Brampton Transit

BUS MAINTENANCE & STORAGE FACILITY

Appendix M

Traffic Impact Study

March 18, 2021

Prepared for

BRAMPTON Flower City
brampton.ca

Prepared by

IBI GROUP

Final Report

City of Brampton Transit Maintenance Facility Environmental Assessment Study – TPAP

Prepared for City of Brampton
by IBI Group
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1 Introduction

The City of Brampton's public transit system, Brampton Transit (BT) is continuing to expand and is projected to require a new transit maintenance and storage facility between 2022 and 2023. The City owns a parcel of land and is in the process of acquiring additional property for the construction of this new facility.

1.1 Study Objective

The objective of the traffic impact study is to assist in the preliminary design and the environmental assessment study of the maintenance storage facility. The surrounding road network was analysed for traffic impacts of the new facility using an existing conditions year 2019 and two horizon years: 2031 and 2041.

2 Context

2.1 Study Area

The study area is located in the north-east section of the City of Brampton. The proposed site is a regular shaped parcel of land, bordered by Highway 50 and Cadetta Road. City of Brampton staff were consulted on the scope of traffic study and the study area. As shown in Exhibit 2-1, the City of Brampton confirmed the study area to include five intersections, which are as follows:

- Major Mackenzie Drive / Coleraine Drive and Highway 50;
- Cadetta Road and Highway 50;
- Fastfrate Entrance and Highway 50;
- Old Castlemore Road; and
- Castlemore Road / Rutherford Road and Highway 50.

The site accesses on both Cadetta Road and Fastfrate Entrance will be analysed in the future conditions analysis.

2.2 Land Use

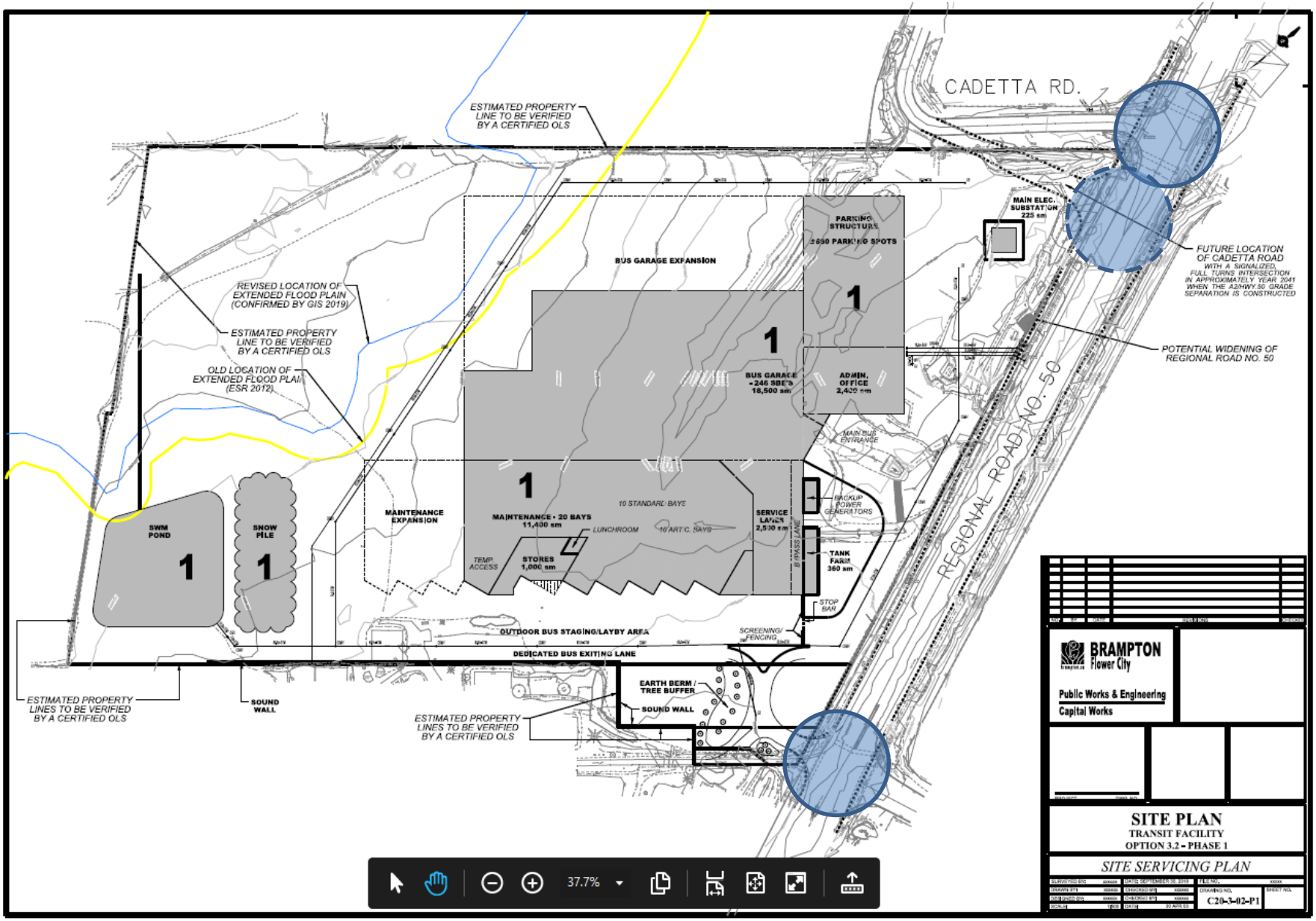
The study area falls under the City's Industrial Secondary Plan Area 47. From this plan, the existing land use is primarily agricultural and rural residential. For the area immediately adjacent to the site, there are industrial and commercial developments. As per the City's Official Plan ('Schedule A'), the study area is also identified as residential, industrial and a 'Corridor Protection Area'. Currently, there are less than 2200 residents 1200 jobs within this secondary plan area.

Exhibit 2-1: Study Area

2.3 Site Plan

The proposed site is to have two accesses. Vehicle access is proposed at Cadetta Road (north access) which is currently a signalized intersection. The second access is located at the opposite leg of the Fastfrate Entrance. This second access will connect to the existing farm property driveway (south access). This is further illustrated in Exhibit 2-2.

Exhibit 2-2: Proposed Site Plan (last updated September 30, 2019)



2.4 Existing Road Network

The following provides a summary and review of the road network.

Highway 50 is a north-south arterial road under the jurisdiction of the Region of Peel and serves as the Peel / York municipal boundary. Currently, this section of Highway 50 is a five lane road with two through lanes of traffic in each direction and a centre two-way left turn lane. It primarily serves as an industrial connector moving commuter and truck traffic between north-western Toronto, north-eastern Mississauga, south-eastern Brampton, Caledon, Simcoe and Dufferin areas. The posted speed limit is 80 km/h.

Coleraine Drive / Major Mackenzie Drive is an east-west minor arterial road. West of Highway 50, Coleraine Drive serves agricultural and rural residential areas. East of Highway 50, Major Mackenzie Drive serves industrial areas.

Cadetta Drive is a small access road that provides connections to a number of industrial properties.

Old Castlemore Road is a small access road that provides connection to residential and agricultural areas.

Castlemore Road / Rutherford Road is an east-west major arterial road under the jurisdiction of the City of Brampton. Under the City's Official Plan ('Schedule C'), Castlemore Road is also identified as a BRT corridor. The posted speed limit is 70 km/h.

2.5 Future Road Network

The future road network is based a number of recent and ongoing studies and plans for the study area:

- The City of Brampton has an ongoing Environmental Assessment, Arterial Roads EA within Highway 427 Industrial Secondary Plan Area.
- Peel Region has a completed EA, Highway 50 from Castlemore Road/Rutherford Road to Mayfield Road/Albion-Vaughan Road and Mayfield Road from Highway 50 to Coleraine Drive.
- Rutherford Road is identified in the York Region Transportation Master Plan as widening to six lanes for Transit / HOV lanes and is subject to future EA. As there may not be an increase in capacity for general purpose traffic, the configuration analyzed was kept four through lanes east-west for this study.

Within the Highway 50 corridor / study area, the Peel Region EA makes key recommendations:

- Highway / Peel Regional Road 50 is planned to be widened to seven lanes by 2031.
- The Region is planning a Single-Point Urban Interchange (SPUI) at Highway 50 & Major Mackenzie Drive, likely implemented in the long-term around 2041.
- There are a number of road realignments and new connections outside of the study area of this TIS, coordinated with the City EA, supporting development including Colearaine Drive realignment.

Coordination with City, Peel Region and their EA teams was undertaken for this assignment. The following documents key outcomes:

- The Highway 50 EA showed potential for reduced / eliminated site access (the EA showed restricted movements at Highway 50 and Cadetta Road).

- Ongoing safety review by Peel Region staff indicated that further traffic restrictions may be necessary compared to the EA draft design.
- City of Brampton team (this Traffic Study team) identified concerns relating to site access and need for coordination / resolution.
- Traffic information was shared with the EA team, and several joint traffic / EA meetings were held.
- Peel Region EA team undertook a detailed review, resulting in design changes to accommodate the transit facility and Cadetta Road.
- The revised design provides full movement access at Cadetta Road and at the south access / Fastfrate Entrance.
- The transit facility site was updated to accommodate the future Highway 50 / SPUI.

Overall the collaboration between the two teams enabled the site to proceed with two accesses as required for the facility. Because the Highway 50 / Major Mackenzie interchange is under separate EA with analysis using compatible traffic forecasts, the interchange (2041) was not included in this traffic study.

2.6 Traffic Volumes

Traffic volumes were provided by the Region of Peel. Exhibit 3-1 provides a summary of the date at which counts were undertaken for each study intersection. The intersections are dated between years 2017 and 2019. These counts are expected to be reflective of existing conditions and are attached in the Appendix.

Exhibit 2-3: Data Collection Summary Table

INTERSCTION	CONTROL TYPE	COUNT DATE
Highway 50 & Major Mackenzie Drive / Coleraine Drive	Signalized	2017-06-08
Highway 50 & Cadetta Road	Signalized	2017-06-08
Highway 50 & Fastfrate Entrance	Signalized	2018-03-20
Highway 50 & Old Castlemore Road	Unsignalized	2019-05-08
Highway 50 & Castlemore Road / Rutherford Road	Signalized	2018-04-11

2.7 Existing Traffic Operations

Intersection operations analysis was conducted using Synchro (version 9) and following Highway Capacity Manual (HCM 2000) methodologies of intersection analysis. Analysis periods were limited to the weekday AM and PM peak hours, when general background traffic is considered highest.

All critical traffic movements are identified with the following conditions (from City's TIS guidelines):

For signalized intersections,

- Volume-to-capacity (v/c) ratios for through movements or shared through/turning movements will operate at 0.85 or greater (0.85 is considered the maximum acceptable level-of-service for these movements);

- V/C ratios for exclusive turning movements increase to 0.90 or greater (0.90 is considered the maximum acceptable level-of-service for these movements):
- Queues for an individual movement are projected to exceed available turning lane storage at 95th percentile volumes.

For unsignalized intersections,

- Level-of-service, based on average delay per vehicle or individual movements is LOS 'D' or greater;
- The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

Level-of-service (LOS) is a measure of performance based on the control delay, as defined in Exhibit 2-4

Exhibit 2-4: Intersection LOS Reference

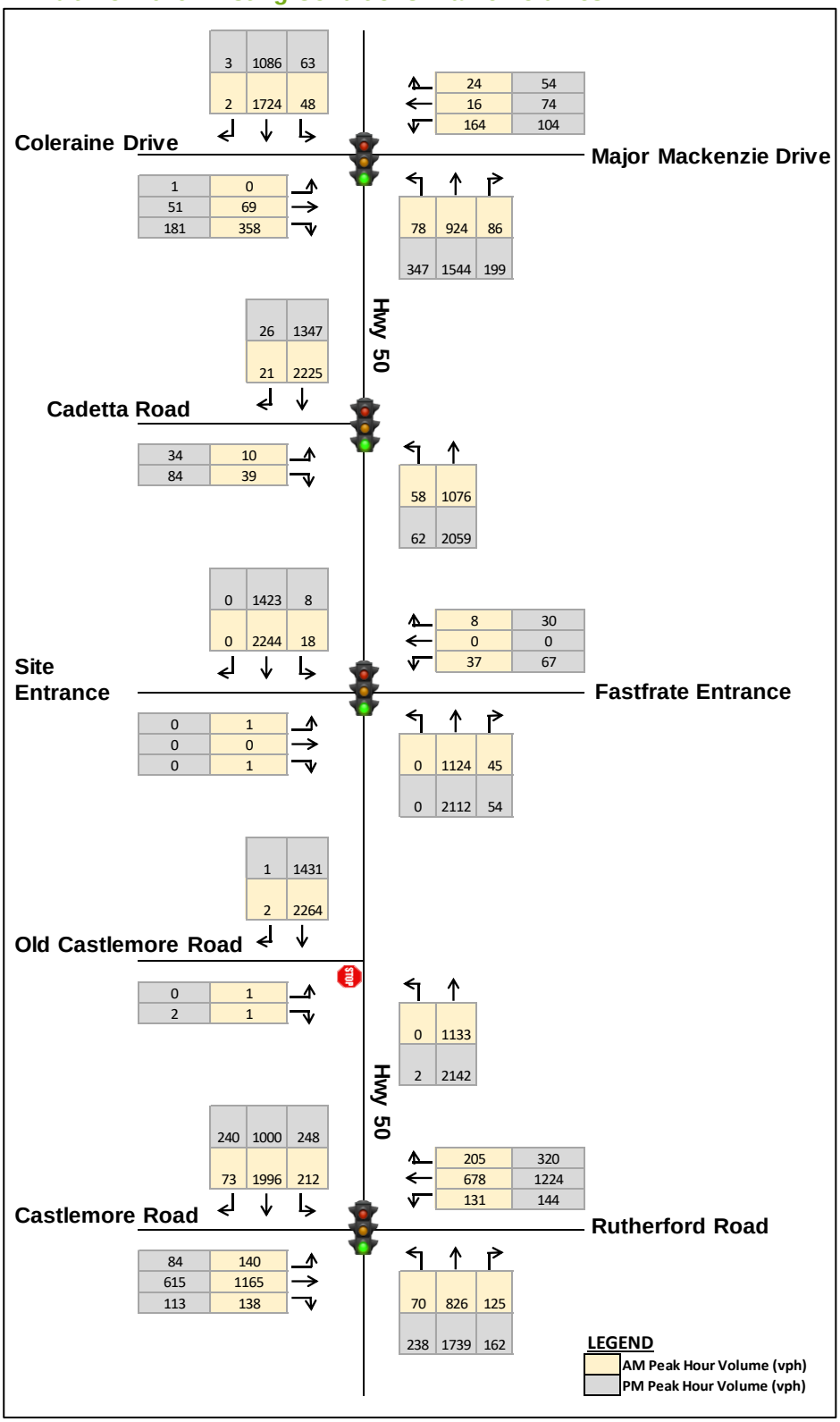
HCM LOS	CONTROL DELAY PER VEHICLE (S)	
	Signalized	Unsignalized
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Default parameter values listed in the City of Brampton TIS guidelines were used. This includes an ideal saturation rate of 1900 vehicles per hour, peak hour factor of 0.92, lane width of roads of 3.3m.

Operational concerns or deficiencies noted in the studied horizon years are identified and addressed through recommendations and potential mitigation measures and/or operational improvements.

For existing traffic operations, a summary of the analysis for the AM and PM peaks is found in Exhibit 2-6 with full Synchro outputs provided in Appendix B.

Exhibit 2-5: 2019 Existing Conditions Traffic Volumes



Note: Not to scale

Exhibit 2-6: Existing Traffic Analysis (Critical Movements) Summary

Intersection	Intersection LOS	Critical Movement					Storage Length (m)
		Mvmt	LOS	Delay (s)	V/C Ratio	95th %ile Queue (m)	
AM Peak							
Highway 50 & Coleraine Drive / Major Mackenzie Drive	F	WBT	F	489	1.90	161	-
		SBT	E	74	1.05	363	-
Highway 50 & Cadetta Road	B	SBT	C	26	0.96	411	-
		NEL	E	62	0.15	9	-
		NER	E	60	0.04	12	-
Highway 50 & Private Driveway / Fastfrate Entrance	C	EBT	E	66	0.00	-	-
		WBL	E	73	0.59	23	-
		WBT	E	58	0.01	-	-
		SBT	C	29	0.98	446	-
Highway 50 & Old Castlemore Road	-	NELR	F	181	0.09	2	-
Highway 50 & Castlemore Road / Rutherford Road	E	EBT	E	77	1.00	263	-
		WBL	F	134	1.03	82	250
		SBT	F	125	1.15	294	-
PM Peak							
Highway 50 & Coleraine Drive / Major Mackenzie Drive	D	WBT	F	116	1.00	138	-
		NBL	F	80	0.97	148	200
		NBT	D	49	0.98	356	-
Highway 50 & Cadetta Road	B	NEL	E	60	0.23	21	-
		NER	E	59	0.06	17	-
Highway 50 & Private Driveway / Fastfrate Entrance	B	WBL	E	67	0.60	33	-
		WBT	E	57	0.02	-	-
		NBT	B	15	0.89	363	-
Highway 50 & Old Castlemore Road	-	No critical movements					
Highway 50 & Castlemore Road / Rutherford Road	E	EBL	E	74	0.78	44	80
		WBT	E	76	1.00	260	-
		NBT	E	62	0.96	225	-
		SBL	F	232	1.34	157	85

During the weekday AM peak hour:

- Coleraine Drive / Major Mackenzie Drive is expected to operate extremely poorly at LOS F. The east approach is operating past capacity as a single lane with no turning lanes. There is high EBR demands which causes delays to WBL turning traffic onto Highway 50 going south. There is also a large SBT demand which causes the movement to operate at capacity (v/c = 1.05).
- Cadetta Road is operating at LOS B with high delays on its minor approach. This is due to long cycle lengths (160 seconds) and signal splits prioritized for the north-south traveling movements.
- The intersection at the Fastfrate Entrance is currently operating well at LOS C. Similar to Cadetta Road, due to long cycle lengths and high mainline volumes, the minor approach experiences long delays.
- Old Castlemore Road being unsignalized is operating poorly. Vehicles wishing to make a left turns will be required to wait several minutes for available gaps.

- Castlemore Road / Rutherford Road is expected to operate poorly at LOS E. The EBT and its opposing WBL movements are at capacity, operating at E and F respectively. With the large SBT demands, the movement is also overcapacity.

During the weekday PM peak hour:

- Coleraine Drive / Major Mackenzie Drive is expected to operate with moderate congestion at LOS D. The east approach continues to operate at capacity. There are heavy northbound demands, with the NBL and NBTR operating slightly below capacity.
- Cadetta Road is currently operating well at LOS B. The minor approach continues to operate with modest delays but under capacity.
- The intersection at the Fastfrate Entrance is also operating well at LOS B. The east approach experiences some delays. The NBT on Highway 50 causes the movement to be critical but with low overall average delays.
- Castlemore Road / Rutherford Road is experiencing high delays with critical movements for all approaches. The EBL and its opposing WBT movements are either critical or at capacity. The high NBT and SBL demands causes the conflicting movements to experience long delays, both of which are near or overcapacity.

Overall, the study intersections are operating with moderate/long delays with the a.m. peak being more critical. All study intersections are operating with critical movements, most notably Coleraine Drive / Major Mackenzie Drive and Castlemore Road / Rutherford Road intersections. It is also observed that traffic is generally oriented south during the a.m. peak hour and north during the p.m. peak hour. With high demands on the mainline, the minor streets experiences longer delays merging onto Highway 50 with minimal available gaps.

3 Site Traffic

This section documents the amount of trips expected to be generated and distributed to the local road network with the completion of the bus facility. Site peak periods refer to when site traffic is expected to be highest. This section is limited to background peak periods (7-9 AM & 4-6 PM), when the road network is expected to be most congested.

3.1 Trip Generation

Typically, trip generation for developments is based off of Institute of Transportation Engineers (ITE) Trip Generation Manual which considers the development's land-use type, square footage and other metrics for estimation. Due to the special nature of this facility and lack of information from the ITE manual, using estimated staffing numbers and types of operation is expected to provide a better basis for trip generation.

Preliminary employee numbers were developed based on the full build-out of the proposed facility. Staffing numbers will generally follow the values shown in Exhibit 3-1.

Exhibit 3-1: Staff Operations for new Brampton Facility

Employee Types	Number of Staff
Bus Operators	900
Mechanics	75
Technician Staff	35
Administration / Support Staff	55
Total	1065

Considering the use of the facility, traffic forecasts for passenger vehicles were separated into four different categories; bus operators, mechanics, technicians and administration / support staff. These categories were based on a review of existing operations of another Brampton Transit storage and maintenance facility (i.e. Sandalwood).

It is important to note that the above four categories reflect auto (passenger vehicle) trips and is further discussed in Section 4.1.1 below. In Section 4.1.2, bus fleet vehicle trips are discussed which reflect transit vehicles entering and exiting the proposed facility.

3.1.1 Passenger Vehicle Trips

To estimate trip rates, the City provided the Sandalwood Shift Schedule outlining the different shift periods for mechanics and technician staff. The number of shifts for a typical weekday was then divided by the total number of staff to attain trip rates. For administration and support staff, it was assumed that they will follow standard background operating times, where they will enter the facility during the a.m. peak hour and leave during the p.m. peak hour. For bus operators, other bus maintenance and storage facilities were reviewed to develop trip rates for bus fleet vehicle trips (refer to Section 4.1.2). Since the operators will need to depart to start their service around the City after they arrive at site, bus operator (passenger vehicle trips) were assumed to be the reverse of those trips during the same period.

With the above assumptions, a summary of the total traffic generated by the site for passenger vehicles is provided in Exhibit 3-2. Total passenger vehicle two-way trips is approximately 95 in the a.m. peak hour and 107 in the p.m. peak hour.

Exhibit 3-2: Site Trip Generation Summary (Passenger Vehicle Trips)

Parameters	# of Employees	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Mechanics[1]							
Trip Rates (trips/person)	75	0.196	0.110	0.306	0.137	0.196	0.333
Trip Ends		15	9	23	11	15	25
Technician Staff[1]							
Trip Rates (trips/person)	35	0.070	0.019	0.088	0.093	0.088	0.181
Trip Ends		3	1	4	4	4	7
Bus Operators[2]							
Trip Ends	900	13	0	13	0	20	20
Administration & Support Staff[3]							
Trip Rates (trips/person)	55	1.00	0.00	1.00	0.00	1.00	1.00
Trip Ends		55	0	55	0	55	55
Total (Passenger Vehicle Trips)	**1065**	***86***	***10***	***95***	***15***	***94***	***107***

Note:

[1]Based on shift schedule (dated July 1st) provided by Brampton Transit

[2]Assumed to be the reverse of the Bus Operators trip ends for their respective peak hours (refer to Section 4.1.2)

[3] Follows standard staff operating hours

3.1.2 Bus Fleet Trips

As discussed in Section 4.1.1, trip rates for bus fleet vehicle trips were estimated based on Northfield GRT Transit Facility and Hamilton maintenance and storage facility. These rates are shown below in Exhibit 3-3.

Exhibit 3-3: Site Trip Generation Summary (Bus Fleet Vehicle Trips)

Parameters	# of Employees	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Bus Fleet Vehicles[4]							
Trip Rates (trips/person)	900	0.014	0	0.014	0	0.022	0.022
Trip Ends		13	0	13	0	20	20
Total (Bus Fleet Vehicle Trips)	***900***	***13***	***0***	***13***	***0***	***20***	***20***

Note:

[4] Trip rates were developed based on review of Northfield GRT Transit Facility and Hamilton Maintenance and Storage Facility

These low volumes are anticipated as the majority of bus fleet vehicles are in operation around the City during the background peak periods. These vehicles are expected to minimally affect the local road network during peak times.

3.2 Trip Distribution

From the site plans, two accesses are proposed. Buses are expected to access and egress the site at the south access, whereas passenger vehicles are assumed to use the signalized north access in proximity to the planned parking structure (as shown in Exhibit 2-2).

Directional percentage split of site passenger vehicle traffic was developed through manual review of routes to and from the facility and based on existing traffic patterns (e.g. TMCs). The general direction of origin and destination for inbound and outbound trips was assumed to be that indicated in Exhibit 3-4. The resulting passenger vehicle site traffic distribution for the a.m. and p.m. peak hours is illustrated in Exhibit 3-6. The assigned trips is illustrated in Exhibit 3-7.

Exhibit 3-4: Passenger Vehicle Traffic Splits Per Direction

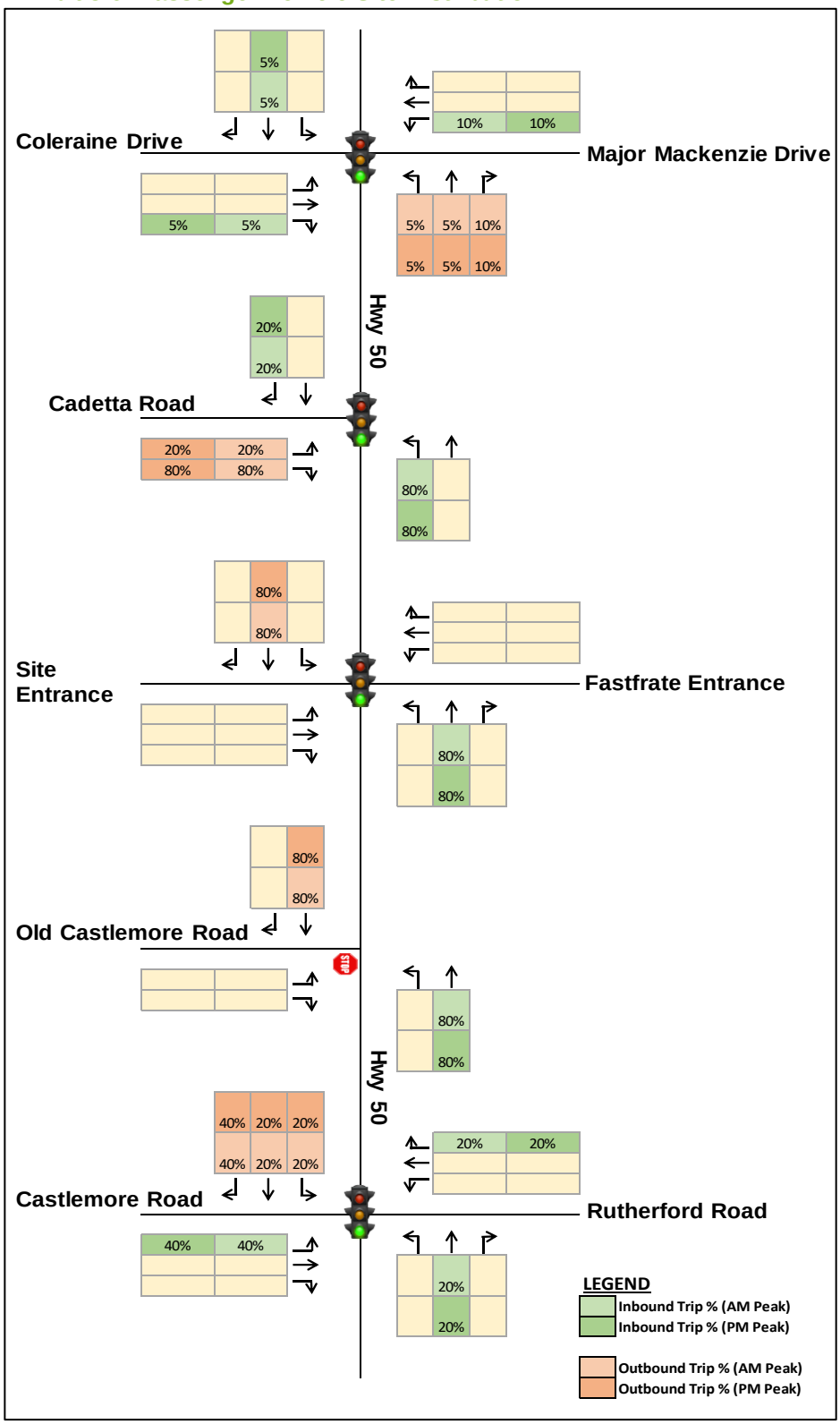
ORIGIN/DESTINATION	PERCENT DISTRIBUTION			
	AM Peak Hour		PM Peak Hour	
To / From the North	In	Out	In	Out
via Highway 50	5%	5%	5%	5%
via Coleraine Drive	5%	5%	5%	5%
via Major Mackenzie Drive	10%	10%	10%	10%
To / From the South	In	Out	In	Out
via Highway 50 / Queen Street	20%	20%	20%	20%
To / From the East	In	Out	In	Out
via Rutherford Road	20%	20%	20%	20%
To / From the West	In	Out	In	Out
via Castlemore Road	40%	40%	40%	40%

Bus traffic splits follows a different distribution due to the fact that buses operate on fixed routes for the location that they are serving. Upon review of existing bus routes and expected service area, it was assumed that most buses would travel to and from the north. The general direction of trips originating from and destining to the site are that indicated in Exhibit 3-5. The resulting bus trip distribution for a.m. and p.m. is illustrated in Exhibit 3-8. The assigned trips is illustrated in Exhibit 3-9.

Exhibit 3-5: Bus Percentage Splits Per Direction

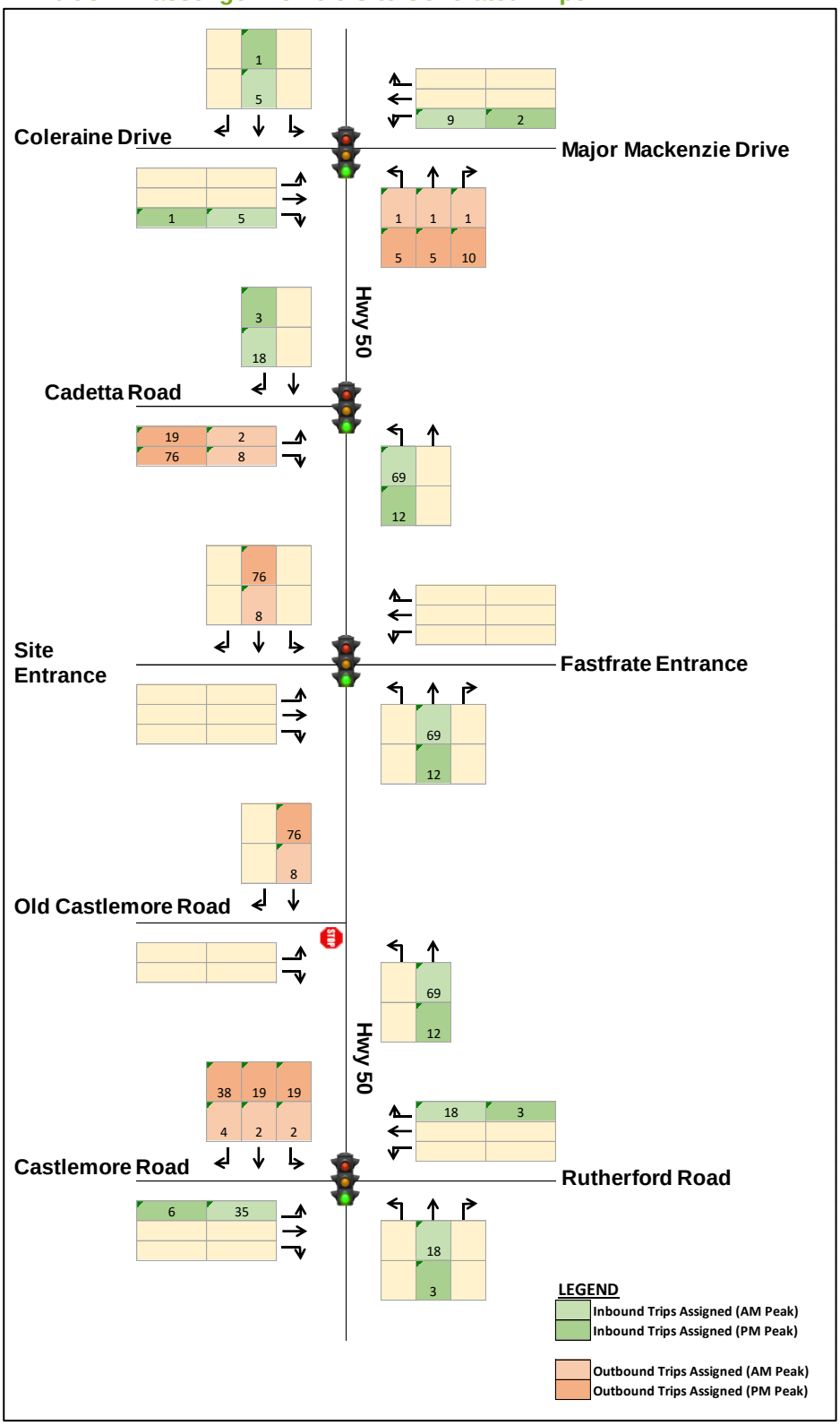
ORIGIN/DESTINATION	PERCENT DISTRIBUTION			
	AM Peak Hour		PM Peak Hour	
To / From the North	In	Out	In	Out
via Highway 50	40%	40%	40%	40%
via Coleraine Drive (new 'Arterial A2')	50%	50%	50%	50%
To / From the West	In	Out	In	Out
via Castlemore Road	5%	5%	5%	5%
To / From the South	In	Out	In	Out
via Highway 50	5%	5%	5%	5%

Exhibit 3-6: Passenger Vehicle Site Distribution



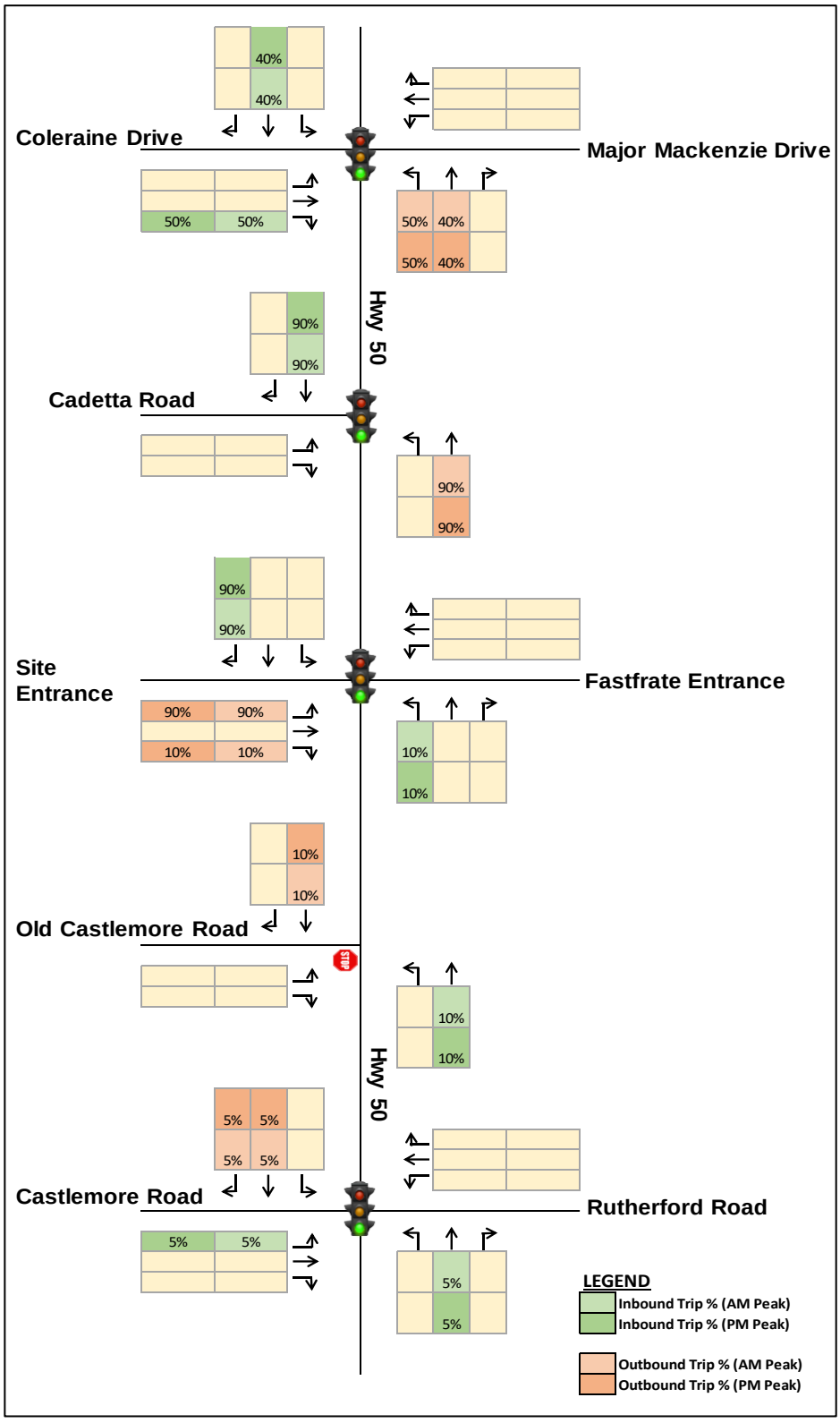
Note: Not to scale

Exhibit 3-7: Passenger Vehicle Site Generated Trips



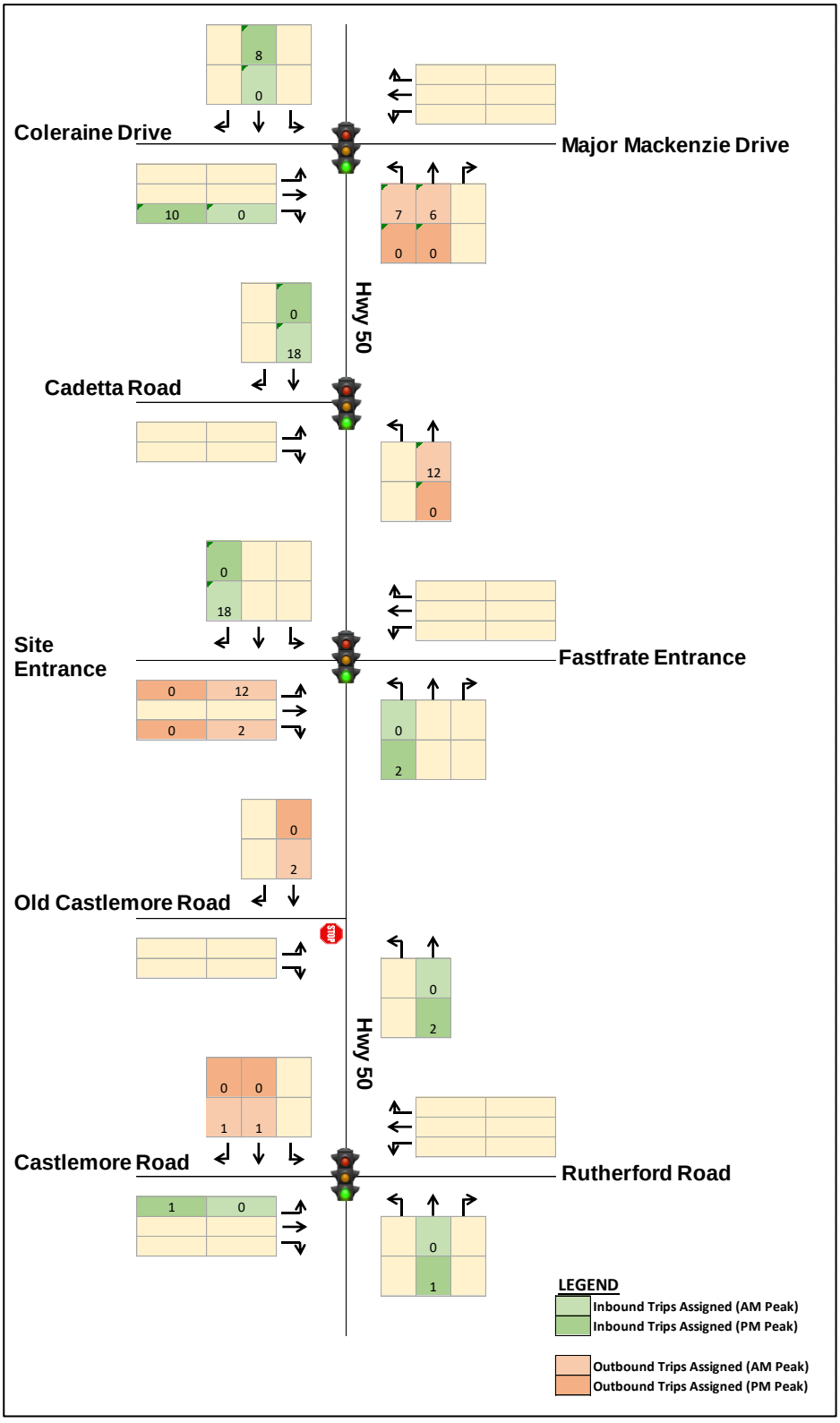
Note: Not to scale, rounded values

Exhibit 3-8: Bus Fleet Vehicle Site Distribution



Note: Not to scale

Exhibit 3-9: Bus Fleet Vehicle Site Generated Trips



Note: Not to scale, rounded values

4 Future Conditions

This section discusses the growth rate and future traffic operations under the 2031 and 2041 horizon years.

4.1 Traffic Growth

As documented in Section 2.5, there will be a lot of changes to the future road network to accommodate background growth. The 2012 Environmental Assessment for Highway / Regional Road 50 completed by HDR projected a widening of Highway 50 to 6 lanes with left turn lanes by 2031. For this study, growth rates were extracted by comparing the EMME model morning and evening peak hour outputs received from the City of Brampton for 2011 and 2041. These EMME outputs includes widening from the existing 2 lanes to 3 lanes in each direction, as well as the planned GTA West corridor located north of the study corridor.

These EMME model outputs for the relevant sections of Highway 50 adjacent to the study area and the calculated compound annual growth rate (CAGR) can be seen in Exhibit 4-1, below. It is worth noting that while the 2041 traffic analysis only uses the Highway 50 volumes and growth rates the total calculated growth rate includes the volume changes for Cadetta Road and Castlemore Road.

Exhibit 4-1: Study Area Compound Annual Growth Rate, 2011-2041

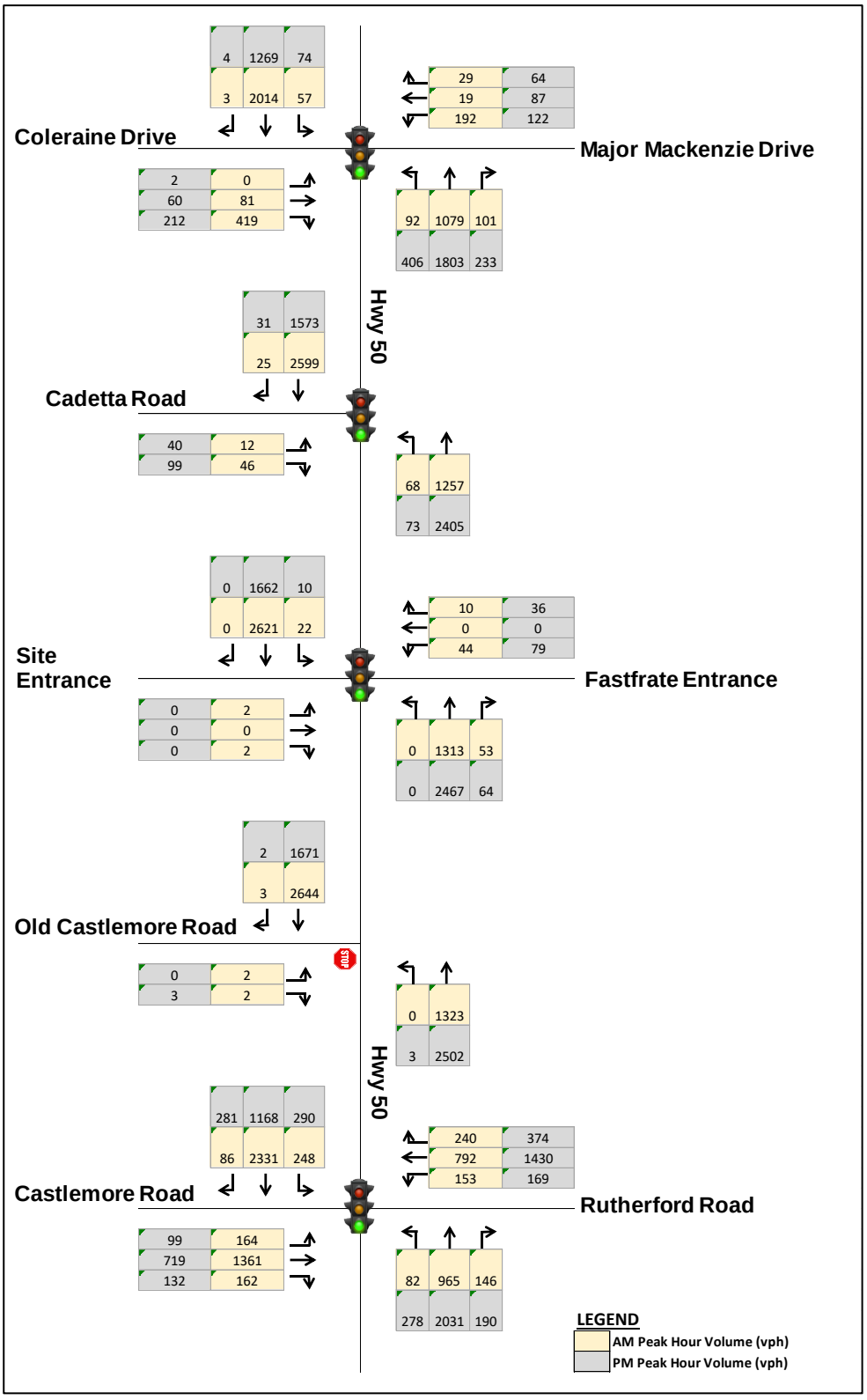
ROAD	FROM	TO	DIRECTION	TIME PERIOD	2011 VOLUME	2041 VOLUME	CAGR
AM Peak							
Highway 50	Major Mackenzie Drive	Cadetta Road	NB	AM	645	267	-2.9%
			SB	AM	1,687	2,047	0.6%
	Cadetta Road	Castlemore Road	NB	AM	674	532	-0.8%
			SB	AM	1,694	1,769	0.1%
	Castlemore Rd	Castle Oaks Crossing	NB	AM	646	276	-2.8%
			SB	AM	1,636	1,442	-0.4%
Cadetta Rd	Highway 50	End	EB	AM	36	165	5.2%
			WB	AM	47	80	1.8%
Castlemore Rd	Apple Valley Way	Highway 50	EB	AM	841	2,417	3.6%
			WB	AM	467	820	1.9%
	Highway 50	CP Yard Entrance	EB	AM	864	2,522	3.6%
			WB	AM	458	854	2.1%
PM Peak							
Highway 50	Major Mackenzie Drive	Cadetta Road	NB	PM	1,481	1,921	0.9%
			SB	PM	768	679	-0.4%
	Cadetta Road	Castlemore Road	NB	PM	1,499	1,691	0.4%
			SB	PM	806	791	-0.1%

	Castlemore Rd	Castle Oaks Crossing	NB	PM	1,465	1,312	-0.4%
			SB	PM	752	417	-1.9%
Cadetta Rd	Highway 50	End	EB	PM	63	165	3.3%
			WB	PM	50	269	5.8%
Castlemore Rd	Apple Valley Way	Highway 50	EB	PM	475	1,105	2.9%
			WB	PM	696	2,177	3.9%
	Highway 50	CP Yard Entrance	EB	PM	448	1,373	3.8%
			WB	PM	648	2,450	4.5%
				Total - AM	9,695	12,191	**1.0%**
				Total - PM	9,151	14,350	**1.5%**
				Total - Both	**18,846**	**27,541**	**1.3%**

In the above exhibit, it was observed that there are negative growth rates for northbound Highway 50 in the AM peak period, and southbound in the PM peak period. This is likely due to traffic diverted to other major north-south corridors such as the planned Highway 427 extension. It is noted that southbound volumes are significantly higher in the AM peak period and lower in the PM peak, and the opposite for northbound volumes. This behaviour is expected and should reflect commuters going to and from work.

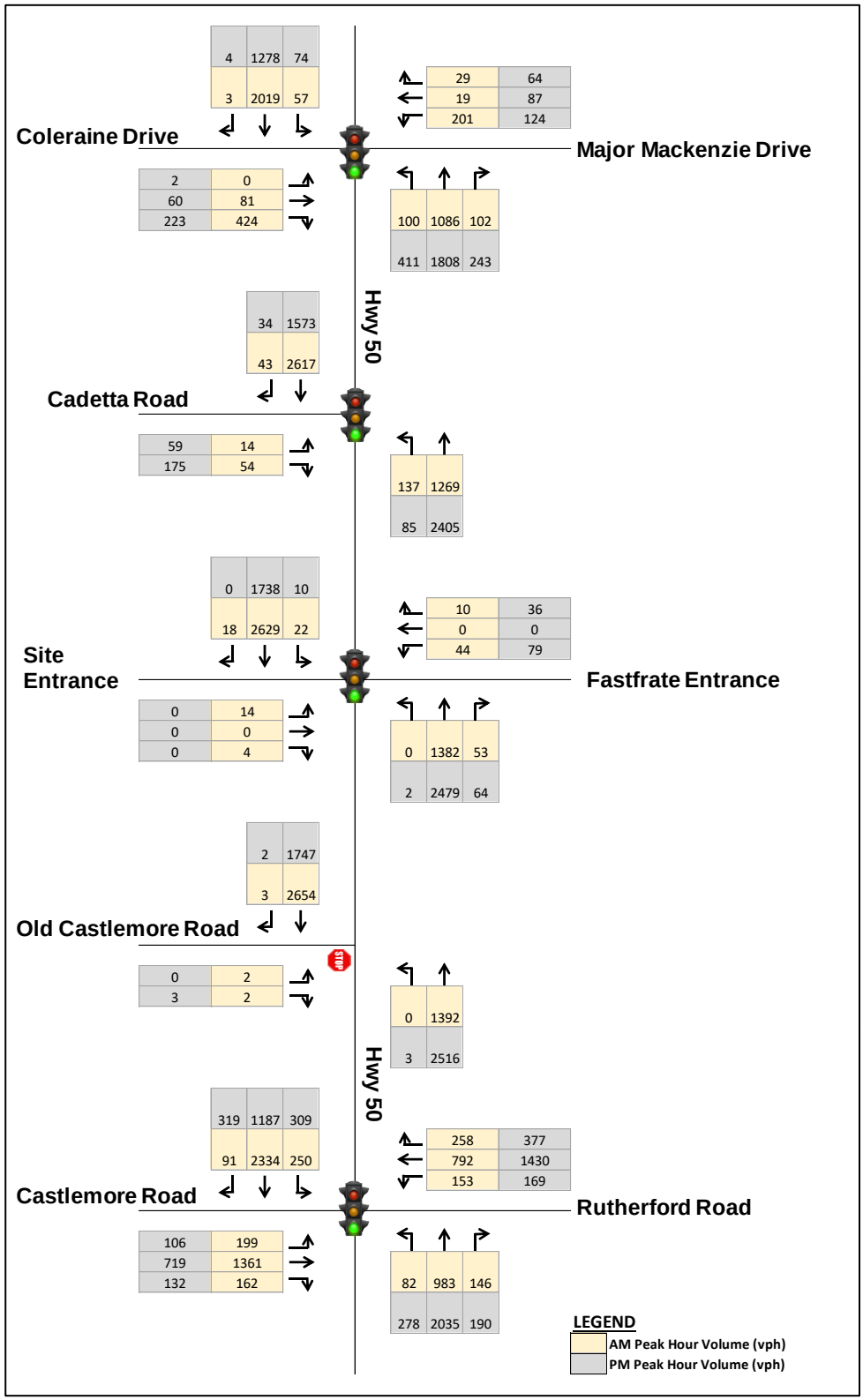
From this calculation using total volumes, a compound annual growth rate of 1.3% was used in projecting future traffic volumes below. Population and employment growth rates from the Region of Peel were also considered for the period between 2011 and 2041. These compound annual growth rates of 1.27% and 1.36%, respectively, support the chosen 1.3% growth rate for future traffic.

Exhibit 4-2: 2031 Future Background Traffic Volumes



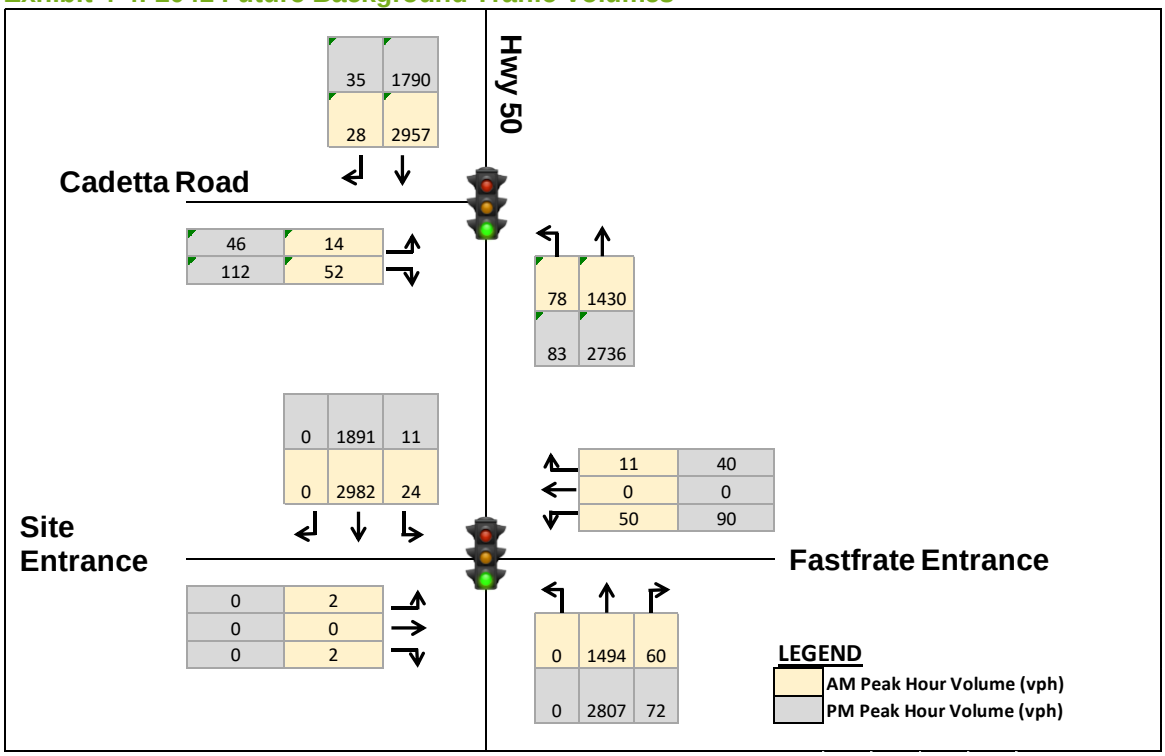
Note: Not to scale, rounded values

Exhibit 4-3: 2031 Future Total Traffic Volumes



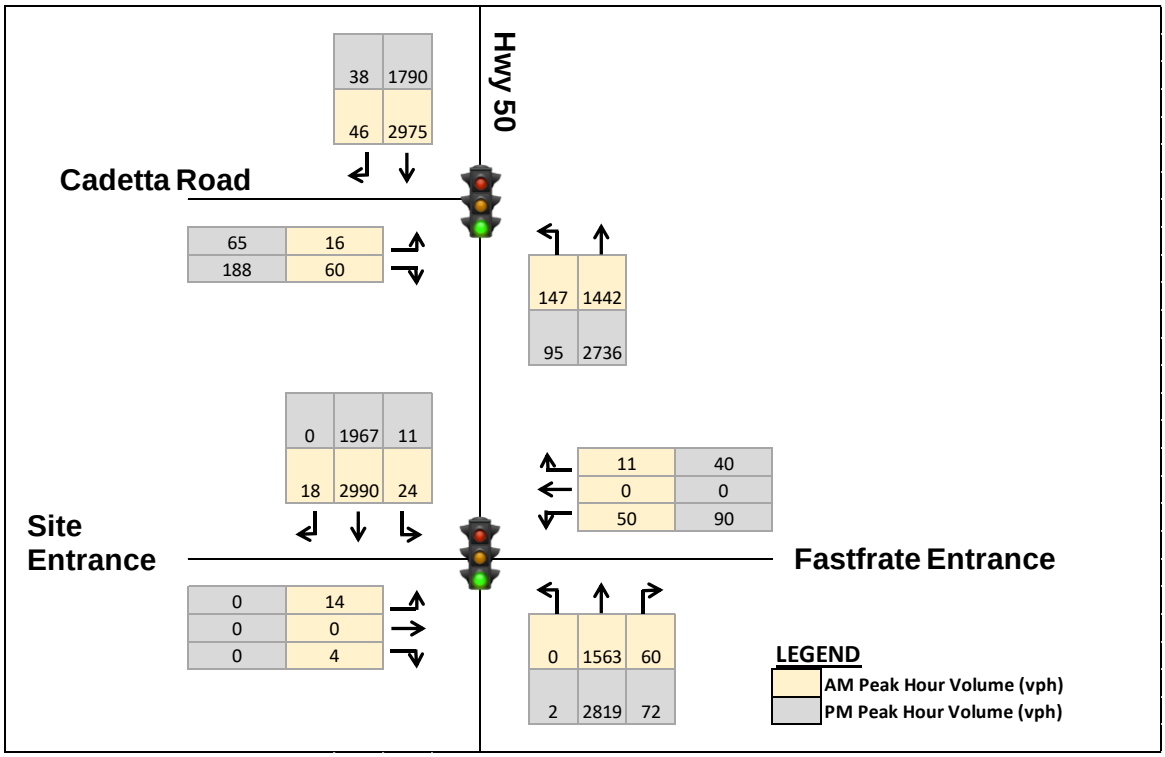
Note: Not to scale, rounded values

Exhibit 4-4: 2041 Future Background Traffic Volumes



Note: Not to scale, rounded values

Exhibit 4-5: 2041 Future Total Traffic Volumes



Note: Not to scale, rounded values

4.2 2031 Future Background

With the growth rates discussed in Section 5.1, existing traffic volumes were grown to the 2031 horizon. These volumes represent future base conditions and do not include trips generated from the bus facility. Future background volumes are shown in Exhibit 4-2.

The assumed intersection configuration for Cadetta Road and Site Access (Fastfrate) intersections includes the following:

Exhibit 4-6 shows a summary of the critical movements identified in the Synchro analysis, including the v/c ratio, 95th percentile queue length and LOS. Detailed Synchro outputs are attached in Appendix D.

Exhibit 4-6: Future Background (2031) Conditions Traffic Analysis Summary

Intersection	Intersection LOS	Critical Movement					Storage Length (m)
		Mvmt	LOS	Delay (s)	V/C Ratio	95th %ile Queue (m)	
AM Peak							
Highway 50 & Coleraine Drive / Major Mackenzie Drive	D	WBL	F	133	1.07	114	60
		NBL	F	81	0.88	50	200
		NBT	D	43	0.87	222	-
Highway 50 & Cadetta Road (Site Access)	A	NEL	E	67	0.18	10	-
		NER	E	65	0.05	13	-
Highway 50 & Fastfrate Entrance (Site Access)	B	EBT	E	70	0.00	-	-
		WBL	F	82	0.64	26	-
		WBT	E	62	0.01	-	-
Highway 50 & Old Castlemore Road	-	NELR	F	247	0.22	5	-
Highway 50 & Castlemore Road / Rutherford Road	F	EBT	F	131	1.15	293	-
		WBL	F	244	1.34	99	250
		SBT	F	84	1.06	295	-
PM Peak							
Highway 50 & Coleraine Drive / Major Mackenzie Drive	C	WBL	F	160	1.07	71	60
Highway 50 & Cadetta Road	A	NEL	E	64	0.27	24	-
		NER	E	62	0.07	18	-
Highway 50 & Fastfrate Entrance (Site Access)	A	WBL	E	62	0.53	36	-
		WBT	E	56	0.02	-	-
Highway 50 & Old Castlemore Road	-	No critical movements					
Highway 50 & Castlemore Road / Rutherford Road	E	EBL	F	125	0.94	51	80
		EBT	E	65	0.83	143	-
		WBL	E	77	0.88	79	250
		WBT	F	116	1.11	300	-
		WBR	D	43	0.50	81	80
		NBT	F	86	1.05	259	-
		SBL	F	176	1.20	159	85

Overall, with the assumed widening of Highway 50 and the adopted lane configurations from the EA, all study intersections north of Castlemore Road / Rutherford Road improved due to increased capacity on the mainline. At Highway 50 and Coleraine Drive, the WBL movement is operating past capacity with high delays during the two peak periods. The minor approaches for

these intersections, including the proposed site accesses continue to operate with high delays but with sufficient capacity. This is not uncommon for side-streets on major arterial roadways and is considered acceptable operations.

At the intersection of Highway 50 and Castlemore Road / Rutherford Road, Highway 50 has been already widened. As a result, the intersection did not see an improvement and is operating at / near capacity with LOS F and E during a.m. and p.m. peak hours, respectively. With increased background volumes, several new movements are now critical with some operating past capacity. Rutherford Road is identified in the York Region Transportation Master Plan as widening to six lanes for Transit / HOV lanes and is subject to future EA. As there may not be an increase in capacity for general purpose traffic, the configuration analyzed was kept four through lanes east-west for this study.

4.3 2031 Future Total

The future total volumes, representing all traffic expected in the 2031 horizon (including traffic generated from the bus facility), are illustrated in Exhibit 4-3.

Exhibit 4-7 shows a summary of critical movements identified in the Synchro analysis, including the v/c ratio, 95th percentile queue length and LOS. Detailed Synchro outputs are attached in Appendix E.

Exhibit 4-7: Future Total (2031) Conditions Traffic Analysis Summary

Intersection	Intersection LOS	Critical Movement					Storage Length (m)
		Mvmt	LOS	Delay (s)	V/C Ratio	95th %ile Queue (m)	
AM Peak							
Highway 50 & Coleraine Drive / Major Mackenzie Drive	D	WBL	F	116	1.03	118	60
		NBL	F	117	0.98	57	200
		SBT	D	48	0.90	223	-
Highway 50 & Cadetta Road (Site Access)	B	NEL	E	67	0.21	12	-
		NER	E	65	0.05	14	-
Highway 50 & Fastfrate Entrance (Site Access)	B	EBT	E	69	0.01	-	-
		WBL	F	84	0.64	26	-
		WBT	E	64	0.01	-	-
Highway 50 & Old Castlemore Road	-	NELR	F	263	0.23	5	-
Highway 50 & Castlemore Road / Rutherford Road	F	EBL	E	63	0.86	76	80
		EBT	F	131	1.15	293	-
		WBL	F	245	1.34	98	250
		WBT	E	55	0.77	147	-
		SBT	F	84	1.06	295	-
PM Peak							
Highway 50 & Coleraine Drive / Major Mackenzie Drive	C	WBL	F	162	1.08	75	60
Highway 50 & Cadetta Road	A	NEL	E	65	0.38	31	-
		NER	E	63	0.12	23	-
Highway 50 & Fastfrate Entrance (Site Access)	A	WBL	E	62	0.53	36	-
		WBT	E	56	0.02	-	-
Highway 50 & Old Castlemore Road	-	No critical movements					
Highway 50 & Castlemore Road / Rutherford Road	F	EBL	F	147	1.01	57	80
		EBT	E	65	0.83	143	-
		WBL	E	77	0.88	79	250
		WBT	F	116	1.11	300	-
		WBR	D	43	0.51	82	80
		NBT	F	87	1.05	260	-
		SBL	F	206	1.28	173	85

For the future total conditions, traffic operations are expected deteriorate slightly for the study intersections. From Section 4, marginal amounts of passenger and bus fleet vehicles are to be introduced to the study intersections. All of those demands will be assigned to the two site accesses of Cadetta Road and Fastfrate Entrance. These two intersections is expected to remain at good levels-of-service (LOS A and B) but with some delays on the minor approaches. Although there are limited amounts of traffic introduced, Highway 50 and Castlemore Road / Rutherford Road will deteriorate during the p.m. peak hour and now operate at LOS F. Overall, traffic for the study intersections is marginally affected by the site generated demands, and where the operational issues arise regardless of the presence of the proposed facility.

4.4 2041 Future Background

With the growth rates discussed in Section 5.1, existing traffic volumes were grown to the 2041 horizon. These volumes represent future base conditions and do not include trips generated from the bus facility. Future background volumes are shown in Exhibit 4-4.

Exhibit 4-8 shows a summary of the critical movements identified in the Synchro analysis, including the v/c ratio, 95th percentile queue length and LOS. Detailed Synchro outputs are attached in Appendix D.

Exhibit 4-8: Future Background (2041) Conditions Traffic Analysis Summary

Intersection	Intersection LOS	Critical Movement					Storage Length (m)
		Mvmt	LOS	Delay (s)	V/C Ratio	95th %ile Queue (m)	
AM Peak							
Highway 50 & Cadetta Road (Site Access)	B	NEL	E	67	0.21	12	-
		NER	E	65	0.05	14	-
Highway 50 & Fastfrate Entrance (Site Access)	B	EBT	E	71	0.00	-	-
		WBL	F	87	0.68	29	-
		WBT	E	62	0.01	-	-
PM Peak							
Highway 50 & Cadetta Road	A	NEL	E	65	0.31	26	-
		NER	E	63	0.07	19	-
Highway 50 & Fastfrate Entrance (Site Access)	B	WBL	E	64	0.57	40	-
		WBT	E	56	0.03	-	-

As stated earlier, due to uncertainty with the major roadway improvements, the 2041 scenarios are limited to the two site accesses. With the future background growth, the two intersections will remain at good levels-of-service (LOS A & B) and with sufficient capacity for its movements. Although there will be delays experienced by the minor approaches, the two intersections is expected to accommodate future volumes.

4.5 2041 Future Total

The future total volumes, representing all traffic expected in the 2031 horizon (including traffic generated from the bus facility), are illustrated in Exhibit 4-5.

Exhibit 4-9 shows a summary of critical movements identified in the Synchro analysis, including the v/c ratio, 95th percentile queue length and LOS. Detailed Synchro outputs are attached in Appendix E.

Exhibit 4-9: Future Total (2041) Conditions Traffic Analysis Summary

Intersection	Intersection LOS	Critical Movement					Storage Length (m)
		Mvmt	LOS	Delay (s)	V/C Ratio	95th %ile Queue (m)	
AM Peak							
Highway 50 & Cadetta Road (Site Access)	B	NBL	E	69	0.80	60	30
		NEL	E	67	0.24	12	-
		NER	E	65	0.06	15	-
Highway 50 & Fastfrate Entrance (Site Access)	B	EBT	E	70	0.01	-	-
		WBL	F	88	0.68	29	-
		WBT	E	63	0.01	-	-
		SBT	B	16	0.85	304	-
PM Peak							
Highway 50 & Cadetta Road	B	NEL	E	66	0.41	34	-
		NER	E	65	0.27	31	-
Highway 50 & Fastfrate Entrance (Site Access)	B	WBL	E	64	0.57	40	-
		WBT	E	56	0.03	-	-

For the future total conditions, traffic operations deteriorate slightly with the introduction of the site generated traffic. The NBL turn movement at Cadetta Road is critical and is expected to experience longer delays but with sufficient reserve capacity (v/c = 0.80). Overall, the two site accesses will remain at acceptable levels-of-service.

5 Improvement Measures

In analyzing existing and future 2031 and 2041 traffic operations for the proposed bus maintenance storage facility at Highway 50 and Cadetta Road, the following improvement measures are recommended to mitigate any potential traffic and safety impacts on the surrounding road network. It is worth noting that these recommendations are solely related to access of the proposed site in question, and not expanded to other areas of the surrounding road network.

- **Extend storage of the existing NBL left turn lane at Cadetta Road**
- **Provide an auxiliary SBR turn lane at Cadetta Road –** The existing conditions have a shared through / right turn lane at the southbound approach at Cadetta Road. Due to high travel speeds on Highway 50, it is recommended to provide an auxiliary southbound right turn lane to provide separation with the through traffic.
- **Dedicated NBL turn lane at Fastfrate Entrance –** Currently there is no northbound left turn lane onto the existing private driveway. It is recommended to provide a northbound left turn lane for heavy vehicles accessing the subject development.
- **Provide an auxiliary SBR turn lane at the Fastfrate Entrance –** for similar reasons as the Cadetta Road recommendation, it is recommended to also provide a right turn lane at the south access driveway as well, to maintain traffic flow and improve safety.

These recommended lane configurations were coordinated with the Peel Region Highway 50 EA team, and are reflected in the Highway 50 updated preliminary design (to be amended to the Highway 427 Secondary Plan EA in 2020).

5.1 Queueing Analysis

To provide storage length recommendations, a queuing analysis was completed using Synchro's built in microsimulation (SimTraffic) software. This analysis focused on the two site accesses during the two background peak hours (8:00-9:00AM and 5:00-6:00PM). SimTraffic is considered more accurate as it considers the varying arrival rates of transit and passenger vehicles. Based on this analysis, the recommended storage for the left and right turns at the two site accesses is summarized below in Exhibit 5-1. SimTraffic reports are provided in Appendix H.

Exhibit 5-1: Recommended Storage Lengths for Site Accesses

LOCATION	MOVEMENT / TURN LANE	SYNCHRO 95TH PERCENTILE	SIMTRAFFIC 95TH PERCENTILE	RECOMMENDED STORAGE LENGTH
Highway 50 & Cadetta Road (Site Access)	SBR	5.8m	25.5m	30m
	NBL	60m	84.7m	90m
Highway 50 Fastfrate Entrance (Site Access)	SBR	0m	8.4m	30m
	NBL	1m	2.7m	60m

Note: 2041 Future Total Volumes

6 Active Transportation and Transit

This section documents existing and planned active transportation and transit facilities proposed in the surrounding areas.

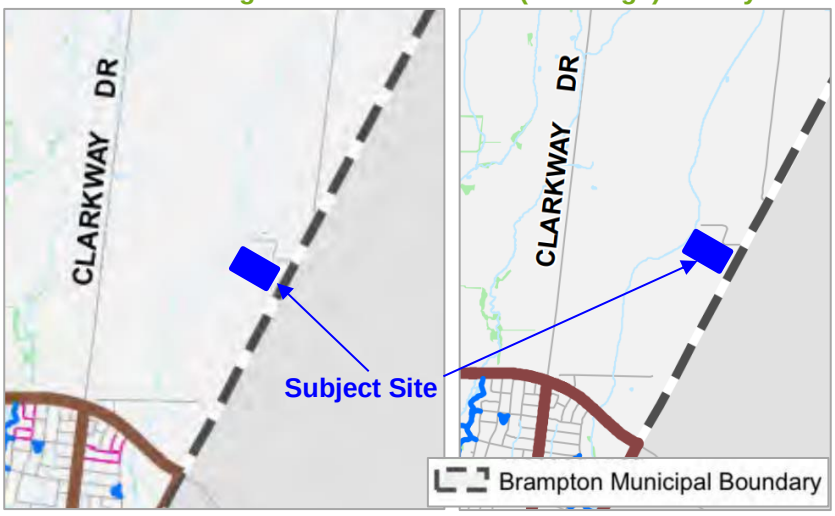
To remain conservative, trip reductions were not undertaken to account for transportation demand management strategies. The reason is that given the site characteristic of being a bus facility, many of the employees (i.e. bus operators) are required to be at the facility prior and/or after bus service begins and/or ends.

6.1 Pedestrian and Cycling

As illustrated in Exhibit 6-1, there is currently a lack of sidewalks and bicycle lanes along Highway 50 within the study area. Both of these are items have been proposed in the Highway 50 EA and is expected to a part of the future road configuration. A multi-use path trail is planned on the west side on Highway 50 and a potential 1.5m sidewalk on the east side. Also, from the Region of Peel's *Long Range Transportation Plan* (2019), the existing cycle route south of Castlemore Road / Rutherford Road is proposed to be extended through the study area to Mayfield Road with connections to Coleraine Drive. This is shown in Exhibit 6-2.

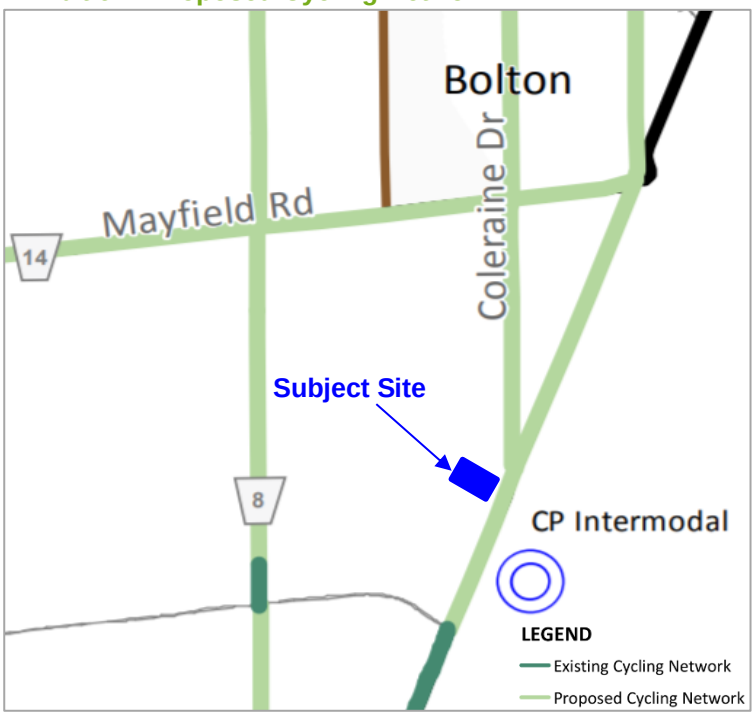
These projects are currently underway and should provide safe, connected and protected cycling and pedestrian network surrounding the subject lands.

Exhibit 6-1: Existing Pedestrian Network (left image) and Cyclist Network (right image)



Source: *City of Brampton's Active Transportation Master Plan (July 2019)*

Exhibit 6-2: Proposed Cycling Network



Source: *Region of Peel Long Range Transportation Plan (2019)*

6.2 Transit

Given the current land-use and location of the bus facility, it is expected that very few bus routes will be in service along Highway 50 within the study horizon . Since the site is a bus facility, where multiple routes begin and end their trips, staff may have opportunities to receive a ride during regular hours. Some staff, will not have access as they will need to begin their work hours before or after transit operation hours. Once Highway 50 is widened with the added multi-use path and sidewalks, there will also be opportunity for new stops to be added.

7 Summary and Conclusions

The proposed bus storage and maintenance facility is a key component of the City's planned transit system expansion. The facility will house a total of 250 standard bus equivalence (SBE) by 2031 and 438 SBE by 2041. This report provides a transportation impact assessment of the facility, including traffic and bus-related operations of the two horizon years, 2031 and 2041.

Vehicular access to the site will be provided by two locations, the first at Cadetta Road and the second at the existing farm property driveway opposite of the Fastfrate Entrance.

For the future road network, there are a number of planned changes. These improvements include: a new arterial road connecting to the west leg of Major Mackenzie Drive intersection, widening of Highway 50 and Major Mackenzie Drive, and a potential construction of a single point urban interchange (SPUI) at Highway 50 & Major Mackenzie Drive around 2041. For the purpose of this study, only the widening of Highway 50 is included in both the 2031 and 2041 horizons. For 2041 scenarios, only the two site accesses were analyzed.

The conclusion of the study is summarized below:

- Overall, under 2019 existing conditions, the study area intersections all operate with critical movements, especially at intersections crossing other east-west corridors. Most notably, the intersections of Coleraine Drive / Major Mackenzie Drive and Castlemore Road / Rutherford Road operate with high delays and queues.
- Under 2031, the Highway 50 intersections with Cadetta Road and the south site access driveway operate with enough capacity, while the major intersections at Coleraine / Major Mackenzie Drive and Castlemore / Rutherford Road operate with longer delays and queues.
- Under 2041, the Highway 50 intersections with Cadetta Road and the south site access driveway continue to operate acceptably with residual capacity.
- The subject site is expected to generate a total of 95 and 107 two-way trips for passenger vehicles in the a.m. and p.m. peak hours, respectively. Separately, a total of 13 and 20 bus trips are expected to be generated. It is noted that majority of site generated trips are generated outside of background peak periods, and is expected to minimally impact the local road network.
- Under 2031 future total conditions, overall traffic for the study intersections is marginally affected by the site generated demands, and where the operational issues arise regardless of the presence of the proposed facility.
- Under 2041 future total conditions, overall the two site accesses will remain at good levels-of-service, but with improvements required for the left-turn movement.
- Recommended improvement measures are:
    - Extend the NBL turn lane at Cadetta Road from 30m to 90m;
    - Add an auxiliary SBR turn (30m) lane at Cadetta Road;
    - Provide a NBL turn (60m) lane at the south site access driveway; and,
    - Add an auxiliary SBR turn (30m) lane at the south access driveway.
- Active Transportation and Transit:

- There is currently a lack of sidewalks and bicycle lanes along Highway 50 within the study area, however a multi-use path trail on the west side and a potential 1.5m sidewalk on the east side are both proposed as part of the EA.
- It is expected that very few bus routes will be in service along Highway 50 within the study horizon, however once Highway 50 is widened with the added multi-use path and sidewalks, there will be opportunity for new stops to be added.

Appendix A – Traffic Data

Turning Movement Count (17 . HWY 50 & CADETTA RD) CustID: 05007936 MioID: 421606

Start Time	Southbound HWY 50					Northbound HWY 50					Eastbound CADETTA RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
07:00:00	482	2	0	0	484	17	235	0	0	252	1	14	1	0	16	752
07:15:00	567	5	0	0	572	14	244	0	0	258	3	9	0	0	12	842
07:30:00	557	5	2	0	564	8	275	0	0	283	2	7	0	0	9	856
07:45:00	565	9	0	0	574	18	266	0	0	284	4	8	0	0	12	870
Hourly	2171	21	2	0	2194	57	1020	0	0	1077	10	38	1	0	49	3320
08:00:00	508	8	0	0	516	10	271	0	0	281	1	12	2	0	15	812
08:15:00	507	5	0	0	512	14	211	0	0	225	1	7	0	0	8	745
08:30:00	500	8	0	0	508	13	250	0	0	263	2	7	0	0	9	780
08:45:00	374	2	0	0	376	8	247	0	0	255	2	8	0	0	10	641
Hourly	1889	23	0	0	1912	45	979	0	0	1024	6	34	2	0	42	2978
BREAK																
11:00:00	241	2	0	0	243	11	197	0	0	208	5	11	0	0	16	467
11:15:00	249	2	0	0	251	7	212	0	0	219	2	10	0	0	12	482
11:30:00	235	2	0	0	237	13	249	0	0	262	1	7	0	0	8	507
11:45:00	249	1	0	0	250	7	227	0	0	234	8	14	0	0	22	506
Hourly	974	7	0	0	981	38	885	0	0	923	16	42	0	0	58	1962
12:00:00	246	6	0	0	252	8	215	0	0	223	3	6	0	0	9	484
12:15:00	255	4	0	0	259	12	229	0	0	241	5	18	0	0	23	523
12:30:00	216	4	0	0	220	15	211	0	0	226	3	11	0	0	14	460
12:45:00	214	1	0	0	215	9	248	0	0	257	5	8	0	0	13	485
Hourly	931	15	0	0	946	44	903	0	0	947	16	43	0	0	59	1952
13:00:00	217	3	0	0	220	12	226	1	0	239	4	6	0	0	10	469
13:15:00	253	3	0	0	256	13	257	0	0	270	0	6	0	0	6	532
13:30:00	237	2	0	0	239	9	280	0	0	289	1	15	0	0	16	544

13:45:00	233	3	0	0	236	14	256	0	0	270	9	10	0	0	19	525
Hourly	940	11	0	0	951	48	1019	1	0	1068	14	37	0	0	51	2070
BREAK																
15:00:00	225	5	0	0	230	10	358	0	0	368	1	7	0	0	8	606
15:15:00	264	4	0	0	268	9	408	0	0	417	3	9	0	0	12	697
15:30:00	315	2	0	0	317	10	435	0	0	445	5	7	0	0	12	774
15:45:00	266	6	0	0	272	11	422	0	0	433	7	6	0	0	13	718
Hourly	1070	17	0	0	1087	40	1623	0	0	1663	16	29	0	0	45	2795
16:00:00	313	3	0	0	316	14	431	0	0	445	6	16	0	0	22	783
16:15:00	310	4	0	0	314	11	467	0	0	478	7	12	0	0	19	811
16:30:00	300	6	0	0	306	6	511	0	0	517	3	15	0	0	18	841
16:45:00	305	7	0	0	312	8	457	0	0	465	7	20	0	0	27	804
Hourly	1228	20	0	0	1248	39	1866	0	0	1905	23	63	0	0	86	3239
17:00:00	320	9	0	0	329	12	469	0	0	481	6	17	0	0	23	833
17:15:00	412	3	0	0	415	16	547	0	0	563	10	13	0	0	23	1001
17:30:00	304	3	0	0	307	18	478	0	0	496	11	33	0	0	44	847
17:45:00	284	10	0	0	294	15	495	0	0	510	6	19	0	0	25	829
Hourly	1320	25	0	0	1345	61	1989	0	0	2050	33	82	0	0	115	3510
Grand Total	10523	139	2	0	10664	372	10284	1	0	10657	134	368	3	0	505	**21826**
Approach%	98.7%	1.3%	0%		-	3.5%	96.5%	0%		-	26.5%	72.9%	0.6%		-	**-**
Totals %	48.2%	0.6%	0%		48.9%	1.7%	47.1%	0%		48.8%	0.6%	1.7%	0%		2.3%	**-**
Heavy	1566	56	0		-	153	1615	0		-	30	117	0		-	**-**
Heavy %	14.9%	40.3%	0%		-	41.1%	15.7%	0%		-	22.4%	31.8%	0%		-	**-**
Bicycles	1	1	0		-	0	0	0		-	1	0	0		-	**-**
Bicycle %	0%	0.7%	0%		-	0%	0%	0%		-	0.7%	0%	0%		-	**-**

Peak Hour: 07:00 AM - 08:00 AM Weather: Clear (12.6 °C)

Start Time	Southbound HWY 50					Northbound HWY 50					Eastbound CADETTA RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
07:00:00	482	2	0	0	484	17	235	0	0	252	1	14	1	0	16	752
07:15:00	567	5	0	0	572	14	244	0	0	258	3	9	0	0	12	842
07:30:00	557	5	2	0	564	8	275	0	0	283	2	7	0	0	9	856
07:45:00	565	9	0	0	574	18	266	0	0	284	4	8	0	0	12	870
Grand Total	2171	21	2	0	2194	57	1020	0	0	1077	10	38	1	0	49	**3320**
Approach%	99%	1%	0.1%		-	5.3%	94.7%	0%		-	20.4%	77.6%	2%		-	-
Totals %	65.4%	0.6%	0.1%		66.1%	1.7%	30.7%	0%		32.4%	0.3%	1.1%	0%		1.5%	-
PHF	0.96	0.58	0.25		0.96	0.79	0.93	0		0.95	0.63	0.68	0.25		0.77	-
Heavy	213	3	0		216	4	138	0		142	7	22	0		29	-
Heavy %	9.8%	14.3%	0%		9.8%	7%	13.5%	0%		13.2%	70%	57.9%	0%		59.2%	-
Lights	1958	18	2		1978	53	882	0		935	3	16	1		20	-
Lights %	90.2%	85.7%	100%		90.2%	93%	86.5%	0%		86.8%	30%	42.1%	100%		40.8%	-
Single-Unit Trucks	109	1	0		110	2	66	0		68	3	4	0		7	-
Single-Unit Trucks %	5%	4.8%	0%		5%	3.5%	6.5%	0%		6.3%	30%	10.5%	0%		14.3%	-
Buses	5	0	0		5	0	6	0		6	1	0	0		1	-
Buses %	0.2%	0%	0%		0.2%	0%	0.6%	0%		0.6%	10%	0%	0%		2%	-
Articulated Trucks	99	2	0		101	2	66	0		68	3	18	0		21	-
Articulated Trucks %	4.6%	9.5%	0%		4.6%	3.5%	6.5%	0%		6.3%	30%	47.4%	0%		42.9%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	1	0	0	0	-	-
Bicycles on Road%	-	-	-	%		-	-	-	%		-	-	-	%		-

Peak Hour: 01:00 PM - 02:00 PM Weather: Clear (18.7 °C)

Start Time	Southbound HWY 50					Northbound HWY 50					Eastbound CADETTA RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
13:00:00	217	3	0	0	220	12	226	1	0	239	4	6	0	0	10	469
13:15:00	253	3	0	0	256	13	257	0	0	270	0	6	0	0	6	532
13:30:00	237	2	0	0	239	9	280	0	0	289	1	15	0	0	16	544
13:45:00	233	3	0	0	236	14	256	0	0	270	9	10	0	0	19	525
Grand Total	940	11	0	0	951	48	1019	1	0	1068	14	37	0	0	51	**2070**
Approach%	98.8%	1.2%	0%		-	4.5%	95.4%	0.1%		-	27.5%	72.5%	0%		-	-
Totals %	45.4%	0.5%	0%		45.9%	2.3%	49.2%	0%		51.6%	0.7%	1.8%	0%		2.5%	-
PHF	0.93	0.92	0		0.93	0.86	0.91	0.25		0.92	0.39	0.62	0		0.67	-
Heavy	230	6	0		236	25	217	0		242	6	15	0		21	-
Heavy %	24.5%	54.5%	0%		24.8%	52.1%	21.3%	0%		22.7%	42.9%	40.5%	0%		41.2%	-
Lights	710	5	0		715	23	802	1		826	8	22	0		30	-
Lights %	75.5%	45.5%	0%		75.2%	47.9%	78.7%	100%		77.3%	57.1%	59.5%	0%		58.8%	-
Single-Unit Trucks	80	4	0		84	11	89	0		100	2	7	0		9	-
Single-Unit Trucks %	8.5%	36.4%	0%		8.8%	22.9%	8.7%	0%		9.4%	14.3%	18.9%	0%		17.6%	-
Buses	6	0	0		6	0	1	0		1	0	0	0		0	-
Buses %	0.6%	0%	0%		0.6%	0%	0.1%	0%		0.1%	0%	0%	0%		0%	-
Articulated Trucks	144	2	0		146	14	127	0		141	4	8	0		12	-
Articulated Trucks %	15.3%	18.2%	0%		15.4%	29.2%	12.5%	0%		13.2%	28.6%	21.6%	0%		23.5%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	%		-	-	-	%		-	-	-	%		-

Peak Hour: 05:00 PM - 06:00 PM Weather: Clear (23.6 °C)

Start Time	Southbound HWY 50					Northbound HWY 50					Eastbound CADETTA RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
17:00:00	320	9	0	0	329	12	469	0	0	481	6	17	0	0	23	833
17:15:00	412	3	0	0	415	16	547	0	0	563	10	13	0	0	23	1001
17:30:00	304	3	0	0	307	18	478	0	0	496	11	33	0	0	44	847
17:45:00	284	10	0	0	294	15	495	0	0	510	6	19	0	0	25	829
Grand Total	1320	25	0	0	1345	61	1989	0	0	2050	33	82	0	0	115	**3510**
Approach%	98.1%	1.9%	0%		-	3%	97%	0%		-	28.7%	71.3%	0%		-	**-**
Totals %	37.6%	0.7%	0%		38.3%	1.7%	56.7%	0%		58.4%	0.9%	2.3%	0%		3.3%	**-**
PHF	0.8	0.63	0		0.81	0.85	0.91	0		0.91	0.75	0.62	0		0.65	**-**
Heavy	124	15	0		139	39	205	0		244	0	10	0		10	**-**
Heavy %	9.4%	60%	0%		10.3%	63.9%	10.3%	0%		11.9%	0%	12.2%	0%		8.7%	**-**
Lights	1196	10	0		1206	22	1784	0		1806	33	72	0		105	**-**
Lights %	90.6%	40%	0%		89.7%	36.1%	89.7%	0%		88.1%	100%	87.8%	0%		91.3%	**-**
Single-Unit Trucks	57	9	0		66	23	77	0		100	0	4	0		4	**-**
Single-Unit Trucks %	4.3%	36%	0%		4.9%	37.7%	3.9%	0%		4.9%	0%	4.9%	0%		3.5%	**-**
Buses	1	0	0		1	2	1	0		3	0	1	0		1	**-**
Buses %	0.1%	0%	0%		0.1%	3.3%	0.1%	0%		0.1%	0%	1.2%	0%		0.9%	**-**
Articulated Trucks	66	6	0		72	14	127	0		141	0	5	0		5	**-**
Articulated Trucks %	5%	24%	0%		5.4%	23%	6.4%	0%		6.9%	0%	6.1%	0%		4.3%	**-**
Bicycles on Road	0	1	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	%		-	-	-	%		-	-	-	%		**-**

Peak Hour: 07:00 AM - 08:00 AM Weather: Clear (12.6 °C)

Peak Hour: 01:00 PM - 02:00 PM Weather: Clear (18.7 °C)

Peak Hour: 05:00 PM - 06:00 PM Weather: Clear (23.6 °C)

Turning Movement Count (16 . HWY 50 & COLERAINE DR) CustID: 05008281 MioID: 421604

Start Time	Southbound HWY 50						Westbound MAJOR MACKENZIE DR						Northbound HWY 50						Eastbound COLERAINE DR						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:00:00	14	373	1	0	0	388	36	6	9	0	0	51	22	203	23	0	0	248	0	21	74	0	0	95	782
07:15:00	14	462	1	0	0	477	38	4	6	0	0	48	14	232	17	0	0	263	0	16	81	0	0	97	885
07:30:00	13	438	0	0	0	451	46	4	3	0	0	53	17	214	22	0	0	253	0	19	102	0	0	121	878
07:45:00	6	417	0	0	0	423	41	2	6	0	0	49	23	257	22	0	0	302	0	12	94	0	0	106	880
Hourly	47	1690	2	0	0	1739	161	16	24	0	0	201	76	906	84	0	0	1066	0	68	351	0	0	419	3425
08:00:00	8	367	0	0	0	375	52	3	11	0	0	66	24	227	18	0	0	269	0	6	91	0	0	97	807
08:15:00	10	353	1	0	0	364	37	3	6	0	0	46	19	172	17	0	0	208	0	16	94	0	0	110	728
08:30:00	11	365	2	0	0	378	46	2	12	0	0	60	26	225	11	0	0	262	0	9	64	0	0	73	773
08:45:00	10	283	1	0	0	294	28	5	14	0	0	47	24	204	15	0	0	243	0	10	59	0	0	69	653
Hourly	39	1368	4	0	0	1411	163	13	43	0	0	219	93	828	61	0	0	982	0	41	308	0	0	349	2961
BREAK																									
11:00:00	11	192	0	0	0	203	21	5	9	0	0	35	12	166	14	0	0	192	0	8	24	0	0	32	462
11:15:00	10	209	1	0	0	220	17	9	13	0	0	39	11	176	28	0	0	215	0	5	27	0	0	32	506
11:30:00	17	187	2	0	0	206	21	4	11	0	0	36	22	187	13	0	0	222	0	3	33	0	0	36	500
11:45:00	9	217	1	0	0	227	14	4	13	0	0	31	28	218	14	0	0	260	1	3	21	0	0	25	543
Hourly	47	805	4	0	0	856	73	22	46	0	0	141	73	747	69	0	0	889	1	19	105	0	0	125	2011
12:00:00	11	204	1	0	0	216	21	7	15	0	0	43	15	179	16	0	0	210	0	5	30	0	0	35	504
12:15:00	17	217	1	0	0	235	24	2	5	0	0	31	21	174	28	0	0	223	0	6	17	0	0	23	512
12:30:00	9	175	1	0	0	185	23	9	7	0	0	39	15	177	15	0	0	207	1	4	26	0	0	31	462
12:45:00	13	179	1	0	0	193	13	14	7	0	0	34	26	193	14	0	0	233	1	4	25	0	0	30	490
Hourly	50	775	4	0	0	829	81	32	34	0	0	147	77	723	73	0	0	873	2	19	98	0	0	119	1968
13:00:00	5	204	0	0	0	209	20	5	14	0	0	39	18	195	20	0	0	233	0	7	17	0	0	24	505
13:15:00	6	209	2	0	0	217	18	8	12	0	0	38	31	199	21	0	0	251	0	5	16	0	0	21	527
13:30:00	5	210	0	0	0	215	18	5	11	0	0	34	26	223	15	0	0	264	0	3	21	0	0	24	537
13:45:00	10	204	2	0	0	216	15	8	9	0	0	32	26	232	15	0	0	273	0	6	17	0	0	23	544
Hourly	26	827	4	0	0	857	71	26	46	0	0	143	101	849	71	0	0	1021	0	21	71	0	0	92	2113
BREAK																									
15:00:00	12	181	1	0	0	194	15	10	11	0	0	36	43	276	31	0	0	350	1	8	36	0	0	45	625
15:15:00	13	236	1	0	0	250	17	14	17	0	0	48	54	335	34	0	0	423	0	7	28	0	0	35	756
15:30:00	13	241	1	0	0	255	28	15	6	0	0	49	74	318	21	0	0	413	0	8	29	0	0	37	754
15:45:00	12	226	0	0	0	238	24	14	18	0	0	56	56	347	39	0	0	442	0	10	31	0	0	41	777
Hourly	50	884	3	0	0	937	84	53	52	0	0	189	227	1276	125	0	0	1628	1	33	124	0	0	158	2912

16:00:00	6	269	0	0	0	275	16	27	17	0	0	60	50	354	32	0	0	436	0	13	36	0	0	49	820
16:15:00	12	240	3	0	0	255	20	24	18	0	0	62	70	358	37	0	0	465	2	8	53	0	1	63	845
16:30:00	20	245	1	0	0	266	21	16	14	0	0	51	74	407	40	0	0	521	0	11	44	0	1	55	893
16:45:00	7	242	1	0	0	250	31	18	18	0	0	67	64	364	32	0	0	460	1	16	31	0	0	48	825
Hourly	45	996	5	0	0	1046	88	85	67	0	0	240	258	1483	141	0	0	1882	3	48	164	0	2	215	3383
17:00:00	15	271	0	0	0	286	30	14	11	0	0	55	77	349	46	0	0	472	0	9	46	0	0	55	868
17:15:00	15	317	0	0	0	332	26	21	19	0	0	66	97	396	58	0	0	551	1	14	44	0	0	59	1008
17:30:00	17	239	2	0	0	258	27	19	9	0	0	55	82	393	43	0	0	518	0	12	49	0	0	61	892
17:45:00	15	223	1	0	0	239	19	19	14	0	0	52	84	376	48	0	0	508	0	15	38	0	0	53	852
Hourly	62	1050	3	0	0	1115	102	73	53	0	0	228	340	1514	195	0	0	2049	1	50	177	0	0	228	3620
Grand Total	366	8395	29	0	0	8790	823	320	365	0	0	1508	1245	8326	819	0	0	10390	8	299	1398	0	2	1705	**22393**
Approach%	4.2%	95.5%	0.3%	0%		-	54.6%	21.2%	24.2%	0%		-	12%	80.1%	7.9%	0%		-	0.5%	17.5%	82%	0%		-	**-**
Totals %	1.6%	37.5%	0.1%	0%		39.3%	3.7%	1.4%	1.6%	0%		6.7%	5.6%	37.2%	3.7%	0%		46.4%	0%	1.3%	6.2%	0%		7.6%	**-**
Heavy	69	1335	4	0		-	211	12	88	0		-	33	1379	238	0		-	1	15	38	0		-	**-**
Heavy %	18.9%	15.9%	13.8%	0%		-	25.6%	3.8%	24.1%	0%		-	2.7%	16.6%	29.1%	0%		-	12.5%	5%	2.7%	0%		-	**-**
Bicycles	0	1	0	0		-	0	0	2	0		-	0	0	0	0		-	0	0	0	0		-	**-**
Bicycle %	0%	0%	0%	0%		-	0%	0%	0.5%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	**-**

Peak Hour: 07:00 AM - 08:00 AM Weather: Clear (12.6 °C)

Start Time	Southbound HWY 50						Westbound MAJOR MACKENZIE DR						Northbound HWY 50						Eastbound COLERAINE DR						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:00:00	14	373	1	0	0	388	36	6	9	0	0	51	22	203	23	0	0	248	0	21	74	0	0	95	782
07:15:00	14	462	1	0	0	477	38	4	6	0	0	48	14	232	17	0	0	263	0	16	81	0	0	97	885
07:30:00	13	438	0	0	0	451	46	4	3	0	0	53	17	214	22	0	0	253	0	19	102	0	0	121	878
07:45:00	6	417	0	0	0	423	41	2	6	0	0	49	23	257	22	0	0	302	0	12	94	0	0	106	880
Grand Total	47	1690	2	0	0	1739	161	16	24	0	0	201	76	906	84	0	0	1066	0	68	351	0	0	419	**3425**
Approach%	2.7%	97.2%	0.1%	0%		-	80.1%	8%	11.9%	0%		-	7.1%	85%	7.9%	0%		-	0%	16.2%	83.8%	0%		-	**-**
Totals %	1.4%	49.3%	0.1%	0%		50.8%	4.7%	0.5%	0.7%	0%		5.9%	2.2%	26.5%	2.5%	0%		31.1%	0%	2%	10.2%	0%		12.2%	**-**
PHF	0.84	0.91	0.5	0		0.91	0.88	0.67	0.67	0		0.95	0.83	0.88	0.91	0		0.88	0	0.81	0.86	0		0.87	**-**
Heavy	6	180	0	0		186	26	2	6	0		34	4	131	17	0		152	0	3	5	0		8	**-**
Heavy %	12.8%	10.7%	0%	0%		10.7%	16.1%	12.5%	25%	0%		16.9%	5.3%	14.5%	20.2%	0%		14.3%	0%	4.4%	1.4%	0%		1.9%	**-**
Lights	41	1510	2	0		1553	135	14	18	0		167	72	775	67	0		914	0	65	346	0		411	**-**
Lights %	87.2%	89.3%	100%	0%		89.3%	83.9%	87.5%	75%	0%		83.1%	94.7%	85.5%	79.8%	0%		85.7%	0%	95.6%	98.6%	0%		98.1%	**-**
Single-Unit Trucks	4	91	0	0		95	13	1	4	0		18	4	62	7	0		73	0	1	5	0		6	**-**
Single-Unit Trucks %	8.5%	5.4%	0%	0%		5.5%	8.1%	6.3%	16.7%	0%		9%	5.3%	6.8%	8.3%	0%		6.8%	0%	1.5%	1.4%	0%		1.4%	**-**
Buses	0	3	0	0		3	0	0	0	0		0	0	5	2	0		7	0	2	0	0		2	**-**
Buses %	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.6%	2.4%	0%		0.7%	0%	2.9%	0%	0%		0.5%	**-**
Articulated Trucks	2	86	0	0		88	13	1	2	0		16	0	64	8	0		72	0	0	0	0		0	**-**
Articulated Trucks %	4.3%	5.1%	0%	0%		5.1%	8.1%	6.3%	8.3%	0%		8%	0%	7.1%	9.5%	0%		6.8%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 01:00 PM - 02:00 PM Weather: Clear (18.7 °C)

Start Time	Southbound HWY 50						Westbound MAJOR MACKENZIE DR						Northbound HWY 50						Eastbound COLERAINE DR						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
13:00:00	5	204	0	0	0	209	20	5	14	0	0	39	18	195	20	0	0	233	0	7	17	0	0	24	505
13:15:00	6	209	2	0	0	217	18	8	12	0	0	38	31	199	21	0	0	251	0	5	16	0	0	21	527
13:30:00	5	210	0	0	0	215	18	5	11	0	0	34	26	223	15	0	0	264	0	3	21	0	0	24	537
13:45:00	10	204	2	0	0	216	15	8	9	0	0	32	26	232	15	0	0	273	0	6	17	0	0	23	544
Grand Total	26	827	4	0	0	857	71	26	46	0	0	143	101	849	71	0	0	1021	0	21	71	0	0	92	**2113**
Approach%	3%	96.5%	0.5%	0%		-	49.7%	18.2%	32.2%	0%		-	9.9%	83.2%	7%	0%		-	0%	22.8%	77.2%	0%		-	**-**
Totals %	1.2%	39.1%	0.2%	0%		40.6%	3.4%	1.2%	2.2%	0%		6.8%	4.8%	40.2%	3.4%	0%		48.3%	0%	1%	3.4%	0%		4.4%	**-**
PHF	0.65	0.98	0.5	0		0.99	0.89	0.81	0.82	0		0.92	0.81	0.91	0.85	0		0.93	0	0.75	0.85	0		0.96	**-**
Heavy	4	200	0	0		204	33	0	12	0		45	5	185	30	0		220	0	0	3	0		3	**-**
Heavy %	15.4%	24.2%	0%	0%		23.8%	46.5%	0%	26.1%	0%		31.5%	5%	21.8%	42.3%	0%		21.5%	0%	0%	4.2%	0%		3.3%	**-**
Lights	22	627	4	0		653	38	26	34	0		98	96	664	41	0		801	0	21	68	0		89	**-**
Lights %	84.6%	75.8%	100%	0%		76.2%	53.5%	100%	73.9%	0%		68.5%	95%	78.2%	57.7%	0%		78.5%	0%	100%	95.8%	0%		96.7%	**-**
Single-Unit Trucks	3	88	0	0		91	7	0	7	0		14	4	81	4	0		89	0	0	1	0		1	**-**
Single-Unit Trucks %	11.5%	10.6%	0%	0%		10.6%	9.9%	0%	15.2%	0%		9.8%	4%	9.5%	5.6%	0%		8.7%	0%	0%	1.4%	0%		1.1%	**-**
Buses	0	7	0	0		7	0	0	0	0		0	0	1	0	0		1	0	0	1	0		1	**-**
Buses %	0%	0.8%	0%	0%		0.8%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	1.4%	0%		1.1%	**-**
Articulated Trucks	1	105	0	0		106	26	0	5	0		31	1	103	26	0		130	0	0	1	0		1	**-**
Articulated Trucks %	3.8%	12.7%	0%	0%		12.4%	36.6%	0%	10.9%	0%		21.7%	1%	12.1%	36.6%	0%		12.7%	0%	0%	1.4%	0%		1.1%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 05:00 PM - 06:00 PM Weather: Clear (23.6 °C)

Start Time	Southbound HWY 50						Westbound MAJOR MACKENZIE DR						Northbound HWY 50						Eastbound COLERAINE DR						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
17:00:00	15	271	0	0	0	286	30	14	11	0	0	55	77	349	46	0	0	472	0	9	46	0	0	55	868
17:15:00	15	317	0	0	0	332	26	21	19	0	0	66	97	396	58	0	0	551	1	14	44	0	0	59	1008
17:30:00	17	239	2	0	0	258	27	19	9	0	0	55	82	393	43	0	0	518	0	12	49	0	0	61	892
17:45:00	15	223	1	0	0	239	19	19	14	0	0	52	84	376	48	0	0	508	0	15	38	0	0	53	852
Grand Total	62	1050	3	0	0	1115	102	73	53	0	0	228	340	1514	195	0	0	2049	1	50	177	0	0	228	**3620**
Approach%	5.6%	94.2%	0.3%	0%		-	44.7%	32%	23.2%	0%		-	16.6%	73.9%	9.5%	0%		-	0.4%	21.9%	77.6%	0%		-	-
Totals %	1.7%	29%	0.1%	0%		30.8%	2.8%	2%	1.5%	0%		6.3%	9.4%	41.8%	5.4%	0%		56.6%	0%	1.4%	4.9%	0%		6.3%	-
PHF	0.91	0.83	0.38	0		0.84	0.85	0.87	0.7	0		0.86	0.88	0.96	0.84	0		0.93	0.25	0.83	0.9	0		0.93	-
Heavy	9	110	1	0		120	22	2	10	0		34	5	171	36	0		212	0	1	8	0		9	-
Heavy %	14.5%	10.5%	33.3%	0%		10.8%	21.6%	2.7%	18.9%	0%		14.9%	1.5%	11.3%	18.5%	0%		10.3%	0%	2%	4.5%	0%		3.9%	-
Lights	53	940	2	0		995	80	71	43	0		194	335	1343	159	0		1837	1	49	169	0		219	-
Lights %	85.5%	89.5%	66.7%	0%		89.2%	78.4%	97.3%	81.1%	0%		85.1%	98.5%	88.7%	81.5%	0%		89.7%	100%	98%	95.5%	0%		96.1%	-
Single-Unit Trucks	6	54	1	0		61	6	2	4	0		12	4	64	11	0		79	0	1	7	0		8	-
Single-Unit Trucks %	9.7%	5.1%	33.3%	0%		5.5%	5.9%	2.7%	7.5%	0%		5.3%	1.2%	4.2%	5.6%	0%		3.9%	0%	2%	4%	0%		3.5%	-
Buses	0	0	0	0		0	1	0	0	0		1	0	1	0	0		1	0	0	1	0		1	-
Buses %	0%	0%	0%	0%		0%	1%	0%	0%	0%		0.4%	0%	0.1%	0%	0%		0%	0%	0%	0.6%	0%		0.4%	-
Articulated Trucks	3	56	0	0		59	15	0	6	0		21	1	106	25	0		132	0	0	0	0		0	-
Articulated Trucks %	4.8%	5.3%	0%	0%		5.3%	14.7%	0%	11.3%	0%		9.2%	0.3%	7%	12.8%	0%		6.4%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	1	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 07:00 AM - 08:00 AM Weather: Clear (12.6 °C)

	Pedestrians
N	0
S	0
E	0
W	0

Peak Hour: 01:00 PM - 02:00 PM Weather: Clear (18.7 °C)

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 05:00 PM - 06:00 PM **Weather: Clear (23.6 °C)**

Turning Movement Count (14 . HWY 50 & OLD CASTLEMORE RD) CustID: 05006861 MioID: 653657

Start Time	Southbound HWY 50					Northbound HWY 50					Eastbound OLD CASTLEMORE RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
07:00:00	516	1	0	0	517	0	272	0	0	272	0	1	0	0	1	790
07:15:00	532	0	0	0	532	0	269	0	0	269	1	0	0	1	1	802
07:30:00	519	1	0	0	520	0	346	0	0	346	0	0	0	1	0	866
07:45:00	545	0	0	0	545	0	316	0	1	316	0	0	0	0	0	861
Hourly	2112	2	0	0	2114	0	1203	0	1	1203	1	1	0	2	2	3319
08:00:00	535	0	0	0	535	0	260	0	0	260	0	0	0	0	0	795
08:15:00	506	0	0	0	506	0	301	0	0	301	0	0	0	0	0	807
08:30:00	473	0	0	0	473	0	243	0	0	243	0	0	0	0	0	716
08:45:00	515	0	0	0	515	0	315	0	0	315	0	0	0	0	0	830
Hourly	2029	0	0	0	2029	0	1119	0	0	1119	0	0	0	0	0	3148
BREAK																
11:00:00	271	0	0	0	271	0	271	0	0	271	0	0	0	0	0	542
11:15:00	308	0	0	0	308	0	275	0	0	275	0	0	0	0	0	583
11:30:00	280	1	0	0	281	0	284	0	0	284	0	0	0	0	0	565
11:45:00	284	0	0	0	284	0	296	0	0	296	0	0	0	0	0	580
Hourly	1143	1	0	0	1144	0	1126	0	0	1126	0	0	0	0	0	2270
12:00:00	308	1	0	0	309	0	270	0	0	270	1	0	0	0	1	580
12:15:00	330	0	0	0	330	0	290	0	0	290	0	0	0	0	0	620
12:30:00	269	0	0	0	269	1	278	0	0	279	0	1	0	0	1	549
12:45:00	267	0	0	0	267	0	276	0	0	276	0	0	0	0	0	543
Hourly	1174	1	0	0	1175	1	1114	0	0	1115	1	1	0	0	2	2292
13:00:00	290	0	0	0	290	1	287	0	0	288	0	1	0	0	1	579
13:15:00	300	0	0	0	300	0	295	0	0	295	0	0	0	0	0	595
13:30:00	271	0	0	0	271	0	323	0	0	323	0	0	0	0	0	594

13:45:00	264	0	0	0	264	0	326	0	0	326	0	0	0	0	0	590
Hourly	1125	0	0	0	1125	1	1231	0	0	1232	0	1	0	0	1	2358
BREAK																
15:00:00	256	0	0	0	256	0	448	0	0	448	0	0	0	0	0	704
15:15:00	355	0	0	0	355	0	456	0	0	456	0	0	0	0	0	811
15:30:00	372	0	0	0	372	0	484	0	0	484	0	0	0	0	0	856
15:45:00	311	2	0	0	313	0	524	0	0	524	0	1	0	0	1	838
Hourly	1294	2	0	0	1296	0	1912	0	0	1912	0	1	0	0	1	3209
16:00:00	393	0	0	0	393	0	457	0	0	457	0	0	0	0	0	850
16:15:00	358	0	0	0	358	0	566	0	0	566	0	0	0	0	0	924
16:30:00	319	0	0	0	319	1	528	0	0	529	0	1	0	0	1	849
16:45:00	382	0	0	0	382	0	546	1	0	547	0	0	0	0	0	929
Hourly	1452	0	0	0	1452	1	2097	1	0	2099	0	1	0	0	1	3552
17:00:00	366	0	0	0	366	0	549	0	0	549	0	0	0	0	0	915
17:15:00	435	0	0	0	435	0	529	0	0	529	0	0	0	0	0	964
17:30:00	296	0	0	0	296	1	530	0	0	531	0	1	0	0	1	828
17:45:00	304	1	0	0	305	1	602	0	0	603	0	1	0	0	1	909
Hourly	1401	1	0	0	1402	2	2210	0	0	2212	0	2	0	0	2	3616
Grand Total	11730	7	0	0	11737	5	12012	1	1	12018	2	7	0	2	9	**23764**
Approach%	99.9%	0.1%	0%		-	0%	100%	0%		-	22.2%	77.8%	0%		-	**-**
Totals %	49.4%	0%	0%		49.4%	0%	50.5%	0%		50.6%	0%	0%	0%		0%	**-**
Heavy	2044	0	0		-	1	2300	0		-	0	1	0		-	**-**
Heavy %	17.4%	0%	0%		-	20%	19.1%	0%		-	0%	14.3%	0%		-	**-**
Bicycles	1	0	0		-	0	0	0		-	0	0	0		-	**-**
Bicycle %	0%	0%	0%		-	0%	0%	0%		-	0%	0%	0%		-	**-**

Peak Hour: 07:00 AM - 08:00 AM Weather: Broken Clouds (4.4 °C)

Start Time	Southbound HWY 50					Northbound HWY 50					Eastbound OLD CASTLEMORE RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
07:00:00	516	1	0	0	517	0	272	0	0	272	0	1	0	0	1	790
07:15:00	532	0	0	0	532	0	269	0	0	269	1	0	0	1	1	802
07:30:00	519	1	0	0	520	0	346	0	0	346	0	0	0	1	0	866
07:45:00	545	0	0	0	545	0	316	0	1	316	0	0	0	0	0	861
Grand Total	2112	2	0	0	2114	0	1203	0	1	1203	1	1	0	2	2	**3319**
Approach%	99.9%	0.1%	0%		-	0%	100%	0%		-	50%	50%	0%		-	**-**
Totals %	63.6%	0.1%	0%		63.7%	0%	36.2%	0%		36.2%	0%	0%	0%		0.1%	**-**
PHF	0.97	0.5	0		0.97	0	0.87	0		0.87	0.25	0.25	0		0.5	**-**
Heavy	279	0	0		279	0	165	0		165	0	0	0		0	**-**
Heavy %	13.2%	0%	0%		13.2%	0%	13.7%	0%		13.7%	0%	0%	0%		0%	**-**
Lights	1833	2	0		1835	0	1038	0		1038	1	1	0		2	**-**
Lights %	86.8%	100%	0%		86.8%	0%	86.3%	0%		86.3%	100%	100%	0%		100%	**-**
Single-Unit Trucks	96	0	0		96	0	66	0		66	0	0	0		0	**-**
Single-Unit Trucks %	4.5%	0%	0%		4.5%	0%	5.5%	0%		5.5%	0%	0%	0%		0%	**-**
Buses	5	0	0		5	0	6	0		6	0	0	0		0	**-**
Buses %	0.2%	0%	0%		0.2%	0%	0.5%	0%		0.5%	0%	0%	0%		0%	**-**
Articulated Trucks	178	0	0		178	0	93	0		93	0	0	0		0	**-**
Articulated Trucks %	8.4%	0%	0%		8.4%	0%	7.7%	0%		7.7%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	33.3%		-	-	-	66.7%		**-**
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

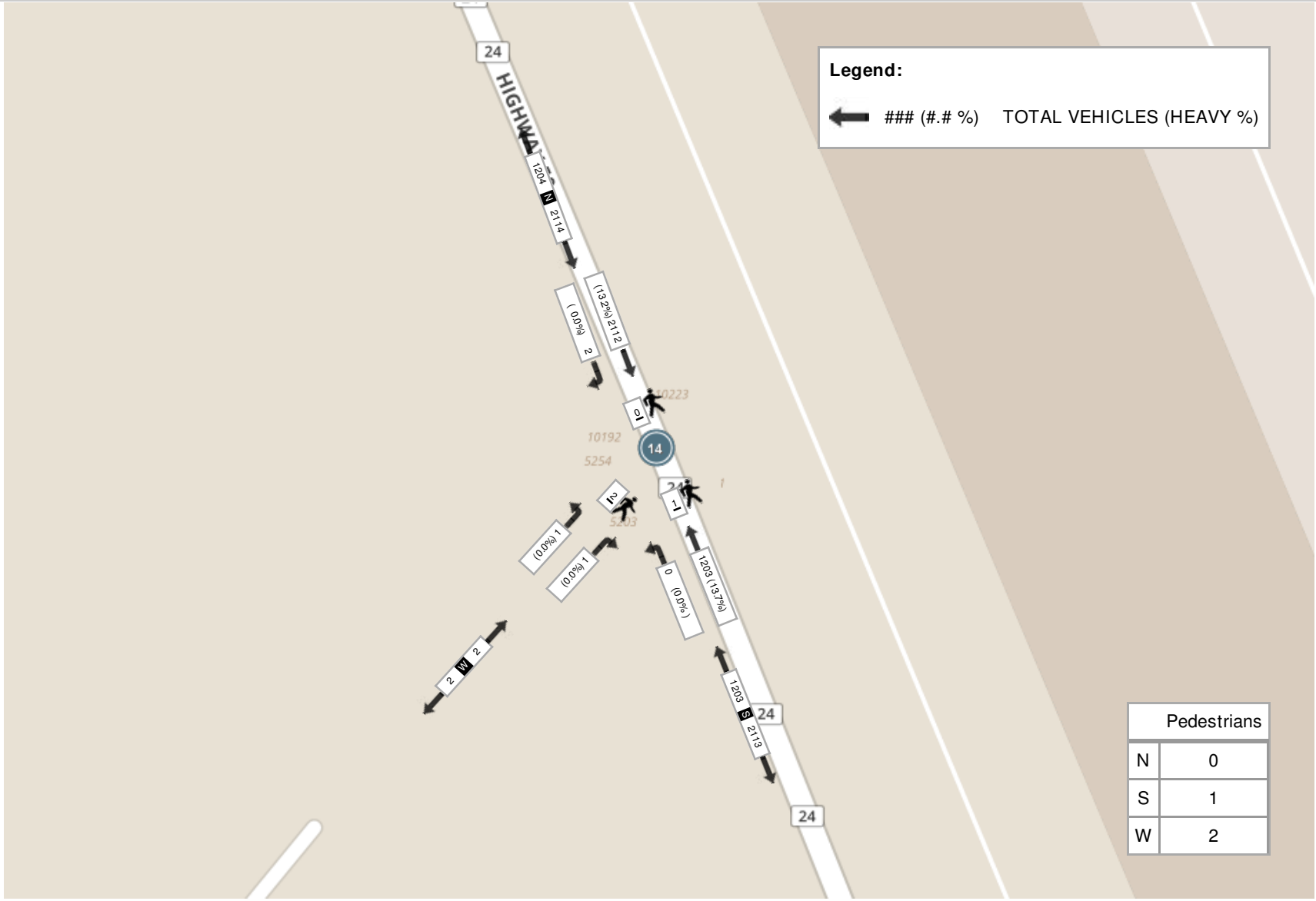
Peak Hour: 01:00 PM - 02:00 PM Weather: Scattered Clouds (9.84 °C)

Start Time	Southbound HWY 50					Northbound HWY 50					Eastbound OLD CASTLEMORE RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
13:00:00	290	0	0	0	290	1	287	0	0	288	0	1	0	0	1	579
13:15:00	300	0	0	0	300	0	295	0	0	295	0	0	0	0	0	595
13:30:00	271	0	0	0	271	0	323	0	0	323	0	0	0	0	0	594
13:45:00	264	0	0	0	264	0	326	0	0	326	0	0	0	0	0	590
Grand Total	1125	0	0	0	1125	1	1231	0	0	1232	0	1	0	0	1	**2358**
Approach%	100%	0%	0%		-	0.1%	99.9%	0%		-	0%	100%	0%		-	**-**
Totals %	47.7%	0%	0%		47.7%	0%	52.2%	0%		52.2%	0%	0%	0%		0%	**-**
PHF	0.94	0	0		0.94	0.25	0.94	0		0.94	0	0.25	0		0.25	**-**
Heavy	274	0	0		274	0	338	0		338	0	0	0		0	**-**
Heavy %	24.4%	0%	0%		24.4%	0%	27.5%	0%		27.4%	0%	0%	0%		0%	**-**
Lights	851	0	0		851	1	893	0		894	0	1	0		1	**-**
Lights %	75.6%	0%	0%		75.6%	100%	72.5%	0%		72.6%	0%	100%	0%		100%	**-**
Single-Unit Trucks	128	0	0		128	0	152	0		152	0	0	0		0	**-**
Single-Unit Trucks %	11.4%	0%	0%		11.4%	0%	12.3%	0%		12.3%	0%	0%	0%		0%	**-**
Buses	7	0	0		7	0	0	0		0	0	0	0		0	**-**
Buses %	0.6%	0%	0%		0.6%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Articulated Trucks	139	0	0		139	0	186	0		186	0	0	0		0	**-**
Articulated Trucks %	12.4%	0%	0%		12.4%	0%	15.1%	0%		15.1%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

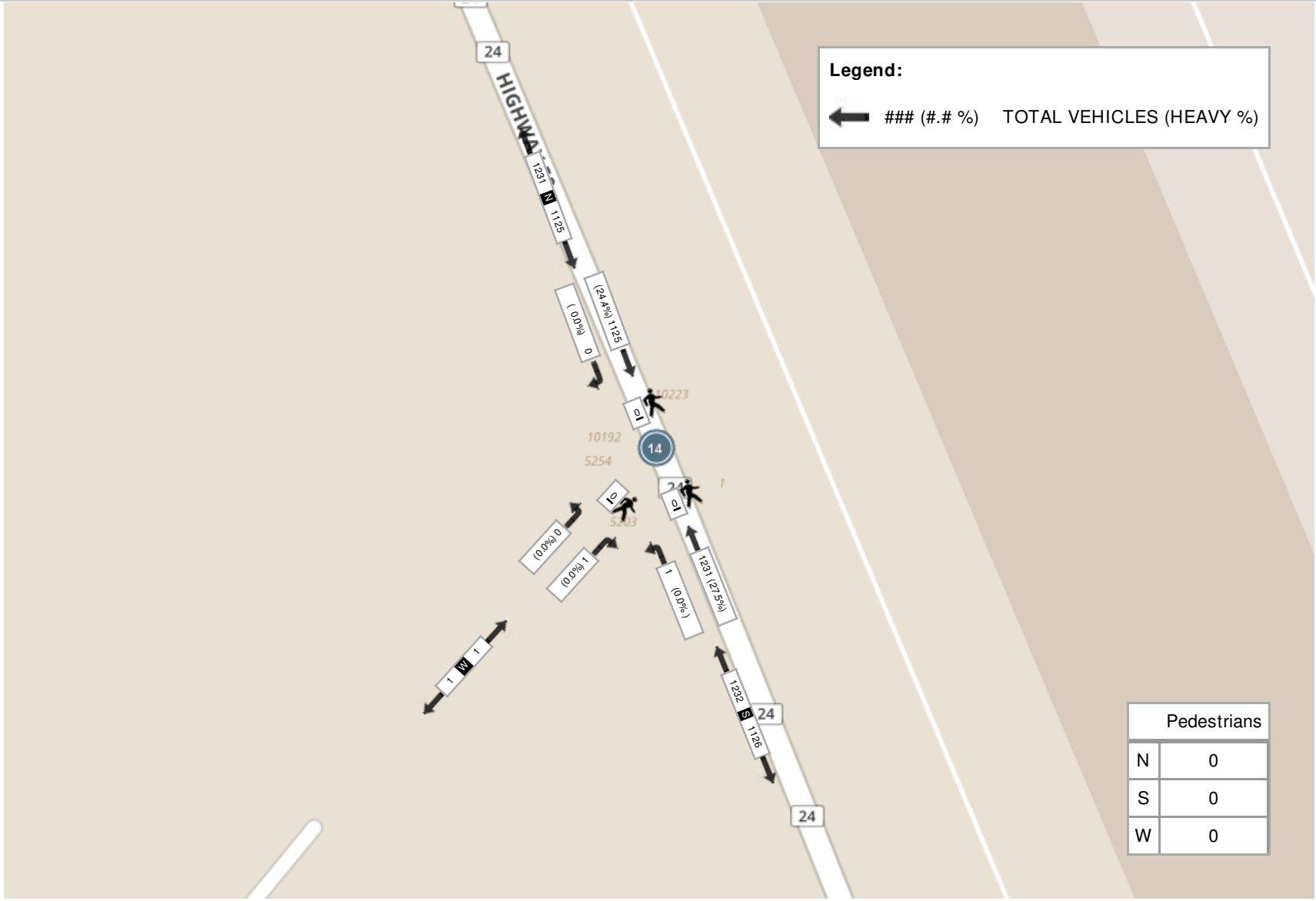
Peak Hour: 05:00 PM - 06:00 PM Weather: Broken Clouds (10.63 °C)

Start Time	Southbound HWY 50					Northbound HWY 50					Eastbound OLD CASTLEMORE RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
17:00:00	366	0	0	0	366	0	549	0	0	549	0	0	0	0	0	915
17:15:00	435	0	0	0	435	0	529	0	0	529	0	0	0	0	0	964
17:30:00	296	0	0	0	296	1	530	0	0	531	0	1	0	0	1	828
17:45:00	304	1	0	0	305	1	602	0	0	603	0	1	0	0	1	909
Grand Total	1401	1	0	0	1402	2	2210	0	0	2212	0	2	0	0	2	**3616**
Approach%	99.9%	0.1%	0%		-	0.1%	99.9%	0%		-	0%	100%	0%		-	**-**
Totals %	38.7%	0%	0%		38.8%	0.1%	61.1%	0%		61.2%	0%	0.1%	0%		0.1%	**-**
PHF	0.81	0.25	0		0.81	0.5	0.92	0		0.92	0	0.5	0		0.5	**-**
Heavy	155	0	0		155	0	314	0		314	0	0	0		0	**-**
Heavy %	11.1%	0%	0%		11.1%	0%	14.2%	0%		14.2%	0%	0%	0%		0%	**-**
Lights	1246	1	0		1247	2	1896	0		1898	0	2	0		2	**-**
Lights %	88.9%	100%	0%		88.9%	100%	85.8%	0%		85.8%	0%	100%	0%		100%	**-**
Single-Unit Trucks	64	0	0		64	0	138	0		138	0	0	0		0	**-**
Single-Unit Trucks %	4.6%	0%	0%		4.6%	0%	6.2%	0%		6.2%	0%	0%	0%		0%	**-**
Buses	1	0	0		1	0	2	0		2	0	0	0		0	**-**
Buses %	0.1%	0%	0%		0.1%	0%	0.1%	0%		0.1%	0%	0%	0%		0%	**-**
Articulated Trucks	90	0	0		90	0	174	0		174	0	0	0		0	**-**
Articulated Trucks %	6.4%	0%	0%		6.4%	0%	7.9%	0%		7.9%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

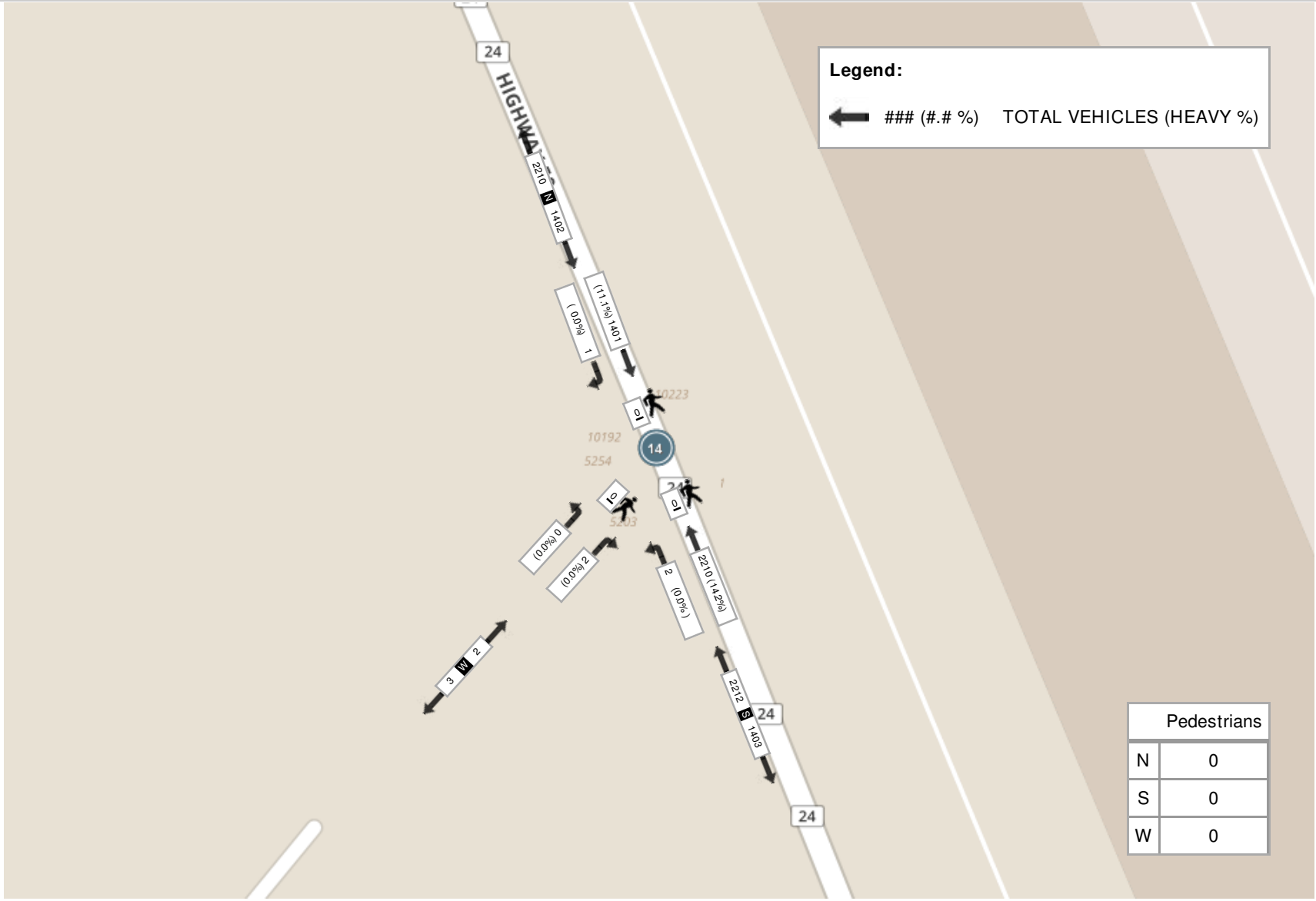
Peak Hour: 07:00 AM - 08:00 AM Weather: Broken Clouds (4.4 °C)



Peak Hour: 01:00 PM - 02:00 PM Weather: Scattered Clouds (9.84 °C)



Peak Hour: 05:00 PM - 06:00 PM Weather: Broken Clouds (10.63 °C)



Turning Movement Count (34 . HWY 50 & RUTHERFORD RD) CustID: 05006314 MioID: 513821

Start Time	Southbound HWY 50						Westbound RUTHERFORD RD						Northbound HWY 50						Eastbound RUTHERFORD RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:00:00	49	407	16	0	0	472	32	120	33	0	0	185	15	178	31	0	0	224	12	270	33	0	0	315	1196
07:15:00	60	405	15	0	0	480	28	192	32	0	0	252	15	162	30	0	0	207	20	325	31	0	0	376	1315
07:30:00	50	370	14	0	0	434	33	216	45	0	0	294	23	179	39	0	0	241	22	310	34	0	0	366	1335
07:45:00	51	433	27	0	0	511	37	143	43	0	0	223	16	200	24	0	0	240	35	246	39	0	0	320	1294
Hourly	210	1615	72	0	0	1897	130	671	153	0	0	954	69	719	124	0	0	912	89	1151	137	0	0	1377	5140
08:00:00	42	351	21	0	0	414	26	184	35	0	0	245	18	143	45	0	0	206	33	309	61	0	0	403	1268
08:15:00	54	414	23	0	0	491	43	162	47	0	0	252	10	144	42	0	0	196	31	268	68	1	0	368	1307
08:30:00	51	390	29	0	0	470	26	160	40	0	0	226	15	182	30	0	0	227	33	277	55	0	0	365	1288
08:45:00	43	334	15	0	0	392	34	90	41	0	0	165	19	109	33	0	0	161	44	233	79	0	0	356	1074
Hourly	190	1489	88	0	0	1767	129	596	163	0	0	888	62	578	150	0	0	790	141	1087	263	1	0	1492	4937
BREAK																									
11:00:00	35	213	15	0	0	263	23	60	33	0	0	116	18	171	29	1	0	219	14	89	41	0	0	144	742
11:15:00	38	198	10	0	0	246	22	65	37	0	0	124	12	179	34	0	0	225	17	93	48	0	0	158	753
11:30:00	33	191	10	0	0	234	26	75	33	0	0	134	11	174	31	0	0	216	14	101	28	0	0	143	727
11:45:00	36	193	11	0	0	240	23	73	43	0	1	139	17	198	31	0	2	246	8	86	43	0	0	137	762
Hourly	142	795	46	0	0	983	94	273	146	0	1	513	58	722	125	1	2	906	53	369	160	0	0	582	2984
12:00:00	23	199	15	0	0	237	20	67	37	0	0	124	16	173	31	0	1	220	28	101	28	0	0	157	738
12:15:00	34	214	17	0	0	265	22	72	31	0	0	125	21	182	22	0	0	225	11	108	31	1	0	151	766
12:30:00	33	229	13	0	0	275	21	70	39	0	0	130	23	187	23	1	0	234	15	86	31	0	0	132	771
12:45:00	28	176	10	0	0	214	27	86	34	0	2	147	27	169	24	0	1	220	11	95	25	0	0	131	712
Hourly	118	818	55	0	0	991	90	295	141	0	2	526	87	711	100	1	2	899	65	390	115	1	0	571	2987
13:00:00	25	215	13	0	0	253	31	87	35	1	0	154	35	189	36	0	0	260	13	93	33	0	0	139	806
13:15:00	31	215	13	0	0	259	27	81	24	0	0	132	20	193	33	0	0	246	18	102	39	0	0	159	796
13:30:00	29	173	15	0	0	217	30	105	41	0	0	176	38	195	27	0	0	260	19	111	34	0	0	164	817
13:45:00	30	176	13	0	0	219	32	102	40	0	0	174	26	252	24	0	0	302	19	98	29	0	0	146	841
Hourly	115	779	54	0	0	948	120	375	140	1	0	636	119	829	120	0	0	1068	69	404	135	0	0	608	3260
BREAK																									
15:00:00	31	188	27	0	0	246	30	155	63	0	0	248	45	279	29	0	1	353	16	139	19	0	0	174	1021
15:15:00	26	202	28	0	0	256	32	207	81	0	0	320	53	254	35	0	0	342	20	192	34	0	0	246	1164
15:30:00	35	187	19	0	0	241	33	259	74	0	0	366	45	214	36	1	0	296	25	190	43	0	0	258	1161
15:45:00	32	221	23	0	0	276	36	243	68	0	0	347	49	298	33	0	0	380	23	149	34	0	0	206	1209
Hourly	124	798	97	0	0	1019	131	864	286	0	0	1281	192	1045	133	1	1	1371	84	670	130	0	0	884	4555

16:00:00	39	179	37	0	0	255	41	270	65	0	0	376	44	318	35	0	0	397	15	162	23	0	0	200	1228
16:15:00	36	237	24	0	1	297	49	257	102	0	1	408	47	387	39	0	0	473	23	142	24	0	0	189	1367
16:30:00	31	227	25	0	0	283	27	264	81	0	0	372	50	405	38	0	0	493	23	156	20	1	0	200	1348
16:45:00	39	200	35	0	0	274	33	245	88	0	0	366	44	354	33	0	0	431	30	180	29	0	0	239	1310
Hourly	145	843	121	0	1	1109	150	1036	336	0	1	1522	185	1464	145	0	0	1794	91	640	96	1	0	828	5253
17:00:00	38	255	36	0	0	329	36	321	57	0	0	414	63	402	31	0	0	496	20	158	25	0	0	203	1442
17:15:00	37	246	41	0	0	324	39	325	89	0	0	453	52	394	49	0	0	495	22	180	27	0	0	229	1501
17:30:00	38	193	39	1	0	271	40	299	73	0	0	412	59	406	39	0	0	504	18	149	30	0	0	197	1384
17:45:00	34	197	42	0	0	273	28	267	98	0	0	393	62	381	41	0	0	484	23	122	30	0	0	175	1325
Hourly	147	891	158	1	0	1197	143	1212	317	0	0	1672	236	1583	160	0	0	1979	83	609	112	0	0	804	5652
Grand Total	1191	8028	691	1	1	9911	987	5322	1682	1	4	7992	1008	7651	1057	3	5	9719	675	5320	1148	3	0	7146	**34768**
Approach%	12%	81%	7%	0%		-	12.3%	66.6%	21%	0%		-	10.4%	78.7%	10.9%	0%		-	9.4%	74.4%	16.1%	0%		-	**-**
Totals %	3.4%	23.1%	2%	0%		28.5%	2.8%	15.3%	4.8%	0%		23%	2.9%	22%	3%	0%		28%	1.9%	15.3%	3.3%	0%		20.6%	**-**
Heavy	303	1405	25	0		-	560	84	427	0		-	19	1307	507	0		-	14	87	25	0		-	**-**
Heavy %	25.4%	17.5%	3.6%	0%		-	56.7%	1.6%	25.4%	0%		-	1.9%	17.1%	48%	0%		-	2.1%	1.6%	2.2%	0%		-	**-**
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**

Peak Hour: 07:00 AM - 08:00 AM Weather: Mostly Cloudy (0.1 °C)

Start Time	Southbound HWY 50						Westbound RUTHERFORD RD						Northbound HWY 50						Eastbound RUTHERFORD RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:00:00	49	407	16	0	0	472	32	120	33	0	0	185	15	178	31	0	0	224	12	270	33	0	0	315	1196
07:15:00	60	405	15	0	0	480	28	192	32	0	0	252	15	162	30	0	0	207	20	325	31	0	0	376	1315
07:30:00	50	370	14	0	0	434	33	216	45	0	0	294	23	179	39	0	0	241	22	310	34	0	0	366	1335
07:45:00	51	433	27	0	0	511	37	143	43	0	0	223	16	200	24	0	0	240	35	246	39	0	0	320	1294
Grand Total	210	1615	72	0	0	1897	130	671	153	0	0	954	69	719	124	0	0	912	89	1151	137	0	0	1377	**5140**
Approach%	11.1%	85.1%	3.8%	0%		-	13.6%	70.3%	16%	0%		-	7.6%	78.8%	13.6%	0%		-	6.5%	83.6%	9.9%	0%		-	-
Totals %	4.1%	31.4%	1.4%	0%		36.9%	2.5%	13.1%	3%	0%		18.6%	1.3%	14%	2.4%	0%		17.7%	1.7%	22.4%	2.7%	0%		26.8%	-
PHF	0.88	0.93	0.67	0		0.93	0.88	0.78	0.85	0		0.81	0.75	0.9	0.79	0		0.95	0.64	0.89	0.88	0		0.92	-
Heavy	45	257	3	0		305	54	14	31	0		99	1	97	45	0		143	2	14	2	0		18	-
Heavy %	21.4%	15.9%	4.2%	0%		16.1%	41.5%	2.1%	20.3%	0%		10.4%	1.4%	13.5%	36.3%	0%		15.7%	2.2%	1.2%	1.5%	0%		1.3%	-
Lights	165	1358	69	0		1592	76	657	122	0		855	68	622	79	0		769	87	1137	135	0		1359	-
Lights %	78.6%	84.1%	95.8%	0%		83.9%	58.5%	97.9%	79.7%	0%		89.6%	98.6%	86.5%	63.7%	0%		84.3%	97.8%	98.8%	98.5%	0%		98.7%	-
Single-Unit Trucks	19	71	2	0		92	12	10	9	0		31	1	34	22	0		57	1	7	0	0		8	-
Single-Unit Trucks %	9%	4.4%	2.8%	0%		4.8%	9.2%	1.5%	5.9%	0%		3.2%	1.4%	4.7%	17.7%	0%		6.3%	1.1%	0.6%	0%	0%		0.6%	-
Buses	0	3	1	0		4	0	2	0	0		2	0	9	1	0		10	0	3	2	0		5	-
Buses %	0%	0.2%	1.4%	0%		0.2%	0%	0.3%	0%	0%		0.2%	0%	1.3%	0.8%	0%		1.1%	0%	0.3%	1.5%	0%		0.4%	-
Articulated Trucks	26	183	0	0		209	42	2	22	0		66	0	54	22	0		76	1	4	0	0		5	-
Articulated Trucks %	12.4%	11.3%	0%	0%		11%	32.3%	0.3%	14.4%	0%		6.9%	0%	7.5%	17.7%	0%		8.3%	1.1%	0.3%	0%	0%		0.4%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

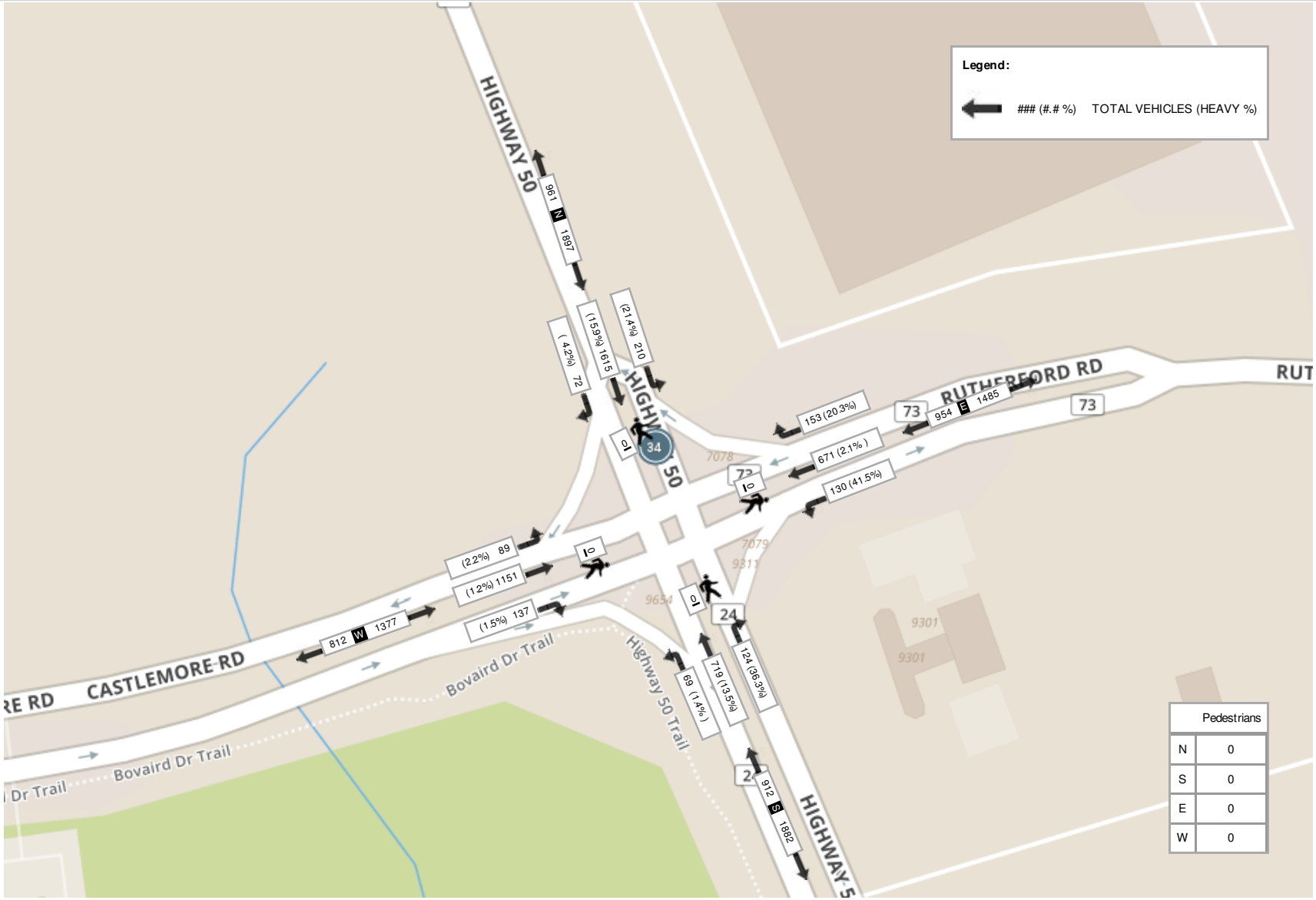
Peak Hour: 01:00 PM - 02:00 PM Weather: Rain (4.1 °C)

Start Time	Southbound HWY 50						Westbound RUTHERFORD RD						Northbound HWY 50						Eastbound RUTHERFORD RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
13:00:00	25	215	13	0	0	253	31	87	35	1	0	154	35	189	36	0	0	260	13	93	33	0	0	139	806
13:15:00	31	215	13	0	0	259	27	81	24	0	0	132	20	193	33	0	0	246	18	102	39	0	0	159	796
13:30:00	29	173	15	0	0	217	30	105	41	0	0	176	38	195	27	0	0	260	19	111	34	0	0	164	817
13:45:00	30	176	13	0	0	219	32	102	40	0	0	174	26	252	24	0	0	302	19	98	29	0	0	146	841
Grand Total	115	779	54	0	0	948	120	375	140	1	0	636	119	829	120	0	0	1068	69	404	135	0	0	608	**3260**
Approach%	12.1%	82.2%	5.7%	0%		-	18.9%	59%	22%	0.2%		-	11.1%	77.6%	11.2%	0%		-	11.3%	66.4%	22.2%	0%		-	-
Totals %	3.5%	23.9%	1.7%	0%		29.1%	3.7%	11.5%	4.3%	0%		19.5%	3.7%	25.4%	3.7%	0%		32.8%	2.1%	12.4%	4.1%	0%		18.7%	-
PHF	0.93	0.91	0.9	0		0.92	0.94	0.89	0.85	0.25		0.9	0.78	0.82	0.83	0		0.88	0.91	0.91	0.87	0		0.93	-
Heavy	39	220	2	0		261	76	6	58	0		140	3	200	77	0		280	4	13	1	0		18	-
Heavy %	33.9%	28.2%	3.7%	0%		27.5%	63.3%	1.6%	41.4%	0%		22%	2.5%	24.1%	64.2%	0%		26.2%	5.8%	3.2%	0.7%	0%		3%	-
Lights	76	559	52	0		687	44	369	82	1		496	116	629	43	0		788	65	391	134	0		590	-
Lights %	66.1%	71.8%	96.3%	0%		72.5%	36.7%	98.4%	58.6%	100%		78%	97.5%	75.9%	35.8%	0%		73.8%	94.2%	96.8%	99.3%	0%		97%	-
Single-Unit Trucks	12	82	2	0		96	16	4	24	0		44	3	72	17	0		92	4	10	1	0		15	-
Single-Unit Trucks %	10.4%	10.5%	3.7%	0%		10.1%	13.3%	1.1%	17.1%	0%		6.9%	2.5%	8.7%	14.2%	0%		8.6%	5.8%	2.5%	0.7%	0%		2.5%	-
Buses	0	1	0	0		1	0	1	0	0		1	0	1	0	0		1	0	1	0	0		1	-
Buses %	0%	0.1%	0%	0%		0.1%	0%	0.3%	0%	0%		0.2%	0%	0.1%	0%	0%		0.1%	0%	0.2%	0%	0%		0.2%	-
Articulated Trucks	27	137	0	0		164	60	1	34	0		95	0	127	60	0		187	0	2	0	0		2	-
Articulated Trucks %	23.5%	17.6%	0%	0%		17.3%	50%	0.3%	24.3%	0%		14.9%	0%	15.3%	50%	0%		17.5%	0%	0.5%	0%	0%		0.3%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

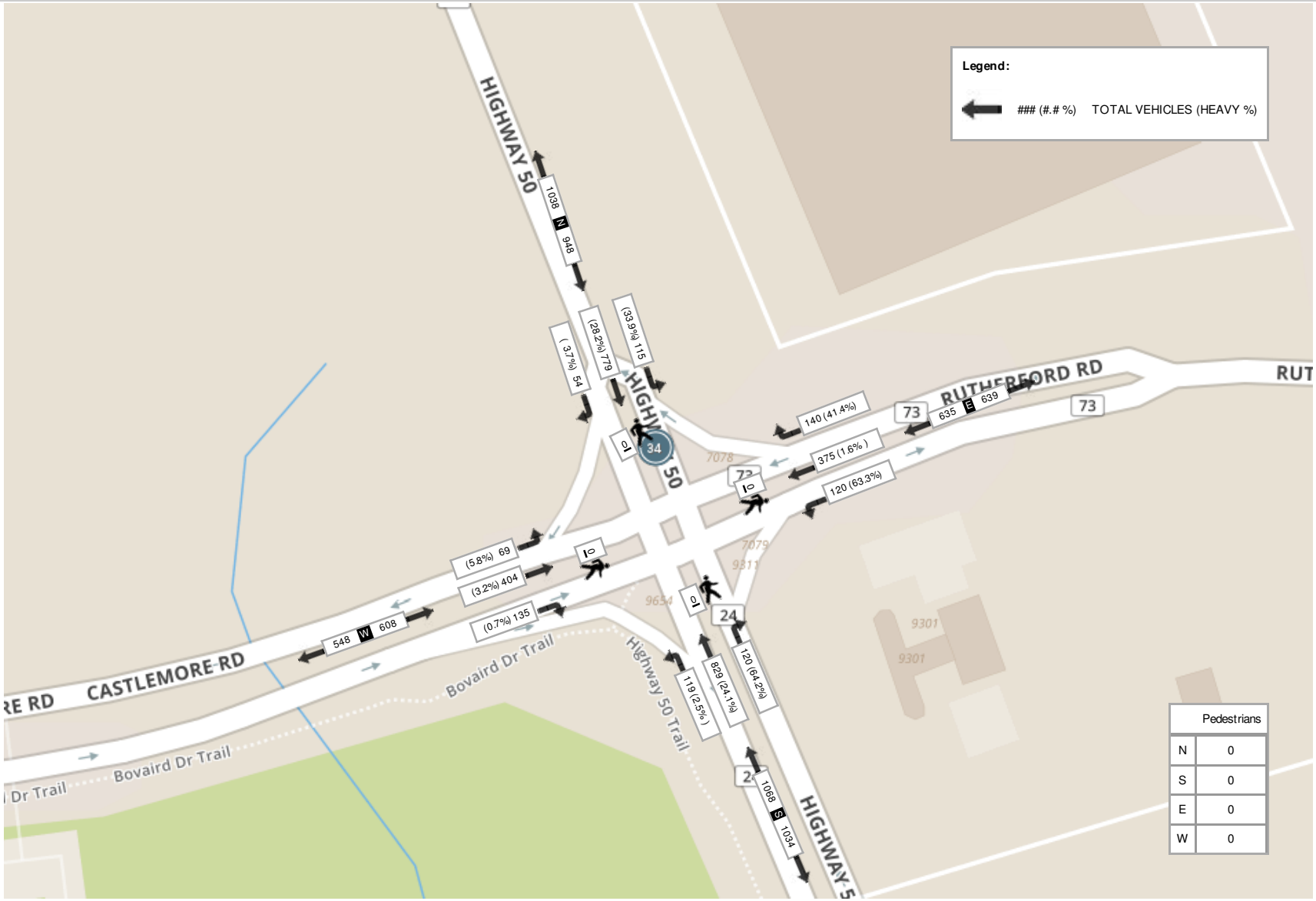
Peak Hour: 05:00 PM - 06:00 PM Weather: Rain (4.9 °C)

Start Time	Southbound HWY 50						Westbound RUTHERFORD RD						Northbound HWY 50						Eastbound RUTHERFORD RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
17:00:00	38	255	36	0	0	329	36	321	57	0	0	414	63	402	31	0	0	496	20	158	25	0	0	203	1442
17:15:00	37	246	41	0	0	324	39	325	89	0	0	453	52	394	49	0	0	495	22	180	27	0	0	229	1501
17:30:00	38	193	39	1	0	271	40	299	73	0	0	412	59	406	39	0	0	504	18	149	30	0	0	197	1384
17:45:00	34	197	42	0	0	273	28	267	98	0	0	393	62	381	41	0	0	484	23	122	30	0	0	175	1325
Grand Total	147	891	158	1	0	1197	143	1212	317	0	0	1672	236	1583	160	0	0	1979	83	609	112	0	0	804	**5652**
Approach%	12.3%	74.4%	13.2%	0.1%		-	8.6%	72.5%	19%	0%		-	11.9%	80%	8.1%	0%		-	10.3%	75.7%	13.9%	0%		-	-
Totals %	2.6%	15.8%	2.8%	0%		21.2%	2.5%	21.4%	5.6%	0%		29.6%	4.2%	28%	2.8%	0%		35%	1.5%	10.8%	2%	0%		14.2%	-
PHF	0.97	0.87	0.94	0.25		0.91	0.89	0.93	0.81	0		0.92	0.94	0.97	0.82	0		0.98	0.9	0.85	0.93	0		0.88	-
Heavy	20	75	2	0		97	76	11	52	0		139	3	176	57	0		236	0	10	1	0		11	-
Heavy %	13.6%	8.4%	1.3%	0%		8.1%	53.1%	0.9%	16.4%	0%		8.3%	1.3%	11.1%	35.6%	0%		11.9%	0%	1.6%	0.9%	0%		1.4%	-
Lights	127	816	156	1		1100	67	1201	265	0		1533	233	1407	103	0		1743	83	599	111	0		793	-
Lights %	86.4%	91.6%	98.7%	100%		91.9%	46.9%	99.1%	83.6%	0%		91.7%	98.7%	88.9%	64.4%	0%		88.1%	100%	98.4%	99.1%	0%		98.6%	-
Single-Unit Trucks	5	22	2	0		29	21	9	17	0		47	3	66	9	0		78	0	9	1	0		10	-
Single-Unit Trucks %	3.4%	2.5%	1.3%	0%		2.4%	14.7%	0.7%	5.4%	0%		2.8%	1.3%	4.2%	5.6%	0%		3.9%	0%	1.5%	0.9%	0%		1.2%	-
Buses	0	0	0	0		0	0	1	0	0		1	0	1	0	0		1	0	1	0	0		1	-
Buses %	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0.1%	0%	0%		0.1%	0%	0.2%	0%	0%		0.1%	-
Articulated Trucks	15	53	0	0		68	55	1	35	0		91	0	109	48	0		157	0	0	0	0		0	-
Articulated Trucks %	10.2%	5.9%	0%	0%		5.7%	38.5%	0.1%	11%	0%		5.4%	0%	6.9%	30%	0%		7.9%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

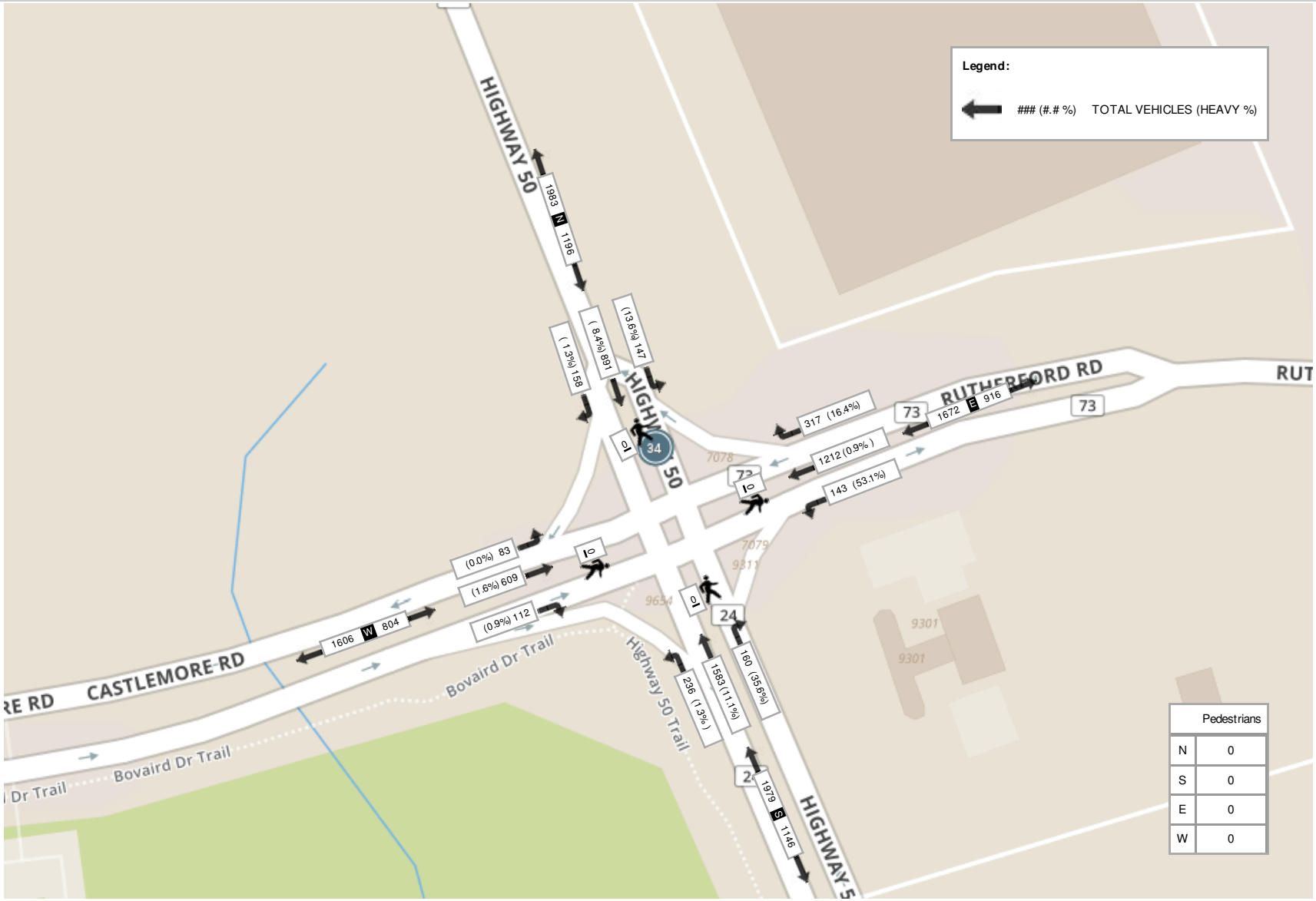
Peak Hour: 07:00 AM - 08:00 AM Weather: Mostly Cloudy (0.1 °C)



Peak Hour: 01:00 PM - 02:00 PM **Weather: Rain (4.1 °C)**



Peak Hour: 05:00 PM - 06:00 PM **Weather: Rain (4.9 °C)**



Spectrum

Turning Movement Count
Location Name: HWY 50 & SEARS WAREHOUSE
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Turning Movement Count (42 . HWY 50 & SEARS WAREHOUSE) CustID: 05007288 MioID: 506062

Start Time	Northbound				Southbound				Westbound				Southbound HWY 50						Westbound SEARS WAREHOUSE ACCESS						Northbound HWY 50						Eastbound DRIVEWAY						Int. Total (15 min)	Int. Total (1 hr)
	Right	Thru	Peds	Approach Total	Left	Thru	Peds	Approach Total	Right	Left	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total		
07:00:00	0	0	0	0	0	0	0	0	0	0	0	0	2	496	0	0	0	498	5	0	1	0	0	6	0	228	6	0	0	234	0	0	0	0	0	0	738	
07:15:00	0	0	0	0	0	0	0	0	0	0	0	0	3	553	0	0	0	556	10	0	1	0	0	11	0	194	8	0	0	202	0	0	0	0	0	0	769	
07:30:00	0	0	0	0	0	0	0	0	0	0	0	0	4	510	0	0	0	514	12	0	2	0	0	14	0	261	12	0	0	273	1	0	0	0	0	1	802	
07:45:00	0	0	0	0	0	0	0	0	0	0	0	0	8	561	0	0	0	569	3	0	3	0	0	6	0	310	12	0	0	322	0	0	0	0	0	0	897	3206
08:00:00	0	0	0	0	0	0	0	0	0	0	0	0	3	528	0	0	0	531	12	0	2	0	0	14	0	244	13	0	0	257	0	0	1	0	0	1	803	3271
08:15:00	0	0	0	0	0	0	0	0	0	0	0	0	5	453	0	0	0	458	13	0	1	0	0	14	0	228	18	0	0	246	0	0	0	0	0	0	718	3220
08:30:00	0	0	0	0	0	0	0	0	0	0	0	0	11	512	0	0	0	523	6	0	3	0	0	9	0	211	19	0	0	230	0	0	0	0	0	0	762	3180
08:45:00	0	0	0	0	0	0	0	0	0	0	0	0	9	400	0	0	0	409	10	0	2	0	0	12	0	255	30	0	0	285	0	0	0	0	0	0	706	2989
BREAK																																						
11:00:00	0	0	0	0	0	0	0	0	0	0	0	0	5	242	0	0	0	247	16	0	4	0	0	20	1	222	12	0	0	235	0	0	1	0	0	1	503	
11:15:00	0	0	0	0	0	0	0	0	0	0	0	0	2	282	0	1	0	285	13	0	0	0	0	13	0	180	10	0	0	190	0	0	0	0	0	0	488	
11:30:00	0	0	0	0	0	0	0	0	0	0	0	0	4	280	0	1	0	285	8	0	2	0	0	10	0	225	8	0	0	233	0	0	0	0	0	0	528	
11:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	245	0	0	0	245	20	0	1	1	0	22	0	225	9	0	0	234	0	0	0	0	1	0	501	2020
12:00:00	0	0	0	0	0	0	0	0	0	0	0	0	1	234	0	0	0	235	6	0	0	0	0	6	0	241	10	0	0	251	0	0	0	0	0	0	492	2009
12:15:00	0	0	0	0	0	0	0	0	0	0	0	0	4	220	0	0	0	224	11	0	6	0	0	17	0	246	9	2	0	257	0	0	0	0	0	0	498	2019
12:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	240	0	0	0	240	17	0	6	0	0	23	0	222	9	0	0	231	0	0	0	0	0	0	494	1985
12:45:00	0	0	0	0	0	0	0	0	0	0	0	0	6	250	0	0	0	256	6	0	3	0	0	9	0	238	9	0	0	247	0	0	0	0	0	0	512	1996
13:00:00	0	0	0	0	0	0	0	0	0	0	0	0	1	214	0	0	0	215	4	0	4	0	0	8	0	229	6	0	0	235	0	0	0	0	0	0	458	1962
13:15:00	0	0	0	0	0	0	0	0	0	0	0	0	3	260	0	0	0	263	5	0	1	0	0	6	0	239	12	0	0	251	0	0	0	0	1	0	520	1984
13:30:00	0	0	0	0	0	0	0	0	0	0	0	0	7	232	0	0	0	239	5	0	3	0	0	8	0	305	13	0	0	318	0	0	0	0	0	0	565	2055
13:45:00	0	0	0	0	0	0	0	0	0	0	0	0	1	201	0	0	0	202	25	0	3	0	0	28	0	253	14	0	0	267	0	0	0	0	0	0	497	2040
BREAK																																						
15:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	226	0	0	0	226	7	0	3	0	0	10	0	386	7	0	0	393	0	0	0	0	0	0	629	
15:15:00	0	0	0	0	0	0	0	0	0	0	0	0	2	257	0	0	0	259	9	0	4	0	0	13	0	421	12	0	0	433	0	0	0	0	0	0	705	
15:30:00	0	0	0	0	0	0	0	0	0	0	0	0	1	256	0	0	0	257	10	0	3	0	0	13	0	444	5	0	0	449	0	0	0	0	0	0	719	
15:45:00	0	0	0	0	0	0	0	0	0	0	0	0	1	245	0	0	0	246	12	0	1	0	0	13	0	448	9	0	0	457	0	0	0	0	0	0	716	2769
16:00:00	0	0	0	0	0	0	0	0	0	0	0	0	4	308	0	0	0	312	17	0	2	0	0	19	0	469	13	0	0	482	0	0	0	0	0	0	813	2953
16:15:00	0	0	0	0	0	0	0	0	0	0	0	0	2	290	0	0	0	292	15	0	1	0	0	16	0	479	13	0	0	492	0	0	0	0	0	0	800	3048
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	3	281	0	0	0	284	17	0	7	0	0	24	1	496	16	0	0	513	0	0	0	0	1	0	821	3150
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	2	280	0	0	0	282	11	0	4	0	0	15	0	493	11	0	0	504	0	0	0	0	0	0	801	3235
17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	1	316	0	0	0	317	21	0	11	0	0	32	0	482	15	0	0	497	0	0	0	0	0	0	846	3268
17:15:00	0	0	0	0	0	0	0	0	0	0	0	0	2	287	0	0	0	289	18	0	11	0	0	29	0	500	15	0	0	515	0	0	0	0	0	0	833	3301
17:30:00	0	0	0	0	0	0	0	0	0	0	0	0	3	293	0	0	0	296	16	0	4	0	0	20	0	507	12	0	0	519	0	0	0	0	0	0	835	3315
17:45:00	0	0	0	0	0	0	0	0	0	0	0	0	3	276	1	0	0	280	18	0	6	0	0	24	0	470	16	0	0	486	0	0	0	0	0	0	790	3304
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	103	10228	1	2	0	10334	378	0	105	1	0	484	2	10351	383	2	0	10738	1	0	2	0	3	3	**21559**	-
Approach%	0%	0%		-	0%	0%		-	0%	0%		-	1%	99%	0%	0%		-	78.1%	0%	21.7%	0.2%		-	0%	96.4%	3.6%	0%		-	33.3%	0%	66.7%	0%		-	**-**	-
Totals %	0%	0%		0%	0%	0%		0%	0%	0%		0%	0.5%	47.4%	0%	0%		47.9%	1.8%	0%	0.5%	0%		2.2%	0%	48%	1.8%	0%		49.8%	0%	0%	0%	0%		0%	**-**	-
Heavy	0	0		-	0	0		-	0	0		-	22	1698	0	0		-	156	0	20	0		-	0	1888	181	0		-	0	0	0	0		-	**-**	-
Heavy %	0%	0%		-	0%	0%		-	0%	0%		-	21.4%	16.6%	0%	0%		-	41.3%	0%	19%	0%		-	0%	18.2%	47.3%	0%		-	0%	0%	0%	0%		-	**-**	-
Bicycles	-	-		-	-	-		-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Spectrum

Turning Movement Count
Location Name: HWY 50 & SEARS WAREHOUSE
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:15 AM - 08:15 AM Weather: Clear (-6.4 °C)

Start Time	Northbound				Southbound				Westbound				Southbound HWY 50						Westbound SEARS WAREHOUSE ACCESS						Northbound HWY 50						Eastbound DRIVEWAY						Int. Total (15 min)
	Right	Thru	Peds	Approach Total	Left	Thru	Peds	Approach Total	Right	Left	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:15:00	0	0	0	0	0	0	0	0	0	0	0	0	3	553	0	0	0	556	10	0	1	0	0	11	0	194	8	0	0	202	0	0	0	0	0	0	769
07:30:00	0	0	0	0	0	0	0	0	0	0	0	0	4	510	0	0	0	514	12	0	2	0	0	14	0	261	12	0	0	273	1	0	0	0	0	1	802
07:45:00	0	0	0	0	0	0	0	0	0	0	0	0	8	561	0	0	0	569	3	0	3	0	0	6	0	310	12	0	0	322	0	0	0	0	0	0	897
08:00:00	0	0	0	0	0	0	0	0	0	0	0	0	3	528	0	0	0	531	12	0	2	0	0	14	0	244	13	0	0	257	0	0	1	0	0	1	803
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	18	2152	0	0	0	2170	37	0	8	0	0	45	0	1009	45	0	0	1054	1	0	1	0	0	2	**3271**
Approach%	0%	0%		-	0%	0%		-	0%	0%		-	0.8%	99.2%	0%	0%		-	82.2%	0%	17.8%	0%		-	0%	95.7%	4.3%	0%		-	50%	0%	50%	0%		-	-
Totals %	0%	0%		0%	0%	0%		0%	0%	0%		0%	0.6%	65.8%	0%	0%		66.3%	1.1%	0%	0.2%	0%		1.4%	0%	30.8%	1.4%	0%		32.2%	0%	0%	0%	0%		0.1%	-
PHF	0	0		0	0	0		0	0	0		0	0.56	0.96	0	0		0.95	0.77	0	0.67	0		0.8	0	0.81	0.87	0		0.82	0.25	0	0.25	0		0.5	-
Heavy	0	0		0	0	0		0	0	0		0	1	244	0	0		245	30	0	3	0		33	0	172	12	0		184	0	0	0	0		0	-
Heavy %	0%	0%		0%	0%	0%		0%	0%	0%		0%	5.6%	11.3%	0%	0%		11.3%	81.1%	0%	37.5%	0%		73.3%	0%	17%	26.7%	0%		17.5%	0%	0%	0%	0%		0%	-
Lights	0	0		0	0	0		0	0	0		0	17	1908	0	0		1925	7	0	5	0		12	0	837	33	0		870	1	0	1	0		2	-
Lights %	0%	0%		0%	0%	0%		0%	0%	0%		0%	94.4%	88.7%	0%	0%		88.7%	18.9%	0%	62.5%	0%		26.7%	0%	83%	73.3%	0%		82.5%	100%	0%	100%	0%		100%	-
Single-Unit Trucks	0	0		0	0	0		0	0	0		0	1	89	0	0		90	8	0	2	0		10	0	98	6	0		104	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%		0%	0%	0%		0%	0%	0%		0%	5.6%	4.1%	0%	0%		4.1%	21.6%	0%	25%	0%		22.2%	0%	9.7%	13.3%	0%		9.9%	0%	0%	0%	0%		0%	-
Buses	0	0		0	0	0		0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	-
Buses %	0%	0%		0%	0%	0%		0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.5%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	0		0	0	0		0	0	0		0	0	151	0	0		151	22	0	1	0		23	0	69	6	0		75	0	0	0	0		0	-
Articulated Trucks %	0%	0%		0%	0%	0%		0%	0%	0%		0%	0%	7%	0%	0%		7%	59.5%	0%	12.5%	0%		51.1%	0%	6.8%	13.3%	0%		7.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	0%		-	-	0%		-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: HWY 50 & SEARS WAREHOUSE
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 12:45 PM - 01:45 PM Weather: Partly Cloudy (-2 °C)

Start Time	Northbound				Southbound				Westbound				Southbound HWY 50						Westbound SEARS WAREHOUSE ACCESS						Northbound HWY 50						Eastbound DRIVEWAY						Int. Total (15 min)
	Right	Thru	Peds	Approach Total	Left	Thru	Peds	Approach Total	Right	Left	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
12:45:00	0	0	0	0	0	0	0	0	0	0	0	0	6	250	0	0	0	256	6	0	3	0	0	9	0	238	9	0	0	247	0	0	0	0	0	0	512
13:00:00	0	0	0	0	0	0	0	0	0	0	0	0	1	214	0	0	0	215	4	0	4	0	0	8	0	229	6	0	0	235	0	0	0	0	0	0	458
13:15:00	0	0	0	0	0	0	0	0	0	0	0	0	3	260	0	0	0	263	5	0	1	0	0	6	0	239	12	0	0	251	0	0	0	0	1	0	520
13:30:00	0	0	0	0	0	0	0	0	0	0	0	0	7	232	0	0	0	239	5	0	3	0	0	8	0	305	13	0	0	318	0	0	0	0	0	0	565
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	17	956	0	0	0	973	20	0	11	0	0	31	0	1011	40	0	0	1051	0	0	0	0	1	0	**2055**
Approach%	0%	0%		-	0%	0%		-	0%	0%		-	1.7%	98.3%	0%	0%		-	64.5%	0%	35.5%	0%		-	0%	96.2%	3.8%	0%		-	0%	0%	0%	0%		-	-
Totals %	0%	0%		0%	0%	0%		0%	0%	0%		0%	0.8%	46.5%	0%	0%		47.3%	1%	0%	0.5%	0%		1.5%	0%	49.2%	1.9%	0%		51.1%	0%	0%	0%	0%		0%	-
PHF	0	0		0	0	0		0	0	0		0	0.61	0.92	0	0		0.92	0.83	0	0.69	0		0.86	0	0.83	0.77	0		0.83	0	0	0	0		0	-
Heavy	0	0		0	0	0		0	0	0		0	4	262	0	0		266	10	0	2	0		12	0	266	19	0		285	0	0	0	0		0	-
Heavy %	0%	0%		0%	0%	0%		0%	0%	0%		0%	23.5%	27.4%	0%	0%		27.3%	50%	0%	18.2%	0%		38.7%	0%	26.3%	47.5%	0%		27.1%	0%	0%	0%	0%		0%	-
Lights	0	0		0	0	0		0	0	0		0	13	694	0	0		707	10	0	9	0		19	0	745	21	0		766	0	0	0	0		0	-
Lights %	0%	0%		0%	0%	0%		0%	0%	0%		0%	76.5%	72.6%	0%	0%		72.7%	50%	0%	81.8%	0%		61.3%	0%	73.7%	52.5%	0%		72.9%	0%	0%	0%	0%		0%	-
Single-Unit Trucks	0	0		0	0	0		0	0	0		0	2	124	0	0		126	3	0	0	0		3	0	115	4	0		119	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%		0%	0%	0%		0%	0%	0%		0%	11.8%	13%	0%	0%		12.9%	15%	0%	0%	0%		9.7%	0%	11.4%	10%	0%		11.3%	0%	0%	0%	0%		0%	-
Buses	0	0		0	0	0		0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Buses %	0%	0%		0%	0%	0%		0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	0		0	0	0		0	0	0		0	2	138	0	0		140	7	0	2	0		9	0	150	15	0		165	0	0	0	0		0	-
Articulated Trucks %	0%	0%		0%	0%	0%		0%	0%	0%		0%	11.8%	14.4%	0%	0%		14.4%	35%	0%	18.2%	0%		29%	0%	14.8%	37.5%	0%		15.7%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Pedestrians%	-	-	0%		-	-	0%		-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	100%		-

Spectrum

Turning Movement Count
Location Name: HWY 50 & SEARS WAREHOUSE
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

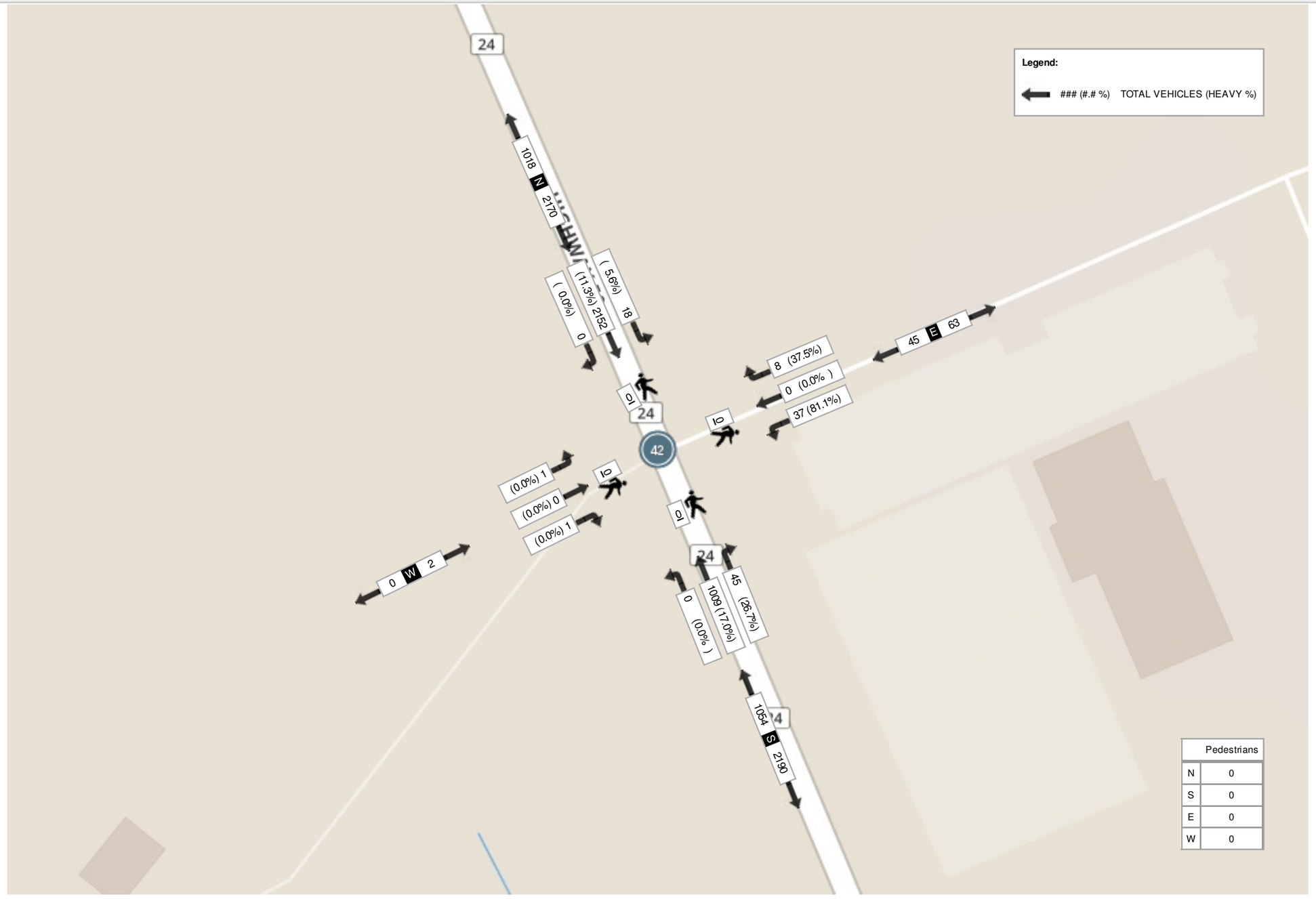
Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 04:45 PM - 05:45 PM Weather: Clear (1.4 °C)

Start Time	Northbound				Southbound				Westbound				Southbound HWY 50						Westbound SEARS WAREHOUSE ACCESS						Northbound HWY 50						Eastbound DRIVEWAY						Int. Total (15 min)
	Right	Thru	Peds	Approach Total	Left	Thru	Peds	Approach Total	Right	Left	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	2	280	0	0	0	282	11	0	4	0	0	15	0	493	11	0	0	504	0	0	0	0	0	0	801
17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	1	316	0	0	0	317	21	0	11	0	0	32	0	482	15	0	0	497	0	0	0	0	0	0	846
17:15:00	0	0	0	0	0	0	0	0	0	0	0	0	2	287	0	0	0	289	18	0	11	0	0	29	0	500	15	0	0	515	0	0	0	0	0	0	833
17:30:00	0	0	0	0	0	0	0	0	0	0	0	0	3	293	0	0	0	296	16	0	4	0	0	20	0	507	12	0	0	519	0	0	0	0	0	0	835
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	8	1176	0	0	0	1184	66	0	30	0	0	96	0	1982	53	0	0	2035	0	0	0	0	0	0	**3315**
Approach%	0%	0%		-	0%	0%		-	0%	0%		-	0.7%	99.3%	0%	0%		-	68.8%	0%	31.3%	0%		-	0%	97.4%	2.6%	0%		-	0%	0%	0%	0%		-	-
Totals %	0%	0%		0%	0%	0%		0%	0%	0%		0%	0.2%	35.5%	0%	0%		35.7%	2%	0%	0.9%	0%		2.9%	0%	59.8%	1.6%	0%		61.4%	0%	0%	0%	0%		0%	-
PHF	0	0		0	0	0		0	0	0		0	0.67	0.93	0	0		0.93	0.79	0	0.68	0		0.75	0	0.98	0.88	0		0.98	0	0	0	0		0	-
Heavy	0	0		0	0	0		0	0	0		0	4	107	0	0		111	3	0	1	0		4	0	236	34	0		270	0	0	0	0		0	-
Heavy %	0%	0%		0%	0%	0%		0%	0%	0%		0%	50%	9.1%	0%	0%		9.4%	4.5%	0%	3.3%	0%		4.2%	0%	11.9%	64.2%	0%		13.3%	0%	0%	0%	0%		0%	-
Lights	0	0		0	0	0		0	0	0		0	4	1069	0	0		1073	63	0	29	0		92	0	1746	19	0		1765	0	0	0	0		0	-
Lights %	0%	0%		0%	0%	0%		0%	0%	0%		0%	50%	90.9%	0%	0%		90.6%	95.5%	0%	96.7%	0%		95.8%	0%	88.1%	35.8%	0%		86.7%	0%	0%	0%	0%		0%	-
Single-Unit Trucks	0	0		0	0	0		0	0	0		0	1	47	0	0		48	2	0	0	0		2	0	78	12	0		90	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%		0%	0%	0%		0%	0%	0%		0%	12.5%	4%	0%	0%		4.1%	3%	0%	0%	0%		2.1%	0%	3.9%	22.6%	0%		4.4%	0%	0%	0%	0%		0%	-
Buses	0	0		0	0	0		0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Buses %	0%	0%		0%	0%	0%		0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	0		0	0	0		0	0	0		0	3	59	0	0		62	1	0	1	0		2	0	157	22	0		179	0	0	0	0		0	-
Articulated Trucks %	0%	0%		0%	0%	0%		0%	0%	0%		0%	37.5%	5%	0%	0%		5.2%	1.5%	0%	3.3%	0%		2.1%	0%	7.9%	41.5%	0%		8.8%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	0%		-	-	0%		-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

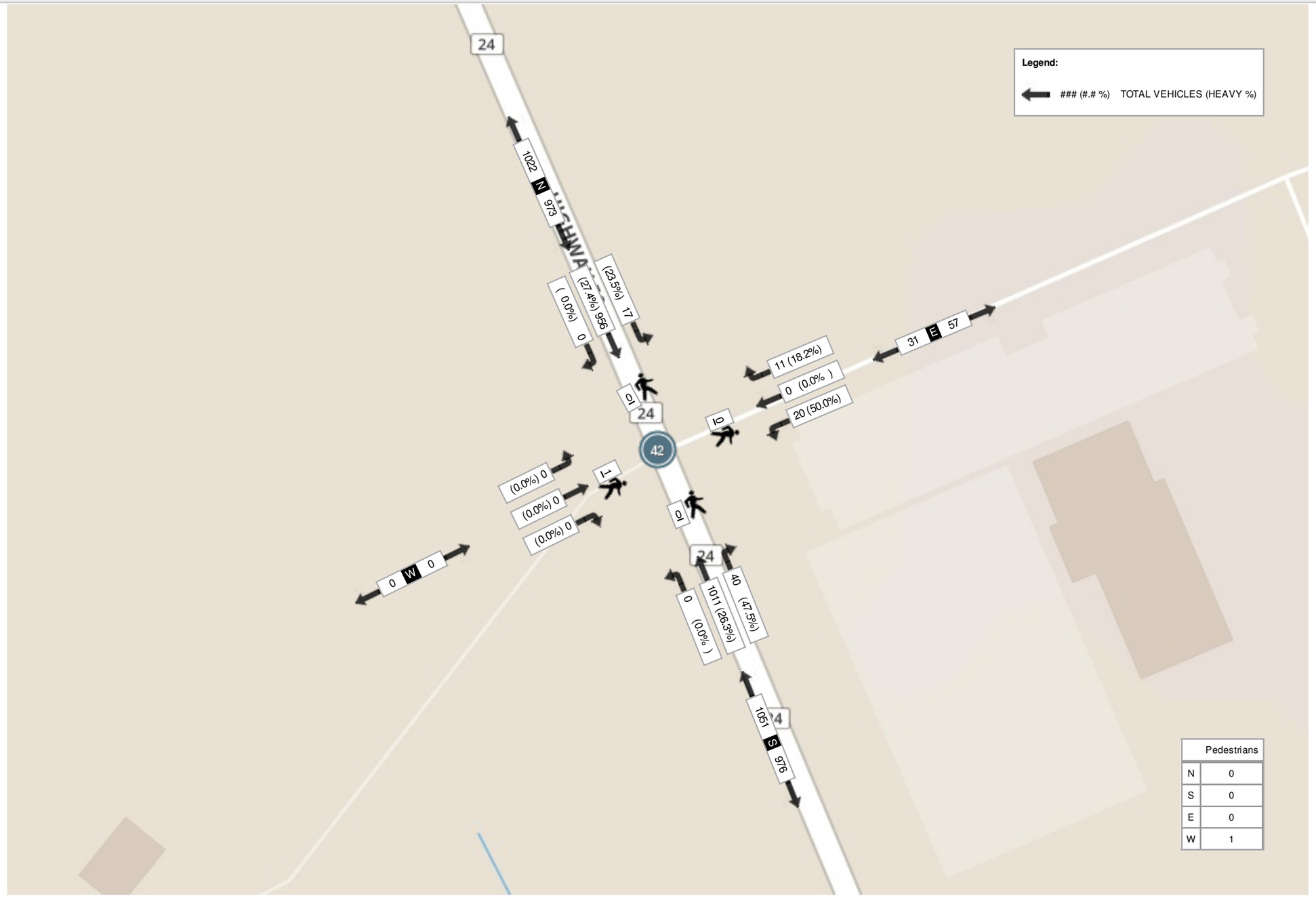
Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:15 AM - 08:15 AM Weather: Clear (-6.4 °C)



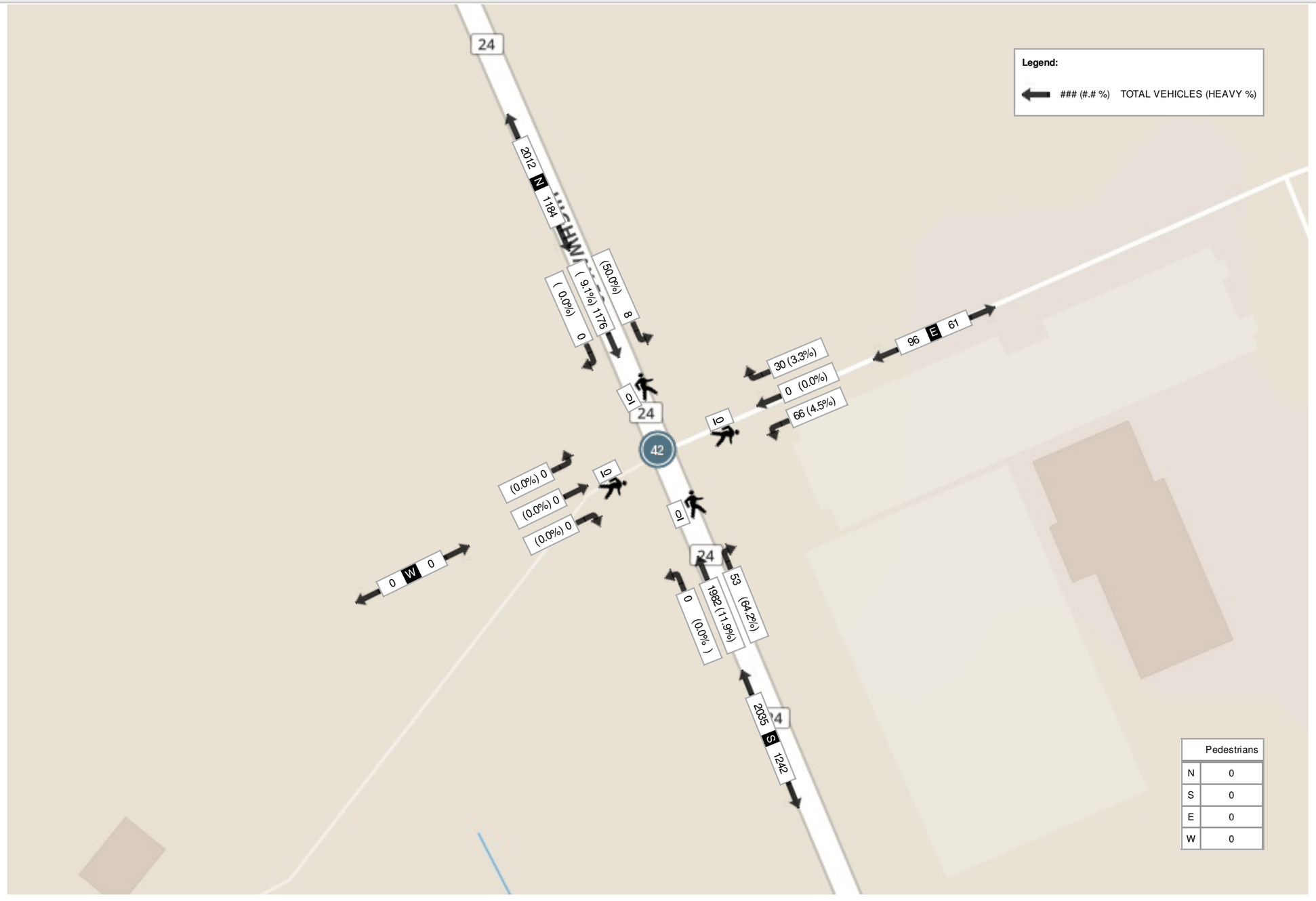
Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 12:45 PM - 01:45 PM Weather: Partly Cloudy (-2 °C)

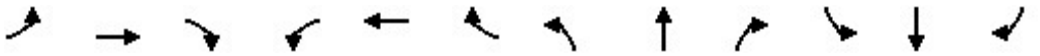


Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 04:45 PM - 05:45 PM Weather: Clear (1.4 °C)



Appendix B – Synchro Outputs – Existing Conditions

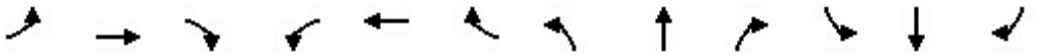


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	152	1266	150	142	737	223	76	898	136	230	2170	79
v/c Ratio	0.55	1.00	0.23	1.01	0.53	0.34	0.52	0.64	0.30	0.80	1.15	0.12
Control Delay	34.9	76.1	8.2	119.8	39.4	5.1	41.2	50.8	8.0	48.9	119.4	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	76.1	8.2	119.8	39.4	5.1	41.2	50.8	8.0	48.9	119.4	2.8
Queue Length 50th (m)	27.4	~212.5	3.6	~34.3	94.9	0.0	13.1	91.0	0.0	44.7	~270.3	0.0
Queue Length 95th (m)	42.0	#262.6	19.3	#81.7	114.6	17.2	26.0	109.8	16.7	70.3	#294.4	6.3
Internal Link Dist (m)		230.1			349.0			332.3			368.0	
Turn Bay Length (m)	80.0		105.0	250.0		80.0	140.0		300.0	85.0		130.0
Base Capacity (vph)	276	1267	648	140	1390	664	151	1407	461	315	1883	658
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	1.00	0.23	1.01	0.53	0.34	0.50	0.64	0.30	0.73	1.15	0.12

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)	140	1165	138	131	678	205	70	826	125	212	1996	73
Future Volume (vph)	140	1165	138	131	678	205	70	826	125	212	1996	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	*1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3614	1601	1285	3579	1361	1807	4601	1201	1508	4968	1570
Flt Permitted	0.28	1.00	1.00	0.07	1.00	1.00	0.08	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	527	3614	1601	92	3579	1361	156	4601	1201	275	4968	1570
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	1266	150	142	737	223	76	898	136	230	2170	79
RTOR Reduction (vph)	0	0	86	0	0	136	0	0	94	0	0	49
Lane Group Flow (vph)	152	1266	64	142	737	87	76	898	42	230	2170	30
Heavy Vehicles (%)	2%	1%	2%	42%	2%	20%	1%	14%	36%	21%	16%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	63.0	56.0	56.0	72.0	62.0	62.0	57.4	48.8	48.8	74.1	60.5	60.5
Effective Green, g (s)	63.0	56.0	56.0	72.0	62.0	62.0	57.4	48.8	48.8	74.1	60.5	60.5
Actuated g/C Ratio	0.39	0.35	0.35	0.45	0.39	0.39	0.36	0.31	0.31	0.46	0.38	0.38
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	263	1268	561	138	1390	528	145	1406	367	284	1883	595
v/s Ratio Prot	0.03	0.35		c0.08	0.21		0.03	0.20		c0.10	c0.44	
v/s Ratio Perm	0.20		0.04	c0.38		0.06	0.16		0.03	0.27		0.02
v/c Ratio	0.58	1.00	0.11	1.03	0.53	0.16	0.52	0.64	0.11	0.81	1.15	0.05
Uniform Delay, d1	35.3	51.8	35.0	49.7	37.6	31.9	40.7	47.8	39.8	30.3	49.5	31.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	24.7	0.1	84.5	0.4	0.1	3.4	2.2	0.6	15.5	75.2	0.2
Delay (s)	38.4	76.5	35.1	134.2	38.0	32.0	44.1	50.0	40.5	45.8	124.7	31.5
Level of Service	D	E	D	F	D	C	D	D	D	D	F	C
Approach Delay (s)		68.8			49.2			48.4			114.4	
Approach LOS		E			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	79.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	159.6	Sum of lost time (s)	21.5
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	63	1170	2441	11	41
v/c Ratio	0.40	0.43	0.94	0.12	0.32
Control Delay	22.5	3.7	24.3	62.0	23.7
Queue Delay	0.0	0.0	1.6	0.0	0.0
Total Delay	22.5	3.7	25.9	62.0	23.7
Queue Length 50th (m)	2.3	40.2	315.0	2.9	0.0
Queue Length 95th (m)	16.5	48.4	#411.2	9.3	12.1
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	45.0				
Base Capacity (vph)	263	2731	2610	260	281
Starvation Cap Reductn	0	0	72	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.43	0.96	0.04	0.15

Intersection Summary

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

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	58	1076	2225	21	10	38
Future Volume (vph)	58	1076	2225	21	10	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	3202	3312		1074	1034
Flt Permitted	0.04	1.00	1.00		0.95	1.00
Satd. Flow (perm)	66	3202	3312		1074	1034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	1170	2418	23	11	41
RTOR Reduction (vph)	0	0	0	0	0	38
Lane Group Flow (vph)	63	1170	2441	0	11	3
Heavy Vehicles (%)	7%	14%	10%	14%	70%	58%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	114.8	114.8	105.3		9.3	9.3
Effective Green, g (s)	114.8	114.8	105.3		9.3	9.3
Actuated g/C Ratio	0.83	0.83	0.76		0.07	0.07
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	132	2669	2532		72	69
v/s Ratio Prot	c0.02	0.37	c0.74		c0.01	
v/s Ratio Perm	0.37					0.00
v/c Ratio	0.48	0.44	0.96		0.15	0.04
Uniform Delay, d1	31.9	3.0	14.5		60.5	60.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.7	0.5	11.2		1.0	0.2
Delay (s)	34.6	3.5	25.7		61.5	60.3
Level of Service	C	A	C		E	E
Approach Delay (s)		5.1	25.7		60.5	
Approach LOS		A	C		E	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	137.7	Sum of lost time (s)	16.6
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	464	221	85	1097	52	1876
v/c Ratio	0.75	1.87	0.69	0.63	0.19	1.05
Control Delay	46.3	452.8	53.2	28.9	14.4	73.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	452.8	53.2	28.9	14.4	73.9
Queue Length 50th (m)	107.7	~106.6	11.1	123.2	6.5	~324.0
Queue Length 95th (m)	151.8	#161.3	#36.8	145.3	12.4	#362.6
Internal Link Dist (m)	531.7	441.3		315.1		452.7
Turn Bay Length (m)			200.0		70.0	
Base Capacity (vph)	619	118	123	1741	282	1784
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	0.75	1.87	0.69	0.63	0.18	1.05

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	69	358	164	16	24	78	924	86	48	1724	2
Future Volume (vph)	0	69	358	164	16	24	78	924	86	48	1724	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8			6.8		3.0	7.5		3.0	7.5	
Lane Util. Factor		1.00			1.00		1.00	*1.00		1.00	*1.00	
Frt		0.89			0.98		1.00	0.99		1.00	1.00	
Flt Protected		1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1679			1556		1738	3286		1825	3461	
Flt Permitted		1.00			0.22		0.05	1.00		0.19	1.00	
Satd. Flow (perm)		1679			348		87	3286		374	3461	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	75	389	178	17	26	85	1004	93	52	1874	2
RTOR Reduction (vph)	0	62	0	0	3	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	402	0	0	218	0	85	1093	0	52	1876	0
Heavy Vehicles (%)	0%	4%	1%	16%	13%	25%	5%	15%	20%	0%	11%	13%
Turn Type		NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		53.2			53.2		91.6	84.6		88.6	83.1	
Effective Green, g (s)		53.2			53.2		91.6	84.6		88.6	83.1	
Actuated g/C Ratio		0.33			0.33		0.57	0.53		0.55	0.52	
Clearance Time (s)		6.8			6.8		3.0	7.5		3.0	7.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		556			115		121	1730		256	1790	
v/s Ratio Prot		0.24					c0.03	0.33		0.01	c0.54	
v/s Ratio Perm					c0.63		0.37			0.11		
v/c Ratio		0.72			1.90		0.70	0.63		0.20	1.05	
Uniform Delay, d1		47.2			53.7		36.2	26.9		18.7	38.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.6			435.1		16.8	1.8		0.4	35.1	
Delay (s)		51.9			488.8		53.0	28.7		19.0	73.9	
Level of Service		D			F		D	C		B	E	
Approach Delay (s)		51.9			488.8			30.5			72.4	
Approach LOS		D			F			C			E	

Intersection Summary			
HCM 2000 Control Delay	81.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	160.6	Sum of lost time (s)	17.3
Intersection Capacity Utilization	110.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	2	40	9	1222	49	20	2439
v/c Ratio	0.01	0.46	0.03	0.50	0.05	0.06	0.91
Control Delay	0.0	72.2	0.1	9.0	0.1	4.3	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	72.2	0.1	9.0	0.1	4.3	19.1
Queue Length 50th (m)	0.0	9.2	0.0	41.3	0.0	0.6	194.7
Queue Length 95th (m)	0.0	22.8	0.0	134.2	0.0	4.1	#445.8
Internal Link Dist (m)	84.8		192.4	627.5			409.3
Turn Bay Length (m)					80.0	100.0	
Base Capacity (vph)	239	263	506	2447	1031	418	2671
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.15	0.02	0.50	0.05	0.05	0.91

Intersection Summary

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

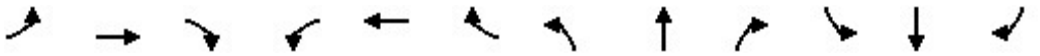
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	37	0	8	0	1124	45	18	2244	0
Future Volume (vph)	1	0	1	37	0	8	0	1124	45	18	2244	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.7		7.7	7.7			6.7	6.7	3.0	6.7	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00	1.00	0.95	
Frt		0.93		1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1748		1008	1183			3120	1286	1722	3288	
Flt Permitted		1.00		0.95	1.00			1.00	1.00	0.19	1.00	
Satd. Flow (perm)		1791		1008	1183			3120	1286	343	3288	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	1	40	0	9	0	1222	49	20	2439	0
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	14	0	0	0
Lane Group Flow (vph)	0	0	0	40	1	0	0	1222	35	20	2439	0
Heavy Vehicles (%)	0%	0%	0%	81%	0%	38%	0%	17%	27%	6%	11%	0%
Turn Type	Perm	NA		Split	NA			NA	Perm	pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3								2	6		
Actuated Green, G (s)		1.4		9.1	9.1			95.9	95.9	101.3	101.3	
Effective Green, g (s)		1.4		9.1	9.1			95.9	95.9	101.3	101.3	
Actuated g/C Ratio		0.01		0.07	0.07			0.72	0.72	0.76	0.76	
Clearance Time (s)		7.7		7.7	7.7			6.7	6.7	3.0	6.7	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		18		68	80			2234	921	284	2487	
v/s Ratio Prot				c0.04	0.00			0.39		0.00	c0.74	
v/s Ratio Perm		c0.00							0.03	0.05		
v/c Ratio		0.00		0.59	0.01			0.55	0.04	0.07	0.98	
Uniform Delay, d1		65.6		60.6	58.2			8.9	5.5	5.2	15.4	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		12.3	0.0			1.0	0.1	0.1	14.0	
Delay (s)		65.6		72.9	58.2			9.8	5.6	5.3	29.4	
Level of Service		E		E	E			A	A	A	C	
Approach Delay (s)		65.6			70.2			9.7			29.2	
Approach LOS		E			E			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	133.9	Sum of lost time (s)	25.1
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	0	1203	2112	2	1	1
Future Volume (Veh/h)	0	1203	2112	2	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1308	2296	2	1	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2298				2951	1149
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2298				2951	1149
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				92	99
cM capacity (veh/h)	222				12	195

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	NE 1
Volume Total	436	872	1531	767	2
Volume Left	0	0	0	0	1
Volume Right	0	0	0	2	1
cSH	222	1700	1700	1700	22
Volume to Capacity	0.00	0.51	0.90	0.45	0.09
Queue Length 95th (m)	0.0	0.0	0.0	0.0	2.0
Control Delay (s)	0.0	0.0	0.0	0.0	181.1
Lane LOS					F
Approach Delay (s)	0.0		0.0		181.1
Approach LOS					F

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

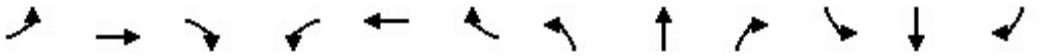


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	91	668	123	157	1330	348	259	1890	176	270	1087	261
v/c Ratio	0.75	0.69	0.23	0.73	1.00	0.55	0.81	0.96	0.31	1.33	0.62	0.39
Control Delay	67.3	57.8	6.8	50.3	75.8	19.5	45.4	61.7	5.7	216.4	44.9	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	57.8	6.8	50.3	75.8	19.5	45.4	61.7	5.7	216.4	44.9	20.2
Queue Length 50th (m)	17.2	101.5	0.0	32.4	211.6	34.7	45.3	195.5	0.0	~97.1	105.5	28.7
Queue Length 95th (m)	#43.9	129.1	14.2	51.2	#259.7	67.6	75.9	#225.0	16.2	#157.4	125.2	55.1
Internal Link Dist (m)		230.1			349.0			332.3			368.0	
Turn Bay Length (m)	80.0		105.0	250.0		80.0	140.0		300.0	85.0		130.0
Base Capacity (vph)	121	964	532	245	1331	628	362	1963	563	203	1742	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.69	0.23	0.64	1.00	0.55	0.72	0.96	0.31	1.33	0.62	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)	84	615	113	144	1224	320	238	1739	162	248	1000	240
Future Volume (vph)	84	615	113	144	1224	320	238	1739	162	248	1000	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	*1.00	1.00	1.00	*1.00	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3579	1617	1193	3804	1408	1807	5192	1201	1601	4856	1617
Flt Permitted	0.09	1.00	1.00	0.19	1.00	1.00	0.14	1.00	1.00	0.07	1.00	1.00
Satd. Flow (perm)	178	3579	1617	235	3804	1408	274	5192	1201	117	4856	1617
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	668	123	157	1330	348	259	1890	176	270	1087	261
RTOR Reduction (vph)	0	0	90	0	0	136	0	0	109	0	0	87
Lane Group Flow (vph)	91	668	33	157	1330	212	259	1890	67	270	1087	174
Heavy Vehicles (%)	0%	2%	1%	53%	1%	16%	1%	11%	36%	14%	8%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	49.1	43.1	43.1	65.0	56.0	56.0	79.6	60.5	60.5	73.4	57.4	57.4
Effective Green, g (s)	49.1	43.1	43.1	65.0	56.0	56.0	79.6	60.5	60.5	73.4	57.4	57.4
Actuated g/C Ratio	0.31	0.27	0.27	0.41	0.35	0.35	0.50	0.38	0.38	0.46	0.36	0.36
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	116	964	435	208	1331	492	319	1963	454	202	1742	580
v/s Ratio Prot	0.03	0.19		c0.09	c0.35		0.10	c0.36		c0.13	0.22	
v/s Ratio Perm	0.21		0.02	0.22		0.15	0.31		0.06	c0.48		0.11
v/c Ratio	0.78	0.69	0.08	0.75	1.00	0.43	0.81	0.96	0.15	1.34	0.62	0.30
Uniform Delay, d1	45.5	52.5	43.6	35.2	52.0	39.8	28.1	48.6	32.8	50.9	42.4	36.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.5	2.2	0.1	14.4	24.3	0.6	14.5	13.2	0.7	181.1	1.7	1.3
Delay (s)	73.9	54.7	43.7	49.6	76.3	40.4	42.6	61.9	33.4	231.9	44.1	38.2
Level of Service	E	D	D	D	E	D	D	E	C	F	D	D
Approach Delay (s)		55.1			67.2			57.6			74.5	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	64.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	104.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	67	2238	1492	36	89
v/c Ratio	0.35	0.83	0.60	0.23	0.43
Control Delay	7.0	10.7	9.5	63.3	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	10.7	9.5	63.3	18.1
Queue Length 50th (m)	2.5	149.8	92.3	9.4	0.0
Queue Length 95th (m)	4.7	181.3	115.4	20.6	16.6
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	45.0				
Base Capacity (vph)	249	2708	2485	428	410
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.83	0.60	0.08	0.22

Intersection Summary

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	62	2059	1347	26	33	82
Future Volume (vph)	62	2059	1347	26	33	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1113	3318	3310		1825	1458
Flt Permitted	0.14	1.00	1.00		0.95	1.00
Satd. Flow (perm)	159	3318	3310		1825	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	2238	1464	28	36	89
RTOR Reduction (vph)	0	0	1	0	0	81
Lane Group Flow (vph)	67	2238	1491	0	36	8
Heavy Vehicles (%)	64%	10%	9%	60%	0%	12%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	114.3	114.3	104.6		12.0	12.0
Effective Green, g (s)	114.3	114.3	104.6		12.0	12.0
Actuated g/C Ratio	0.82	0.82	0.75		0.09	0.09
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	175	2710	2474		156	125
v/s Ratio Prot	0.02	c0.67	0.45		c0.02	
v/s Ratio Perm	0.29					0.01
v/c Ratio	0.38	0.83	0.60		0.23	0.06
Uniform Delay, d1	5.6	7.2	8.1		59.6	58.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4	3.0	1.1		0.8	0.2
Delay (s)	7.0	10.2	9.2		60.4	59.0
Level of Service	A	B	A		E	E
Approach Delay (s)		10.1	9.2		59.4	
Approach LOS		B	A		E	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	139.9	Sum of lost time (s)	16.6
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	253	252	377	1894	68	1183
v/c Ratio	0.48	1.00	0.96	0.98	0.52	0.77
Control Delay	30.8	112.2	71.7	48.5	38.4	39.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	112.2	71.7	48.5	38.4	39.8
Queue Length 50th (m)	38.5	~78.7	83.8	277.2	7.1	163.3
Queue Length 95th (m)	66.4	#138.3	#147.9	#356.4	22.3	191.4
Internal Link Dist (m)	531.7	441.3		315.1		452.7
Turn Bay Length (m)			200.0		70.0	
Base Capacity (vph)	524	251	396	1938	242	1533
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	1.00	0.95	0.98	0.28	0.77

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.

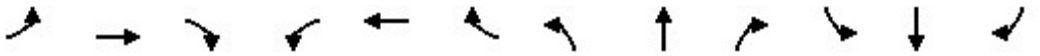
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	51	181	104	74	54	347	1544	199	63	1086	3
Future Volume (vph)	1	51	181	104	74	54	347	1544	199	63	1086	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8			6.8		3.0	6.5		3.0	6.5	
Lane Util. Factor		1.00			1.00		1.00	*1.00		1.00	0.95	
Frt		0.89			0.97		1.00	0.98		1.00	1.00	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1648			1579		1789	3375		1587	3285	
Flt Permitted		1.00			0.56		0.11	1.00		0.05	1.00	
Satd. Flow (perm)		1646			908		209	3375		90	3285	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	55	197	113	80	59	377	1678	216	68	1180	3
RTOR Reduction (vph)	0	79	0	0	7	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	174	0	0	245	0	377	1888	0	68	1183	0
Heavy Vehicles (%)	0%	2%	5%	22%	3%	19%	2%	11%	19%	15%	11%	33%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		43.2			43.2		103.2	91.5		83.2	74.5	
Effective Green, g (s)		43.2			43.2		103.2	91.5		83.2	74.5	
Actuated g/C Ratio		0.27			0.27		0.65	0.57		0.52	0.47	
Clearance Time (s)		6.8			6.8		3.0	6.5		3.0	6.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		445			245		389	1933		128	1532	
v/s Ratio Prot							c0.16	c0.56		0.03	0.36	
v/s Ratio Perm		0.11			c0.27		0.47			0.25		
v/c Ratio		0.39			1.00		0.97	0.98		0.53	0.77	
Uniform Delay, d1		47.5			58.2		43.2	33.1		30.2	35.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6			58.0		37.1	15.7		4.2	3.8	
Delay (s)		48.1			116.2		80.2	48.8		34.4	39.4	
Level of Service		D			F		F	D		C	D	
Approach Delay (s)		48.1			116.2			54.0			39.1	
Approach LOS		D			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	52.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	159.7	Sum of lost time (s)	16.3
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	73	33	2296	59	9	1547
v/c Ratio	0.49	0.10	0.86	0.07	0.10	0.55
Control Delay	66.9	0.6	14.4	0.3	4.2	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.9	0.6	14.4	0.3	4.2	5.2
Queue Length 50th (m)	17.8	0.0	165.2	0.0	0.3	61.1
Queue Length 95th (m)	33.4	0.0	#363.1	0.6	1.4	88.3
Internal Link Dist (m)		192.4	633.1			409.3
Turn Bay Length (m)				80.0	100.0	
Base Capacity (vph)	347	495	2684	838	152	2805
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	0.21	0.07	0.86	0.07	0.06	0.55

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)	0	0	0	67	0	30	0	2112	54	8	1423	0
Future Volume (vph)	0	0	0	67	0	30	0	2112	54	8	1423	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				7.7	7.7			6.7	6.7	3.0	6.7	
Lane Util. Factor				1.00	1.00			0.95	1.00	1.00	0.95	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1738	1585			3259	996	1217	3349	
Flt Permitted				0.95	1.00			1.00	1.00	0.04	1.00	
Satd. Flow (perm)				1738	1585			3259	996	49	3349	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	73	0	33	0	2296	59	9	1547	0
RTOR Reduction (vph)	0	0	0	0	31	0	0	0	13	0	0	0
Lane Group Flow (vph)	0	0	0	73	2	0	0	2296	46	9	1547	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	12%	64%	50%	9%	0%
Turn Type				Split	NA			NA	Perm	pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3								2	6		
Actuated Green, G (s)				9.2	9.2			103.0	103.0	107.2	107.2	
Effective Green, g (s)				9.2	9.2			103.0	103.0	107.2	107.2	
Actuated g/C Ratio				0.07	0.07			0.79	0.79	0.82	0.82	
Clearance Time (s)				7.7	7.7			6.7	6.7	3.0	6.7	
Vehicle Extension (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)				122	111			2566	784	50	2744	
v/s Ratio Prot				c0.04	0.00			c0.70		0.00	c0.46	
v/s Ratio Perm									0.05	0.14		
v/c Ratio				0.60	0.02			0.89	0.06	0.18	0.56	
Uniform Delay, d1				59.0	56.6			10.0	3.1	14.0	4.0	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				7.7	0.1			5.4	0.1	1.7	0.8	
Delay (s)				66.7	56.7			15.4	3.2	15.7	4.8	
Level of Service				E	E			B	A	B	A	
Approach Delay (s)		0.0			63.6			15.1			4.9	
Approach LOS		A			E			B			A	

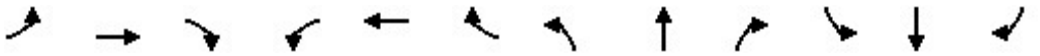
Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	130.8	Sum of lost time (s)	25.1
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	2	2210	1401	1	0	2
Future Volume (Veh/h)	2	2210	1401	1	0	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	2402	1523	1	0	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1524				2728	762
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1524				2728	762
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	443				17	352

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	NE 1
Volume Total	803	1601	1015	509	2
Volume Left	2	0	0	0	0
Volume Right	0	0	0	1	2
cSH	443	1700	1700	1700	352
Volume to Capacity	0.00	0.94	0.60	0.30	0.01
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.1
Control Delay (s)	0.1	0.0	0.0	0.0	15.3
Lane LOS	A				C
Approach Delay (s)	0.0		0.0		15.3
Approach LOS					C

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

Appendix C – Synchro Outputs – Future Background 2031 Conditions

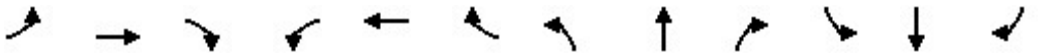


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	164	1361	162	153	792	240	82	965	146	248	2331	86
v/c Ratio	0.70	1.15	0.28	1.31	0.75	0.44	0.59	0.59	0.28	0.79	1.06	0.11
Control Delay	46.6	124.2	14.4	221.3	56.9	10.9	47.7	44.8	7.0	42.2	81.9	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	124.2	14.4	221.3	56.9	10.9	47.7	44.8	7.0	42.2	81.9	3.1
Queue Length 50th (m)	33.2	~252.5	10.6	~50.7	122.0	7.2	12.5	91.0	0.0	43.2	~271.5	0.0
Queue Length 95th (m)	50.5	#293.1	29.2	#98.7	146.7	31.2	#33.5	116.0	16.8	70.7	#294.8	7.3
Internal Link Dist (m)		230.1			349.0			332.3			368.0	
Turn Bay Length (m)	80.0		105.0	250.0		80.0	140.0		300.0	85.0		130.0
Base Capacity (vph)	243	1188	579	117	1050	547	138	1636	521	378	2189	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	1.15	0.28	1.31	0.75	0.44	0.59	0.59	0.28	0.66	1.06	0.11

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)	164	1361	162	153	792	240	82	965	146	248	2331	86
Future Volume (vph)	164	1361	162	153	792	240	82	965	146	248	2331	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	*1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3804	1601	1285	3579	1361	1807	4601	1201	1508	4968	1570
Flt Permitted	0.14	1.00	1.00	0.09	1.00	1.00	0.07	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	265	3804	1601	115	3579	1361	134	4601	1201	279	4968	1570
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)	164	1361	162	153	792	240	82	965	146	248	2331	86
RTOR Reduction (vph)	0	0	79	0	0	148	0	0	94	0	0	48
Lane Group Flow (vph)	164	1361	83	153	792	92	82	965	52	248	2331	38
Heavy Vehicles (%)	2%	1%	2%	42%	2%	20%	1%	14%	36%	21%	16%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	63.0	50.0	50.0	57.0	47.0	47.0	64.9	56.9	56.9	83.5	70.5	70.5
Effective Green, g (s)	63.0	50.0	50.0	57.0	47.0	47.0	64.9	56.9	56.9	83.5	70.5	70.5
Actuated g/C Ratio	0.39	0.31	0.31	0.36	0.29	0.29	0.41	0.36	0.36	0.52	0.44	0.44
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	228	1188	500	114	1051	399	138	1636	427	311	2189	691
v/s Ratio Prot	c0.06	0.36		c0.08	0.22		0.03	0.21		c0.11	c0.47	
v/s Ratio Perm	0.22		0.05	c0.39		0.07	0.21		0.04	0.31		0.02
v/c Ratio	0.72	1.15	0.17	1.34	0.75	0.23	0.59	0.59	0.12	0.80	1.06	0.05
Uniform Delay, d1	36.1	55.0	39.9	42.8	51.2	42.8	37.5	42.0	34.7	25.8	44.8	25.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	75.8	0.2	201.3	3.1	0.3	6.7	1.6	0.6	13.2	39.2	0.2
Delay (s)	46.5	130.8	40.0	244.1	54.4	43.1	44.2	43.6	35.3	39.0	84.0	25.8
Level of Service	D	F	D	F	D	D	D	D	D	D	F	C
Approach Delay (s)		113.9			76.6			42.6			77.9	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	80.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	116.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	68	1257	2624	12	46
v/c Ratio	0.45	0.32	0.69	0.13	0.36
Control Delay	29.9	2.8	10.1	67.7	25.1
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	29.9	2.8	10.2	67.7	25.1
Queue Length 50th (m)	4.3	26.3	138.4	3.4	0.0
Queue Length 95th (m)	20.7	30.1	162.0	10.3	13.0
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	30.0				
Base Capacity (vph)	167	3969	3809	169	202
Starvation Cap Reductn	0	0	257	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.32	0.74	0.07	0.23

Intersection Summary

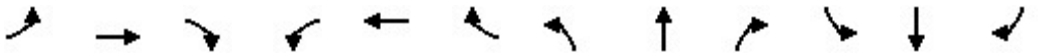
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	68	1257	2599	25	12	46
Future Volume (vph)	68	1257	2599	25	12	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	4601	4759		1074	1034
Flt Permitted	0.03	1.00	1.00		0.95	1.00
Satd. Flow (perm)	61	4601	4759		1074	1034
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	68	1257	2599	25	12	46
RTOR Reduction (vph)	0	0	0	0	0	43
Lane Group Flow (vph)	68	1257	2624	0	12	3
Heavy Vehicles (%)	7%	14%	10%	14%	70%	58%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	124.5	124.5	114.8		9.4	9.4
Effective Green, g (s)	124.5	124.5	114.8		9.4	9.4
Actuated g/C Ratio	0.84	0.84	0.78		0.06	0.06
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	126	3883	3703		68	65
v/s Ratio Prot	c0.02	0.27	c0.55		c0.01	
v/s Ratio Perm	0.43					0.00
v/c Ratio	0.54	0.32	0.71		0.18	0.05
Uniform Delay, d1	21.0	2.5	8.1		65.4	64.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.4	0.2	1.2		1.2	0.3
Delay (s)	25.4	2.7	9.3		66.6	65.1
Level of Service	C	A	A		E	E
Approach Delay (s)		3.9	9.3		65.4	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	147.5	Sum of lost time (s)	16.6
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	500	192	48	92	1079	101	57	2014	3
v/c Ratio	0.69	1.07	0.08	0.85	0.47	0.15	0.21	0.88	0.00
Control Delay	35.7	129.2	13.0	79.6	31.5	6.3	22.4	45.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	129.2	13.0	79.6	31.5	6.3	22.4	45.3	0.0
Queue Length 50th (m)	104.6	59.7	3.4	15.4	84.7	0.9	9.3	202.6	0.0
Queue Length 95th (m)	144.9	#113.5	11.5	#50.0	97.3	12.6	17.5	222.1	0.0
Internal Link Dist (m)	531.7		441.3		315.1			452.7	
Turn Bay Length (m)		60.0		200.0		60.0	60.0		60.0
Base Capacity (vph)	823	207	702	108	2277	670	268	2294	664
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.93	0.07	0.85	0.47	0.15	0.21	0.88	0.00

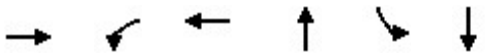
Intersection Summary

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)	0	81	419	192	19	29	92	1079	101	57	2014	3
Future Volume (vph)	0	81	419	192	19	29	92	1079	101	57	2014	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8		6.8	6.8		3.0	7.5	7.5	3.0	7.5	7.5
Lane Util. Factor		1.00		1.00	1.00		1.00	*1.00	1.00	1.00	*1.00	1.00
Frt		0.87		1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1655		1573	1453		1738	5012	1361	1825	5192	1445
Flt Permitted		1.00		0.27	1.00		0.06	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)		1655		439	1453		106	5012	1361	440	5192	1445
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)	0	81	419	192	19	29	92	1079	101	57	2014	3
RTOR Reduction (vph)	0	46	0	0	17	0	0	0	53	0	0	2
Lane Group Flow (vph)	0	454	0	192	31	0	92	1079	48	57	2014	1
Heavy Vehicles (%)	0%	4%	1%	16%	13%	25%	5%	15%	20%	0%	11%	13%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		62.1		62.1	62.1		73.8	68.8	68.8	71.6	67.7	67.7
Effective Green, g (s)		62.1		62.1	62.1		73.8	68.8	68.8	71.6	67.7	67.7
Actuated g/C Ratio		0.41		0.41	0.41		0.49	0.45	0.45	0.47	0.45	0.45
Clearance Time (s)		6.8		6.8	6.8		3.0	7.5	7.5	3.0	7.5	7.5
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		675		179	593		105	2267	615	242	2310	643
v/s Ratio Prot		0.27			0.02		c0.03	0.22		0.01	0.39	
v/s Ratio Perm				c0.44			c0.39		0.04	0.10		0.00
v/c Ratio		0.67		1.07	0.05		0.88	0.48	0.08	0.24	0.87	0.00
Uniform Delay, d1		36.7		45.0	27.2		30.5	29.1	23.7	22.5	38.3	23.4
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.7		87.9	0.0		50.4	0.7	0.2	0.5	4.9	0.0
Delay (s)		39.4		132.9	27.2		80.9	29.8	23.9	23.0	43.2	23.4
Level of Service		D		F	C		F	C	C	C	D	C
Approach Delay (s)		39.4			111.8			33.0			42.6	
Approach LOS		D			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	43.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	152.1	Sum of lost time (s)	17.3
Intersection Capacity Utilization	105.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	4	44	10	1366	22	2621
v/c Ratio	0.02	0.51	0.04	0.39	0.07	0.68
Control Delay	0.2	79.8	0.2	7.7	4.4	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.2	79.8	0.2	7.7	4.4	8.8
Queue Length 50th (m)	0.0	11.1	0.0	42.6	0.7	88.4
Queue Length 95th (m)	0.0	26.1	0.0	89.9	4.4	209.8
Internal Link Dist (m)	84.8		192.4	627.5		409.3
Turn Bay Length (m)					100.0	
Base Capacity (vph)	200	184	375	3472	327	3879
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	0.02	0.24	0.03	0.39	0.07	0.68

Intersection Summary

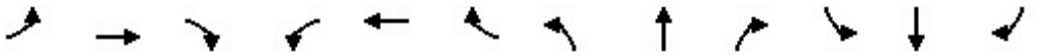
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	2	44	0	10	0	1313	53	22	2621	0
Future Volume (vph)	2	0	2	44	0	10	0	1313	53	22	2621	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.7		7.7	7.7			6.7		3.0	6.7	
Lane Util. Factor		1.00		1.00	1.00			0.91		1.00	0.91	
Frt		0.93		1.00	0.85			0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1748		1008	1183			4442		1722	4725	
Flt Permitted		1.00		0.95	1.00			1.00		0.17	1.00	
Satd. Flow (perm)		1791		1008	1183			4442		301	4725	
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)	2	0	2	44	0	10	0	1313	53	22	2621	0
RTOR Reduction (vph)	0	4	0	0	9	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	44	1	0	0	1364	0	22	2621	0
Heavy Vehicles (%)	0%	0%	0%	81%	0%	38%	0%	17%	27%	6%	11%	0%
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		
Actuated Green, G (s)		1.4		9.8	9.8			102.7		109.2	109.2	
Effective Green, g (s)		1.4		9.8	9.8			102.7		109.2	109.2	
Actuated g/C Ratio		0.01		0.07	0.07			0.72		0.77	0.77	
Clearance Time (s)		7.7		7.7	7.7			6.7		3.0	6.7	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		17		69	81			3201		265	3620	
v/s Ratio Prot				c0.04	0.00			0.31		0.00	c0.55	
v/s Ratio Perm		c0.00								0.06		
v/c Ratio		0.00		0.64	0.01			0.43		0.08	0.72	
Uniform Delay, d1		69.9		64.6	61.8			8.0		4.4	8.7	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.1		17.7	0.0			0.4		0.1	1.3	
Delay (s)		69.9		82.3	61.9			8.4		4.6	10.0	
Level of Service		E		F	E			A		A	B	
Approach Delay (s)		69.9			78.6			8.4			10.0	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	142.5	Sum of lost time (s)	25.1
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	0	1323	2644	3	2	2
Future Volume (Veh/h)	0	1323	2644	3	2	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1323	2644	3	2	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2647				3086	883
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2647				3086	883
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				79	99
cM capacity (veh/h)	162				10	293

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	NE 1
Volume Total	0	441	441	441	1058	1058	532	4
Volume Left	0	0	0	0	0	0	0	2
Volume Right	0	0	0	0	0	0	3	2
cSH	1700	1700	1700	1700	1700	1700	1700	18
Volume to Capacity	0.00	0.26	0.26	0.26	0.62	0.62	0.31	0.22
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	247.2
Lane LOS								F
Approach Delay (s)	0.0				0.0			247.2
Approach LOS								F

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

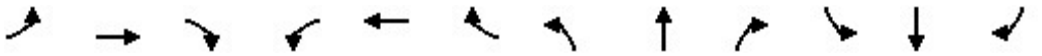


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	99	719	132	169	1430	374	278	2031	190	290	1168	281
v/c Ratio	0.90	0.83	0.27	0.87	1.11	0.61	0.83	1.05	0.34	1.19	0.66	0.42
Control Delay	99.7	67.3	8.7	76.5	110.8	23.8	51.4	83.8	5.8	163.3	45.5	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	99.7	67.3	8.7	76.5	110.8	23.8	51.4	83.8	5.8	163.3	45.5	23.6
Queue Length 50th (m)	19.5	117.0	0.0	38.4	~259.6	45.1	54.0	~234.0	0.0	~97.5	116.1	37.6
Queue Length 95th (m)	#51.4	#143.2	17.6	#78.5	#300.1	81.3	86.3	#259.0	17.0	#159.2	135.4	65.5
Internal Link Dist (m)		230.1			349.0			332.3			368.0	
Turn Bay Length (m)	80.0		105.0	250.0		80.0	140.0		300.0	85.0		130.0
Base Capacity (vph)	110	864	490	205	1283	611	374	1930	565	243	1764	665
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.83	0.27	0.82	1.11	0.61	0.74	1.05	0.34	1.19	0.66	0.42

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)	99	719	132	169	1430	374	278	2031	190	290	1168	281
Future Volume (vph)	99	719	132	169	1430	374	278	2031	190	290	1168	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	*1.00	1.00	1.00	*1.00	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3579	1617	1193	3804	1408	1807	5192	1201	1601	4856	1617
Flt Permitted	0.10	1.00	1.00	0.12	1.00	1.00	0.13	1.00	1.00	0.07	1.00	1.00
Satd. Flow (perm)	199	3579	1617	152	3804	1408	242	5192	1201	116	4856	1617
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)	99	719	132	169	1430	374	278	2031	190	290	1168	281
RTOR Reduction (vph)	0	0	100	0	0	136	0	0	119	0	0	78
Lane Group Flow (vph)	99	719	32	169	1430	238	278	2031	71	290	1168	203
Heavy Vehicles (%)	0%	2%	1%	53%	1%	16%	1%	11%	36%	14%	8%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	43.6	38.6	38.6	62.0	54.0	54.0	80.9	59.5	59.5	78.1	58.1	58.1
Effective Green, g (s)	43.6	38.6	38.6	62.0	54.0	54.0	80.9	59.5	59.5	78.1	58.1	58.1
Actuated g/C Ratio	0.27	0.24	0.24	0.39	0.34	0.34	0.51	0.37	0.37	0.49	0.36	0.36
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	105	863	390	191	1283	475	331	1930	446	242	1763	587
v/s Ratio Prot	0.03	0.20		c0.11	c0.38		0.11	0.39		c0.15	0.24	
v/s Ratio Perm	0.23		0.02	0.23		0.17	0.31		0.06	c0.43		0.13
v/c Ratio	0.94	0.83	0.08	0.88	1.11	0.50	0.84	1.05	0.16	1.20	0.66	0.35
Uniform Delay, d1	55.4	57.6	47.0	41.9	53.0	42.3	33.5	50.2	33.5	53.5	42.7	37.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	69.2	6.9	0.1	34.9	62.8	0.8	16.8	35.9	0.8	122.1	2.0	1.6
Delay (s)	124.6	64.6	47.1	76.8	115.8	43.1	50.3	86.1	34.3	175.6	44.7	38.7
Level of Service	F	E	D	E	F	D	D	F	C	F	D	D
Approach Delay (s)		68.4			98.7			78.2			65.6	
Approach LOS		E			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	79.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	119.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	73	2405	1604	40	99
v/c Ratio	0.41	0.61	0.45	0.27	0.47
Control Delay	8.7	5.3	7.4	68.0	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	5.3	7.4	68.0	18.9
Queue Length 50th (m)	2.7	73.7	57.2	11.1	0.0
Queue Length 95th (m)	5.0	81.5	65.4	23.6	17.8
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	45.0				
Base Capacity (vph)	237	3933	3563	320	337
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.31	0.61	0.45	0.13	0.29

Intersection Summary

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	73	2405	1573	31	40	99
Future Volume (vph)	73	2405	1573	31	40	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1113	4768	4755		1825	1458
Flt Permitted	0.13	1.00	1.00		0.95	1.00
Satd. Flow (perm)	148	4768	4755		1825	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	73	2405	1573	31	40	99
RTOR Reduction (vph)	0	0	1	0	0	91
Lane Group Flow (vph)	73	2405	1603	0	40	8
Heavy Vehicles (%)	64%	10%	9%	60%	0%	12%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	120.7	120.7	109.6		12.0	12.0
Effective Green, g (s)	120.7	120.7	109.6		12.0	12.0
Actuated g/C Ratio	0.83	0.83	0.75		0.08	0.08
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	175	3933	3562		149	119
v/s Ratio Prot	0.02	c0.50	0.34		c0.02	
v/s Ratio Perm	0.32					0.01
v/c Ratio	0.42	0.61	0.45		0.27	0.07
Uniform Delay, d1	3.7	4.5	6.9		63.0	62.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.7	0.4		1.0	0.2
Delay (s)	5.3	5.2	7.4		64.0	62.2
Level of Service	A	A	A		E	E
Approach Delay (s)		5.2	7.4		62.7	
Approach LOS		A	A		E	

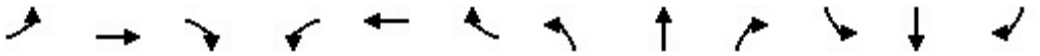
Intersection Summary			
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	146.3	Sum of lost time (s)	16.6
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	2	272	122	151	406	1803	233	74	1273
v/c Ratio	0.01	0.62	1.07	0.41	0.82	0.56	0.26	0.37	0.58
Control Delay	41.0	34.4	155.8	42.5	39.2	18.5	5.4	18.4	32.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	34.4	155.8	42.5	39.2	18.5	5.4	18.4	32.8
Queue Length 50th (m)	0.4	40.3	~36.9	30.7	67.0	94.4	6.9	5.7	95.4
Queue Length 95th (m)	2.7	70.1	#71.3	51.6	121.7	144.8	24.7	14.9	150.9
Internal Link Dist (m)		531.7		441.3		315.1			452.7
Turn Bay Length (m)			60.0		200.0		60.0	60.0	
Base Capacity (vph)	379	621	179	565	631	3195	909	227	2194
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	0.01	0.44	0.68	0.27	0.64	0.56	0.26	0.33	0.58

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.

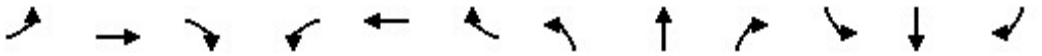


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	60	212	122	87	64	406	1803	233	74	1269	4
Future Volume (vph)	2	60	212	122	87	64	406	1803	233	74	1269	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	6.8		3.0	6.5	6.5	3.0	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*1.00	1.00	1.00	0.91	
Frt	1.00	0.88		1.00	0.94		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	1626		1496	1639		1789	5192	1372	1587	4720	
Flt Permitted	0.59	1.00		0.34	1.00		0.14	1.00	1.00	0.14	1.00	
Satd. Flow (perm)	1129	1626		534	1639		259	5192	1372	233	4720	
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)	2	60	212	122	87	64	406	1803	233	74	1269	4
RTOR Reduction (vph)	0	89	0	0	18	0	0	0	65	0	0	0
Lane Group Flow (vph)	2	183	0	122	133	0	406	1803	168	74	1273	0
Heavy Vehicles (%)	0%	2%	5%	22%	3%	19%	2%	11%	19%	15%	11%	33%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	30.4	30.4		30.4	30.4		97.8	87.2	87.2	73.4	65.8	
Effective Green, g (s)	30.4	30.4		30.4	30.4		97.8	87.2	87.2	73.4	65.8	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.69	0.62	0.62	0.52	0.47	
Clearance Time (s)	6.8	6.8		6.8	6.8		3.0	6.5	6.5	3.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	242	349		114	352		492	3199	845	193	2194	
v/s Ratio Prot		0.11			0.08		c0.17	0.35		0.02	0.27	
v/s Ratio Perm	0.00			c0.23			c0.40		0.12	0.18		
v/c Ratio	0.01	0.53		1.07	0.38		0.83	0.56	0.20	0.38	0.58	
Uniform Delay, d1	43.7	49.2		55.5	47.5		29.0	16.0	11.9	17.2	27.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.4		104.4	0.7		10.8	0.7	0.5	1.3	1.1	
Delay (s)	43.7	50.6		160.0	48.1		39.8	16.7	12.4	18.5	28.9	
Level of Service	D	D		F	D		D	B	B	B	C	
Approach Delay (s)		50.5			98.1			20.1			28.3	
Approach LOS		D			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	141.5	Sum of lost time (s)	16.3
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	79	36	2531	10	1662
v/c Ratio	0.52	0.13	0.70	0.11	0.43
Control Delay	69.8	1.0	8.5	4.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	69.8	1.0	8.5	4.7	4.4
Queue Length 50th (m)	19.9	0.0	85.5	0.4	38.7
Queue Length 95th (m)	36.3	0.0	160.9	1.5	53.7
Internal Link Dist (m)		192.4	633.1		409.3
Turn Bay Length (m)				100.0	
Base Capacity (vph)	324	418	3640	103	3864
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.09	0.70	0.10	0.43

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	79	0	36	0	2467	64	10	1662	0
Future Volume (vph)	0	0	0	79	0	36	0	2467	64	10	1662	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				7.7	7.7			6.7		3.0	6.7	
Lane Util. Factor				1.00	1.00			0.91		1.00	0.91	
Frt				1.00	0.85			1.00		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1738	1585			4611		1217	4812	
Flt Permitted				0.95	1.00			1.00		0.04	1.00	
Satd. Flow (perm)				1738	1585			4611		50	4812	
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)	0	0	0	79	0	36	0	2467	64	10	1662	0
RTOR Reduction (vph)	0	0	0	0	33	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	79	3	0	0	2530	0	10	1662	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	12%	64%	50%	9%	0%
Turn Type				Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		
Actuated Green, G (s)				11.5	11.5			103.7		107.9	107.9	
Effective Green, g (s)				11.5	11.5			103.7		107.9	107.9	
Actuated g/C Ratio				0.09	0.09			0.78		0.81	0.81	
Clearance Time (s)				7.7	7.7			6.7		3.0	6.7	
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)				149	136			3573		50	3880	
v/s Ratio Prot				c0.05	0.00			c0.55		0.00	c0.35	
v/s Ratio Perm										0.16		
v/c Ratio				0.53	0.02			0.71		0.20	0.43	
Uniform Delay, d1				58.6	56.0			7.5		6.0	3.8	
Progression Factor				1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2				3.6	0.1			1.2		2.0	0.3	
Delay (s)				62.2	56.1			8.7		8.0	4.2	
Level of Service				E	E			A		A	A	
Approach Delay (s)		0.0			60.3			8.7			4.2	
Approach LOS		A			E			A			A	

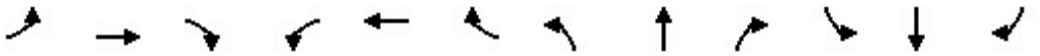
Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	133.8	Sum of lost time (s)	25.1
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	3	2502	1671	2	0	3
Future Volume (Veh/h)	3	2502	1671	2	0	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	2502	1671	2	0	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1673				2512	558
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1673				2512	558
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	389				24	478

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	NE 1
Volume Total	3	834	834	834	668	668	336	3
Volume Left	3	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	2	3
cSH	389	1700	1700	1700	1700	1700	1700	478
Volume to Capacity	0.01	0.49	0.49	0.49	0.39	0.39	0.20	0.01
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Control Delay (s)	14.3	0.0	0.0	0.0	0.0	0.0	0.0	12.6
Lane LOS	B							B
Approach Delay (s)	0.0				0.0			12.6
Approach LOS								B

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

Appendix D – Synchro Outputs – Future Total 2031 Conditions

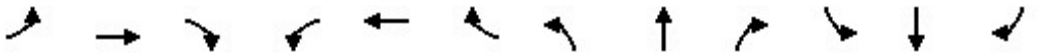


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	199	1361	162	153	792	258	82	983	146	250	2334	91
v/c Ratio	0.84	1.15	0.28	1.31	0.77	0.47	0.59	0.60	0.28	0.80	1.07	0.12
Control Delay	59.8	124.2	14.4	219.2	57.9	11.0	47.4	45.4	7.1	44.1	82.4	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.8	124.2	14.4	219.2	57.9	11.0	47.4	45.4	7.1	44.1	82.4	3.7
Queue Length 50th (m)	41.2	~252.5	10.6	~50.1	122.0	7.7	12.5	93.9	0.0	43.7	~272.2	0.0
Queue Length 95th (m)	#75.8	#293.1	29.2	#98.1	146.7	32.9	#33.1	118.6	16.8	73.1	#295.5	8.5
Internal Link Dist (m)		230.1			349.0			332.3			368.0	
Turn Bay Length (m)	80.0		105.0	250.0		80.0	140.0		300.0	85.0		130.0
Base Capacity (vph)	240	1188	579	117	1033	552	139	1625	518	374	2189	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	1.15	0.28	1.31	0.77	0.47	0.59	0.60	0.28	0.67	1.07	0.12

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)	199	1361	162	153	792	258	82	983	146	250	2334	91
Future Volume (vph)	199	1361	162	153	792	258	82	983	146	250	2334	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	*1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3804	1601	1285	3579	1361	1807	4601	1201	1508	4968	1570
Flt Permitted	0.14	1.00	1.00	0.09	1.00	1.00	0.07	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	255	3804	1601	117	3579	1361	135	4601	1201	268	4968	1570
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)	199	1361	162	153	792	258	82	983	146	250	2334	91
RTOR Reduction (vph)	0	0	79	0	0	160	0	0	94	0	0	51
Lane Group Flow (vph)	199	1361	83	153	792	98	82	983	52	250	2334	40
Heavy Vehicles (%)	2%	1%	2%	42%	2%	20%	1%	14%	36%	21%	16%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	63.0	50.0	50.0	56.2	46.2	46.2	64.5	56.5	56.5	83.5	70.5	70.5
Effective Green, g (s)	63.0	50.0	50.0	56.2	46.2	46.2	64.5	56.5	56.5	83.5	70.5	70.5
Actuated g/C Ratio	0.39	0.31	0.31	0.35	0.29	0.29	0.40	0.35	0.35	0.52	0.44	0.44
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	232	1188	500	114	1033	392	138	1624	424	310	2189	691
v/s Ratio Prot	c0.07	0.36		c0.08	0.22		0.03	0.21		c0.11	c0.47	
v/s Ratio Perm	0.26		0.05	c0.39		0.07	0.21		0.04	0.31		0.03
v/c Ratio	0.86	1.15	0.17	1.34	0.77	0.25	0.59	0.61	0.12	0.81	1.07	0.06
Uniform Delay, d1	37.2	55.0	39.9	43.3	52.0	43.6	37.7	42.6	35.0	26.2	44.8	25.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.4	75.8	0.2	201.3	3.5	0.3	6.7	1.7	0.6	14.2	39.7	0.2
Delay (s)	62.6	130.8	40.0	244.6	55.4	44.0	44.4	44.3	35.6	40.3	84.5	25.8
Level of Service	E	F	D	F	E	D	D	D	D	D	F	C
Approach Delay (s)		114.4			77.0			43.2			78.4	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	81.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	116.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	137	1269	2660	14	54
v/c Ratio	0.70	0.32	0.75	0.16	0.40
Control Delay	53.9	2.8	14.0	68.6	24.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	53.9	2.8	14.1	68.6	24.7
Queue Length 50th (m)	24.1	26.5	164.7	3.9	0.0
Queue Length 95th (m)	46.2	30.8	203.9	11.6	14.0
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	30.0				
Base Capacity (vph)	248	3970	3551	166	205
Starvation Cap Reductn	0	0	184	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.55	0.32	0.79	0.08	0.26

Intersection Summary

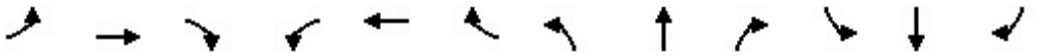
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	137	1269	2617	43	14	54
Future Volume (vph)	137	1269	2617	43	14	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	4601	4753		1074	1034
Flt Permitted	0.04	1.00	1.00		0.95	1.00
Satd. Flow (perm)	64	4601	4753		1074	1034
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	137	1269	2617	43	14	54
RTOR Reduction (vph)	0	0	1	0	0	51
Lane Group Flow (vph)	137	1269	2659	0	14	3
Heavy Vehicles (%)	7%	14%	10%	14%	70%	58%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	124.3	124.3	108.8		9.4	9.4
Effective Green, g (s)	124.3	124.3	108.8		9.4	9.4
Actuated g/C Ratio	0.84	0.84	0.74		0.06	0.06
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	193	3882	3510		68	65
v/s Ratio Prot	c0.06	0.28	c0.56		c0.01	
v/s Ratio Perm	0.54					0.00
v/c Ratio	0.71	0.33	0.76		0.21	0.05
Uniform Delay, d1	43.1	2.5	11.4		65.4	64.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	11.3	0.2	1.6		1.5	0.3
Delay (s)	54.4	2.7	13.0		66.9	65.1
Level of Service	D	A	B		E	E
Approach Delay (s)		7.7	13.0		65.5	
Approach LOS		A	B		E	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	147.3	Sum of lost time (s)	16.6
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	505	201	48	100	1086	102	57	2019	3
v/c Ratio	0.67	1.02	0.07	0.96	0.49	0.16	0.23	0.91	0.00
Control Delay	34.5	112.9	12.9	105.8	33.6	6.4	23.3	49.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	112.9	12.9	105.8	33.6	6.4	23.3	49.8	0.0
Queue Length 50th (m)	106.3	62.5	3.4	16.8	85.4	1.1	9.3	203.4	0.0
Queue Length 95th (m)	146.9	#117.9	11.5	#56.6	98.1	13.0	17.5	222.8	0.0
Internal Link Dist (m)	531.7		441.3		315.1			452.7	
Turn Bay Length (m)		60.0		200.0		60.0	60.0		60.0
Base Capacity (vph)	798	210	679	104	2197	650	253	2216	643
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	0.63	0.96	0.07	0.96	0.49	0.16	0.23	0.91	0.00

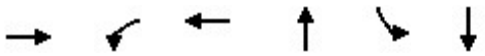
Intersection Summary

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



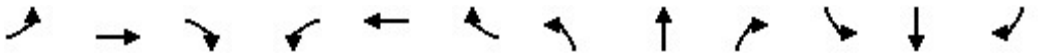
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	81	424	201	19	29	100	1086	102	57	2019	3
Future Volume (vph)	0	81	424	201	19	29	100	1086	102	57	2019	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8		6.8	6.8		3.0	7.5	7.5	3.0	7.5	7.5
Lane Util. Factor		1.00		1.00	1.00		1.00	*1.00	1.00	1.00	*1.00	1.00
Frt		0.87		1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1655		1573	1453		1738	5012	1361	1825	5192	1445
Flt Permitted		1.00		0.28	1.00		0.06	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)		1655		459	1453		107	5012	1361	426	5192	1445
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)	0	81	424	201	19	29	100	1086	102	57	2019	3
RTOR Reduction (vph)	0	44	0	0	17	0	0	0	54	0	0	2
Lane Group Flow (vph)	0	461	0	201	31	0	100	1086	48	57	2019	1
Heavy Vehicles (%)	0%	4%	1%	16%	13%	25%	5%	15%	20%	0%	11%	13%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		67.1		67.1	67.1		73.5	68.5	68.5	71.3	67.4	67.4
Effective Green, g (s)		67.1		67.1	67.1		73.5	68.5	68.5	71.3	67.4	67.4
Actuated g/C Ratio		0.43		0.43	0.43		0.47	0.44	0.44	0.45	0.43	0.43
Clearance Time (s)		6.8		6.8	6.8		3.0	7.5	7.5	3.0	7.5	7.5
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		708		196	621		102	2189	594	228	2231	621
v/s Ratio Prot		0.28			0.02		c0.03	0.22		0.01	0.39	
v/s Ratio Perm				c0.44			c0.43		0.04	0.11		0.00
v/c Ratio		0.65		1.03	0.05		0.98	0.50	0.08	0.25	0.90	0.00
Uniform Delay, d1		35.6		44.9	26.2		34.0	31.7	25.8	24.7	41.7	25.5
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.2		71.1	0.0		82.5	0.8	0.3	0.6	6.6	0.0
Delay (s)		37.7		115.9	26.3		116.6	32.5	26.0	25.3	48.4	25.5
Level of Service		D		F	C		F	C	C	C	D	C
Approach Delay (s)		37.7			98.7			38.6			47.7	
Approach LOS		D			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	156.8	Sum of lost time (s)	17.3
Intersection Capacity Utilization	107.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	18	44	10	1435	22	2647
v/c Ratio	0.10	0.51	0.04	0.43	0.08	0.71
Control Delay	1.2	84.6	0.3	10.8	6.2	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.2	84.6	0.3	10.8	6.2	12.7
Queue Length 50th (m)	0.0	12.6	0.0	73.1	1.5	167.3
Queue Length 95th (m)	0.0	26.1	0.0	96.4	4.4	214.5
Internal Link Dist (m)	84.8		192.4	627.5		409.3
Turn Bay Length (m)					100.0	
Base Capacity (vph)	177	176	343	3324	292	3709
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	0.10	0.25	0.03	0.43	0.08	0.71

Intersection Summary



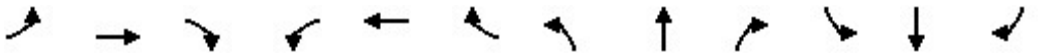
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	0	4	44	0	10	0	1382	53	22	2629	18
Future Volume (vph)	14	0	4	44	0	10	0	1382	53	22	2629	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.7		7.7	7.7			6.7		3.0	6.7	
Lane Util. Factor		1.00		1.00	1.00			0.91		1.00	0.91	
Frt		0.97		1.00	0.85			0.99		1.00	1.00	
Flt Protected		0.96		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1794		1008	1183			4444		1722	4723	
Flt Permitted		0.79		0.95	1.00			1.00		0.15	1.00	
Satd. Flow (perm)		1472		1008	1183			4444		273	4723	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	0	4	44	0	10	0	1382	53	22	2629	18
RTOR Reduction (vph)	0	17	0	0	9	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1	0	44	1	0	0	1433	0	22	2647	0
Heavy Vehicles (%)	0%	0%	0%	81%	0%	38%	0%	17%	27%	6%	11%	0%
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		
Actuated Green, G (s)		4.5		10.1	10.1			103.2		109.7	109.7	
Effective Green, g (s)		4.5		10.1	10.1			103.2		109.7	109.7	
Actuated g/C Ratio		0.03		0.07	0.07			0.70		0.75	0.75	
Clearance Time (s)		7.7		7.7	7.7			6.7		3.0	6.7	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		45		69	81			3132		239	3539	
v/s Ratio Prot				c0.04	0.00			0.32		0.00	c0.56	
v/s Ratio Perm		c0.00								0.07		
v/c Ratio		0.01		0.64	0.01			0.46		0.09	0.75	
Uniform Delay, d1		68.8		66.4	63.5			9.4		5.4	10.5	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.1		17.7	0.0			0.5		0.2	1.5	
Delay (s)		68.9		84.1	63.5			9.9		5.6	12.0	
Level of Service		E		F	E			A		A	B	
Approach Delay (s)		68.9			80.3			9.9			11.9	
Approach LOS		E			F			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	146.4	Sum of lost time (s)	25.1
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	0	1392	2654	3	2	2
Future Volume (Veh/h)	0	1392	2654	3	2	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1392	2654	3	2	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2657				3120	886
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2657				3120	886
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				78	99
cM capacity (veh/h)	161				9	292

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	NE 1
Volume Total	0	464	464	464	1062	1062	534	4
Volume Left	0	0	0	0	0	0	0	2
Volume Right	0	0	0	0	0	0	3	2
cSH	1700	1700	1700	1700	1700	1700	1700	18
Volume to Capacity	0.00	0.27	0.27	0.27	0.62	0.62	0.31	0.23
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	262.7
Lane LOS								F
Approach Delay (s)	0.0				0.0			262.7
Approach LOS								F

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	106	719	132	169	1430	377	278	2035	190	309	1187	319
v/c Ratio	0.96	0.83	0.27	0.87	1.11	0.62	0.84	1.05	0.34	1.28	0.68	0.48
Control Delay	115.2	67.3	8.7	76.5	110.8	24.0	53.3	84.4	5.8	192.1	46.0	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	115.2	67.3	8.7	76.5	110.8	24.0	53.3	84.4	5.8	192.1	46.0	27.0
Queue Length 50th (m)	20.9	117.0	0.0	38.4	~259.6	45.7	55.5	~234.9	0.0	~110.4	119.1	48.9
Queue Length 95th (m)	#56.6	#143.2	17.6	#78.5	#300.1	82.2	88.3	#259.7	17.0	#172.5	138.0	79.7
Internal Link Dist (m)		230.1			349.0			332.3			368.0	
Turn Bay Length (m)	80.0		105.0	250.0		80.0	140.0		300.0	85.0		130.0
Base Capacity (vph)	110	864	490	205	1283	611	370	1930	565	242	1756	662
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.83	0.27	0.82	1.11	0.62	0.75	1.05	0.34	1.28	0.68	0.48

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	719	132	169	1430	377	278	2035	190	309	1187	319
Future Volume (vph)	106	719	132	169	1430	377	278	2035	190	309	1187	319
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	*1.00	1.00	1.00	*1.00	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3579	1617	1193	3804	1408	1807	5192	1201	1601	4856	1617
Flt Permitted	0.10	1.00	1.00	0.12	1.00	1.00	0.12	1.00	1.00	0.07	1.00	1.00
Satd. Flow (perm)	199	3579	1617	152	3804	1408	230	5192	1201	116	4856	1617
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)	106	719	132	169	1430	377	278	2035	190	309	1187	319
RTOR Reduction (vph)	0	0	100	0	0	136	0	0	119	0	0	78
Lane Group Flow (vph)	106	719	32	169	1430	241	278	2035	71	309	1187	241
Heavy Vehicles (%)	0%	2%	1%	53%	1%	16%	1%	11%	36%	14%	8%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)	43.6	38.6	38.6	62.0	54.0	54.0	81.1	59.5	59.5	77.9	57.9	57.9
Effective Green, g (s)	43.6	38.6	38.6	62.0	54.0	54.0	81.1	59.5	59.5	77.9	57.9	57.9
Actuated g/C Ratio	0.27	0.24	0.24	0.39	0.34	0.34	0.51	0.37	0.37	0.49	0.36	0.36
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	105	863	390	191	1283	475	329	1930	446	242	1757	585
v/s Ratio Prot	c0.03	0.20		0.11	c0.38		0.11	0.39		c0.16	0.24	
v/s Ratio Perm	0.24		0.02	0.23		0.17	0.31		0.06	c0.46		0.15
v/c Ratio	1.01	0.83	0.08	0.88	1.11	0.51	0.84	1.05	0.16	1.28	0.68	0.41
Uniform Delay, d1	56.8	57.6	47.0	41.9	53.0	42.4	35.2	50.2	33.5	53.5	43.1	38.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	90.4	6.9	0.1	34.9	62.8	0.9	17.7	36.6	0.8	152.6	2.1	2.1
Delay (s)	147.2	64.6	47.1	76.8	115.8	43.2	52.9	86.8	34.3	206.1	45.2	40.4
Level of Service	F	E	D	E	F	D	D	F	C	F	D	D
Approach Delay (s)		71.3			98.6			79.1			71.8	
Approach LOS		E			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	81.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	120.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	85	2405	1607	59	175
v/c Ratio	0.47	0.61	0.45	0.38	0.62
Control Delay	10.8	5.5	7.9	71.0	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	5.5	7.9	71.0	18.3
Queue Length 50th (m)	3.2	73.7	57.3	16.5	0.0
Queue Length 95th (m)	6.6	91.5	75.4	31.4	23.3
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	45.0				
Base Capacity (vph)	235	3920	3533	319	399
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.61	0.45	0.18	0.44

Intersection Summary

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	85	2405	1573	34	59	175
Future Volume (vph)	85	2405	1573	34	59	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1113	4768	4749		1825	1458
Flt Permitted	0.13	1.00	1.00		0.95	1.00
Satd. Flow (perm)	147	4768	4749		1825	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	2405	1573	34	59	175
RTOR Reduction (vph)	0	0	1	0	0	160
Lane Group Flow (vph)	85	2405	1606	0	59	15
Heavy Vehicles (%)	64%	10%	9%	60%	0%	12%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	120.7	120.7	109.2		12.5	12.5
Effective Green, g (s)	120.7	120.7	109.2		12.5	12.5
Actuated g/C Ratio	0.82	0.82	0.74		0.09	0.09
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	176	3920	3532		155	124
v/s Ratio Prot	0.03	c0.50	0.34		c0.03	
v/s Ratio Perm	0.37					0.01
v/c Ratio	0.48	0.61	0.45		0.38	0.12
Uniform Delay, d1	4.0	4.7	7.3		63.5	62.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.1	0.7	0.4		1.6	0.4
Delay (s)	6.1	5.4	7.7		65.1	62.5
Level of Service	A	A	A		E	E
Approach Delay (s)		5.4	7.7		63.1	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	146.8	Sum of lost time (s)	16.6
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	2	283	124	151	411	1808	243	74	1282
v/c Ratio	0.01	0.62	1.08	0.40	0.83	0.57	0.27	0.38	0.60
Control Delay	40.5	33.9	159.2	42.0	41.6	19.3	5.6	19.2	34.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.5	33.9	159.2	42.0	41.6	19.3	5.6	19.2	34.4
Queue Length 50th (m)	0.4	42.0	~38.1	30.8	72.0	98.8	7.5	6.0	100.7
Queue Length 95th (m)	2.7	72.4	#74.9	51.6	125.5	145.5	25.8	14.9	152.3
Internal Link Dist (m)		531.7		441.3		315.1			452.7
Turn Bay Length (m)			60.0		200.0		60.0	60.0	
Base Capacity (vph)	377	619	172	559	621	3162	904	222	2142
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	0.01	0.46	0.72	0.27	0.66	0.57	0.27	0.33	0.60

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

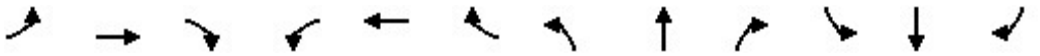
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	60	223	124	87	64	411	1808	243	74	1278	4
Future Volume (vph)	2	60	223	124	87	64	411	1808	243	74	1278	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	6.8		3.0	6.5	6.5	3.0	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*1.00	1.00	1.00	0.91	
Frt	1.00	0.88		1.00	0.94		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	1623		1496	1639		1789	5192	1372	1587	4720	
Flt Permitted	0.59	1.00		0.33	1.00		0.13	1.00	1.00	0.14	1.00	
Satd. Flow (perm)	1135	1623		518	1639		248	5192	1372	232	4720	
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)	2	60	223	124	87	64	411	1808	243	74	1278	4
RTOR Reduction (vph)	0	93	0	0	18	0	0	0	69	0	0	0
Lane Group Flow (vph)	2	190	0	124	133	0	411	1808	174	74	1282	0
Heavy Vehicles (%)	0%	2%	5%	22%	3%	19%	2%	11%	19%	15%	11%	33%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	31.8	31.8		31.8	31.8		97.9	87.2	87.2	72.6	64.9	
Effective Green, g (s)	31.8	31.8		31.8	31.8		97.9	87.2	87.2	72.6	64.9	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.68	0.61	0.61	0.51	0.45	
Clearance Time (s)	6.8	6.8		6.8	6.8		3.0	6.5	6.5	3.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	252	360		115	364		493	3166	836	190	2142	
v/s Ratio Prot		0.12			0.08		c0.17	0.35		0.02	0.27	
v/s Ratio Perm	0.00			c0.24			c0.40		0.13	0.18		
v/c Ratio	0.01	0.53		1.08	0.37		0.83	0.57	0.21	0.39	0.60	
Uniform Delay, d1	43.3	49.0		55.6	47.1		30.8	16.7	12.5	18.2	29.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.4		106.5	0.6		11.5	0.8	0.6	1.3	1.2	
Delay (s)	43.3	50.4		162.1	47.7		42.4	17.5	13.0	19.5	30.5	
Level of Service	D	D		F	D		D	B	B	B	C	
Approach Delay (s)		50.4			99.3			21.2			29.9	
Approach LOS		D			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	143.0	Sum of lost time (s)	16.3
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	79	36	2	2543	10	1756
v/c Ratio	0.52	0.13	0.01	0.70	0.11	0.46
Control Delay	69.8	1.0	4.5	8.6	4.8	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.8	1.0	4.5	8.6	4.8	4.6
Queue Length 50th (m)	19.9	0.0	0.1	86.3	0.4	42.1
Queue Length 95th (m)	36.3	0.0	1.0	162.9	1.5	58.2
Internal Link Dist (m)		192.4		633.1		409.3
Turn Bay Length (m)			30.0		100.0	
Base Capacity (vph)	324	418	180	3640	102	3859
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	0.24	0.09	0.01	0.70	0.10	0.46

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	79	0	36	2	2479	64	10	1738	18
Future Volume (vph)	0	0	0	79	0	36	2	2479	64	10	1738	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				7.7	7.7		6.7	6.7		3.0	6.7	
Lane Util. Factor				1.00	1.00		1.00	0.91		1.00	0.91	
Frt				1.00	0.85		1.00	1.00		1.00	1.00	
Flt Protected				0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1738	1585		1825	4611		1217	4808	
Flt Permitted				0.95	1.00		0.12	1.00		0.04	1.00	
Satd. Flow (perm)				1738	1585		229	4611		49	4808	
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)	0	0	0	79	0	36	2	2479	64	10	1738	18
RTOR Reduction (vph)	0	0	0	0	33	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	79	3	0	2	2542	0	10	1756	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	12%	64%	50%	9%	0%
Turn Type				Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		
Actuated Green, G (s)				11.5	11.5		103.7	103.7		107.9	107.9	
Effective Green, g (s)				11.5	11.5		103.7	103.7		107.9	107.9	
Actuated g/C Ratio				0.09	0.09		0.78	0.78		0.81	0.81	
Clearance Time (s)				7.7	7.7		6.7	6.7		3.0	6.7	
Vehicle Extension (s)				3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				149	136		177	3573		49	3877	
v/s Ratio Prot				c0.05	0.00			c0.55		0.00	c0.37	
v/s Ratio Perm							0.01			0.16		
v/c Ratio				0.53	0.02		0.01	0.71		0.20	0.45	
Uniform Delay, d1				58.6	56.0		3.4	7.5		6.1	3.9	
Progression Factor				1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2				3.6	0.1		0.1	1.2		2.1	0.4	
Delay (s)				62.2	56.1		3.5	8.8		8.2	4.3	
Level of Service				E	E		A	A		A	A	
Approach Delay (s)		0.0			60.3			8.8			4.4	
Approach LOS		A			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	133.8	Sum of lost time (s)	25.1
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	3	2516	1747	2	0	3
Future Volume (Veh/h)	3	2516	1747	2	0	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	2516	1747	2	0	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1749				2593	583
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1749				2593	583
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	363				21	460

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	NE 1
Volume Total	3	839	839	839	699	699	351	3
Volume Left	3	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	2	3
cSH	363	1700	1700	1700	1700	1700	1700	460
Volume to Capacity	0.01	0.49	0.49	0.49	0.41	0.41	0.21	0.01
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Control Delay (s)	15.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9
Lane LOS	B							B
Approach Delay (s)	0.0				0.0			12.9
Approach LOS								B

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

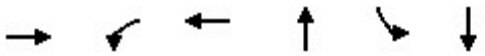
Appendix E – Synchro Outputs – Future Background 2041 Conditions

Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	78	1430	2985	14	52
v/c Ratio	0.55	0.36	0.81	0.16	0.39
Control Delay	38.7	3.0	13.0	68.7	25.0
Queue Delay	0.0	0.0	0.3	0.0	0.0
Total Delay	38.7	3.0	13.3	68.7	25.0
Queue Length 50th (m)	7.3	31.4	189.3	3.9	0.0
Queue Length 95th (m)	25.0	35.9	207.2	11.6	13.7
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	30.0				
Base Capacity (vph)	143	3971	3702	166	203
Starvation Cap Reductn	0	0	221	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.55	0.36	0.86	0.08	0.26

Intersection Summary

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	78	1430	2957	28	14	52
Future Volume (vph)	78	1430	2957	28	14	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	4601	4760		1074	1034
Flt Permitted	0.03	1.00	1.00		0.95	1.00
Satd. Flow (perm)	62	4601	4760		1074	1034
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	78	1430	2957	28	14	52
RTOR Reduction (vph)	0	0	0	0	0	49
Lane Group Flow (vph)	78	1430	2985	0	14	3
Heavy Vehicles (%)	7%	14%	10%	14%	70%	58%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	124.3	124.3	113.3		9.4	9.4
Effective Green, g (s)	124.3	124.3	113.3		9.4	9.4
Actuated g/C Ratio	0.84	0.84	0.77		0.06	0.06
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	141	3882	3661		68	65
v/s Ratio Prot	c0.03	0.31	c0.63		c0.01	
v/s Ratio Perm	0.44					0.00
v/c Ratio	0.55	0.37	0.82		0.21	0.05
Uniform Delay, d1	30.9	2.6	10.5		65.4	64.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.6	0.3	2.1		1.5	0.3
Delay (s)	35.6	2.9	12.6		66.9	65.1
Level of Service	D	A	B		E	E
Approach Delay (s)		4.6	12.6		65.5	
Approach LOS		A	B		E	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	147.3	Sum of lost time (s)	16.6
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	4	50	11	1554	24	2982
v/c Ratio	0.02	0.54	0.04	0.45	0.09	0.77
Control Delay	0.2	81.4	0.3	8.7	4.9	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.2	81.4	0.3	8.7	4.9	11.7
Queue Length 50th (m)	0.0	12.7	0.0	53.5	0.9	126.9
Queue Length 95th (m)	0.0	28.8	0.0	111.2	5.0	296.7
Internal Link Dist (m)	84.8		192.4	627.5		409.3
Turn Bay Length (m)					100.0	
Base Capacity (vph)	199	181	357	3454	275	3860
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	0.02	0.28	0.03	0.45	0.09	0.77

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	2	50	0	11	0	1494	60	24	2982	0
Future Volume (vph)	2	0	2	50	0	11	0	1494	60	24	2982	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.7		7.7	7.7			6.7		3.0	6.7	
Lane Util. Factor		1.00		1.00	1.00			0.91		1.00	0.91	
Frt		0.93		1.00	0.85			0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1748		1008	1183			4442		1722	4725	
Flt Permitted		1.00		0.95	1.00			1.00		0.13	1.00	
Satd. Flow (perm)		1791		1008	1183			4442		238	4725	
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)	2	0	2	50	0	11	0	1494	60	24	2982	0
RTOR Reduction (vph)	0	4	0	0	10	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	50	1	0	0	1552	0	24	2982	0
Heavy Vehicles (%)	0%	0%	0%	81%	0%	38%	0%	17%	27%	6%	11%	0%
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		
Actuated Green, G (s)		1.4		10.6	10.6			103.0		109.6	109.6	
Effective Green, g (s)		1.4		10.6	10.6			103.0		109.6	109.6	
Actuated g/C Ratio		0.01		0.07	0.07			0.72		0.76	0.76	
Clearance Time (s)		7.7		7.7	7.7			6.7		3.0	6.7	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		17		74	87			3183		218	3603	
v/s Ratio Prot				c0.05	0.00			0.35		0.00	c0.63	
v/s Ratio Perm		c0.00								0.08		
v/c Ratio		0.00		0.68	0.01			0.49		0.11	0.83	
Uniform Delay, d1		70.5		64.9	61.7			8.9		5.0	11.0	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.1		21.7	0.0			0.5		0.2	2.3	
Delay (s)		70.5		86.6	61.7			9.4		5.2	13.3	
Level of Service		E		F	E			A		A	B	
Approach Delay (s)		70.5			82.1			9.4			13.2	
Approach LOS		E			F			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	143.7	Sum of lost time (s)	25.1
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	83	2736	1825	46	112
v/c Ratio	0.53	0.69	0.52	0.31	0.51
Control Delay	18.5	6.4	8.6	70.3	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	6.4	8.6	70.3	19.0
Queue Length 50th (m)	3.1	97.4	69.9	13.0	0.0
Queue Length 95th (m)	13.8	108.9	93.3	26.4	19.1
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	45.0				
Base Capacity (vph)	202	3942	3538	291	327
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.69	0.52	0.16	0.34

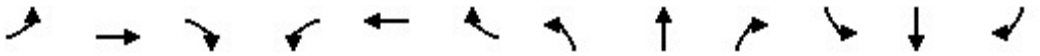
Intersection Summary

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	83	2736	1790	35	46	112
Future Volume (vph)	83	2736	1790	35	46	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1113	4768	4755		1825	1458
Flt Permitted	0.10	1.00	1.00		0.95	1.00
Satd. Flow (perm)	111	4768	4755		1825	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	83	2736	1790	35	46	112
RTOR Reduction (vph)	0	0	1	0	0	103
Lane Group Flow (vph)	83	2736	1824	0	46	9
Heavy Vehicles (%)	64%	10%	9%	60%	0%	12%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	122.7	122.7	110.4		12.1	12.1
Effective Green, g (s)	122.7	122.7	110.4		12.1	12.1
Actuated g/C Ratio	0.83	0.83	0.74		0.08	0.08
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	154	3942	3537		148	118
v/s Ratio Prot	0.03	c0.57	0.38		c0.03	
v/s Ratio Perm	0.41					0.01
v/c Ratio	0.54	0.69	0.52		0.31	0.08
Uniform Delay, d1	5.6	5.2	7.9		64.2	63.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.6	1.0	0.5		1.2	0.3
Delay (s)	9.2	6.3	8.4		65.4	63.3
Level of Service	A	A	A		E	E
Approach Delay (s)		6.3	8.4		63.9	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	148.4	Sum of lost time (s)	16.6
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	90	40	2879	11	1891
v/c Ratio	0.56	0.14	0.80	0.12	0.49
Control Delay	71.1	1.1	11.5	5.4	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	71.1	1.1	11.5	5.4	5.1
Queue Length 50th (m)	22.9	0.0	121.7	0.4	49.3
Queue Length 95th (m)	40.4	0.0	228.6	1.7	68.7
Internal Link Dist (m)		192.4	633.1		409.3
Turn Bay Length (m)				100.0	
Base Capacity (vph)	319	412	3621	100	3843
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.10	0.80	0.11	0.49

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	90	0	40	0	2807	72	11	1891	0
Future Volume (vph)	0	0	0	90	0	40	0	2807	72	11	1891	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				7.7	7.7			6.7		3.0	6.7	
Lane Util. Factor				1.00	1.00			0.91		1.00	0.91	
Frt				1.00	0.85			1.00		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1738	1585			4612		1217	4812	
Flt Permitted				0.95	1.00			1.00		0.04	1.00	
Satd. Flow (perm)				1738	1585			4612		48	4812	
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)	0	0	0	90	0	40	0	2807	72	11	1891	0
RTOR Reduction (vph)	0	0	0	0	36	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	90	4	0	0	2878	0	11	1891	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	12%	64%	50%	9%	0%
Turn Type				Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		
Actuated Green, G (s)				12.2	12.2			103.9		108.1	108.1	
Effective Green, g (s)				12.2	12.2			103.9		108.1	108.1	
Actuated g/C Ratio				0.09	0.09			0.77		0.80	0.80	
Clearance Time (s)				7.7	7.7			6.7		3.0	6.7	
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)				157	143			3557		48	3861	
v/s Ratio Prot				c0.05	0.00			c0.62		0.00	c0.39	
v/s Ratio Perm										0.18		
v/c Ratio				0.57	0.03			0.81		0.23	0.49	
Uniform Delay, d1				58.8	55.8			9.4		9.5	4.3	
Progression Factor				1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2				5.0	0.1			2.1		2.4	0.4	
Delay (s)				63.7	55.9			11.5		12.0	4.8	
Level of Service				E	E			B		B	A	
Approach Delay (s)		0.0			61.3			11.5			4.8	
Approach LOS		A			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	134.7	Sum of lost time (s)	25.1
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix F – Synchro Outputs – Future Total 2041 Conditions

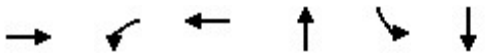
Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	147	1442	3021	16	60
v/c Ratio	0.78	0.36	0.84	0.18	0.43
Control Delay	64.6	3.0	17.0	69.3	24.4
Queue Delay	0.0	0.0	0.4	0.0	0.0
Total Delay	64.6	3.0	17.4	69.3	24.4
Queue Length 50th (m)	27.2	31.8	228.0	4.5	0.0
Queue Length 95th (m)	#60.0	37.1	252.7	12.4	14.7
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	30.0				
Base Capacity (vph)	204	3968	3576	166	210
Starvation Cap Reductn	0	0	160	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.72	0.36	0.88	0.10	0.29

Intersection Summary

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

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	147	1442	2975	46	16	60
Future Volume (vph)	147	1442	2975	46	16	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1706	4601	4754		1074	1034
Flt Permitted	0.04	1.00	1.00		0.95	1.00
Satd. Flow (perm)	64	4601	4754		1074	1034
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	147	1442	2975	46	16	60
RTOR Reduction (vph)	0	0	1	0	0	56
Lane Group Flow (vph)	147	1442	3020	0	16	4
Heavy Vehicles (%)	7%	14%	10%	14%	70%	58%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	124.3	124.3	109.6		9.4	9.4
Effective Green, g (s)	124.3	124.3	109.6		9.4	9.4
Actuated g/C Ratio	0.84	0.84	0.74		0.06	0.06
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	184	3882	3537		68	65
v/s Ratio Prot	c0.06	0.31	c0.64		c0.01	
v/s Ratio Perm	0.61					0.00
v/c Ratio	0.80	0.37	0.85		0.24	0.06
Uniform Delay, d1	48.0	2.6	13.2		65.5	64.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	21.0	0.3	2.9		1.8	0.4
Delay (s)	69.0	2.9	16.1		67.3	65.2
Level of Service	E	A	B		E	E
Approach Delay (s)		9.0	16.1		65.6	
Approach LOS		A	B		E	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	147.3	Sum of lost time (s)	16.6
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	18	50	11	1623	24	3008
v/c Ratio	0.10	0.55	0.04	0.49	0.10	0.81
Control Delay	1.2	86.3	0.4	12.0	6.8	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.2	86.3	0.4	12.0	6.8	16.7
Queue Length 50th (m)	0.0	14.4	0.0	90.3	1.7	235.9
Queue Length 95th (m)	0.0	28.8	0.0	118.7	5.0	303.8
Internal Link Dist (m)	84.8		192.4	627.5		409.3
Turn Bay Length (m)					100.0	
Base Capacity (vph)	176	173	329	3308	246	3691
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	0.10	0.29	0.03	0.49	0.10	0.81

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	0	4	50	0	11	0	1563	60	24	2990	18
Future Volume (vph)	14	0	4	50	0	11	0	1563	60	24	2990	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.7		7.7	7.7			6.7		3.0	6.7	
Lane Util. Factor		1.00		1.00	1.00			0.91		1.00	0.91	
Frt		0.97		1.00	0.85			0.99		1.00	1.00	
Flt Protected		0.96		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1794		1008	1183			4444		1722	4723	
Flt Permitted		0.79		0.95	1.00			1.00		0.12	1.00	
Satd. Flow (perm)		1472		1008	1183			4444		214	4723	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	0	4	50	0	11	0	1563	60	24	2990	18
RTOR Reduction (vph)	0	17	0	0	10	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1	0	50	1	0	0	1621	0	24	3008	0
Heavy Vehicles (%)	0%	0%	0%	81%	0%	38%	0%	17%	27%	6%	11%	0%
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		
Actuated Green, G (s)		4.5		10.9	10.9			103.5		110.1	110.1	
Effective Green, g (s)		4.5		10.9	10.9			103.5		110.1	110.1	
Actuated g/C Ratio		0.03		0.07	0.07			0.70		0.75	0.75	
Clearance Time (s)		7.7		7.7	7.7			6.7		3.0	6.7	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		44		74	87			3116		196	3523	
v/s Ratio Prot				c0.05	0.00			0.36		0.00	c0.64	
v/s Ratio Perm		c0.00								0.09		
v/c Ratio		0.01		0.68	0.01			0.52		0.12	0.85	
Uniform Delay, d1		69.4		66.6	63.3			10.4		6.0	13.1	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.1		21.7	0.0			0.6		0.3	2.9	
Delay (s)		69.5		88.3	63.4			11.0		6.3	16.0	
Level of Service		E		F	E			B		A	B	
Approach Delay (s)		69.5			83.8			11.0			15.9	
Approach LOS		E			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	147.6	Sum of lost time (s)	25.1
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBT	SBT	NEL	NER
Lane Group Flow (vph)	95	2736	1828	65	188
v/c Ratio	0.59	0.70	0.52	0.41	0.67
Control Delay	24.8	6.9	9.7	72.3	24.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	6.9	9.7	72.3	24.6
Queue Length 50th (m)	3.6	97.4	70.2	18.6	5.6
Queue Length 95th (m)	20.8	136.1	112.6	34.1	30.8
Internal Link Dist (m)		409.3	315.1	132.2	
Turn Bay Length (m)	45.0				
Base Capacity (vph)	200	3915	3485	289	372
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.70	0.52	0.22	0.51

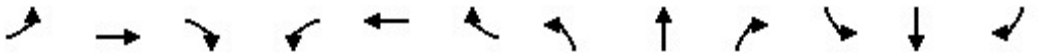
Intersection Summary

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	95	2736	1790	38	65	188
Future Volume (vph)	95	2736	1790	38	65	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3		7.3	7.3
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1113	4768	4750		1825	1458
Flt Permitted	0.09	1.00	1.00		0.95	1.00
Satd. Flow (perm)	110	4768	4750		1825	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	2736	1790	38	65	188
RTOR Reduction (vph)	0	0	1	0	0	153
Lane Group Flow (vph)	95	2736	1827	0	65	35
Heavy Vehicles (%)	64%	10%	9%	60%	0%	12%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	122.7	122.7	109.6		13.1	13.1
Effective Green, g (s)	122.7	122.7	109.6		13.1	13.1
Actuated g/C Ratio	0.82	0.82	0.73		0.09	0.09
Clearance Time (s)	3.0	6.3	6.3		7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	158	3915	3484		160	127
v/s Ratio Prot	0.04	c0.57	0.38		c0.04	
v/s Ratio Perm	0.45					0.02
v/c Ratio	0.60	0.70	0.52		0.41	0.27
Uniform Delay, d1	7.4	5.6	8.6		64.5	63.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.3	1.1	0.6		1.7	1.2
Delay (s)	13.7	6.7	9.2		66.2	64.9
Level of Service	B	A	A		E	E
Approach Delay (s)		6.9	9.2		65.2	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	149.4	Sum of lost time (s)	16.6
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	90	40	2	2891	11	1967
v/c Ratio	0.56	0.14	0.01	0.80	0.12	0.51
Control Delay	71.1	1.1	5.0	11.6	5.4	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.1	1.1	5.0	11.6	5.4	5.3
Queue Length 50th (m)	22.9	0.0	0.1	122.7	0.4	52.8
Queue Length 95th (m)	40.4	0.0	1.0	231.6	1.7	73.4
Internal Link Dist (m)		192.4		633.1		409.3
Turn Bay Length (m)			30.0		100.0	
Base Capacity (vph)	319	412	139	3622	100	3843
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	0.28	0.10	0.01	0.80	0.11	0.51

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	90	0	40	2	2819	72	11	1967	0
Future Volume (vph)	0	0	0	90	0	40	2	2819	72	11	1967	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				7.7	7.7		6.7	6.7		3.0	6.7	
Lane Util. Factor				1.00	1.00		1.00	0.91		1.00	0.91	
Frt				1.00	0.85		1.00	1.00		1.00	1.00	
Flt Protected				0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1738	1585		1825	4612		1217	4812	
Flt Permitted				0.95	1.00		0.09	1.00		0.04	1.00	
Satd. Flow (perm)				1738	1585		176	4612		48	4812	
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)	0	0	0	90	0	40	2	2819	72	11	1967	0
RTOR Reduction (vph)	0	0	0	0	36	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	90	4	0	2	2890	0	11	1967	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	12%	64%	50%	9%	0%
Turn Type				Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		
Actuated Green, G (s)				12.2	12.2		103.9	103.9		108.1	108.1	
Effective Green, g (s)				12.2	12.2		103.9	103.9		108.1	108.1	
Actuated g/C Ratio				0.09	0.09		0.77	0.77		0.80	0.80	
Clearance Time (s)				7.7	7.7		6.7	6.7		3.0	6.7	
Vehicle Extension (s)				3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				157	143		135	3557		48	3861	
v/s Ratio Prot				c0.05	0.00			c0.63		0.00	c0.41	
v/s Ratio Perm							0.01			0.18		
v/c Ratio				0.57	0.03		0.01	0.81		0.23	0.51	
Uniform Delay, d1				58.8	55.8		3.6	9.4		9.7	4.4	
Progression Factor				1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2				5.0	0.1		0.2	2.1		2.4	0.5	
Delay (s)				63.7	55.9		3.8	11.6		12.1	4.9	
Level of Service				E	E		A	B		B	A	
Approach Delay (s)		0.0			61.3			11.6			5.0	
Approach LOS		A			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	134.7	Sum of lost time (s)	25.1
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix G – Synchro Outputs – Future Improvements 2041 Conditions

Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Group Flow (vph)	147	1442	2975	46	16	60
v/c Ratio	0.82	0.36	0.83	0.04	0.18	0.43
Control Delay	71.0	3.0	15.7	4.1	69.6	24.6
Queue Delay	0.0	0.0	0.3	0.0	0.0	0.0
Total Delay	71.0	3.0	16.0	4.1	69.6	24.6
Queue Length 50th (m)	28.0	31.8	211.7	2.2	4.5	0.0
Queue Length 95th (m)	#64.7	37.2	235.6	5.8	12.5	14.7
Internal Link Dist (m)		409.3	315.1		132.2	
Turn Bay Length (m)	70.0			35.0		
Base Capacity (vph)	190	3969	3606	1087	161	206
Starvation Cap Reductn	0	0	184	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	0.77	0.36	0.87	0.04	0.10	0.29

Intersection Summary

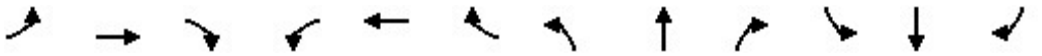
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	147	1442	2975	46	16	60
Future Volume (vph)	147	1442	2975	46	16	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3	6.3	7.3	7.3
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1706	4601	4768	1432	1074	1034
Flt Permitted	0.04	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	63	4601	4768	1432	1074	1034
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	147	1442	2975	46	16	60
RTOR Reduction (vph)	0	0	0	4	0	56
Lane Group Flow (vph)	147	1442	2975	42	16	4
Heavy Vehicles (%)	7%	14%	10%	14%	70%	58%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			2		8
Actuated Green, G (s)	124.8	124.8	110.7	110.7	9.5	9.5
Effective Green, g (s)	124.8	124.8	110.7	110.7	9.5	9.5
Actuated g/C Ratio	0.84	0.84	0.75	0.75	0.06	0.06
Clearance Time (s)	3.0	6.3	6.3	6.3	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	176	3882	3568	1071	68	66
v/s Ratio Prot	c0.06	0.31	0.62		c0.01	
v/s Ratio Perm	c0.64			0.03		0.00
v/c Ratio	0.84	0.37	0.83	0.04	0.24	0.06
Uniform Delay, d1	48.2	2.6	12.4	4.8	65.7	65.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.5	0.3	2.5	0.1	1.8	0.4
Delay (s)	75.7	2.9	14.9	4.9	67.5	65.4
Level of Service	E	A	B	A	E	E
Approach Delay (s)		9.6	14.7		65.8	
Approach LOS		A	B		E	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	147.9	Sum of lost time (s)	16.6
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	18	50	11	1623	24	2990	18
v/c Ratio	0.10	0.55	0.04	0.49	0.10	0.81	0.03
Control Delay	1.2	86.3	0.4	12.0	6.8	16.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.2	86.3	0.4	12.0	6.8	16.5	0.1
Queue Length 50th (m)	0.0	14.4	0.0	90.3	1.7	232.0	0.0
Queue Length 95th (m)	0.0	28.8	0.0	118.7	5.0	298.9	0.0
Internal Link Dist (m)	84.8		192.4	627.5		409.3	
Turn Bay Length (m)					100.0		30.0
Base Capacity (vph)	176	173	329	3308	246	3693	656
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.29	0.03	0.49	0.10	0.81	0.03

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	0	4	50	0	11	0	1563	60	24	2990	18
Future Volume (vph)	14	0	4	50	0	11	0	1563	60	24	2990	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.7		7.7	7.7			6.7		3.0	6.7	6.7
Lane Util. Factor		1.00		1.00	1.00			0.91		1.00	0.91	1.00
Frt		0.97		1.00	0.85			0.99		1.00	1.00	0.85
Flt Protected		0.96		0.95	1.00			1.00		0.95	1.00	1.00
Satd. Flow (prot)		1794		1008	1183			4444		1722	4725	816
Flt Permitted		0.79		0.95	1.00			1.00		0.12	1.00	1.00
Satd. Flow (perm)		1472		1008	1183			4444		214	4725	816
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	0	4	50	0	11	0	1563	60	24	2990	18
RTOR Reduction (vph)	0	17	0	0	10	0	0	2	0	0	0	5
Lane Group Flow (vph)	0	1	0	50	1	0	0	1621	0	24	2990	13
Heavy Vehicles (%)	0%	0%	0%	81%	0%	38%	0%	17%	27%	6%	11%	100%
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		6
Actuated Green, G (s)		4.5		10.9	10.9			103.5		110.1	110.1	110.1
Effective Green, g (s)		4.5		10.9	10.9			103.5		110.1	110.1	110.1
Actuated g/C Ratio		0.03		0.07	0.07			0.70		0.75	0.75	0.75
Clearance Time (s)		7.7		7.7	7.7			6.7		3.0	6.7	6.7
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		44		74	87			3116		196	3524	608
v/s Ratio Prot				c0.05	0.00			0.36		0.00	c0.63	
v/s Ratio Perm		c0.00								0.09		0.02
v/c Ratio		0.01		0.68	0.01			0.52		0.12	0.85	0.02
Uniform Delay, d1		69.4		66.6	63.3			10.4		6.0	13.0	4.8
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2		0.1		21.7	0.0			0.6		0.3	2.7	0.1
Delay (s)		69.5		88.3	63.4			11.0		6.3	15.7	4.9
Level of Service		E		F	E			B		A	B	A
Approach Delay (s)		69.5			83.8			11.0			15.6	
Approach LOS		E			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	147.6	Sum of lost time (s)	25.1
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Group Flow (vph)	95	2736	1790	38	65	188
v/c Ratio	0.58	0.70	0.51	0.05	0.42	0.64
Control Delay	22.0	6.7	9.3	4.3	72.7	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	6.7	9.3	4.3	72.7	18.4
Queue Length 50th (m)	3.6	97.4	67.4	1.4	18.4	0.0
Queue Length 95th (m)	18.4	123.5	103.1	5.8	34.1	23.8
Internal Link Dist (m)		409.3	315.1		132.2	
Turn Bay Length (m)	90.0			30.0		
Base Capacity (vph)	225	3922	3531	753	304	399
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.70	0.51	0.05	0.21	0.47

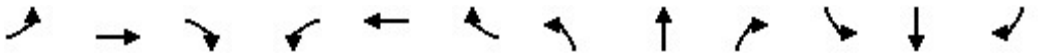
Intersection Summary

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	95	2736	1790	38	65	188
Future Volume (vph)	95	2736	1790	38	65	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.3	6.3	6.3	7.3	7.3
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1113	4768	4812	1021	1825	1458
Flt Permitted	0.10	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	115	4768	4812	1021	1825	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	2736	1790	38	65	188
RTOR Reduction (vph)	0	0	0	5	0	172
Lane Group Flow (vph)	95	2736	1790	33	65	16
Heavy Vehicles (%)	64%	10%	9%	60%	0%	12%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			2		8
Actuated Green, G (s)	121.7	121.7	108.6	108.6	12.7	12.7
Effective Green, g (s)	121.7	121.7	108.6	108.6	12.7	12.7
Actuated g/C Ratio	0.82	0.82	0.73	0.73	0.09	0.09
Clearance Time (s)	3.0	6.3	6.3	6.3	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	162	3920	3530	749	156	125
v/s Ratio Prot	0.04	c0.57	0.37		c0.04	
v/s Ratio Perm	0.44			0.03		0.01
v/c Ratio	0.59	0.70	0.51	0.04	0.42	0.13
Uniform Delay, d1	6.5	5.5	8.4	5.4	64.1	62.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	1.1	0.5	0.1	1.8	0.5
Delay (s)	11.8	6.5	8.9	5.5	65.9	63.0
Level of Service	B	A	A	A	E	E
Approach Delay (s)		6.7	8.8		63.8	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	90	40	2	2891	11	1967
v/c Ratio	0.56	0.14	0.01	0.80	0.12	0.51
Control Delay	71.1	1.1	5.0	11.6	5.4	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.1	1.1	5.0	11.6	5.4	5.3
Queue Length 50th (m)	22.9	0.0	0.1	122.7	0.4	52.8
Queue Length 95th (m)	40.4	0.0	1.0	231.6	1.7	73.4
Internal Link Dist (m)		192.4		633.1		409.3
Turn Bay Length (m)			60.0		100.0	
Base Capacity (vph)	319	412	139	3622	100	3843
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	0.28	0.10	0.01	0.80	0.11	0.51

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	90	0	40	2	2819	72	11	1967	0
Future Volume (vph)	0	0	0	90	0	40	2	2819	72	11	1967	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				7.7	7.7		6.7	6.7		3.0	6.7	
Lane Util. Factor				1.00	1.00		1.00	0.91		1.00	0.91	
Frt				1.00	0.85		1.00	1.00		1.00	1.00	
Flt Protected				0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1738	1585		1825	4612		1217	4812	
Flt Permitted				0.95	1.00		0.09	1.00		0.04	1.00	
Satd. Flow (perm)				1738	1585		176	4612		48	4812	
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)	0	0	0	90	0	40	2	2819	72	11	1967	0
RTOR Reduction (vph)	0	0	0	0	36	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	90	4	0	2	2890	0	11	1967	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	12%	64%	50%	9%	0%
Turn Type				Split	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		3		4	4			2		1	6	
Permitted Phases	3						2			6		6
Actuated Green, G (s)				12.2	12.2		103.9	103.9		108.1	108.1	
Effective Green, g (s)				12.2	12.2		103.9	103.9		108.1	108.1	
Actuated g/C Ratio				0.09	0.09		0.77	0.77		0.80	0.80	
Clearance Time (s)				7.7	7.7		6.7	6.7		3.0	6.7	
Vehicle Extension (s)				3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				157	143		135	3557		48	3861	
v/s Ratio Prot				c0.05	0.00			c0.63		0.00	c0.41	
v/s Ratio Perm							0.01			0.18		
v/c Ratio				0.57	0.03		0.01	0.81		0.23	0.51	
Uniform Delay, d1				58.8	55.8		3.6	9.4		9.7	4.4	
Progression Factor				1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2				5.0	0.1		0.2	2.1		2.4	0.5	
Delay (s)				63.7	55.9		3.8	11.6		12.1	4.9	
Level of Service				E	E		A	B		B	A	
Approach Delay (s)		0.0			61.3			11.6			5.0	
Approach LOS		A			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	134.7	Sum of lost time (s)	25.1
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix H – Queuing & Blocking Reports

Intersection: 6: Cadetta Road & Highway 50

Movement	NB	NB	NB	NB	SB	SB	SB	SB	NE	NE
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (m)	89.3	99.2	104.4	83.5	275.1	271.7	192.2	47.3	30.7	56.7
Average Queue (m)	47.0	23.6	23.6	22.3	95.3	104.6	95.7	4.3	5.8	22.2
95th Queue (m)	84.7	76.2	74.1	63.4	196.8	211.7	174.9	23.1	20.9	44.3
Link Distance (m)		405.7	405.7	405.7	320.7	320.7	320.7		130.7	130.7
Upstream Blk Time (%)					0	0				
Queuing Penalty (veh)					0	0				
Storage Bay Dist (m)	70.0							35.0		
Storage Blk Time (%)	9	0					17			
Queuing Penalty (veh)	43	0					8			

Intersection: 13: Highway 50 & Private Driveway (Site Access)/Fastfrate Entrance

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	LTR	L	TR	T	T	TR	L	T	T	T	R
Maximum Queue (m)	14.8	68.1	16.6	101.8	108.6	124.6	9.2	218.9	230.8	150.7	17.8
Average Queue (m)	3.3	26.9	2.9	31.1	30.7	34.6	5.0	66.5	71.3	68.0	1.2
95th Queue (m)	10.2	53.9	11.3	74.9	83.3	90.6	11.7	165.1	172.0	136.0	8.4
Link Distance (m)	90.5	201.9	201.9	642.7	642.7	642.7		405.7	405.7	405.7	
Upstream Blk Time (%)									0		
Queuing Penalty (veh)									0		
Storage Bay Dist (m)							100.0				30.0
Storage Blk Time (%)				2				2		13	
Queuing Penalty (veh)				0				1		2	

Zone Summary

Zone wide Queuing Penalty: 55

Intersection: 6: Cadetta Road & Highway 50

Movement	NB	NB	NB	NB	SB	SB	SB	SB	NE	NE
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (m)	67.9	82.1	111.2	116.2	92.4	99.7	101.5	32.0	41.4	62.4
Average Queue (m)	28.6	31.5	36.0	42.3	33.0	35.4	32.3	5.6	15.5	29.0
95th Queue (m)	54.2	72.9	81.6	92.2	72.2	77.1	74.0	25.5	31.8	49.8
Link Distance (m)		405.7	405.7	405.7	320.7	320.7	320.7		130.7	130.7
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0							30.0		
Storage Blk Time (%)		0					7			
Queuing Penalty (veh)		0					3			

Intersection: 13: Highway 50 & Private Driveway (Site Access)/Fastfrate Entrance

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	T	T	TR	L	T	T	T
Maximum Queue (m)	54.3	22.4	5.8	138.7	128.2	141.9	25.1	81.6	91.4	106.4
Average Queue (m)	23.8	8.7	0.3	43.9	40.6	47.7	4.0	29.5	34.3	37.5
95th Queue (m)	42.9	18.7	2.7	100.1	98.2	106.3	15.8	71.6	78.7	82.8
Link Distance (m)	201.9	201.9		648.2	648.2	648.2		405.7	405.7	405.7
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)			60.0				100.0			
Storage Blk Time (%)				3				0		7
Queuing Penalty (veh)				0				0		0

Zone Summary

Zone wide Queuing Penalty: 3