50th (m)	23.5	7.1	0.9	14.3	0.1	109.2
Queue Length 95th (m)	30.7	21.8	3.7	25.0	m0.3	105.9
Internal Link Dist (m)	104.2	51.5		208.0		20.6
Turn Bay Length (m)			60.0		34.0	
Base Capacity (vph)	457	199	213	2684	630	2820
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	0.33	0.34	0.09	0.22	0.01	0.54

Intersection Summary

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

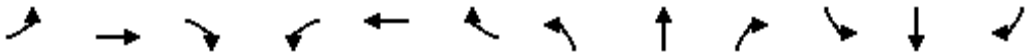


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	109	58	0	5	18	516	7	4	1307	1
Future Volume (vph)	1	0	109	58	0	5	18	516	7	4	1307	1
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0			5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		0.98	1.00	
Frt		0.87			0.99		1.00	1.00		1.00	1.00	
Flt Protected		1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1634			1809		1822	3373		1783	3543	
Flt Permitted		1.00			0.35		0.14	1.00		0.43	1.00	
Satd. Flow (perm)		1632			668		275	3373		806	3543	
Peak-hour factor, PHF	0.72	0.72	0.72	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	1	0	151	63	0	5	20	580	8	5	1520	1
RTOR Reduction (vph)	0	42	0	0	32	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	110	0	0	36	0	20	588	0	5	1521	0
Confl. Peds. (#/hr)	9		4	4		9	6		14	14		6
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.5			13.5		93.5	93.5		93.5	93.5	
Effective Green, g (s)		14.5			14.5		93.5	95.5		93.5	95.5	
Actuated g/C Ratio		0.12			0.12		0.78	0.80		0.78	0.80	
Clearance Time (s)		6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		197			80		214	2684		628	2819	
v/s Ratio Prot								0.17			c0.43	
v/s Ratio Perm		c0.07			0.05		0.07			0.01		
v/c Ratio		0.56			0.45		0.09	0.22		0.01	0.54	
Uniform Delay, d1		49.7			49.1		3.2	3.0		2.9	4.4	
Progression Factor		1.00			1.00		1.00	1.00		0.42	1.25	
Incremental Delay, d2		3.4			4.1		0.9	0.2		0.0	0.6	
Delay (s)		53.1			53.1		4.0	3.2		1.3	6.1	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		53.1			53.1			3.2			6.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	35	212	177	49	70	49	476	38	1223
v/c Ratio	0.13	0.45	0.94	0.11	0.18	0.16	0.21	0.07	0.56
Control Delay	35.4	22.6	97.1	33.3	8.6	8.3	7.6	13.4	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	22.6	97.1	33.3	8.6	8.3	7.6	13.4	16.3
Queue Length 50th (m)	6.6	22.4	41.0	9.0	0.0	3.1	18.6	3.6	86.6
Queue Length 95th (m)	13.9	40.1	57.9	15.9	8.6	8.4	31.5	9.9	120.7
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	365	579	250	592	488	358	2225	542	2169
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	0.10	0.37	0.71	0.08	0.14	0.14	0.21	0.07	0.56

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	59	130	147	41	58	48	380	81	33	1038	14
Future Volume (vph)	31	59	130	147	41	58	48	380	81	33	1038	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1643	1664		1799	1921	1505	1685	3250		1766	3492	
Flt Permitted	0.73	1.00		0.45	1.00	1.00	0.16	1.00		0.48	1.00	
Satd. Flow (perm)	1254	1664		858	1921	1505	290	3250		892	3492	
Peak-hour factor, PHF	0.89	0.89	0.89	0.83	0.83	0.83	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	35	66	146	177	49	70	49	392	84	38	1207	16
RTOR Reduction (vph)	0	73	0	0	0	55	0	12	0	0	1	0
Lane Group Flow (vph)	35	139	0	177	49	15	49	464	0	38	1222	0
Confl. Peds. (#/hr)	35		6	6		35	10		24	24		10
Heavy Vehicles (%)	7%	7%	0%	1%	0%	3%	6%	9%	2%	0%	4%	23%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	26.3	26.3		26.3	26.3	26.3	80.2	80.2		72.5	72.5	
Effective Green, g (s)	26.3	28.3		26.3	28.3	26.3	82.2	81.7		72.5	74.0	
Actuated g/C Ratio	0.22	0.24		0.22	0.24	0.22	0.69	0.68		0.60	0.62	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	274	392		188	453	329	276	2212		538	2153	
v/s Ratio Prot		0.08			0.03		0.01	c0.14			c0.35	
v/s Ratio Perm	0.03			c0.21		0.01	0.11			0.04		
v/c Ratio	0.13	0.35		0.94	0.11	0.05	0.18	0.21		0.07	0.57	
Uniform Delay, d1	37.6	38.2		46.1	36.0	37.0	8.3	7.1		9.8	13.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.07	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.6		48.8	0.1	0.1	0.1	0.2		0.3	1.1	
Delay (s)	37.8	38.8		94.9	36.1	37.0	9.0	7.4		10.1	14.7	
Level of Service	D	D		F	D	D	A	A		B	B	
Approach Delay (s)		38.6			71.5			7.5			14.5	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	5	515	7	3	1312
Future Volume (Veh/h)	0	5	515	7	3	1312
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	560	8	3	1426
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.82	0.96			0.96	
vC, conflicting volume	1283	284			568	
vC1, stage 1 conf vol	564					
vC2, stage 2 conf vol	719					
vCu, unblocked vol	682	172			467	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	510	815			1061	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	5	373	195	3	713	713
Volume Left	0	0	0	3	0	0
Volume Right	5	0	8	0	0	0
cSH	815	1700	1700	1061	1700	1700
Volume to Capacity	0.01	0.22	0.11	0.00	0.42	0.42
Queue Length 95th (m)	0.1	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	9.4	0.0	0.0	8.4	0.0	0.0
Lane LOS	A			A		
Approach Delay (s)	9.4	0.0		0.0		
Approach LOS	A					

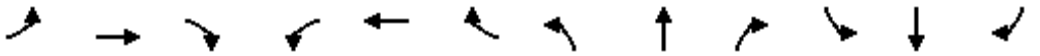
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	367	1230	101	76	789	587	188	623	133	343	397
v/c Ratio	1.13	0.67	0.18	0.41	0.51	0.81	0.58	0.66	0.28	0.70	0.39
Control Delay	150.3	44.7	4.2	29.5	44.8	27.0	75.8	56.3	9.9	72.7	28.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	150.3	44.7	4.2	29.5	44.8	27.0	75.8	56.3	9.9	72.7	28.0
Queue Length 50th (m)	~69.1	120.4	0.0	12.8	74.3	68.2	29.8	93.2	1.7	54.2	32.6
Queue Length 95th (m)	#102.1	142.6	9.1	23.4	90.3	128.6	42.6	117.3	19.2	68.9	47.9
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	326	1830	555	203	1540	722	377	946	468	657	1016
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.13	0.67	0.18	0.37	0.51	0.81	0.50	0.66	0.28	0.52	0.39

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.



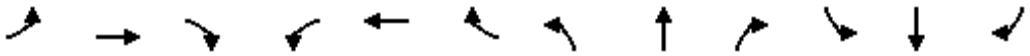
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	367	1230	101	76	789	587	188	623	133	343	210	187
Future Volume (vph)	367	1230	101	76	789	587	188	623	133	343	210	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.90	1.00	1.00	0.91	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3267	4902	1287	1525	4641	1416	3177	3544	1411	3395	2956	
Flt Permitted	0.95	1.00	1.00	0.14	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3267	4902	1287	221	4641	1416	3177	3544	1411	3395	2956	
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)	367	1230	101	76	789	587	188	623	133	343	210	187
RTOR Reduction (vph)	0	0	63	0	0	253	0	0	92	0	100	0
Lane Group Flow (vph)	367	1230	38	76	789	334	188	623	41	343	297	0
Confl. Peds. (#/hr)	62		28	28		62	23		61	61		23
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	6%	7%	17%	17%	13%	2%	9%	3%	3%	2%	5%	10%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	16.0	59.8	59.8	64.4	53.1	53.1	16.3	42.7	42.7	23.2	49.6	
Effective Green, g (s)	16.0	59.8	59.8	64.4	53.1	53.1	16.3	42.7	42.7	23.2	49.6	
Actuated g/C Ratio	0.10	0.37	0.37	0.40	0.33	0.33	0.10	0.27	0.27	0.14	0.31	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	326	1832	481	181	1540	469	323	945	376	492	916	
v/s Ratio Prot	c0.11	0.25		0.03	0.17		0.06	c0.18		c0.10	0.10	
v/s Ratio Perm			0.03	0.14		c0.24			0.03			
v/c Ratio	1.13	0.67	0.08	0.42	0.51	0.71	0.58	0.66	0.11	0.70	0.32	
Uniform Delay, d1	72.0	41.9	32.3	31.5	43.0	46.8	68.6	52.2	44.3	65.1	42.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	88.3	2.0	0.3	3.3	1.2	8.9	4.1	3.6	0.6	5.4	0.9	
Delay (s)	160.3	43.9	32.6	34.8	44.2	55.7	72.7	55.8	44.9	70.5	43.3	
Level of Service	F	D	C	C	D	E	E	E	D	E	D	
Approach Delay (s)		68.4			48.4			57.6			55.9	
Approach LOS		E			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	58.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	39	107	1526	6	769
v/c Ratio	0.33	0.27	0.18	0.50	0.02	0.25
Control Delay	22.8	22.8	3.0	3.0	1.6	1.2
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	22.8	22.8	3.0	3.3	1.6	1.2
Queue Length 50th (m)	1.6	0.7	4.0	38.8	0.1	8.5
Queue Length 95th (m)	5.8	11.3	8.8	53.8	m0.4	10.1
Internal Link Dist (m)	104.2	51.5		208.0		20.6
Turn Bay Length (m)			60.0		34.0	
Base Capacity (vph)	445	398	582	3068	251	3021
Starvation Cap Reductn	0	0	0	721	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.10	0.18	0.65	0.02	0.25

Intersection Summary

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



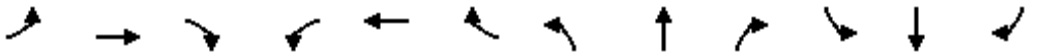
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	29	29	0	6	104	1453	27	5	681	4
Future Volume (vph)	4	0	29	29	0	6	104	1453	27	5	681	4
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0			5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99		0.98	1.00		0.99	1.00	
Frt		0.88			0.98		1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1649			1778		1783	3527		1806	3473	
Flt Permitted		0.96			0.78		0.36	1.00		0.15	1.00	
Satd. Flow (perm)		1589			1438		675	3527		291	3473	
Peak-hour factor, PHF	0.61	0.61	0.61	0.92	0.92	0.92	0.97	0.97	0.97	0.89	0.89	0.89
Adj. Flow (vph)	7	0	48	32	0	7	107	1498	28	6	765	4
RTOR Reduction (vph)	0	45	0	0	34	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	10	0	0	5	0	107	1526	0	6	769	0
Confl. Peds. (#/hr)	15		7	7		15	18		33	33		18
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.8			6.8		100.2	100.2		100.2	100.2	
Effective Green, g (s)		7.8			7.8		100.2	102.2		100.2	102.2	
Actuated g/C Ratio		0.06			0.06		0.84	0.85		0.84	0.85	
Clearance Time (s)		6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		103			93		563	3003		242	2957	
v/s Ratio Prot								c0.43			0.22	
v/s Ratio Perm		c0.01			0.00		0.16			0.02		
v/c Ratio		0.10			0.06		0.19	0.51		0.02	0.26	
Uniform Delay, d1		52.8			52.7		1.9	2.3		1.7	1.7	
Progression Factor		1.00			1.00		1.00	1.00		0.67	0.59	
Incremental Delay, d2		0.4			0.3		0.7	0.6		0.2	0.2	
Delay (s)		53.2			52.9		2.7	2.9		1.3	1.2	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		53.2			52.9			2.9			1.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	238	183	134	58	88	1426	44	652
v/c Ratio	0.17	0.49	0.96	0.27	0.14	0.17	0.66	0.28	0.33
Control Delay	34.8	35.7	99.6	35.3	8.6	6.6	12.3	23.1	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	35.7	99.6	35.3	8.6	6.6	12.3	23.1	14.8
Queue Length 50th (m)	7.9	41.0	41.7	24.6	0.0	4.7	100.5	5.3	41.3
Queue Length 95th (m)	14.1	49.8	#78.3	39.2	9.5	8.4	136.2	13.1	49.9
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	307	568	230	592	474	563	2176	155	1966
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	0.14	0.42	0.80	0.23	0.12	0.16	0.66	0.28	0.33

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 (vph)	33	110	71	168	123	53	85	1136	247	34	483	26
Future Volume (vph)	33	110	71	168	123	53	85	1136	247	34	483	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.91	1.00	0.96		1.00	1.00	
Flpb, ped/bikes	0.94	1.00		0.98	1.00	1.00	0.99	1.00		0.98	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	1781		1742	1921	1484	1725	3288		1789	3402	
Flt Permitted	0.62	1.00		0.43	1.00	1.00	0.36	1.00		0.15	1.00	
Satd. Flow (perm)	1054	1781		791	1921	1484	651	3288		276	3402	
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.97	0.97	0.97	0.78	0.78	0.78
Adj. Flow (vph)	43	145	93	183	134	58	88	1171	255	44	619	33
RTOR Reduction (vph)	0	21	0	0	0	44	0	13	0	0	3	0
Lane Group Flow (vph)	43	217	0	183	134	14	88	1413	0	44	649	0
Confl. Peds. (#/hr)	72		24	24		72	19		81	81		19
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	6%	0%	0%	3%	0%	0%	3%	4%	2%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	29.1	29.1		29.1	29.1	29.1	77.4	77.4		67.7	67.7	
Effective Green, g (s)	29.1	31.1		29.1	31.1	29.1	79.4	78.9		67.7	69.2	
Actuated g/C Ratio	0.24	0.26		0.24	0.26	0.24	0.66	0.66		0.56	0.58	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	461		191	497	359	508	2161		155	1961	
v/s Ratio Prot		0.12			0.07		0.01	c0.43			0.19	
v/s Ratio Perm	0.04			c0.23		0.01	0.10			0.16		
v/c Ratio	0.17	0.47		0.96	0.27	0.04	0.17	0.65		0.28	0.33	
Uniform Delay, d1	35.9	37.5		44.8	35.4	34.8	7.5	12.3		13.6	13.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.82	0.83		1.00	1.00	
Incremental Delay, d2	0.3	0.8		52.4	0.3	0.0	0.1	1.4		4.5	0.5	
Delay (s)	36.2	38.3		97.3	35.7	34.8	6.2	11.6		18.1	13.7	
Level of Service	D	D		F	D	C	A	B		B	B	
Approach Delay (s)		38.0			65.6			11.3			14.0	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	6	1436	27	4	690
Future Volume (Veh/h)	0	6	1436	27	4	690
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	7	1561	29	4	750
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.90	0.88			0.88	
vC, conflicting volume	1958	795			1590	
vC1, stage 1 conf vol	1576					
vC2, stage 2 conf vol	383					
vCu, unblocked vol	1616	498			1400	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	172	461			436	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	7	1041	549	4	375	375
Volume Left	0	0	0	4	0	0
Volume Right	7	0	29	0	0	0
cSH	461	1700	1700	436	1700	1700
Volume to Capacity	0.02	0.61	0.32	0.01	0.22	0.22
Queue Length 95th (m)	0.4	0.0	0.0	0.2	0.0	0.0
Control Delay (s)	12.9	0.0	0.0	13.3	0.0	0.0
Lane LOS	B			B		
Approach Delay (s)	12.9	0.0		0.1		
Approach LOS	B					

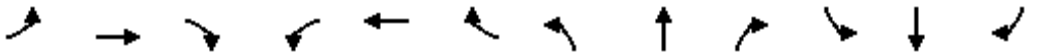
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix G

2025 Future Background and 2025 Future Total Conditions (Mitigated) Synchro Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	135	792	266	120	866	238	69	150	73	514	806
v/c Ratio	0.51	0.50	0.38	0.44	0.55	0.40	0.36	0.18	0.18	0.79	0.68
Control Delay	77.0	41.3	5.5	30.9	46.2	6.6	75.5	49.4	1.0	71.0	42.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.0	41.3	5.5	30.9	46.2	6.6	75.5	49.4	1.0	71.0	42.8
Queue Length 50th (m)	21.4	72.1	0.0	21.6	83.8	0.0	10.9	20.2	0.0	80.5	104.6
Queue Length 95th (m)	32.8	87.7	19.9	35.9	101.2	20.7	19.2	30.5	0.0	99.4	129.0
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	292	1587	692	273	1581	601	253	824	406	721	1184
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	0.46	0.50	0.38	0.44	0.55	0.40	0.27	0.18	0.18	0.71	0.68

Intersection Summary



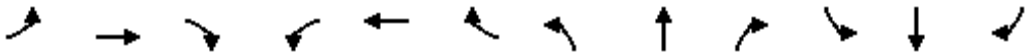
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	792	266	120	866	238	69	150	73	514	523	283
Future Volume (vph)	135	792	266	120	866	238	69	150	73	514	523	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.89	1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3120	4371	1439	1565	4812	1343	2705	3444	1209	3395	3171	
Flt Permitted	0.95	1.00	1.00	0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3120	4371	1439	491	4812	1343	2705	3444	1209	3395	3171	
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)	135	792	266	120	866	238	69	150	73	514	523	283
RTOR Reduction (vph)	0	0	169	0	0	160	0	0	56	0	45	0
Lane Group Flow (vph)	135	792	97	120	866	78	69	150	17	514	761	0
Confl. Peds. (#/hr)	72		5	5		72	4		27	27		4
Heavy Vehicles (%)	11%	20%	8%	14%	9%	6%	28%	6%	26%	2%	2%	6%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	13.5	58.1	58.1	62.6	52.6	52.6	11.4	38.3	38.3	30.6	57.5	
Effective Green, g (s)	13.5	58.1	58.1	62.6	52.6	52.6	11.4	38.3	38.3	30.6	57.5	
Actuated g/C Ratio	0.08	0.36	0.36	0.39	0.33	0.33	0.07	0.24	0.24	0.19	0.36	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	263	1587	522	259	1581	441	192	824	289	649	1139	
v/s Ratio Prot	c0.04	0.18		0.03	c0.18		0.03	0.04		c0.15	c0.24	
v/s Ratio Perm			0.07	0.15		0.06			0.01			
v/c Ratio	0.51	0.50	0.19	0.46	0.55	0.18	0.36	0.18	0.06	0.79	0.67	
Uniform Delay, d1	70.1	39.6	34.8	32.3	44.0	38.3	70.8	48.4	47.0	61.7	43.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	1.1	0.8	2.7	1.4	0.9	2.4	0.5	0.4	7.5	3.1	
Delay (s)	73.4	40.8	35.6	35.0	45.3	39.2	73.2	48.9	47.4	69.2	46.3	
Level of Service	E	D	D	D	D	D	E	D	D	E	D	
Approach Delay (s)		43.3			43.1			54.3			55.2	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	47.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	102.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	152	20	572	1521
v/c Ratio	0.64	0.09	0.21	0.54
Control Delay	45.5	4.9	3.5	6.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	45.5	4.9	3.5	6.8
Queue Length 50th (m)	23.5	0.9	13.9	108.9
Queue Length 95th (m)	30.7	3.6	24.3	109.1
Internal Link Dist (m)	104.2		208.0	20.6
Turn Bay Length (m)		60.0		
Base Capacity (vph)	457	216	2689	2820
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.09	0.21	0.54

Intersection Summary

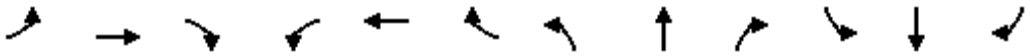


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	109	0	0	0	18	509	0	0	1307	1
Future Volume (vph)	1	0	109	0	0	0	18	509	0	0	1307	1
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0					6.0	5.0			5.0	
Lane Util. Factor		1.00					1.00	0.95			0.95	
Frpb, ped/bikes		0.98					1.00	1.00			1.00	
Flpb, ped/bikes		1.00					1.00	1.00			1.00	
Frt		0.87					1.00	1.00			1.00	
Flt Protected		1.00					0.95	1.00			1.00	
Satd. Flow (prot)		1634					1822	3380			3543	
Flt Permitted		1.00					0.14	1.00			1.00	
Satd. Flow (perm)		1633					275	3380			3543	
Peak-hour factor, PHF	0.72	0.72	0.72	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	1	0	151	0	0	0	20	572	0	0	1520	1
RTOR Reduction (vph)	0	42	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	110	0	0	0	0	20	572	0	0	1521	0
Confl. Peds. (#/hr)	9		4	4		9	6		14	14		6
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.5					94.5	94.5			94.5	
Effective Green, g (s)		14.5					94.5	95.5			95.5	
Actuated g/C Ratio		0.12					0.79	0.80			0.80	
Clearance Time (s)		6.0					6.0	6.0			6.0	
Vehicle Extension (s)		3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)		197					216	2689			2819	
v/s Ratio Prot								0.17			c0.43	
v/s Ratio Perm		c0.07					0.07					
v/c Ratio		0.56					0.09	0.21			0.54	
Uniform Delay, d1		49.7					2.9	3.0			4.4	
Progression Factor		1.00					1.00	1.00			1.25	
Incremental Delay, d2		3.4					0.8	0.2			0.6	
Delay (s)		53.1					3.8	3.2			6.1	
Level of Service		D					A	A			A	
Approach Delay (s)		53.1			0.0			3.2			6.1	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	35	212	177	49	70	49	465	38	1215
v/c Ratio	0.13	0.45	0.94	0.11	0.18	0.16	0.21	0.07	0.56
Control Delay	35.4	22.6	97.1	33.3	8.6	8.4	7.6	13.4	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	22.6	97.1	33.3	8.6	8.4	7.6	13.4	16.2
Queue Length 50th (m)	6.6	22.4	41.0	9.0	0.0	3.1	17.9	3.6	85.9
Queue Length 95th (m)	13.9	40.1	57.9	15.9	8.6	8.4	30.6	9.9	119.6
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	365	579	250	592	488	361	2223	548	2169
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	0.10	0.37	0.71	0.08	0.14	0.14	0.21	0.07	0.56

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	59	130	147	41	58	48	370	81	33	1031	14
Future Volume (vph)	31	59	130	147	41	58	48	370	81	33	1031	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1643	1664		1799	1921	1505	1685	3248		1765	3492	
Flt Permitted	0.73	1.00		0.45	1.00	1.00	0.17	1.00		0.48	1.00	
Satd. Flow (perm)	1254	1664		858	1921	1505	294	3248		901	3492	
Peak-hour factor, PHF	0.89	0.89	0.89	0.83	0.83	0.83	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	35	66	146	177	49	70	49	381	84	38	1199	16
RTOR Reduction (vph)	0	73	0	0	0	55	0	13	0	0	1	0
Lane Group Flow (vph)	35	139	0	177	49	15	49	452	0	38	1214	0
Confl. Peds. (#/hr)	35		6	6		35	10		24	24		10
Heavy Vehicles (%)	7%	7%	0%	1%	0%	3%	6%	9%	2%	0%	4%	23%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	26.3	26.3		26.3	26.3	26.3	80.2	80.2		72.5	72.5	
Effective Green, g (s)	26.3	28.3		26.3	28.3	26.3	82.2	81.7		72.5	74.0	
Actuated g/C Ratio	0.22	0.24		0.22	0.24	0.22	0.69	0.68		0.60	0.62	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	274	392		188	453	329	279	2211		544	2153	
v/s Ratio Prot		0.08			0.03		0.01	c0.14			c0.35	
v/s Ratio Perm	0.03			c0.21		0.01	0.11			0.04		
v/c Ratio	0.13	0.35		0.94	0.11	0.05	0.18	0.20		0.07	0.56	
Uniform Delay, d1	37.6	38.2		46.1	36.0	37.0	8.3	7.1		9.8	13.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.08	1.01		1.00	1.00	
Incremental Delay, d2	0.2	0.6		48.8	0.1	0.1	0.1	0.2		0.2	1.1	
Delay (s)	37.8	38.8		94.9	36.1	37.0	9.0	7.3		10.1	14.6	
Level of Service	D	D		F	D	D	A	A		B	B	
Approach Delay (s)		38.6			71.5			7.5			14.5	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	510	0	0	1308
Future Volume (Veh/h)	0	0	510	0	0	1308
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	554	0	0	1422
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.82	0.96			0.96	
vC, conflicting volume	1265	277			554	
vC1, stage 1 conf vol	554					
vC2, stage 2 conf vol	711					
vCu, unblocked vol	670	168			456	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	516	820			1072	

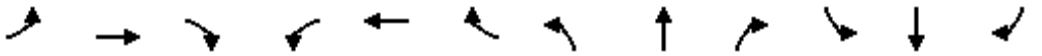
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	369	185	0	711	711
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.22	0.11	0.00	0.42	0.42
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	345	1230	101	76	789	568	188	610	133	329	382
v/c Ratio	0.89	0.67	0.18	0.41	0.54	0.82	0.58	0.64	0.27	0.69	0.38
Control Delay	94.2	44.7	4.2	29.8	47.5	28.0	75.8	55.1	5.2	72.8	27.6
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	94.2	44.7	4.2	29.8	47.5	28.0	75.8	55.1	5.2	72.8	27.6
Queue Length 50th (m)	56.7	120.4	0.0	12.8	76.5	65.8	29.8	90.4	0.0	52.1	31.0
Queue Length 95th (m)	#83.9	142.6	9.1	23.4	92.9	#126.1	42.6	114.0	11.6	66.5	46.1
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	387	1830	555	203	1453	696	377	960	494	657	1014
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	0.89	0.67	0.18	0.37	0.54	0.82	0.50	0.64	0.27	0.50	0.38

Intersection Summary

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

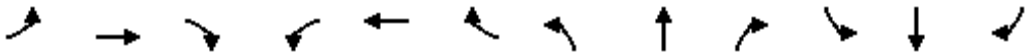


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	1230	101	76	789	568	188	610	133	329	205	177
Future Volume (vph)	345	1230	101	76	789	568	188	610	133	329	205	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.90	1.00	1.00	0.91	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3267	4902	1287	1525	4641	1416	3177	3544	1411	3395	2962	
Flt Permitted	0.95	1.00	1.00	0.15	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3267	4902	1287	235	4641	1416	3177	3544	1411	3395	2962	
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)	345	1230	101	76	789	568	188	610	133	329	205	177
RTOR Reduction (vph)	0	0	63	0	0	253	0	0	97	0	97	0
Lane Group Flow (vph)	345	1230	38	76	789	315	188	610	36	329	285	0
Confl. Peds. (#/hr)	62		28	28		62	23		61	61		23
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	6%	7%	17%	17%	13%	2%	9%	3%	3%	2%	5%	10%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	19.0	59.8	59.8	61.4	50.1	50.1	16.3	43.3	43.3	22.6	49.6	
Effective Green, g (s)	19.0	59.8	59.8	61.4	50.1	50.1	16.3	43.3	43.3	22.6	49.6	
Actuated g/C Ratio	0.12	0.37	0.37	0.38	0.31	0.31	0.10	0.27	0.27	0.14	0.31	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	387	1832	481	181	1453	443	323	959	381	479	918	
v/s Ratio Prot	c0.11	0.25		0.03	0.17		0.06	c0.17		c0.10	0.10	
v/s Ratio Perm			0.03	0.13		c0.22			0.03			
v/c Ratio	0.89	0.67	0.08	0.42	0.54	0.71	0.58	0.64	0.09	0.69	0.31	
Uniform Delay, d1	69.5	41.9	32.3	33.0	45.5	48.6	68.6	51.4	43.7	65.3	42.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	23.0	2.0	0.3	3.3	1.5	9.4	4.1	3.2	0.5	5.2	0.9	
Delay (s)	92.5	43.9	32.6	36.3	46.9	57.9	72.7	54.6	44.2	70.5	43.0	
Level of Service	F	D	C	D	D	E	E	D	D	E	D	
Approach Delay (s)		53.2			50.7			56.8			55.8	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	53.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	55	107	1470	769
v/c Ratio	0.33	0.18	0.48	0.25
Control Delay	22.8	2.8	2.9	1.2
Queue Delay	0.0	0.0	0.2	0.0
Total Delay	22.8	2.8	3.2	1.2
Queue Length 50th (m)	1.6	3.8	36.3	8.5
Queue Length 95th (m)	5.8	8.2	50.2	10.1
Internal Link Dist (m)	104.2		208.0	20.6
Turn Bay Length (m)		60.0		
Base Capacity (vph)	444	586	3083	3021
Starvation Cap Reductn	0	0	753	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.12	0.18	0.63	0.25

Intersection Summary



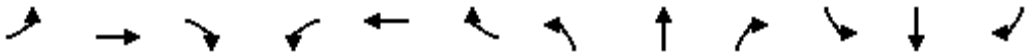
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	29	0	0	0	104	1426	0	0	681	4
Future Volume (vph)	4	0	29	0	0	0	104	1426	0	0	681	4
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0					6.0	5.0			5.0	
Lane Util. Factor		1.00					1.00	0.95			0.95	
Frpb, ped/bikes		0.98					1.00	1.00			1.00	
Flpb, ped/bikes		1.00					0.98	1.00			1.00	
Frt		0.88					1.00	1.00			1.00	
Flt Protected		0.99					0.95	1.00			1.00	
Satd. Flow (prot)		1649					1783	3544			3473	
Flt Permitted		0.95					0.36	1.00			1.00	
Satd. Flow (perm)		1583					675	3544			3473	
Peak-hour factor, PHF	0.61	0.61	0.61	0.92	0.92	0.92	0.97	0.97	0.97	0.89	0.89	0.89
Adj. Flow (vph)	7	0	48	0	0	0	107	1470	0	0	765	4
RTOR Reduction (vph)	0	45	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	10	0	0	0	0	107	1470	0	0	769	0
Confl. Peds. (#/hr)	15		7	7		15	18		33	33		18
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.8					101.2	101.2			101.2	
Effective Green, g (s)		7.8					101.2	102.2			102.2	
Actuated g/C Ratio		0.06					0.84	0.85			0.85	
Clearance Time (s)		6.0					6.0	6.0			6.0	
Vehicle Extension (s)		3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)		102					569	3018			2957	
v/s Ratio Prot								c0.41			0.22	
v/s Ratio Perm		c0.01					0.16					
v/c Ratio		0.10					0.19	0.49			0.26	
Uniform Delay, d1		52.8					1.8	2.3			1.7	
Progression Factor		1.00					1.00	1.00			0.59	
Incremental Delay, d2		0.4					0.7	0.6			0.2	
Delay (s)		53.2					2.5	2.8			1.2	
Level of Service		D					A	A			A	
Approach Delay (s)		53.2			0.0			2.8			1.2	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	238	183	134	58	88	1414	44	641
v/c Ratio	0.17	0.49	0.96	0.27	0.14	0.17	0.65	0.28	0.33
Control Delay	34.8	35.7	99.6	35.3	8.6	6.6	12.2	22.8	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	35.7	99.6	35.3	8.6	6.6	12.2	22.8	14.8
Queue Length 50th (m)	7.9	41.0	41.7	24.6	0.0	4.7	99.0	5.3	40.4
Queue Length 95th (m)	14.1	49.8	#78.3	39.2	9.5	8.3	134.4	13.0	49.0
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	307	568	230	592	474	569	2176	158	1966
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	0.14	0.42	0.80	0.23	0.12	0.15	0.65	0.28	0.33

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 (vph)	33	110	71	168	123	53	85	1124	247	34	474	26
Future Volume (vph)	33	110	71	168	123	53	85	1124	247	34	474	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.91	1.00	0.96		1.00	1.00	
Flpb, ped/bikes	0.94	1.00		0.98	1.00	1.00	0.99	1.00		0.98	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	1781		1742	1921	1484	1725	3286		1788	3402	
Flt Permitted	0.62	1.00		0.43	1.00	1.00	0.36	1.00		0.15	1.00	
Satd. Flow (perm)	1054	1781		791	1921	1484	661	3286		281	3402	
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.97	0.97	0.97	0.78	0.78	0.78
Adj. Flow (vph)	43	145	93	183	134	58	88	1159	255	44	608	33
RTOR Reduction (vph)	0	21	0	0	0	44	0	14	0	0	3	0
Lane Group Flow (vph)	43	217	0	183	134	14	88	1400	0	44	638	0
Confl. Peds. (#/hr)	72		24	24		72	19		81	81		19
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	6%	0%	0%	3%	0%	0%	3%	4%	2%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	29.1	29.1		29.1	29.1	29.1	77.4	77.4		67.7	67.7	
Effective Green, g (s)	29.1	31.1		29.1	31.1	29.1	79.4	78.9		67.7	69.2	
Actuated g/C Ratio	0.24	0.26		0.24	0.26	0.24	0.66	0.66		0.56	0.58	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	461		191	497	359	514	2160		158	1961	
v/s Ratio Prot		0.12			0.07		0.01	c0.43			0.19	
v/s Ratio Perm	0.04			c0.23		0.01	0.10			0.16		
v/c Ratio	0.17	0.47		0.96	0.27	0.04	0.17	0.65		0.28	0.33	
Uniform Delay, d1	35.9	37.5		44.8	35.4	34.8	7.5	12.3		13.5	13.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.82	0.83		1.00	1.00	
Incremental Delay, d2	0.3	0.8		52.4	0.3	0.0	0.1	1.4		4.3	0.4	
Delay (s)	36.2	38.3		97.3	35.7	34.8	6.2	11.5		17.9	13.7	
Level of Service	D	D		F	D	C	A	B		B	B	
Approach Delay (s)		38.0			65.6			11.2			13.9	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

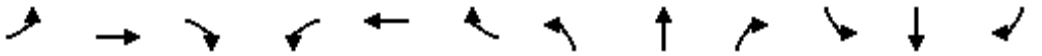
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	1430	0	0	685
Future Volume (Veh/h)	0	0	1430	0	0	685
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1554	0	0	745
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.91	0.89			0.89	
vC, conflicting volume	1926	777			1554	
vC1, stage 1 conf vol	1554					
vC2, stage 2 conf vol	372					
vCu, unblocked vol	1599	500			1374	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	175	464			450	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	1036	518	0	372	372
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.61	0.30	0.00	0.22	0.22
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	141	792	266	120	866	244	69	152	73	538	840
v/c Ratio	0.53	0.50	0.39	0.44	0.55	0.41	0.36	0.19	0.18	0.81	0.70
Control Delay	77.3	41.7	5.5	31.2	46.7	6.6	75.5	49.6	1.0	71.5	43.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.3	41.7	5.5	31.2	46.7	6.6	75.5	49.6	1.0	71.5	43.2
Queue Length 50th (m)	22.4	72.9	0.0	21.9	84.9	0.0	10.9	20.5	0.0	84.2	109.0
Queue Length 95th (m)	34.2	87.7	19.9	35.9	101.2	21.0	19.2	30.8	0.0	104.3	135.4
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	292	1575	688	271	1563	601	253	817	403	721	1194
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	0.48	0.50	0.39	0.44	0.55	0.41	0.27	0.19	0.18	0.75	0.70

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	792	266	120	866	244	69	152	73	538	537	303
Future Volume (vph)	141	792	266	120	866	244	69	152	73	538	537	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.89	1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3120	4371	1439	1565	4812	1343	2705	3444	1209	3395	3165	
Flt Permitted	0.95	1.00	1.00	0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3120	4371	1439	492	4812	1343	2705	3444	1209	3395	3165	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	792	266	120	866	244	69	152	73	538	537	303
RTOR Reduction (vph)	0	0	170	0	0	165	0	0	56	0	48	0
Lane Group Flow (vph)	141	792	96	120	866	79	69	152	17	538	792	0
Confl. Peds. (#/hr)	72		5	5		72	4		27	27		4
Heavy Vehicles (%)	11%	20%	8%	14%	9%	6%	28%	6%	26%	2%	2%	6%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	13.7	57.6	57.6	61.9	51.9	51.9	11.4	38.0	38.0	31.4	58.0	
Effective Green, g (s)	13.7	57.6	57.6	61.9	51.9	51.9	11.4	38.0	38.0	31.4	58.0	
Actuated g/C Ratio	0.09	0.36	0.36	0.39	0.32	0.32	0.07	0.24	0.24	0.20	0.36	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	267	1573	518	257	1560	435	192	817	287	666	1147	
v/s Ratio Prot	c0.05	0.18		0.03	c0.18		0.03	0.04		c0.16	c0.25	
v/s Ratio Perm			0.07	0.15		0.06			0.01			
v/c Ratio	0.53	0.50	0.18	0.47	0.56	0.18	0.36	0.19	0.06	0.81	0.69	
Uniform Delay, d1	70.1	40.0	35.1	32.7	44.5	38.8	70.8	48.7	47.2	61.4	43.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.6	1.2	0.8	2.8	1.4	0.9	2.4	0.5	0.4	8.1	3.4	
Delay (s)	73.6	41.2	35.9	35.5	46.0	39.7	73.2	49.2	47.6	69.5	46.8	
Level of Service	E	D	D	D	D	D	E	D	D	E	D	
Approach Delay (s)		43.8			43.7			54.4			55.7	
Approach LOS		D			D			D			E	

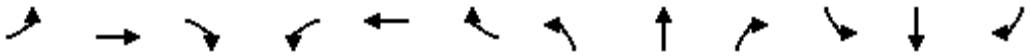
Intersection Summary			
HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	152	68	20	588	5	1521
v/c Ratio	0.64	0.61	0.09	0.22	0.01	0.54
Control Delay	45.5	48.5	5.3	3.6	1.8	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	48.5	5.3	3.6	1.8	6.8
Queue Length 50th (m)	23.5	7.1	0.9	14.3	0.1	109.2
Queue Length 95th (m)	30.7	21.8	3.7	25.0	m0.3	105.9
Internal Link Dist (m)	104.2	51.5		208.0		20.6
Turn Bay Length (m)			60.0		34.0	
Base Capacity (vph)	457	199	213	2684	630	2820
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	0.33	0.34	0.09	0.22	0.01	0.54

Intersection Summary

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

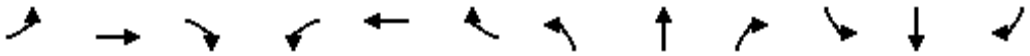


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	109	58	0	5	18	516	7	4	1307	1
Future Volume (vph)	1	0	109	58	0	5	18	516	7	4	1307	1
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0			5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		0.98	1.00	
Frt		0.87			0.99		1.00	1.00		1.00	1.00	
Flt Protected		1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1634			1809		1822	3373		1783	3543	
Flt Permitted		1.00			0.35		0.14	1.00		0.43	1.00	
Satd. Flow (perm)		1632			668		275	3373		806	3543	
Peak-hour factor, PHF	0.72	0.72	0.72	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	1	0	151	63	0	5	20	580	8	5	1520	1
RTOR Reduction (vph)	0	42	0	0	32	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	110	0	0	36	0	20	588	0	5	1521	0
Confl. Peds. (#/hr)	9		4	4		9	6		14	14		6
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.5			13.5		93.5	93.5		93.5	93.5	
Effective Green, g (s)		14.5			14.5		93.5	95.5		93.5	95.5	
Actuated g/C Ratio		0.12			0.12		0.78	0.80		0.78	0.80	
Clearance Time (s)		6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		197			80		214	2684		628	2819	
v/s Ratio Prot								0.17			c0.43	
v/s Ratio Perm		c0.07			0.05		0.07			0.01		
v/c Ratio		0.56			0.45		0.09	0.22		0.01	0.54	
Uniform Delay, d1		49.7			49.1		3.2	3.0		2.9	4.4	
Progression Factor		1.00			1.00		1.00	1.00		0.42	1.25	
Incremental Delay, d2		3.4			4.1		0.9	0.2		0.0	0.6	
Delay (s)		53.1			53.1		4.0	3.2		1.3	6.1	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		53.1			53.1			3.2			6.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	35	212	177	49	70	49	476	38	1223
v/c Ratio	0.13	0.45	0.94	0.11	0.18	0.16	0.21	0.07	0.56
Control Delay	35.4	22.6	97.1	33.3	8.6	8.3	7.6	13.4	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	22.6	97.1	33.3	8.6	8.3	7.6	13.4	16.3
Queue Length 50th (m)	6.6	22.4	41.0	9.0	0.0	3.1	18.6	3.6	86.6
Queue Length 95th (m)	13.9	40.1	57.9	15.9	8.6	8.4	31.5	9.9	120.7
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	365	579	250	592	488	358	2225	542	2169
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	0.10	0.37	0.71	0.08	0.14	0.14	0.21	0.07	0.56

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	59	130	147	41	58	48	380	81	33	1038	14
Future Volume (vph)	31	59	130	147	41	58	48	380	81	33	1038	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1643	1664		1799	1921	1505	1685	3250		1766	3492	
Flt Permitted	0.73	1.00		0.45	1.00	1.00	0.16	1.00		0.48	1.00	
Satd. Flow (perm)	1254	1664		858	1921	1505	290	3250		892	3492	
Peak-hour factor, PHF	0.89	0.89	0.89	0.83	0.83	0.83	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	35	66	146	177	49	70	49	392	84	38	1207	16
RTOR Reduction (vph)	0	73	0	0	0	55	0	12	0	0	1	0
Lane Group Flow (vph)	35	139	0	177	49	15	49	464	0	38	1222	0
Confl. Peds. (#/hr)	35		6	6		35	10		24	24		10
Heavy Vehicles (%)	7%	7%	0%	1%	0%	3%	6%	9%	2%	0%	4%	23%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	26.3	26.3		26.3	26.3	26.3	80.2	80.2		72.5	72.5	
Effective Green, g (s)	26.3	28.3		26.3	28.3	26.3	82.2	81.7		72.5	74.0	
Actuated g/C Ratio	0.22	0.24		0.22	0.24	0.22	0.69	0.68		0.60	0.62	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	274	392		188	453	329	276	2212		538	2153	
v/s Ratio Prot		0.08			0.03		0.01	c0.14			c0.35	
v/s Ratio Perm	0.03			c0.21		0.01	0.11			0.04		
v/c Ratio	0.13	0.35		0.94	0.11	0.05	0.18	0.21		0.07	0.57	
Uniform Delay, d1	37.6	38.2		46.1	36.0	37.0	8.3	7.1		9.8	13.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.07	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.6		48.8	0.1	0.1	0.1	0.2		0.3	1.1	
Delay (s)	37.8	38.8		94.9	36.1	37.0	9.0	7.4		10.1	14.7	
Level of Service	D	D		F	D	D	A	A		B	B	
Approach Delay (s)		38.6			71.5			7.5			14.5	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	5	515	7	3	1312
Future Volume (Veh/h)	0	5	515	7	3	1312
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	560	8	3	1426
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.82	0.96			0.96	
vC, conflicting volume	1283	284			568	
vC1, stage 1 conf vol	564					
vC2, stage 2 conf vol	719					
vCu, unblocked vol	682	172			467	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	510	815			1061	

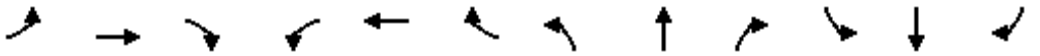
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	5	373	195	3	713	713
Volume Left	0	0	0	3	0	0
Volume Right	5	0	8	0	0	0
cSH	815	1700	1700	1061	1700	1700
Volume to Capacity	0.01	0.22	0.11	0.00	0.42	0.42
Queue Length 95th (m)	0.1	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	9.4	0.0	0.0	8.4	0.0	0.0
Lane LOS	A			A		
Approach Delay (s)	9.4	0.0		0.0		
Approach LOS	A					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	367	1230	101	76	789	587	188	623	133	343	397
v/c Ratio	0.95	0.67	0.18	0.41	0.54	0.85	0.58	0.66	0.27	0.70	0.39
Control Delay	103.4	44.7	4.2	29.8	47.5	31.3	75.8	56.3	5.3	72.7	28.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.4	44.7	4.2	29.8	47.5	31.3	75.8	56.3	5.3	72.7	28.0
Queue Length 50th (m)	60.7	120.4	0.0	12.8	76.5	75.2	29.8	93.2	0.0	54.2	32.6
Queue Length 95th (m)	#91.7	142.6	9.1	23.4	92.9	#150.0	42.6	117.3	11.7	68.9	47.9
Internal Link Dist (m)		563.5			156.8			158.8			208.0
Turn Bay Length (m)	120.0		100.0	78.0		90.0	81.5		73.0	101.0	
Base Capacity (vph)	387	1830	555	203	1453	694	377	946	489	657	1016
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	0.95	0.67	0.18	0.37	0.54	0.85	0.50	0.66	0.27	0.52	0.39

Intersection Summary

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



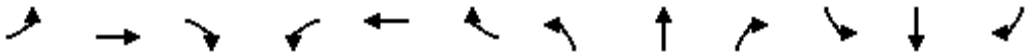
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	367	1230	101	76	789	587	188	623	133	343	210	187
Future Volume (vph)	367	1230	101	76	789	587	188	623	133	343	210	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7
Total Lost time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.90	1.00	1.00	0.91	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3267	4902	1287	1525	4641	1416	3177	3544	1411	3395	2956	
Flt Permitted	0.95	1.00	1.00	0.15	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3267	4902	1287	235	4641	1416	3177	3544	1411	3395	2956	
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)	367	1230	101	76	789	587	188	623	133	343	210	187
RTOR Reduction (vph)	0	0	63	0	0	251	0	0	98	0	100	0
Lane Group Flow (vph)	367	1230	38	76	789	336	188	623	35	343	297	0
Confl. Peds. (#/hr)	62		28	28		62	23		61	61		23
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	6%	7%	17%	17%	13%	2%	9%	3%	3%	2%	5%	10%
Bus Blockages (#/hr)	0	0	2	0	0	0	0	0	0	0	23	0
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6		6			4			
Actuated Green, G (s)	19.0	59.8	59.8	61.4	50.1	50.1	16.3	42.7	42.7	23.2	49.6	
Effective Green, g (s)	19.0	59.8	59.8	61.4	50.1	50.1	16.3	42.7	42.7	23.2	49.6	
Actuated g/C Ratio	0.12	0.37	0.37	0.38	0.31	0.31	0.10	0.27	0.27	0.14	0.31	
Clearance Time (s)	5.0	7.6	7.6	3.0	7.6	7.6	5.0	7.4	7.4	5.0	7.4	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	387	1832	481	181	1453	443	323	945	376	492	916	
v/s Ratio Prot	c0.11	0.25		0.03	0.17		0.06	c0.18		c0.10	0.10	
v/s Ratio Perm			0.03	0.13		c0.24			0.03			
v/c Ratio	0.95	0.67	0.08	0.42	0.54	0.76	0.58	0.66	0.09	0.70	0.32	
Uniform Delay, d1	70.0	41.9	32.3	33.0	45.5	49.5	68.6	52.2	44.1	65.1	42.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.1	2.0	0.3	3.3	1.5	11.5	4.1	3.6	0.5	5.4	0.9	
Delay (s)	103.1	43.9	32.6	36.3	46.9	61.0	72.7	55.8	44.6	70.5	43.3	
Level of Service	F	D	C	D	D	E	E	E	D	E	D	
Approach Delay (s)		56.0			52.1			57.6			55.9	
Approach LOS		E			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	55.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	39	107	1526	6	769
v/c Ratio	0.33	0.27	0.18	0.50	0.02	0.25
Control Delay	22.8	22.8	3.0	3.0	1.6	1.2
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	22.8	22.8	3.0	3.3	1.6	1.2
Queue Length 50th (m)	1.6	0.7	4.0	38.8	0.1	8.5
Queue Length 95th (m)	5.8	11.3	8.8	53.8	m0.4	10.1
Internal Link Dist (m)	104.2	51.5		208.0		20.6
Turn Bay Length (m)			60.0		34.0	
Base Capacity (vph)	445	398	582	3068	251	3021
Starvation Cap Reductn	0	0	0	721	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.10	0.18	0.65	0.02	0.25

Intersection Summary

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



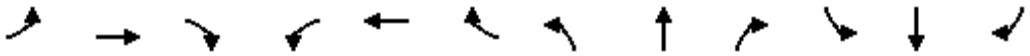
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	29	29	0	6	104	1453	27	5	681	4
Future Volume (vph)	4	0	29	29	0	6	104	1453	27	5	681	4
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Total Lost time (s)		5.0			5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99		0.98	1.00		0.99	1.00	
Frt		0.88			0.98		1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1649			1778		1783	3527		1806	3473	
Flt Permitted		0.96			0.78		0.36	1.00		0.15	1.00	
Satd. Flow (perm)		1589			1438		675	3527		291	3473	
Peak-hour factor, PHF	0.61	0.61	0.61	0.92	0.92	0.92	0.97	0.97	0.97	0.89	0.89	0.89
Adj. Flow (vph)	7	0	48	32	0	7	107	1498	28	6	765	4
RTOR Reduction (vph)	0	45	0	0	34	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	10	0	0	5	0	107	1526	0	6	769	0
Confl. Peds. (#/hr)	15		7	7		15	18		33	33		18
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	18	0	0	18
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.8			6.8		100.2	100.2		100.2	100.2	
Effective Green, g (s)		7.8			7.8		100.2	102.2		100.2	102.2	
Actuated g/C Ratio		0.06			0.06		0.84	0.85		0.84	0.85	
Clearance Time (s)		6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		103			93		563	3003		242	2957	
v/s Ratio Prot								c0.43			0.22	
v/s Ratio Perm		c0.01			0.00		0.16			0.02		
v/c Ratio		0.10			0.06		0.19	0.51		0.02	0.26	
Uniform Delay, d1		52.8			52.7		1.9	2.3		1.7	1.7	
Progression Factor		1.00			1.00		1.00	1.00		0.67	0.59	
Incremental Delay, d2		0.4			0.3		0.7	0.6		0.2	0.2	
Delay (s)		53.2			52.9		2.7	2.9		1.3	1.2	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		53.2			52.9			2.9			1.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	238	183	134	58	88	1426	44	652
v/c Ratio	0.17	0.49	0.96	0.27	0.14	0.17	0.66	0.28	0.33
Control Delay	34.8	35.7	99.6	35.3	8.6	6.6	12.3	23.1	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	35.7	99.6	35.3	8.6	6.6	12.3	23.1	14.8
Queue Length 50th (m)	7.9	41.0	41.7	24.6	0.0	4.7	100.5	5.3	41.3
Queue Length 95th (m)	14.1	49.8	#78.3	39.2	9.5	8.4	136.2	13.1	49.9
Internal Link Dist (m)		111.7		462.1			246.8		287.8
Turn Bay Length (m)	70.0		37.0		33.0	53.0		30.0	
Base Capacity (vph)	307	568	230	592	474	563	2176	155	1966
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	0.14	0.42	0.80	0.23	0.12	0.16	0.66	0.28	0.33

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 (vph)	33	110	71	168	123	53	85	1136	247	34	483	26
Future Volume (vph)	33	110	71	168	123	53	85	1136	247	34	483	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1860	1900	1640	1900	1900	1640
Total Lost time (s)	7.0	5.0		7.0	5.0	7.0	1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.91	1.00	0.96		1.00	1.00	
Flpb, ped/bikes	0.94	1.00		0.98	1.00	1.00	0.99	1.00		0.98	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	1781		1742	1921	1484	1725	3288		1789	3402	
Flt Permitted	0.62	1.00		0.43	1.00	1.00	0.36	1.00		0.15	1.00	
Satd. Flow (perm)	1054	1781		791	1921	1484	651	3288		276	3402	
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.97	0.97	0.97	0.78	0.78	0.78
Adj. Flow (vph)	43	145	93	183	134	58	88	1171	255	44	619	33
RTOR Reduction (vph)	0	21	0	0	0	44	0	13	0	0	3	0
Lane Group Flow (vph)	43	217	0	183	134	14	88	1413	0	44	649	0
Confl. Peds. (#/hr)	72		24	24		72	19		81	81		19
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	6%	0%	0%	3%	0%	0%	3%	4%	2%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	20	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)	29.1	29.1		29.1	29.1	29.1	77.4	77.4		67.7	67.7	
Effective Green, g (s)	29.1	31.1		29.1	31.1	29.1	79.4	78.9		67.7	69.2	
Actuated g/C Ratio	0.24	0.26		0.24	0.26	0.24	0.66	0.66		0.56	0.58	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	461		191	497	359	508	2161		155	1961	
v/s Ratio Prot		0.12			0.07		0.01	c0.43			0.19	
v/s Ratio Perm	0.04			c0.23		0.01	0.10			0.16		
v/c Ratio	0.17	0.47		0.96	0.27	0.04	0.17	0.65		0.28	0.33	
Uniform Delay, d1	35.9	37.5		44.8	35.4	34.8	7.5	12.3		13.6	13.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.82	0.83		1.00	1.00	
Incremental Delay, d2	0.3	0.8		52.4	0.3	0.0	0.1	1.4		4.5	0.5	
Delay (s)	36.2	38.3		97.3	35.7	34.8	6.2	11.6		18.1	13.7	
Level of Service	D	D		F	D	C	A	B		B	B	
Approach Delay (s)		38.0			65.6			11.3			14.0	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	6	1436	27	4	690
Future Volume (Veh/h)	0	6	1436	27	4	690
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	7	1561	29	4	750
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			45			271
pX, platoon unblocked	0.90	0.88			0.88	
vC, conflicting volume	1958	795			1590	
vC1, stage 1 conf vol	1576					
vC2, stage 2 conf vol	383					
vCu, unblocked vol	1616	498			1400	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	172	461			436	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	7	1041	549	4	375	375
Volume Left	0	0	0	4	0	0
Volume Right	7	0	29	0	0	0
cSH	461	1700	1700	436	1700	1700
Volume to Capacity	0.02	0.61	0.32	0.01	0.22	0.22
Queue Length 95th (m)	0.4	0.0	0.0	0.2	0.0	0.0
Control Delay (s)	12.9	0.0	0.0	13.3	0.0	0.0
Lane LOS	B			B		
Approach Delay (s)	12.9	0.0		0.1		
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix H

Transportation Demand Management Options Memorandum

April 20, 2020

IBI GROUP
200 East Wing – 360 James Street North
Hamilton ON L8L 1H5 Canada

tel 905 546 1010

Memorandum

To/Attention	City of Mississauga	**Date**	May 27, 2020
From	IBI Group	**Project No**	120212
Cc	Redwood Properties		
Subject	Transportation Demand Management Options Memorandum - 7085 Goreway Drive		

1.0 Introduction

Redwood Properties proposes to construct a high-rise residential development at 7085 Goreway Drive and has retained IBI Group Professional Services Canada Inc. (''IBI Group'') to complete a Traffic Demand Management (TDM) options memorandum for this development. In accordance with the City of Mississauga's TIS Guidelines, IBI Group is pleased to submit this Transportation Demand Management (TDM) memo as part of this TIS.

2.0 Overview of Development

The subject lands are located at 7085 Goreway Drive in the City of Mississauga (refer to **Exhibit 2-1**) and are situated about 250 metres northwest of the Goreway Drive and Derry Road E intersection, on the northeast side of Goreway Drive. The subject lands cover an area of 9,870 m^2 and is currently the site of the former Starwind Supermarket.

The subject lands are located within the Malton Village neighbourhood in Mississauga, bordering both Brampton and Toronto. The site is located within a major thoroughfare of these municipalities.

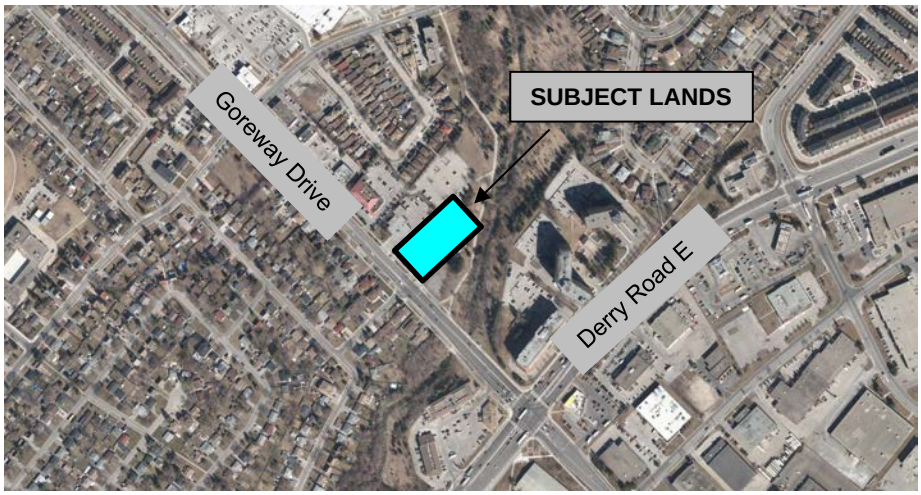
The site is bordered by low-density residential neighbourhoods consisting of single-detached and multi-family homes to the southwest and northwest side. It borders a fire station and retail plaza directly northwest and abuts the Malton Greenway and Mimico Creek spanning southeast to the north. The subject lands are within walking and cycling distance of retail plazas, restaurants, a gas station, arena, medical services, light industrial buildings and other residential developments to the southeast, closer to the Goreway Drive and Derry Road E intersection.

The proposal is to construct a high-rise residential building with two towers, 18-storey with 138 residential units and 16-storey with 121 residential units along the southeast limits of the site, linked by a two storey amenities podium and a block of 12 two storey townhouse units along the northwest limit of the site, totaling 271 residential units.

On the ground floor, a bike room will be provided with 74 spaces, approximately 292 bike spaces will be provided through the site. Underground parking will be provided, with 318 residential spaces and 54 visitor spaces, totalling 372 parking spaces.

The subject lands will be accessible from Goreway Drive and will have an access point from the pedestrian connection to the Malton Greenway Trail.

Exhibit 2-1: Subject Lands (aerial view)



Source: Mississauga Maps (2018)

3.0 Existing TDM-supportive Infrastructure

3.1 Active Transportation

The subject lands are nearby to the following active transportation facilities:

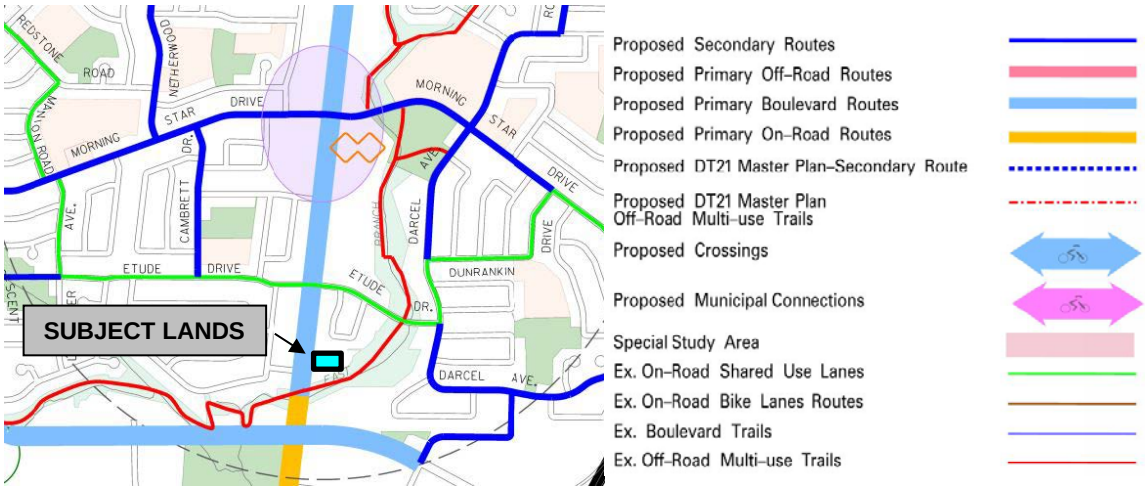
1. An existing off-road paved multi-use trail, part of the Malton Greenway, abutting the subject lands (refer to **Exhibit 3-1**);
2. An existing off-road paved multi-use trail, part of the Derry Road Trail (Wildwood Trail), 250 metres southeast of the subject lands (refer to **Exhibit 3-1**);
3. Existing signed bike route, part of the Malton Loop, 280 metres northwest of the subject lands (refer to **Exhibit 3-2**).

There are sidewalks on both sides of the street on Goreway Drive. Derry Road E south of Goreway Drive has a sidewalk on the northwest side and a paved multi-use trail on the southeast side. The neighbourhood opposite the development site on Goreway Drive has sidewalks on one side of the street.

City of Mississauga – May 27, 2020

Exhibit 3-1: City of Mississauga Malton Greenway Trail

Exhibit 3-2: City of Mississauga Existing and Proposed Cycling Facilities



Source: Mississauga Cycling Map (2010)

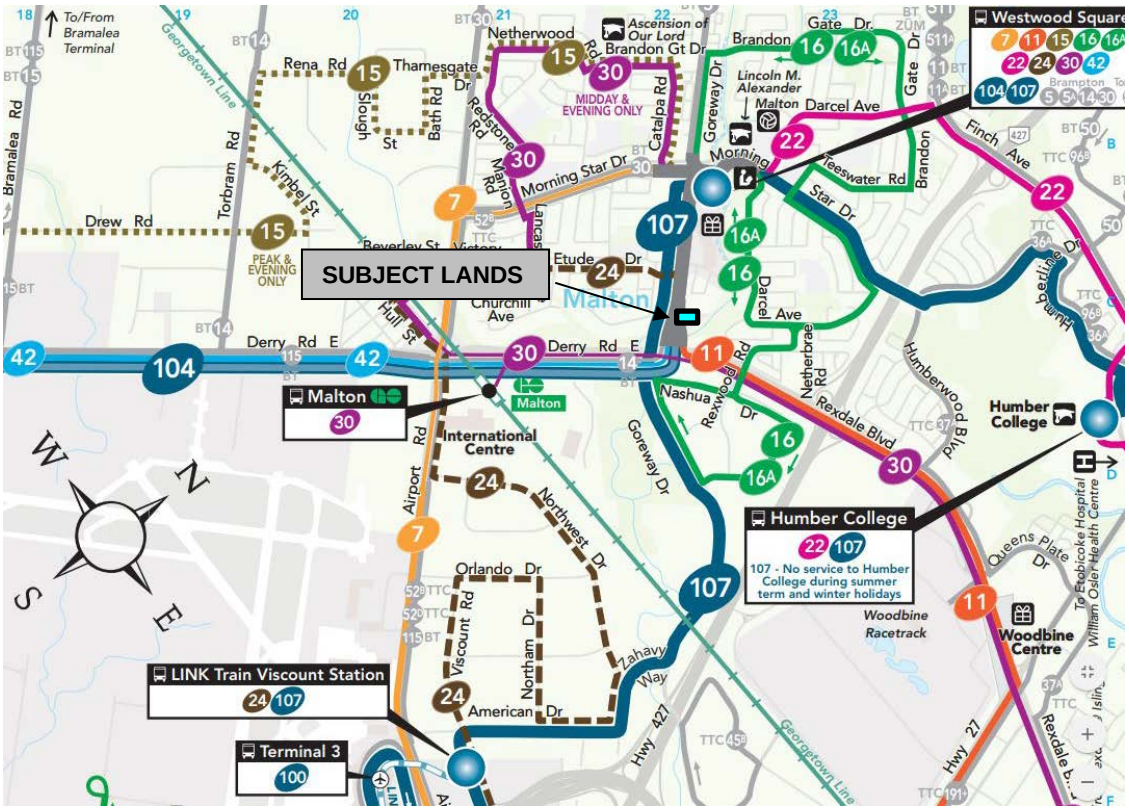
3.2 Transit

MiWay has multiple routes that run adjacent and near the subject lands. The subject lands are also provided overlapping inter-municipal transit service from Brampton Transit and TTC due to the proximity of their respective municipalities. These transit routes provide access to major transfer points – Westwood Square, Humber College, Pearson International Airport, Malton GO Station, and Bramalea Terminal – within City of Mississauga, City of Toronto and the City of Brampton. The Malton GO Station and adjacent parking lot is approximately 1 KM from the subject

lands and provides vital regional transit access via GO train (Kitchener Line) and bus (Route 38 – Bolton/Malton). A list of weekday routes in the surrounding area that are within a 10-minute walk from the subject lands (400m-800m) include:

- Route 11 (MiWay) – Westwood
- Route 14 (Brampton Transit) – Torbram
- Route 16/A (MiWay) - Malton
- Route 24 (MiWay) – Northwest
- Route 30 (MiWay) – Rexdale
- Route 42 (MiWay) – Derry
- Route 52B (TTC) – Lawrence West
- Express Route 104 (MiWay) – Derry Express
- Express Route 107 (MiWay) – Malton Express

Exhibit 3-3: Existing Transit Routes



Source: City of Mississauga Transit System Map (Weekday)

4.0 Proposed On-Site TDM Measures

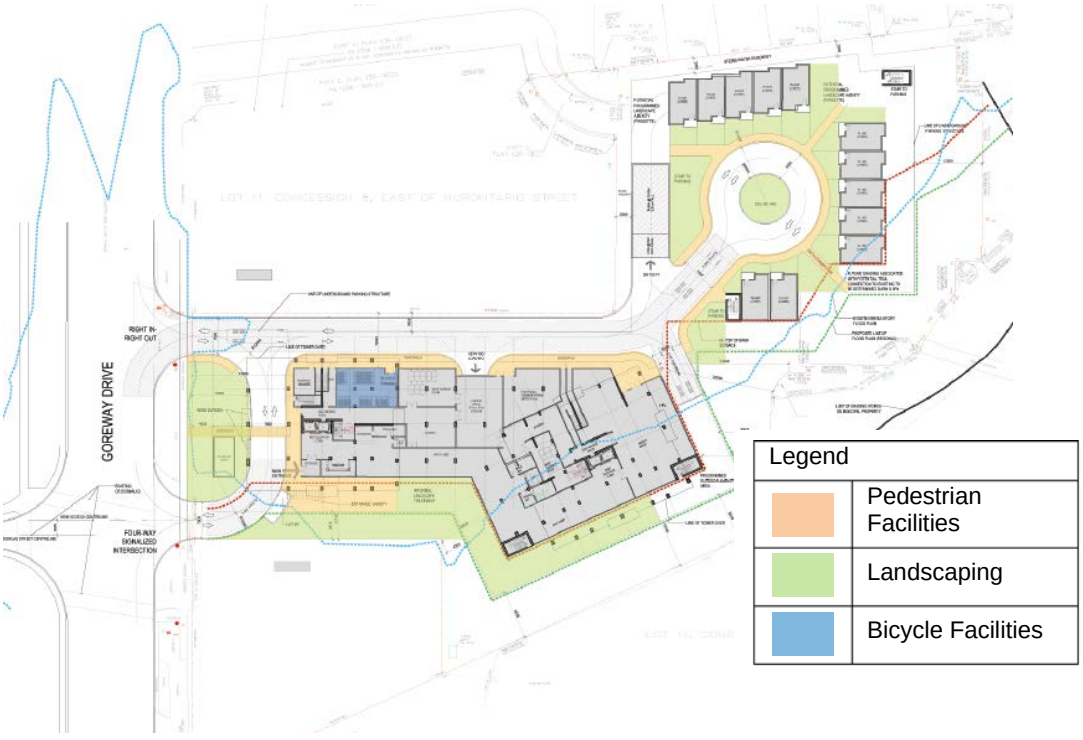
The TDM measures prescribed within this document are informed by The City of Mississauga's TDM Strategy and Implementation Plan, Peel Sustainable Transportation Strategy, Mississauga Official Plan, Region of Peel Official Plan, Region of Peel Long Range Transportation Plan, Mississauga Transportation Master Plan, and Mississauga Cycling Master Plan.

4.1 Active Transportation – Walking

The proposed site will have concrete sidewalks surrounding the high-rise residential buildings, with landscaped and amenity areas near the main entrance providing a pleasant pedestrian experience. Across the front loop, a crosswalk connecting to a concrete sidewalk will provide direct access from the building's main entrance to Goreway Drive. The laneway access has a concrete sidewalk adjacent to the north side of the high-rise residential buildings on one side and extends to the cul-de-sac of proposed townhouses on site. The sidewalks will be maintained with pedestrian amenities to provide safe and convenient pedestrian access to all development entrances. Pedestrian amenities include benches, textured surfaces, and planters. The proposed sidewalks will be complimented by landscaping.

Exhibit 4-1, shows the site plan including pedestrian facilities. The proposed development has one entrance to the main building off Goreway Drive and an east side entrance off the laneway. A path connection to the Malton Greenway Trail, paved multi-use trail, off the cul-de-sac is also established providing access to the subject lands. Signage will be provided for clear wayfinding to all active transportation.

Exhibit 4-1: Proposed Site Plan



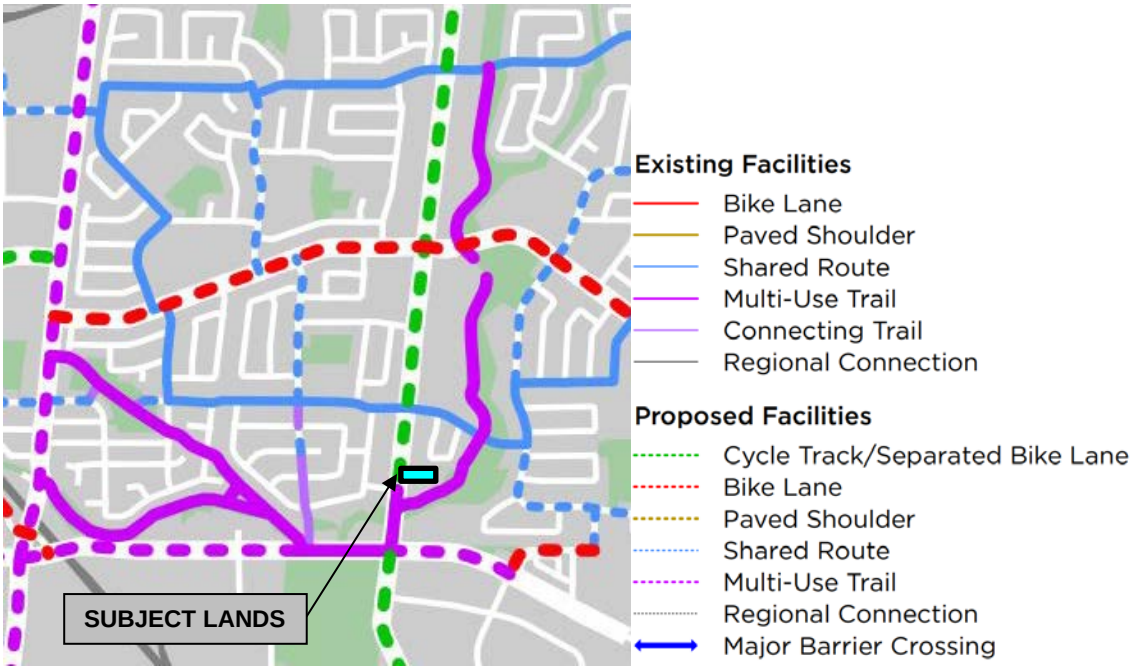
4.2 Active Transportation – Cycling

The subject lands are adjacent to Goreway Drive where a cycle track/separated bike lane are proposed (refer to **Exhibit 4-2**). The subject lands are adjacent to the existing Malton Greenway multi-use trail that will directly connect with the proposed multi-use trail on Derry Road E. The existing and proposed cycling network surrounding the subject lands will support safe cycling in Mississauga and added infrastructure will encourage residents to cycle to and from their destination.

Based on the City of Mississauga's TDM guidelines, a recommended minimum bike parking requirement for the proposed development would be 0.8 spaces per unit and 6 spaces for visitors. The development will have short-term bike parking facilities, ring-and-post, located securely near the entrance of the main building and other convenient locations throughout the site to accommodate visitors. Approximately 292 bicycle parking spaces will be provided on site. The development will have a designated bike parking room on the ground floor with 74 bike parking spaces accessible from the north side of the main building (refer to **Exhibit 4-3**). The development will also have locker rooms within each of the three levels of the underground parking and on the second-floor podium, that can be used as bike lockers (refer to **Exhibit 4-4** and **Exhibit 4-5**). Safe and secure bicycle infrastructure is important in enabling and motivating cycling, as it can help both promote and security of bicycles.

In Mississauga 0.3% of all trips made by bicycles and 84% of these trips are 5km or less. The subject lands are surrounded by major hubs within this distance and make taking active transportation feasible. The Malton GO Station has cycling park and ride facilities for its riders, which will encourage the use of sustainable modes for the origin-destination trips.

Exhibit 4-2: Existing and Proposed Cycling Facilities

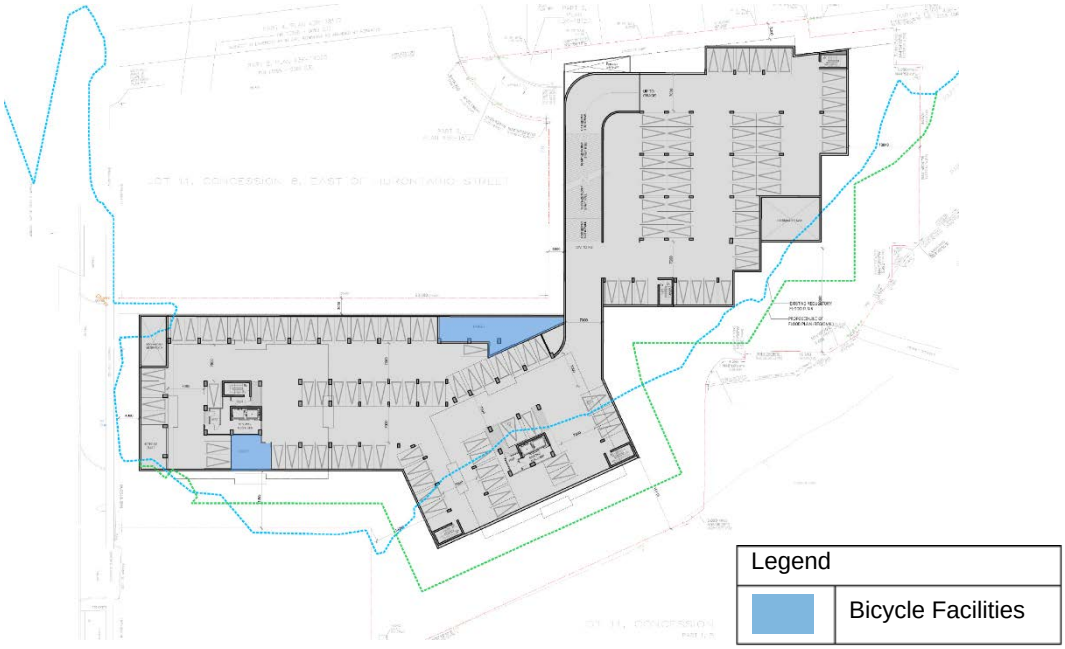


Source: Mississauga Cycling Map 2018 Final Report

Exhibit 4-3: Proposed Site Plan (bicycle facilities

Exhibit 4-4: 2nd Floor Podium Plan

Exhibit 4-5: Parking 1-3 Plan



4.3 Transit

The proposed development has access to multiple local and regional transit options connecting to major transit hubs.

The Malton GO Station, part of the Kitchener Line, already has high AM peak boardings with four weekday morning and four weekday return rail trips between Kitchener and Union Station. Planned future two-way all-day service every 15 minutes between Bramalea Terminal and Union Station will continue to increase ridership and further connect the area regionally.

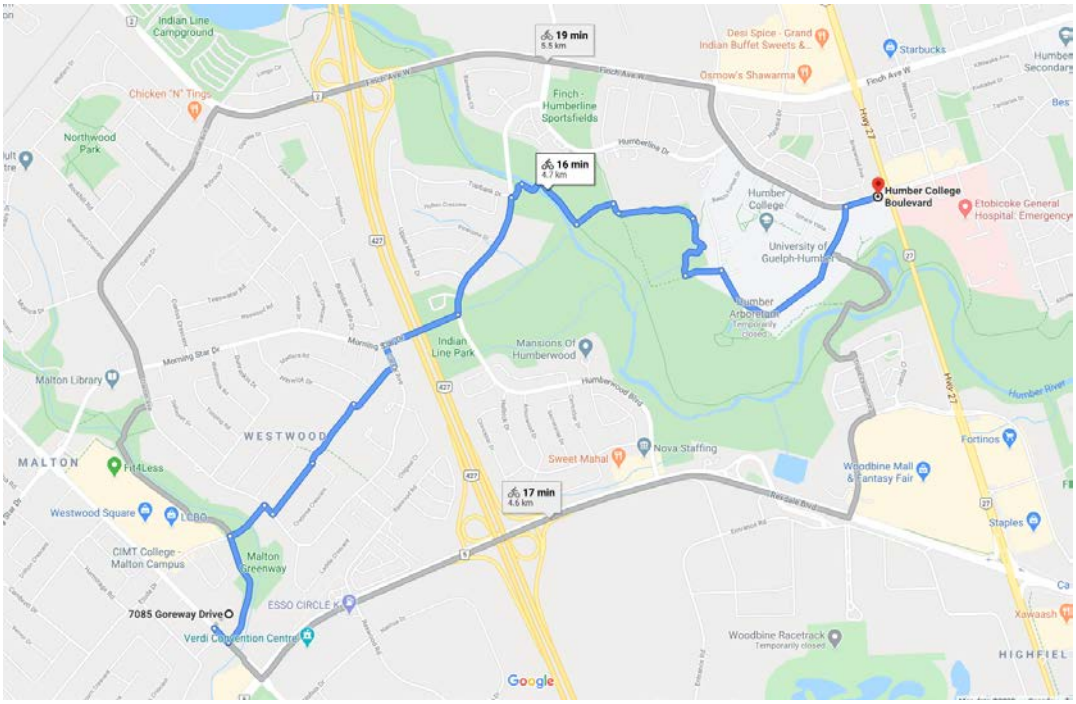
The proposed Finch West LRT (refer to **Exhibit 4-6**) at Humber College is accessible via MiWay and is within cycling distance (refer to **Exhibit 4-7**). The Finch West LRT is expected to be completed in 2023. The LRT will provide essential links to local and regional transit systems including TTC, GO Transit, MiWay, York Region Transit, VIVA, Brampton Transit, and ZUM services and give residents the opportunity to live, work, study, and play across these regions. The Finch West LRT will provide frequent, convenient, and reliable transit, service to support growth in northwest Toronto. The LRT will have dedicated tracks along Finch Avenue and will run every 5-7 minutes during peak hours, seamlessly connecting Humber College to TTC Finch West Subway Station in approximately 40 minutes. The new infrastructure will be accessible to carpoolers, transit riders, cyclists and pedestrians. With the completion of the Finch West LRT, a corresponding reduction in automobile dependence and usage is anticipated in the area.

City of Mississauga – May 27, 2020

Exhibit 4-6: Proposed Finch West LRT

Source: Metrolinx.com

Exhibit 4-7: Distance from subject lands to the Finch West LRT by bike



Source: Google Maps

Existing transit service (Route 104) within the area will feed into the proposed Hurontario LRT corridor, to be completed late 2024. The LRT system will connect Mississauga and Brampton from Port Credit to Brampton Terminal and provide high-quality transit service with the capacity to accommodate Mississauga's growth. **Exhibit 4-8** shows the proposed Hurontario LRT Line and other proposed transit lines.

Residents of the proposed development will also have access to Zum Transitway, Mississauga Transitway, and future 407 Transitway via connecting local routes, supporting vital connections to York Region, City of Brampton, and the City of Toronto.

Furthermore, fare integration between MiWay, Brampton Transit and York Region Transit allows for seamless travel with no additional cost. In addition, transferring from GO Transit these transit agencies allows riders to pay a reduced face. Seamless travel between different transit systems contributes to the creation of a regional transit network.

Information regarding transit routes, schedules, connections, and other information regarding transit will be provided in print within the proposed development. Tenants of the development will also receive transit information in real-time via digital displays in shared amenities within the development such as lobbies, elevators, common areas, etc. Providing this real time information will encourage the use of the mode share because it is up-to-date and convenient.

Exhibit 4-8: Proposed Hurontario LRT Line

Source: Metrolinx.com

4.4 Parking

There are three pedestrian access points to the underground parking near the proposed townhomes. There is also pedestrian access to the underground parking from the main buildings. There is one vehicle access point to the underground parking.

The proposed development provides 372 parking spaces, included 318 resident spaces and 54 visitor spaces.

Providing unbundled parking ensures parking is not an automatic requirement with the sale of the unit, reducing the need for excessive parking beyond the minimum requirement. Providing TDM measures in lieu of parking will can ensure tenants consider sustainable transportation as a feasible option.

Designating some of the visitor parking spaces for carsharing vehicles will be investigated.

4.5 Carpooling

Residents of the development have access to the Smart Commute tool as a member of the public. The carpool ride-matching tool is a convenient online tool that matches users with other people in the Smart Commute network that are looking for a carpool rider, driver, or both by matching where people live and work. Information about the tool will be provided to tenants. Carpooling and carsharing reduces the load on the transportation network during peak periods, while increasing system efficiency.

4.6 Wayfinding and Travel Planning

Information regarding the suite of transportation options in the area will be available to residents at the concierge desk, property management office, mailroom, and daycare/community program area. Tenants will have access to bike maps, trail maps, bus route maps and schedules, and online resources in their resident welcome package.

In addition, the development will provide sustainable transformation information in real-time regarding (i.e. transit schedules) via digital displays in shared amenities such as lobbies, elevators, common spaces, etc. This real-time information provides up-to-date and a convenient method to encourage the use of sustainable modes as they pose as constant reminders.

Residents of the development will also have access to the Smart Commute website which allows citizens to explore their sustainable transportation options. In addition to providing public transit options and routes, it provides access to carpool ride-mating programs, information on active transportation, emergency ride home programs, workplace programs, and discounted transit pass programs amongst other fun events and promotions. There are two Smart Commute associations that serve in the City of Mississauga: Smart Commute Pearson Airport Area (SCPAA) and Smart Commute Mississauga (SCM).

4.7 Education/Promotion and Incentives

Existing residents, tenants, and employees of the building have access to the Smart Commute website which includes trip planning resources, online tools, and information on various promotions and incentives as a member of the public. As a member of the public, residents of the development are eligible to receive incentives and participate during various promotional campaigns such as Smart Commute Month, Carpool Week, Bike to Work Day, and Bike Month.

The development will also investigate potential partnership opportunities with the municipality to deliver transportation education programs, transportation fairs, training programs and community-based social marketing and travel planning programs.

5.0 Conclusion

Based on the existing and proposed TDM measures noted in this memo, the Redwood Properties project is well suited to serve pedestrians, cyclists, and transit users. We trust the above will satisfy the requirements of the TDM plan.

Due to the existing and proposed TDM measures noted within this memo, the proposed development at 7085 Goreway Drive supports the City of Mississauga's TDM goals. Whether it is cycling, walking, taking the bus, or taking the future LRT system, there is ample opportunity for future residents to choose sustainable transportation modes.

6.0 Recommendations

The following recommendations are highlighted throughout the memo, providing these measures will ensure the development will be well suited to serve sustainable transportation users.

- The proposed site will have concrete sidewalks surrounding the high-rise residential buildings with landscaped and amenity areas near the main entrance providing a pleasant pedestrian experience.
- The proposed sidewalks will have pedestrian amenities that provide safe and convenient pedestrian access to all entrances. Pedestrian amenities include benches, textured surfaces, and planters and will be complimented by landscaping.
- Signage should be provided for clear wayfinding to all active transportation facilities.
- The development will have 6 short-term bike parking facilities located securely near the entrance of the main building and other convenient locations throughout the site to accommodate visitors.
- The development will have a designated bike parking room on the ground floor with 74 bike parking spaces and there are storage lockers on each level of underground parking and on the second-floor podium, that can be used as bike lockers. In total, approximately 292 bicycle parking spaces will be provided on site.
- Information regarding transit routes, schedules, connections, and other information regarding transit will be provided in the resident welcome package.
- Tenants of the development will also receive transit information in real-time via digital displays in shared amenities within the development such as lobbies, elevators, common areas, etc.
- Parking spaces will be unbundled from the sale of the unit.
- Designating some of the visitor parking spaces for carsharing vehicles will be investigated.
- The development will investigate potential partnership opportunities with the municipality to deliver transportation education programs, transportation fairs, training programs and community-based social marketing and travel planning programs.

Appendix I

Vehicle Swept Path Analysis

PART 4, PLAN 43R-18127
PIN 13258 – 0059 (LT)
SUBJECT TO EASEMENT AS IN INST. RO954468 AS AMENDED BY RO964775

PART 2, PLAN 43R-14025
PIN 13258 – 0059 (LT)

PART 2, PLAN 43R-18127

LOT 11, CONCESSION 8, EAST OF HURONTARIO STREET

GOREWAY DRIVE

LINE OF UNDERGROUND PARKING STRUCTURE

RIGHT IN/ RIGHT OUT

LINE OF TOWER OVER

SIDEWALK

SERVICE/ LOADING

BICYCLE PARKING

PROPERTY MANAGER

WEST GARBAGE ROOM

ELECTRICAL/ COMMUNICATIONS METER ROOM

LOADING SPACE (3.5 m x 9.5 m x 4.6 m H)

WEST MOVING ROOM

CONCIERGE

PACKAGES

STAGING

WEST ELEVATOR LOBBY

WEST LOBBY

VESTIBULE

MAILROOM

WIND SCREEN

INTAKE AIR SHAFT

EXISTING CROSSWALKS

FOUR-WAY SIGNALIZED INTERSECTION

MAIN ENTRANCE

ENTRANCE CANOPY

LANDSCAPED AREA

AMENITY AREA

EAST MOVING ROOM

EAST ELEVATOR LOBBY

EAST LOBBY

AMENITY SPACE

2 FL.

STAGING

TH UNIT (LOWER)

STAIR TO PARKING

CUL-DE-SAC

PATH CONNECTION

DN TO P1

PAVED WALKWAY

PROPOSED 3m STORMWATER EASEMENT

EXISTING REGULATORY FLOOD PLAIN

PROPOSED LINE OF FLOOD PLAIN (REGIONAL)

6m TOP OF BANK SETBACK

LIMIT OF GRADING WORKS ON MUNICIPAL PROPERTY

EXISTING PARK

HYDRO VAULT ON CPAD

LOT 11, CONCESSION 8, EAST OF HURONTA

PART 1, PLAN 43R-6711
PIN 13258 – 0066 (LT)

LEGEND
EXISTING REGU
PROPOSED LINE
6m TOP OF BAN

N
CONSTRUCTION NORTH

5 0 5 10 20
1:500 (m)

IBI GROUP
55 St. Clair Avenue West, 7th Fl
Toronto ON M4V 2Y7 Canada
tel 416 596 1930
ibigroup.com

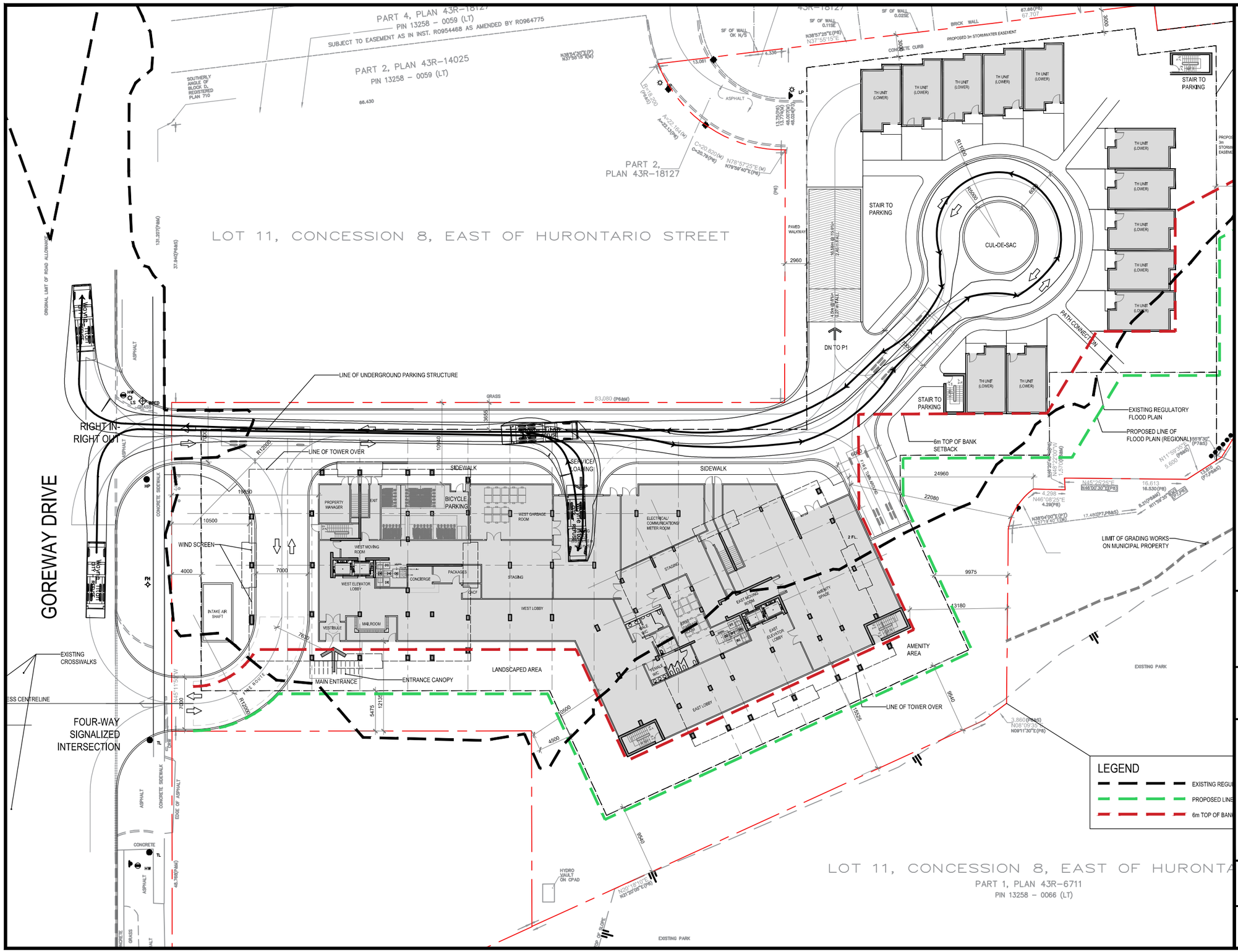
SCALE	1:500
DATE	April 20, 2020
PROJECT No.	120212

13056
3137 6096
Smeal Aerial RM 105ft
mm
Width : 2540
Track : 2413
Lock to Lock Time : 6.0
Steering Angle : 32.0

(NTS)

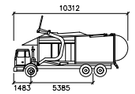
FIRE TRUCK TURNING MOVEMENT

FIGURE 1



IBI GROUP
55 St. Clair Avenue West, 7th Fl
Toronto ON M4V 2Y7 Canada
tel 416 596 1930
ibigroup.com

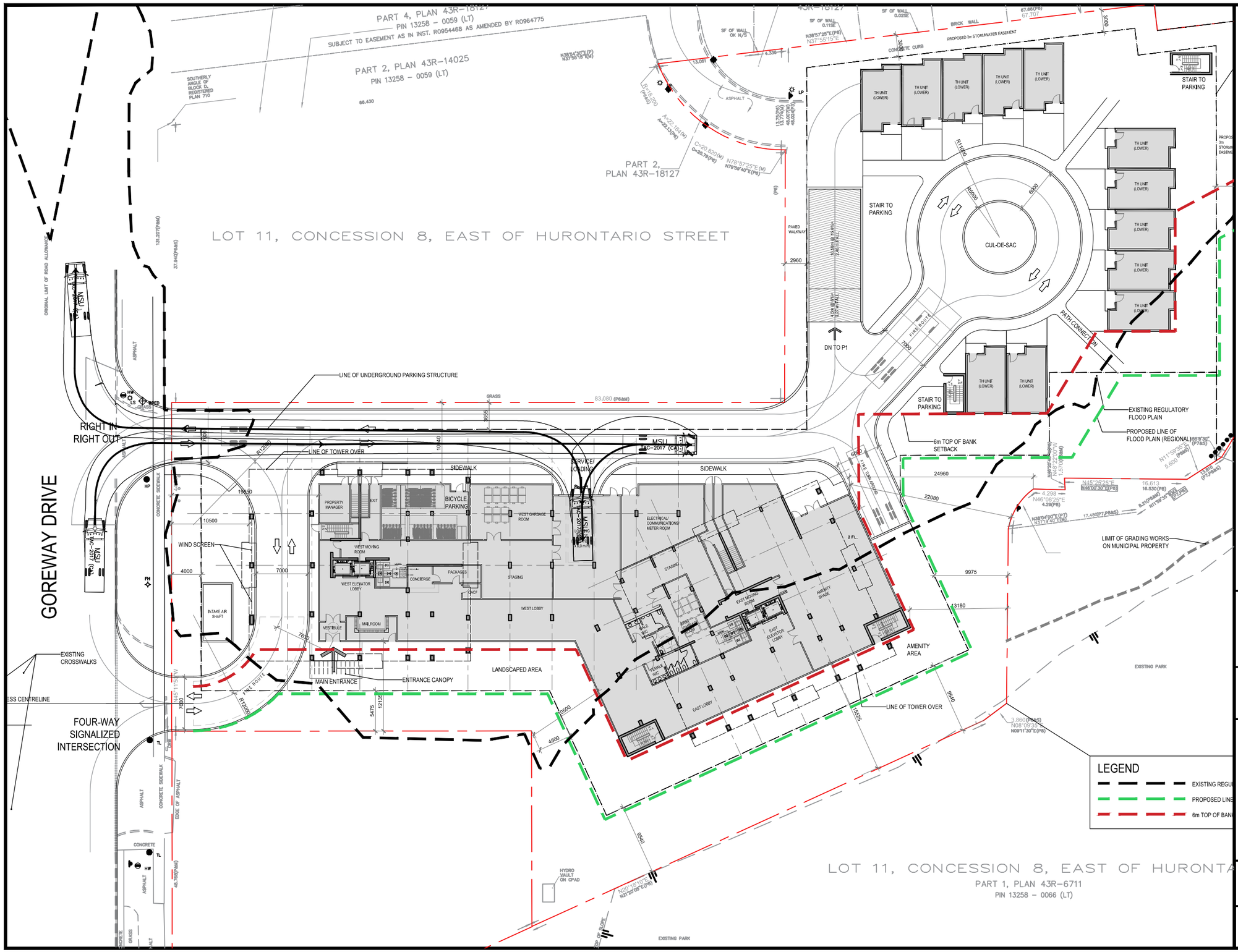
SCALE	1:500
DATE	April 20, 2020
PROJECT No.	120212



(NTS)

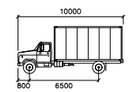
WAYNE TITAN TURNING MOVEMENT

FIGURE 2



IBI GROUP
55 St. Clair Avenue West, 7th Fl
Toronto ON M4V 2Y7 Canada
tel 416 596 1930
ibigroup.com

SCALE	1:500
DATE	April 20, 2020
PROJECT No.	120212



(NTS)

MSU TURNING MOVEMENT

FIGURE 3