Kalar Road Residential Development
City of Niagara Falls, Ontario

Transportation Impact Study

January 14, 2024

Prepared for:

M5V Developments Inc.

Prepared by:

Stantec Consulting Ltd.

Revision	Description	Author	Quality Check	Independent Review
December 13, 2022		A.M.	A.S.	E.C.
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EXECUTIVE SUMMARY

Stantec Consulting Ltd. was retained by M5V Developments Inc. to complete a Traffic Impact Study (TIS) for the proposed Kalar Residential Development, located on the east side of Kalar Road, just north and opposite of Mulberry Drive, in the City of Niagara Falls.

The proposed condominium development consists of 91 townhouse dwelling units, driveway and garage parking for each unit, 20 street-level visitor spaces, on-site garbage bins, and two driveway access points off Kalar Road. All private driveways to individual residential units are located on the site's internal laneways; no private driveways are located on the public roadway. Pedestrian connections between the site and the existing sidewalk on Kalar Road are also proposed.

Based on consultation with City staff, capacity analysis was completed for the following study intersections:

- Kalar Road at McLeod Road
- Kalar Road at Mulberry Drive
- Kalar Road at Brown Road
- Two proposed site driveways on Kalar Road

The analysis adopted future planning horizons of 2024 (representing the assumed build-out year of the subject development) and 2029 representing five years post build-out year, and an annual growth rate of 1% per annum was assumed for all study roads in addition to traffic generated from two nearby developments which was also captured in the traffic forecasts.

The proposed residential development is projected to generate approximately 51 two-way trips during the weekday a.m. peak hour (12 inbound and 39 outbound), and 60 two-way trips during the weekday p.m. peak hour (38 inbound and 22 outbound).

The industry standard Synchro macroscopic traffic analysis software was utilized to analyse the study intersections, and key performance measures such as Level of Service (LOS), volume-to-capacity ratio (v/c ratio), and 95th percentile queuing was reported.

As per the results of the intersection capacity analysis and MTO left-turn lane warrants, auxiliary left-turn lanes are not warranted on Kalar Road at the proposed driveways up to the ultimate 2029 horizon year.

Signal timing adjustments at the intersection of Kalar Road at McLeod Road can help improve operations and any future projected capacity constraints, however it is expected future geometric modifications may be required if the City desires to ensure 95th percentile queueing remains within the available storage lengths during peak hours for all auxiliary turn lanes.

The traffic generated from the subject development during peak hours is not expected to result in any new operational concerns at the study intersections requiring mitigation, with almost no identifiable impact at most of the study intersections.

Based on the results of the capacity analysis, there are no improvements recommended at the study intersections in response to the subject development.

It is recommended both proposed driveways on Kalar Road be full movement accesses (no turn restrictions) with stop control for the driveway approaches (free flow for Kalar Road), and no auxiliary turn lanes as confirmed by the capacity analysis and MTO left-turn lane warrants.

January 17, 2024

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1.0 INTRODUCTION

1.1 STUDY OBJECTIVES

Stantec Consulting Ltd. was retained by M5V Developments Inc. to complete a Traffic Impact Study (TIS) for the proposed Kalar Residential Development, located on the east side of Kalar Road, just north and opposite of Mulberry Drive, in the City of Niagara Falls.

The primary objectives of the TIS include:

- Estimation of peak hour traffic generation from the proposed development;
- Intersection capacity analyses for the study area intersections under existing and future conditions;
- Recommendation of intersections improvements, where required, in order to maintain an acceptable level of service; and
- An evaluation of the site layout from transportation safety, site circulation, and access management standpoints.

The study has been completed in accordance with the City of Niagara Falls' *Guidelines for the Preparation of Transportation Impact Studies and Site Plan Review* document and has employed the use of the industry-standard Synchro capacity analysis software for completing the capacity analysis of the selected study area intersections.

1.2 PROPOSED DEVELOPMENT

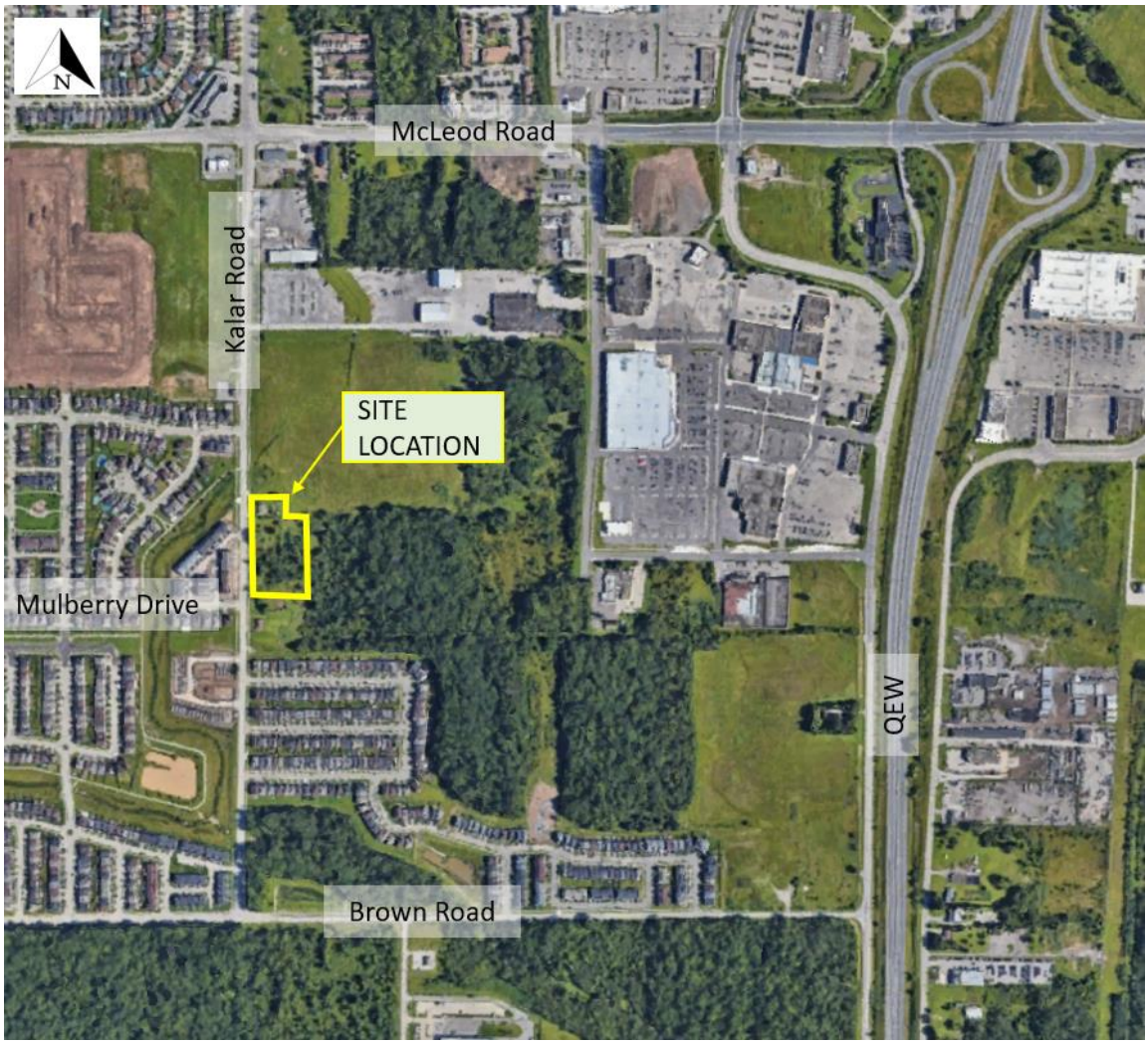
The proposed condominium development consists of 91 townhouse dwelling units, driveway and garage parking for each unit, 20 street-level visitor spaces, on-site garbage bins, and two driveway access points off Kalar Road. All private driveways to individual residential units are located on the site's internal laneways; no private driveways are located on the public roadway. Pedestrian connections between the site and the existing sidewalk on Kalar Road are also proposed.

1.3 DEVELOPMENT LOCATION

The proposed development will be located on an existing parcel (referred to as Lot 186) on the east side of Kalar Road, just north and opposite of Mulberry Drive. Lands on the opposite side (west side) of Kalar Road consist of generally low-density residential subdivisions, from Brown Road in the south to north of Kalar Road. Lands to the east of the site consist of a variety of low-density residential uses, commercial and retails uses, and planned future high-density residential development, as well as existing Greenfields (vacant parcels) and forested lands.

Kalar Road is a north-south arterial road providing access to the McLeod Road corridor, which is a major east-west arterial servicing the surrounding area and providing access to the Queen Elizabeth Way (QEW) and the City's downtown area. The location of the proposed development and its relation to the surrounding road network is shown in **Figure 1**.

Figure 1: Site Area



1.4 STUDY INTERSECTIONS

Based on consultation with City staff, capacity analysis was completed for the following study intersections:

- Kalar Road at McLeod Road
- Kalar Road at Mulberry Drive
- Kalar Road at Brown Road
- Two proposed site driveways on Kalar Road

2.0 EXISTING CONDITIONS

2.1 EXISTING ROAD NETWORK

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

McLeod Road — An east-west arterial roadway under the jurisdiction of the City of Niagara Falls within the study area, with a four-lane urban cross-section and a posted speed limit of 50km/h. At its signalized intersection with Kalar Road, it has auxiliary left-turn lanes in the eastbound and westbound directions and an auxiliary right-turn lane in the westbound direction.

Kalar Road — A north-south arterial roadway under the jurisdiction of the City of Niagara Falls with a two-lane urban cross-section and a posted speed limit of 50km/h. In the vicinity of the site, there are no identifiable horizontal or vertical curves in the road's alignment requiring review. At its signalized intersection with McLeod Road, it has auxiliary left-turn lanes in the northbound and southbound directions, and at its stop-controlled T-intersection with Brown Road (stop-controlled for Kalar Road, free flow for Brown Road) it has auxiliary left- and right-turn lanes in the southbound direction.

Mulberry Drive — An east-west minor-collector roadway under the jurisdiction of the City of Niagara Falls, with a two-lane urban cross-section and an assumed speed limit of 50km/h. At its stop-controlled T-intersection with Kalar Road (stop-controlled for Mulberry Drive, free flow for Kalar Road), it has no auxiliary turn lanes.

Brown Road — An east-west collector roadway under the jurisdiction of the City of Niagara Falls, with a mix of two-lane urban and rural cross-sections and a speed limit of 60km/h. At its stop-controlled T-intersection with Kalar Road (stop-controlled for Kalar Road, free flow for Brown Road) it has an auxiliary left-turn lane in the eastbound direction.

2.2 ACTIVE TRANSPORTATION FACILITIES

Sidewalks are currently provided along both sides of Kalar Road, McLeod Road, Mulberry Drive, and the northern side of Brown Road. Warren Woods Trail is located east of Kalar Road, providing connections to residential subdivisions east of the site. On-street bike lanes are provided on Kalar Road and McLeod Road, however, do not continue through the intersection approaches at the signalized intersection of Kalar Road and McLeod Road.

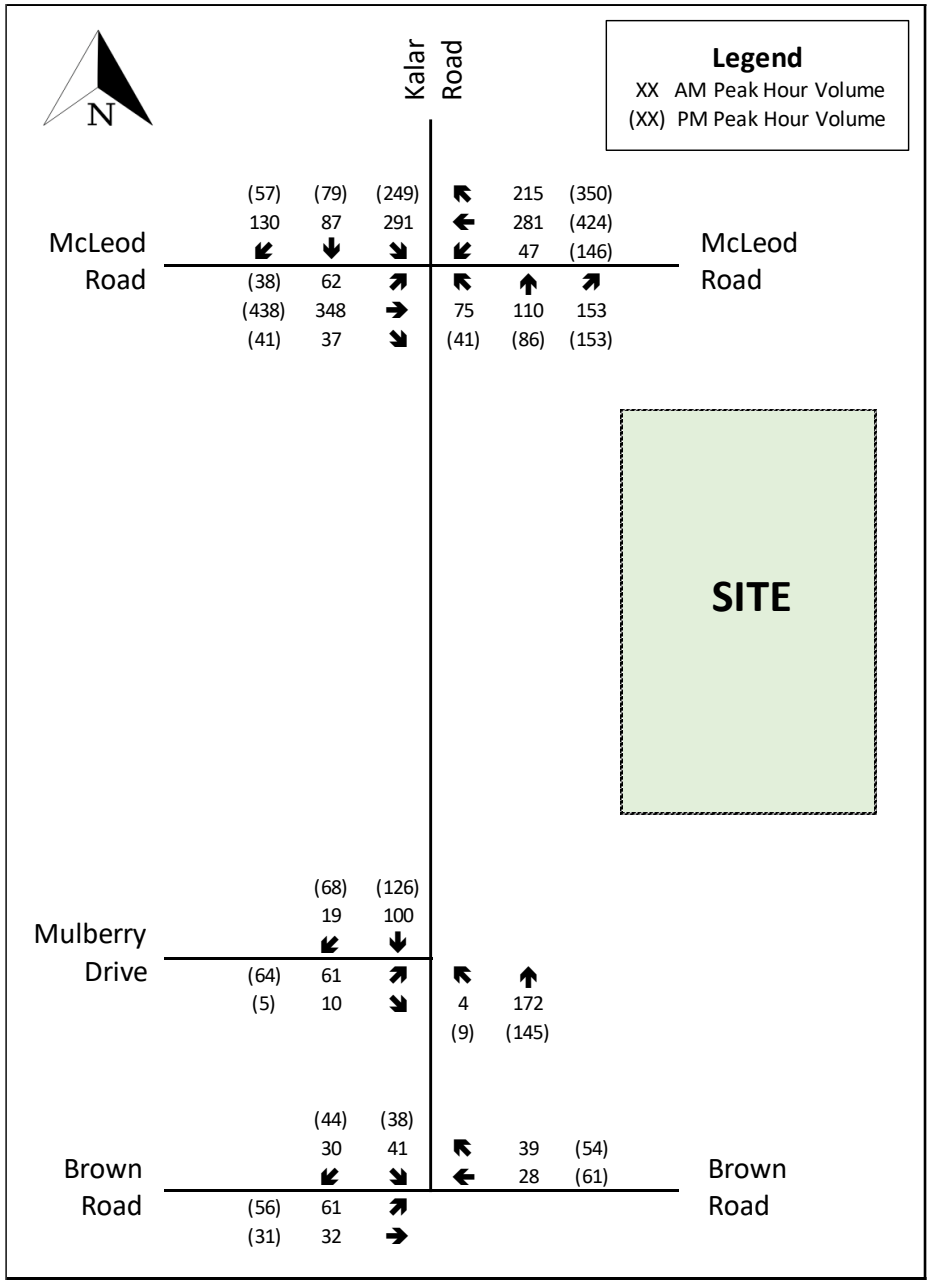
2.3 TRANSIT SERVICES

Niagara Transit operates Route 105 on Kalar Road, operating Mondays to Saturdays and travelling from Canadian Drive Hub to Niagara Square. Transit stops are in close proximity to the site, with northbound and southbound stops immediately adjacent to the northern side of the subject site.

2.4 EXISTING TRAFFIC VOLUMES

Intersection traffic volume counts were collected at the study area intersections on November 16, 2022. The a.m. peak hour commenced at approximately 7:30 a.m. to 7:45 a.m., and the p.m. peak hour commenced at approximately 4:00 p.m. to 4:15 p.m. The traffic volume data is provided in **Appendix A**. The existing peak hour traffic volumes are shown in **Figure 2**.

Figure 2: 2022 Existing Traffic Volumes



3.0 FUTURE BACKGROUND CONTITIONS

3.1 STUDY HORIZON YEARS

Based on consultation with City staff, the analysis adopted future planning horizons of 2024 (representing the assumed build-out year of the subject development) and 2029 representing five years post build-out year.

3.2 PLANNED TRANSPORTATION NETWORK IMPROVEMENTS

An Environmental Assessment (EA) is planned to be completed for McLeod Road between Kalar Road and Thorold Townline Road which will include a traffic operational review of the Kalar Road at McLeod Road intersection, and therefore may result in future recommendations for future geometric modifications at that intersection.

3.3 FUTURE BACKGROUND GROWTH

Based on consultation with City staff, an annual growth rate of 1% per annum was assumed for all study roads and was applied to all turning movements at the study area intersections.

The 2024 and 2029 future background growth traffic volumes are shown in **Figure 3** and **Figure 4**, respectively.

3.4 FUTURE BACKGROUND DEVELOPMENTS

Based on consultation with City staff, the following background developments have been included in the projected future background traffic volumes:

- Splendor residential subdivision development, west side of Kalar Road to the north
- Kalar Road residential condominium development, at the northeast corner of the McLeod Road at Kalar Road

The future traffic volumes generated from the Splendor subdivision and Kalar Road condominium development, as provided by City staff, are shown in **Figure 5** and **Figure 6**, respectively.

3.5 FUTURE BACKROUND TRAFFIC VOLUMES

The 2024 and 2029 future background traffic volumes were estimated by combining the future background growth traffic volumes (Section 3.3) with the future background development traffic volumes (Section 3.4). The resulting 2024 and 2029 future background traffic volumes are shown in **Figure 7** and **Figure 8**, respectively.

Figure 3: 2024 Background Growth

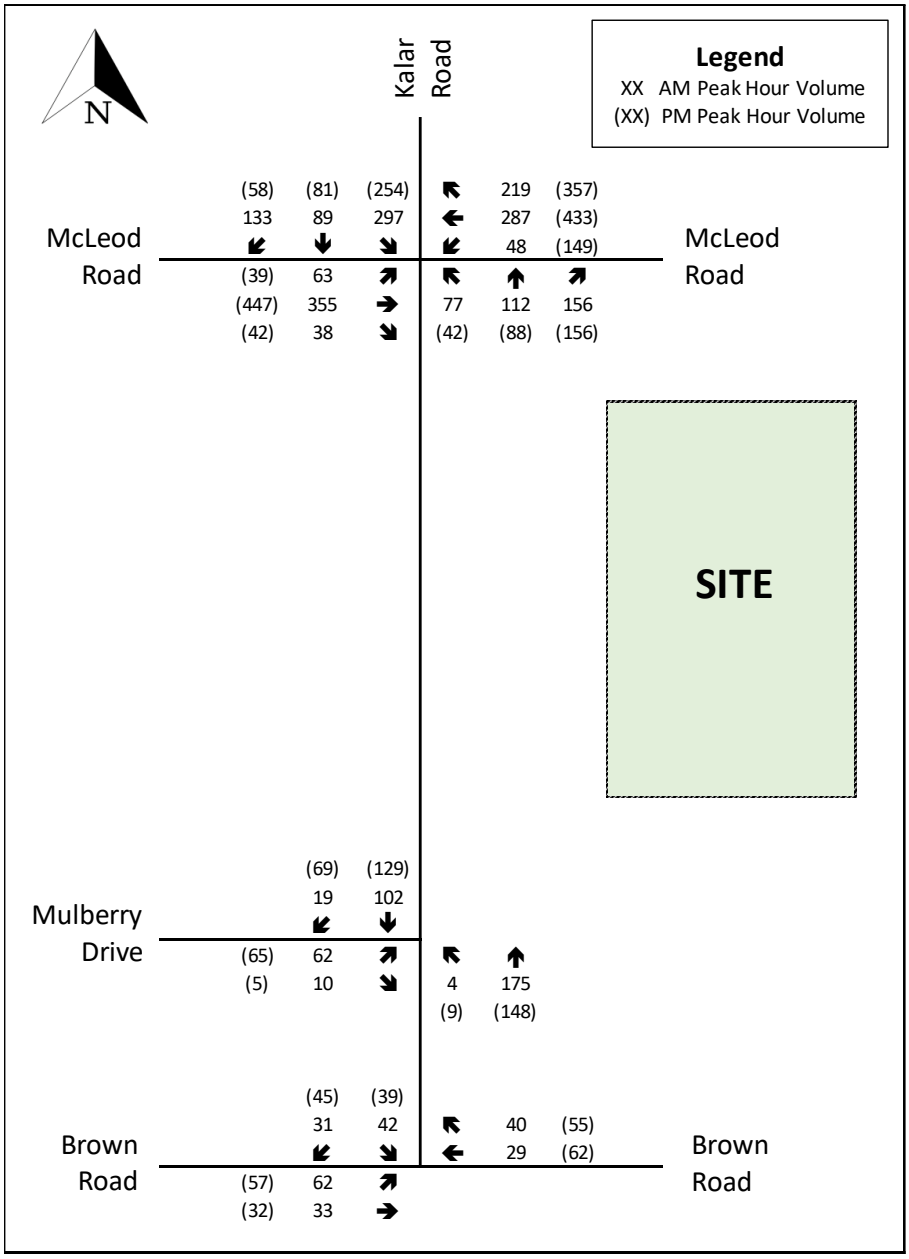


Figure 4: 2029 Background Growth

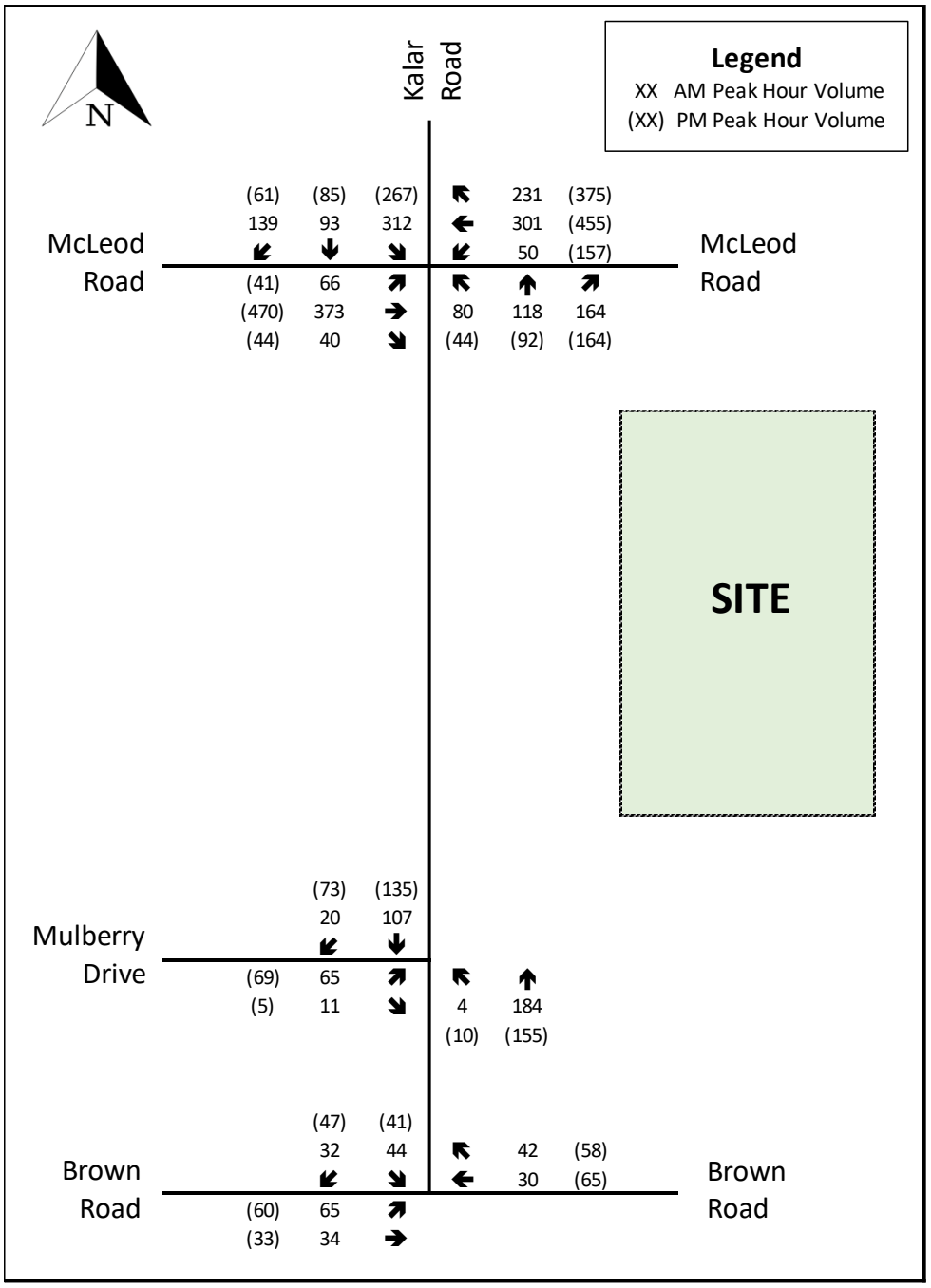


Figure 5: Splendor Development Traffic

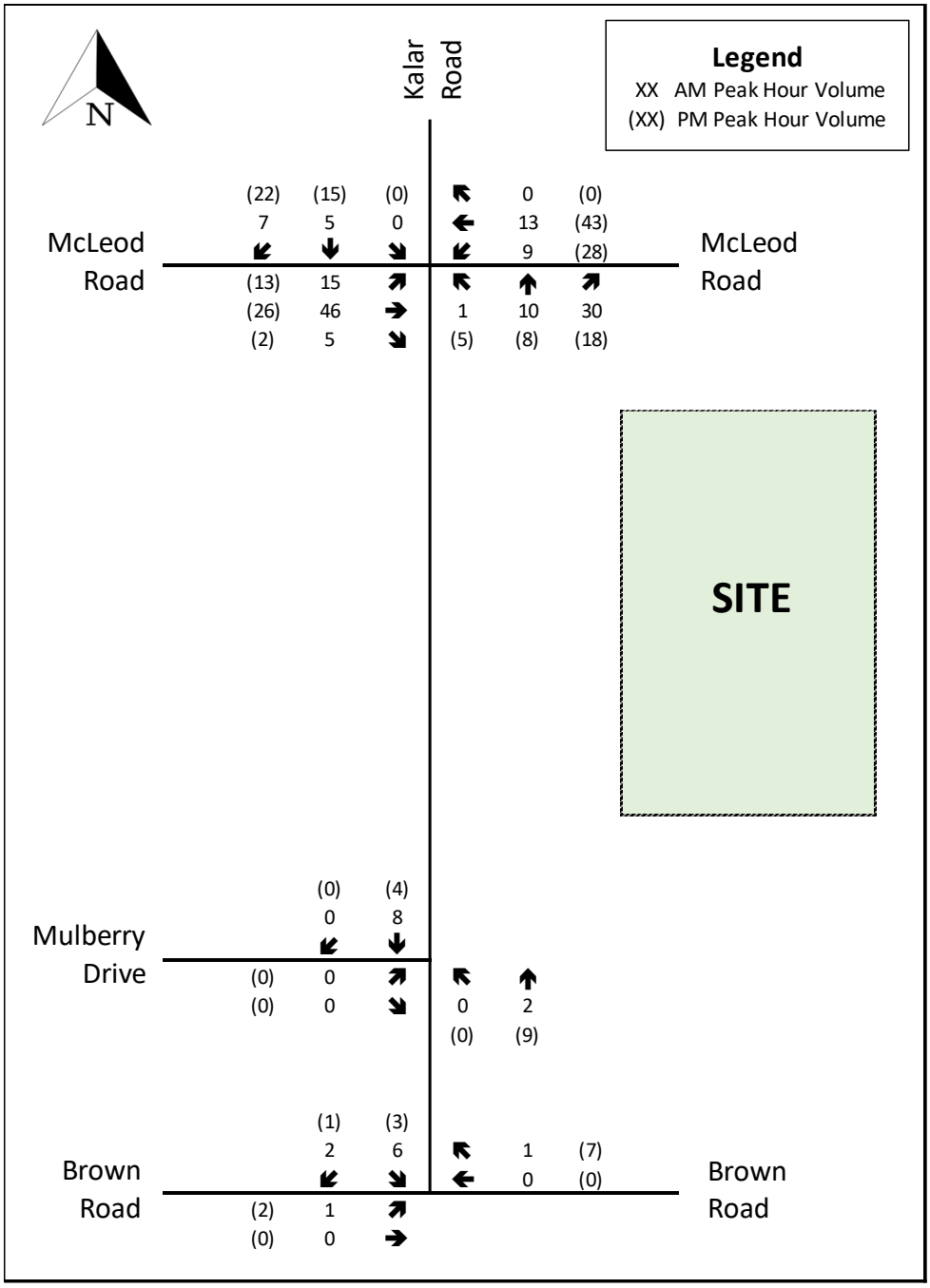


Figure 6: McLeod Development Traffic

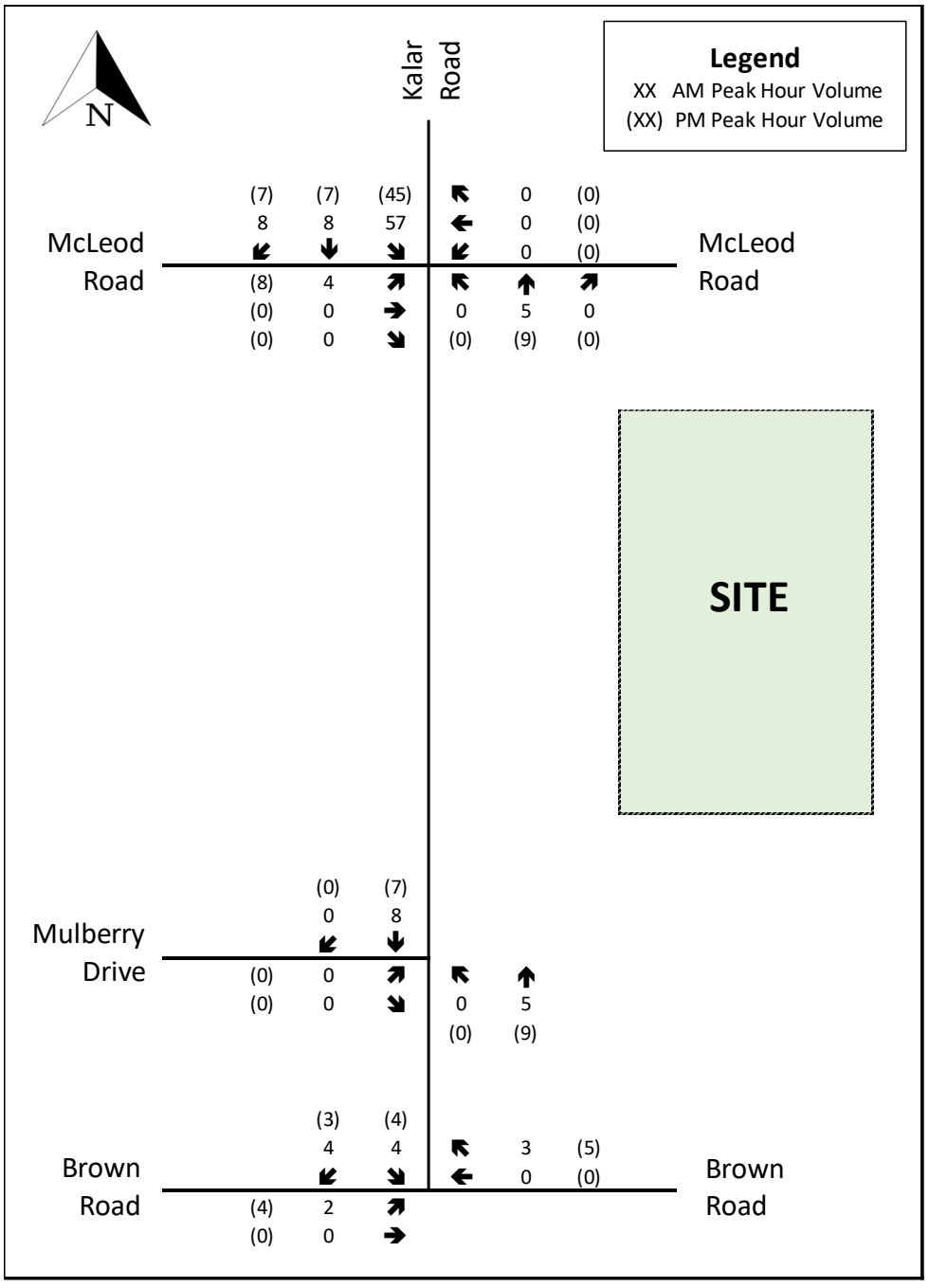


Figure 7: 2024 Future Background Traffic

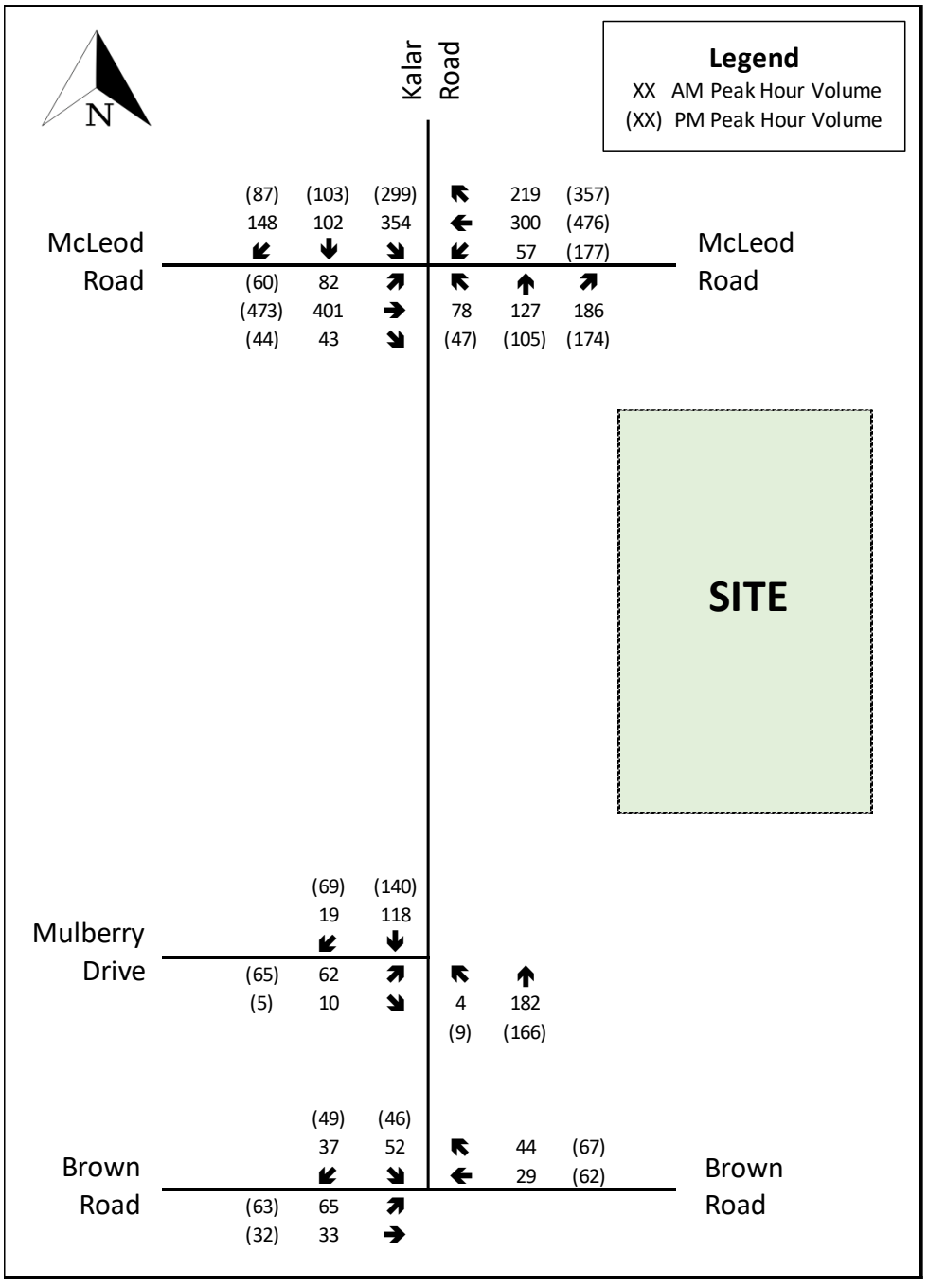
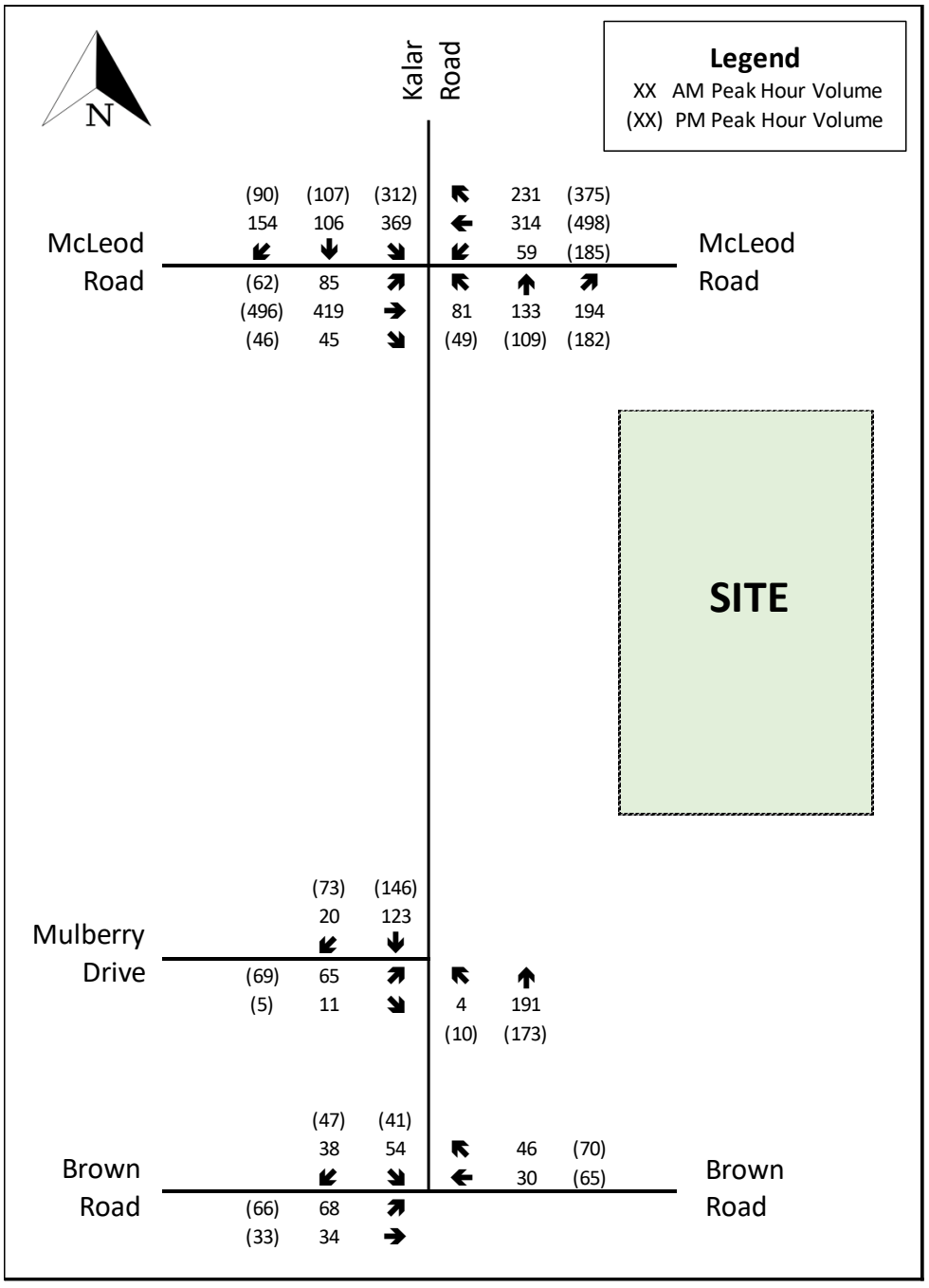


Figure 8: 2029 Future Background Traffic



4.0 PROPOSED DEVELOPMENT

4.1 SITE DESCRIPTION

The proposed condominium development consists of 91 townhouse dwelling units, driveway and garage parking for each unit, 20 street-level visitor spaces, on-site garbage bins, and two driveway access points off Kalar Road. All private driveways to individual residential units are located on the site's internal laneways; no private driveways are located on the public roadway. Pedestrian connections between the site and the existing sidewalk on Kalar Road are also proposed. The site plan is shown in **Appendix B**.

4.2 ACCESS CONFIGURATION

Both proposed driveways on Kalar Road are planned to be full movement accesses (no turn restrictions) with stop control for the driveway approaches, and no auxiliary turn lanes. The horizontal and vertical alignments of Kalar Road in the vicinity of the site are generally straight and flat; therefore, no sightline concerns exist. As per the results of the intersection capacity analysis for the proposed driveways (Section 6.2.4), the intersections of both driveways and Kalar Road are expected to operate acceptably in the proposed configuration, with no operational issues requiring mitigation. Furthermore, left-turn lane warrant was completed for the southbound left-turn movements into the site at both driveways using the MTO methodology as directed by City staff. The results of the warrants are illustrated in **Appendix C** and confirm that auxiliary left-turn lanes are not warranted on Kalar Road at the proposed driveways up to the ultimate 2029 horizon year.

As per the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads, the recommended minimum spacing of the site's southernmost driveway from the intersection of Mulberry Drive is 35 metres. The proposed site plan illustrates that the spacing will be approximately 75 metres, well surpassing the national guideline.

4.3 TRIP GENERATION

Automobile trip generation for the proposed development during the peak periods of the adjacent street traffic was estimated by using the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th edition) methodology for a Multifamily Housing Low-Rise (Land Use Code #220). Trip Generation datasheets are provided in **Appendix D**. As presented in **Table 1**, the proposed residential development is projected to generate approximately 51 two-way trips during the weekday a.m. peak hour (12 inbound and 39 outbound), and 60 two-way trips during the weekday p.m. peak hour (38 inbound and 22 outbound).

These trip estimates are expected to be conservative given they don't account for the widely known traffic reducing impacts Covid-19 has had on commuter patterns (e.g., increase in telecommuting), nor do they consider any alternative modes of travel (e.g., walking, cycling, transit) despite sidewalk, on-street bike lanes, and transit service being located on Kalar Road in the vicinity of the site.

Table 1: Trip Generation Calculations

ITE Land Use	# of Units	Peak Hours	Total Site Trips	Directional Distribution		Directional Site Trips	
				In	Out	In	Out
Multifamily Housing (Low-Rise)	91	AM	51	24%	76%	12	39
		PM	60	63%	37%	38	22

4.4 TRIP DISTRIBUTION

Given the majority of trips generated by the site during the weekday a.m. and p.m. peak hours will primarily be commuter trips, and given the residential nature of the development, 2016 Transportation Tomorrow Survey (TTS) commuter data was reviewed to estimate the distribution of the site generated traffic to the surrounding road network. Table 2 outlines the estimated trip distribution assumptions for the site generated trips, which is based on the analyzed TTS data provided in **Appendix E**.

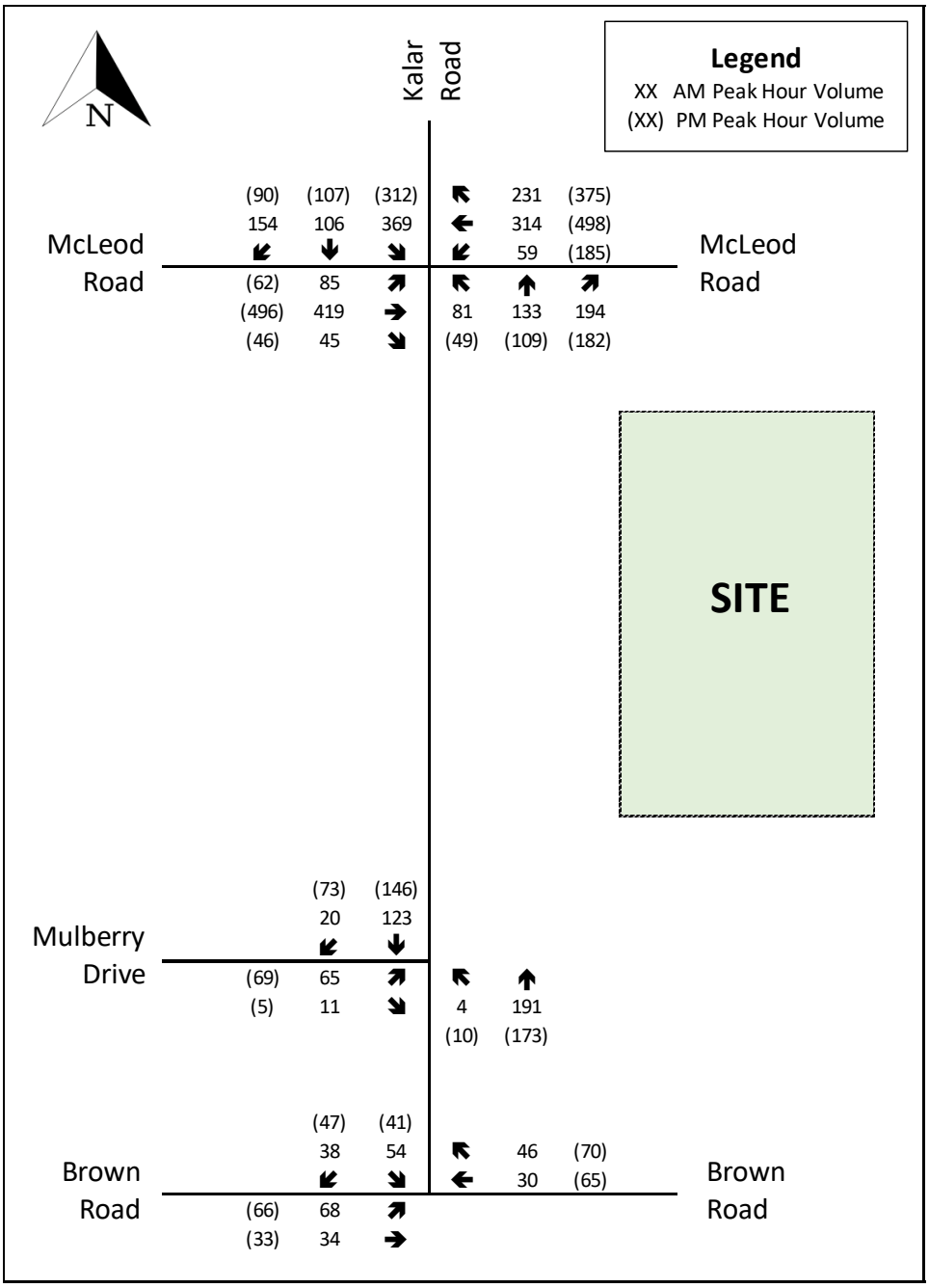
Table 2: Trip Distribution Assumptions

Direction	Proportion of Site Trips
McLeod Road (west of Kalar Road)	6%
McLeod Road (east of Kalar Road)	68%
Kalar Road (north of McLeod Road)	12%
Brown Road (west of Kalar Road)	8%
Brown Road (east of Kalar Road)	6%
TOTAL	**100%**

4.5 TRIP ASSIGNMENT

The site generated traffic has been assigned to individual turning movements at the study area intersections based on the aforementioned trip generation estimates and trip distribution assumptions. The assignment of the estimated peak hour site generated traffic for the proposed residential development is shown in **Figure 9**.

Figure 9: Site Trip Assignment



5.0 FUTURE TOTAL CONDITIONS

5.1 FUTURE TOTAL TRAFFIC VOLUMES

The future total traffic volumes for the 2024 and 2029 horizon years were developed by combining the estimated site generated traffic from the residential development with the future background traffic at each horizon year. The resulting 2024 and 2029 future total intersection volumes are shown in **Figure 10** and **Figure 11**, respectively.

Figure 10: 2024 Future Background Traffic

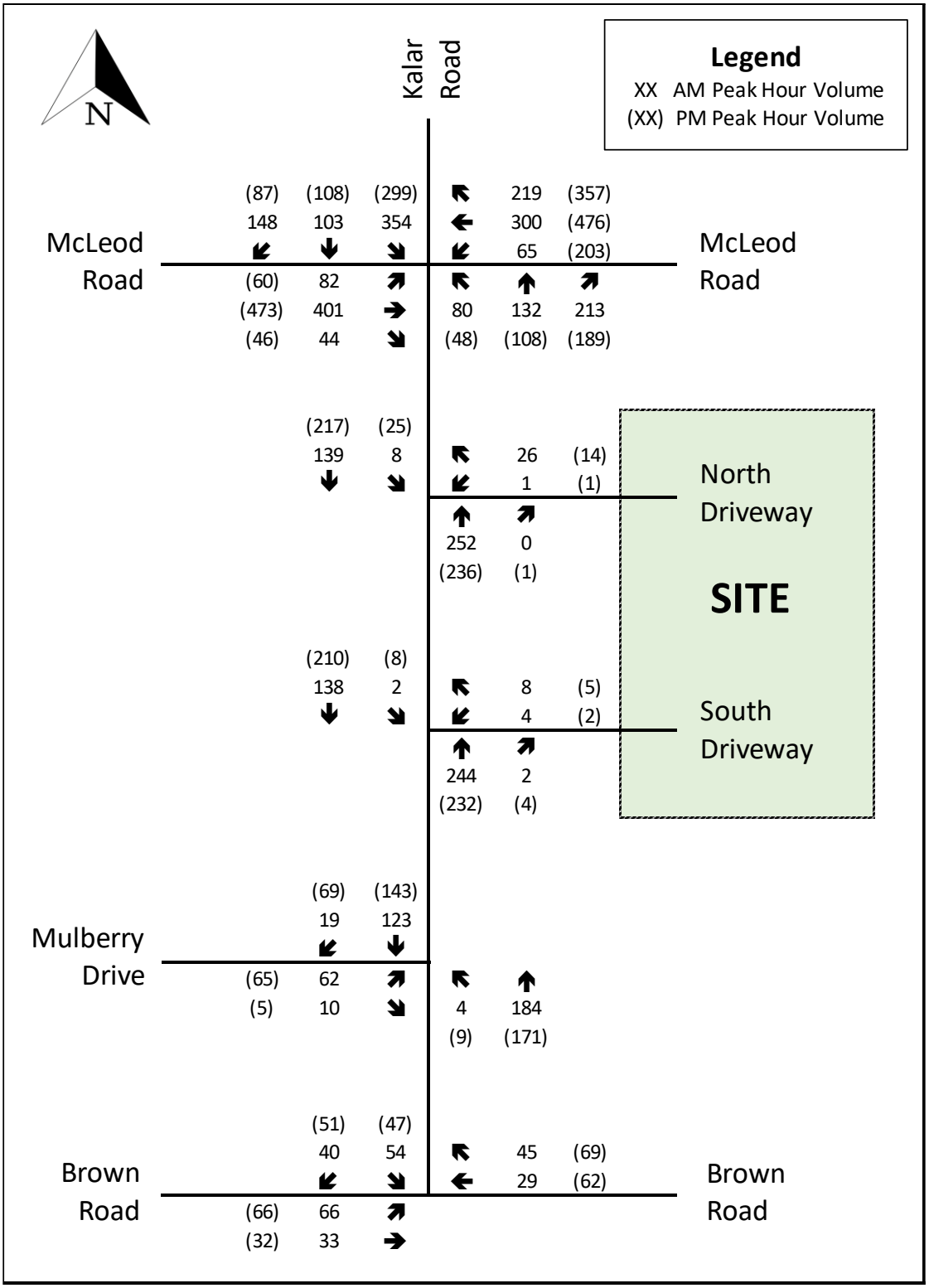
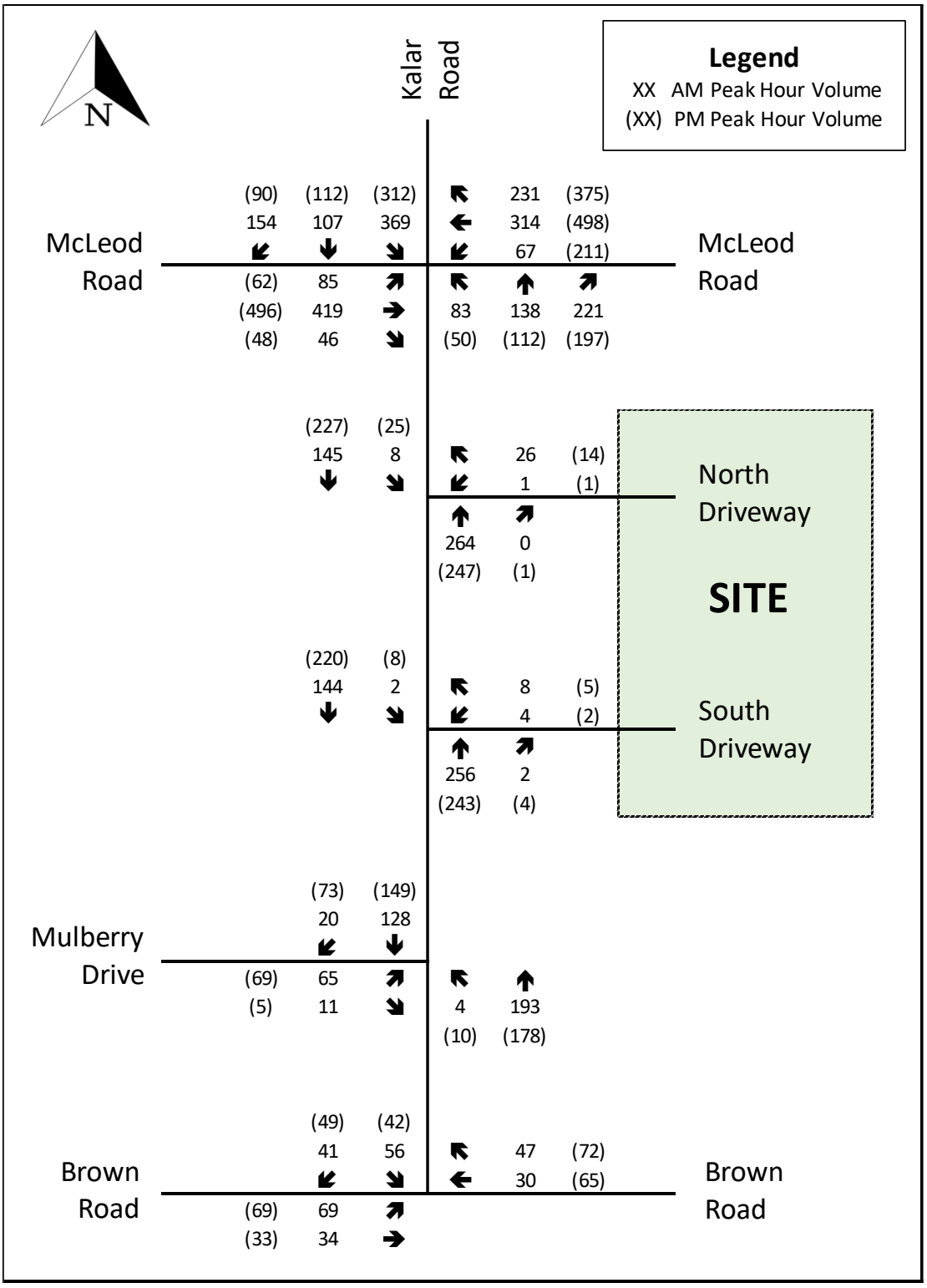


Figure 11: 2029 Future Background Traffic



6.0 INTERSECTION CAPACITY ANALYSIS

6.1 METHODOOLOGY

The industry standard Synchro macroscopic traffic analysis software was utilized to analyse the intersections. Key performance measures such as Level of Service (LOS), volume-to-capacity ratio (v/c ratio), and 95th percentile queuing was reported, and are defined below:

- Average vehicle control delay is used to characterize LOS for the entire intersection, an approach, or movement. Delay quantifies the variations in travel time and is also a surrogate measure of driver discomfort and fuel consumption.
- V/c ratio quantifies the degree to which the capacity of each signal phase is utilized by a defined lane group. The City's TIS guidelines indicate capacity concerns for through or shared through movements reporting a v/c ratio of 0.85 or greater, and exclusive turning movements at 0.95 or greater.
- 95th percentile queue is the queue length which is expected to be exceeded only 5% of the time; it is common practice to identify preferred storage length requirements for auxiliary turn lanes at signalized intersections based on estimated peak hour 95th percentile queueing.

Table 3 identifies the control delay thresholds (seconds of delay per vehicle) for each LOS based on Highway Capacity Manual (HCM) methodology.

Table 3: Characteristics of Level of Service at Intersections

Level of Service (LOS)	Control Delay (average seconds of delays / vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	< 10 seconds	< 10 seconds
B	> 10 to 20 seconds	> 10 to 15 seconds
C	> 20 to 35 seconds	> 15 to 25 seconds
D	> 35 to 55 seconds	> 25 to 35 seconds
E	> 55 to 80 seconds	> 35 to 50 seconds
F	> 80 seconds	> 50 seconds

The capacity analysis included use of the City's current signal timing plan for the signalized intersection of Kalar Road at McLeod Road, which was provided by City staff and is provided in **Appendix F**.

6.2 CAPACITY ANALYSIS RESULTS

The following sections present the findings from the capacity analysis for the study area intersections. Detailed output reports from the Synchro software are provided in **Appendix G**.

6.2.1 Kalar Road at McLeod Road

Table 4 presents the results from the capacity analysis for the intersection of Kalar Road at McLeod Road. The westbound left-turn movement is nearing capacity in the p.m. peak hour in the 2029 future total horizon year; however as per results of the optimized timings scenario in which green time was re-allocated without changes to the overall cycle length, the v/c ratio can be reduced to below the City's recommended maximum threshold of 0.95. No other capacity concerns were identified.

There are some queueing concerns for the westbound left- and right-turn movement under existing conditions that continue into the future horizon years. However, it was determined that adjustments to the signal timings alone would not be sufficient to reduce the 95th percentile queue lengths to below the available storage lengths for these specific movements. If geometric improvements were to be considered at this intersection as an opportunity to mitigate these queueing concerns, it is recommended the need for such improvements be further analyzed within the future EA Study planned for the McLeod Road corridor. Furthermore, given these are existing issues, they are largely unrelated to the subject development.

Based on the results of the capacity analysis, there are no improvements recommended at this intersection in response to the subject development.

Table 4: Capacity Analysis Results for Kalar Road at McLeod Road

Scenario	Movement	Weekday AM Peak Hour			Weekday AM Peak Hour			Storage Length
		v/c	LOS	95%Q	v/c	LOS	95%Q	
2022 Existing	EBL	0.26	C	18m	0.17	C	12m	30m
	EBTR	0.50	C	47m	0.48	C	57m	
	WBL	0.41	D	21m	0.80	D	**58m**	40m
	WBT	0.62	D	43m	0.55	C	62m	
	WBR	0.35	C	**32m**	0.63	D	**71m**	15m
	NBL	0.18	B	22m	0.10	B	17m	25m
	NBTR	0.39	B	57m	0.34	C	61m	
	SBL	0.52	A	49m	0.48	B	61m	140m
	SBTR	0.10	A	10m	0.07	B	12m	
2024 Future Background	EBL	0.34	C	23m	0.23	C	17m	30m
	EBTR	0.54	C	54m	0.45	C	62m	
	WBL	0.50	D	25m	0.88	E	**83m**	40m
	WBT	0.63	D	46m	0.55	C	70m	
	WBR	0.39	D	**35m**	0.62	D	**79m**	15m
	NBL	0.20	B	24m	0.13	C	19m	25m
	NBTR	0.49	C	74m	0.45	C	77m	
	SBL	0.69	B	65m	0.68	C	75m	140m
	SBTR	0.12	A	12m	0.11	B	16m	
2024 Future Total	EBL	0.33	C	23m	0.21	C	17m	30m
	EBTR	0.54	C	54m	0.42	C	62m	
	WBL	0.56	D	28m	0.93	E	**101m**	40m
	WBT	0.61	D	46m	0.50	C	70m	
	WBR	0.38	D	**35m**	0.58	C	**79m**	15m
	NBL	0.21	B	25m	0.14	C	20m	25m
	NBTR	0.54	C	86m	0.51	C	82m	
	SBL	0.73	B	76m	0.75	C	79m	140m
	SBTR	0.12	A	13m	0.11	B	16m	
2029 Future Total	EBL	0.34	C	24m	0.22	C	17m	30m
	EBTR	0.55	C	57m	0.43	C	65m	
	WBL	0.56	D	29m	**0.95**	F	**107m**	40m
	WBT	0.61	D	48m	0.50	C	74m	
	WBR	0.42	D	**38m**	0.60	C	**87m**	15m
	NBL	0.22	B	**26m**	0.15	C	20m	25m
	NBTR	0.57	C	92m	0.55	C	87m	
	SBL	0.79	C	92m	0.82	D	95m	140m
	SBTR	0.13	A	13m	0.12	B	17m	
2029 Future Total (Optimized Timing Splits)	EBL	0.43	C	26m	0.24	C	18m	30m
	EBTR	0.62	C	62m	0.45	C	66m	
	WBL	0.57	D	29m	0.94	E	**101m**	40m
	WBT	0.62	D	48m	0.49	C	70m	
	WBR	0.42	D	**38m**	0.58	C	**80m**	15m
	NBL	0.21	B	25m	0.15	C	20m	25m
	NBTR	0.54	C	87m	0.52	C	86m	
	SBL	0.73	B	65m	0.79	C	89m	140m
	SBTR	0.12	A	12m	0.12	B	17m	

6.2.2 Kalar Road at Mulberry Drive

Table 5 presents the results from the capacity analysis for the intersection of Kalar Road at Mulberry Drive. There are no operational concerns to report. Based on the results of the capacity analysis, it is expected any impact to operations associated with the subject development will not be identifiable from the driver's perspective. There are no improvements recommended at this intersection in response to the subject development.

Table 5: Capacity Analysis Results for Kalar Road at Mulberry Drive

Scenario	Movement	Weekday AM Peak Hour			Weekday AM Peak Hour		
		v/c	LOS	95%Q	v/c	LOS	95%Q
2022 Existing	EBLR	0.11	B	<1 veh	0.11	B	<1 veh
	NBLT	0.00	A	<1 veh	0.01	A	<1 veh
2024 Future Background	EBLR	0.12	B	<1 veh	0.12	B	<1 veh
	NBLT	0.00	A	<1 veh	0.01	A	<1 veh
2024 Future Total	EBLR	0.12	B	<1 veh	0.12	B	<1 veh
	NBLT	0.00	A	<1 veh	0.01	A	<1 veh
2029 Future Total	EBLR	0.13	B	<1 veh	0.13	B	<1 veh
	NBLT	0.00	A	<1 veh	0.01	A	<1 veh

6.2.3 Kalar Road at Brown Road

Table 6 presents the results from the capacity analysis for the intersection of Kalar Road at Brown Road. There are no operational concerns to report. Based on the results of the capacity analysis, it is expected any impact to operations associated with the subject development will not be identifiable from the driver's perspective. There are no improvements recommended at this intersection in response to the subject development.

Table 6: Capacity Analysis Results for Kalar Road at Brown Road

Scenario	Movement	Weekday AM Peak Hour			Weekday AM Peak Hour			Storage Length
		v/c	LOS	95%Q	v/c	LOS	95%Q	
2022 Existing	EBL	0.04	A	<1 veh	0.04	A	<1 veh	55m
	SBL	0.06	B	<1 veh	0.06	B	<1 veh	40m
	SBR	0.03	A	<1 veh	0.05	A	<1 veh	
2024 Future Background	EBL	0.05	A	<1 veh	0.05	A	<1 veh	55m
	SBL	0.08	B	<1 veh	0.07	B	<1 veh	40m
	SBR	0.04	A	<1 veh	0.06	A	<1 veh	
2024 Future Total	EBL	0.05	A	<1 veh	0.05	A	<1 veh	55m
	SBL	0.08	B	<1 veh	0.08	B	<1 veh	40m
	SBR	0.04	A	<1 veh	0.06	A	<1 veh	
2029 Future Total	EBL	0.05	A	<1 veh	0.05	A	<1 veh	55m
	SBL	0.09	B	<1 veh	0.07	B	<1 veh	40m
	SBR	0.05	A	<1 veh	0.06	A	<1 veh	

6.2.4 Proposed Site Driveways

Table 7 presents the results from the capacity analysis for the proposed site driveway intersections on Kalar Road. There are no operational concerns to report with both driveways expected to operate with no capacity concerns, low levels of delay (not exceeding LOS "B"), and negligible queueing on Kalar Road and on the driveways internal to the site.

Table 7: Capacity Analysis Results for Kalar Road at Proposed Site Driveways

Scenario	Movement	Weekday AM Peak Hour			Weekday AM Peak Hour		
		v/c	LOS	95%Q	v/c	LOS	95%Q
North Driveway							
2024 Future Total	WBLR SBLT	0.04 0.16	A A	<1 veh <1 veh	0.02 0.02	A A	<1 veh <1 veh
2029 Future Total	WBLR SBLT	0.04 0.01	B A	<1 veh <1 veh	0.02 0.02	A A	<1 veh <1 veh
South Driveway							
2024 Future Total	WBLR SBLT	0.02 0.00	B A	<1 veh <1 veh	0.01 0.01	B A	<1 veh <1 veh
2029 Future Total	WBLR SBLT	0.02 0.00	B A	<1 veh <1 veh	0.01 0.01	B A	<1 veh <1 veh

7.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

7.1 SUMMARY OF FINDINGS

The key findings from this study can be summarized as follows:

- The proposed residential development is projected to generate approximately 51 two-way trips during the weekday a.m. peak hour (12 inbound and 39 outbound), and 60 two-way trips during the weekday p.m. peak hour (38 inbound and 22 outbound);
- The trip generation estimates are expected to be conservative given they don't account for the widely known traffic reducing impacts Covid-19 has had on commuter patterns (e.g., increase in telecommuting), nor do they consider any alternative modes of travel (e.g., walking, cycling, transit) despite sidewalk, on-street bike lanes, and transit service being located on Kalar Road in the vicinity of the site;
- Both proposed driveways on Kalar Road are planned to be full movement accesses (no turn restrictions) with stop control for the driveway approaches, and no auxiliary turn lanes;
- As per the results of the intersection capacity analysis and MTO left-turn lane warrants, auxiliary left-turn lanes are not warranted on Kalar Road at the proposed driveways up to the ultimate 2029 horizon year;
- Signal timing adjustments at the intersection of Kalar Road at McLeod Road can help improve operations and any future projected capacity constraints, however it is expected future geometric modifications may be required if the City desires to ensure 95th percentile queueing remains within the available storage lengths during peak hours; and
- The traffic generated from the subject development during peak hours is not expected to result in any new operational concerns at the study intersections requiring mitigation, with almost no identifiable impact at most of the study intersections.

7.2 RECOMMENDATIONS

Based on the results of the capacity analysis, there are no improvements recommended at the study intersections in response to the subject development.

It is recommended both proposed driveways on Kalar Road be full movement accesses (no turn restrictions) with stop control for the driveway approaches (free flow for Kalar Road), and no auxiliary turn lanes, as confirmed by the capacity analysis and MTO left-turn lane warrants.

Appendix A

Traffic Data

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

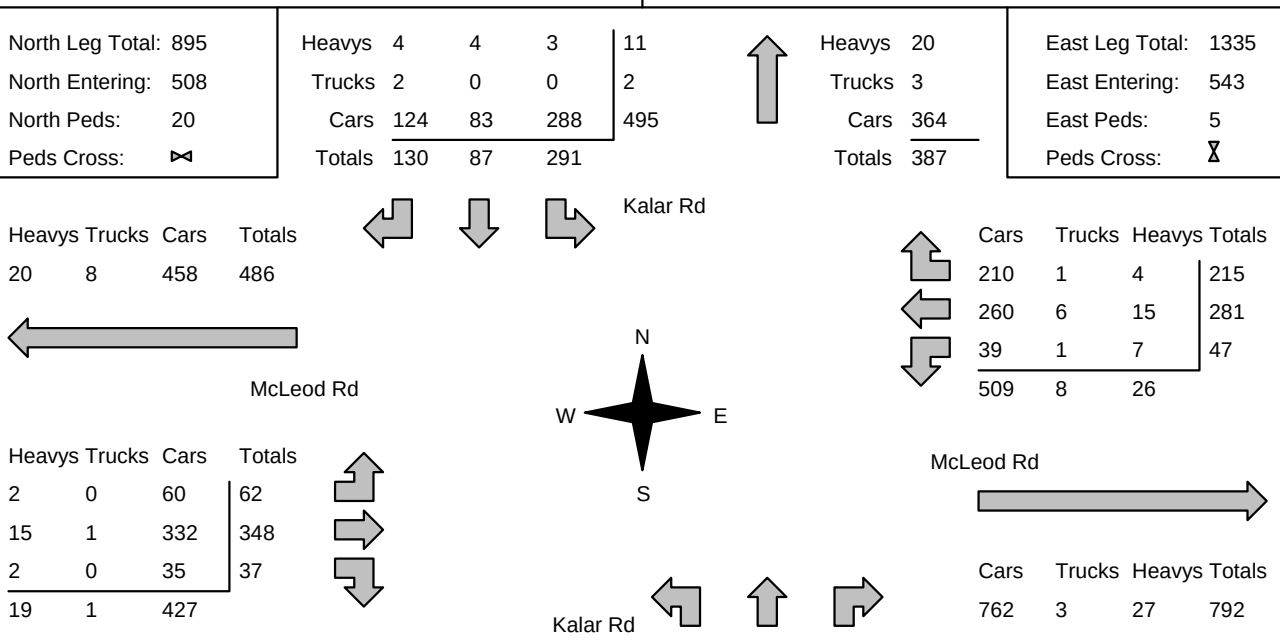
Municipality: Niagara Falls
Site #: 2221600001
Intersection: McLeod Rd & Kalar Rd
TFR File #: 1
Count date: 16-Nov-22

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: McLeod Rd runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:00:00
To: 17:00:00

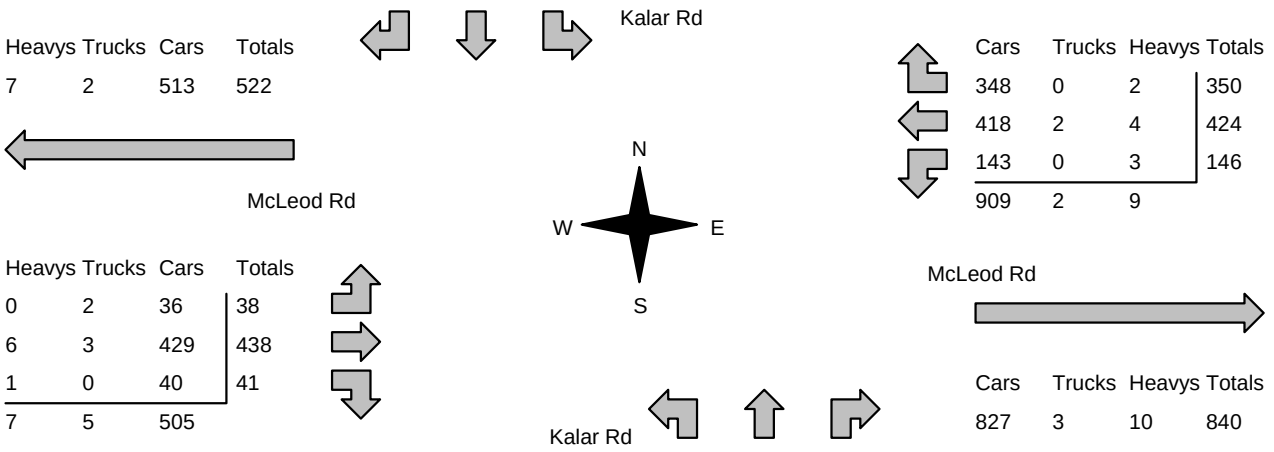
Municipality: Niagara Falls
Site #: 2221600001
Intersection: McLeod Rd & Kalar Rd
TFR File #: 1
Count date: 16-Nov-22

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: McLeod Rd runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Total Count Diagram

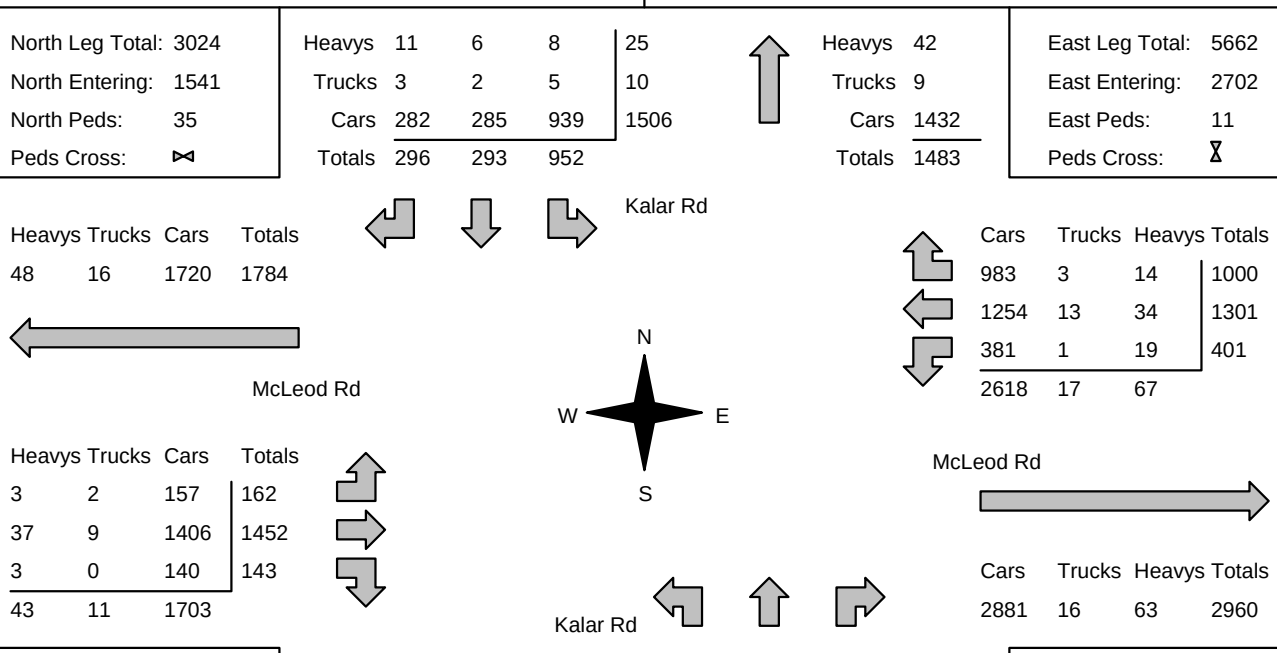
Municipality: Niagara Falls
Site #: 2221600001
Intersection: McLeod Rd & Kalar Rd
TFR File #: 1
Count date: 16-Nov-22

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: McLeod Rd runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Traffic Count Summary

Intersection: McLeod Rd & Kalar Rd | **Count Date:** 16-Nov-22 | **Municipality:** Niagara Falls

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*177*	*53*	*88*	*318*	*12*
9:00:00	*291*	*81*	*109*	*481*	*15*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*249*	*79*	*57*	*385*	*3*
18:00:00	*235*	*80*	*42*	*357*	*5*
Totals:	952	293	296	1541	35

North/South Total Approaches: *2605*

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*70*	*44*	*98*	*212*	*0*
9:00:00	*40*	*109*	*166*	*315*	*0*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*41*	*86*	*153*	*280*	*2*
18:00:00	*36*	*82*	*139*	*257*	*0*
S Totals:	187	321	556	1064	2

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*46*	*268*	*119*	*433*	*3*
9:00:00	*58*	*223*	*224*	*505*	*3*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*146*	*424*	*350*	*920*	*3*
18:00:00	*151*	*386*	*307*	*844*	*2*
Totals:	401	1301	1000	2702	11

East/West Total Approaches: *4459*

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*27*	*267*	*36*	*330*	*3*
9:00:00	*65*	*373*	*34*	*472*	*5*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*38*	*438*	*41*	*517*	*2*
18:00:00	*32*	*374*	*32*	*438*	*0*
W Totals:	162	1452	143	1757	10

Calculated Values for Traffic Crossing Major Street

Hours Ending:	*7:00*	*8:00*	*9:00*	*16:00*	*17:00*	*18:00*	*0:00*	*0:00*
Crossing Values:	*0*	*306*	*448*	*0*	*381*	*355*	*0*	*0*

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600001

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	25	25	6	6	11	11	0	0	0	0	0	0	3	3	0	0	0	0	0	0
7:30:00	60	35	13	7	25	14	2	2	1	1	0	0	3	0	0	0	2	2	0	0
7:45:00	101	41	30	17	47	22	4	2	1	0	1	1	3	0	0	0	2	0	5	5
8:00:00	169	68	50	20	84	37	4	0	1	0	1	0	4	1	2	2	3	1	12	7
8:15:00	226	57	64	14	114	30	4	0	1	0	2	1	4	0	2	0	4	1	13	1
8:30:00	286	60	78	14	140	26	4	0	1	0	3	1	6	2	4	2	5	1	22	9
8:45:00	389	103	113	35	171	31	4	0	1	0	3	0	6	0	4	0	6	1	25	3
9:00:00	456	67	128	15	187	16	5	1	1	0	3	0	7	1	5	1	7	1	27	2
9:15:00	456	0	128	0	187	0	5	0	1	0	3	0	7	0	5	0	7	0	27	0
16:00:00	456	0	128	0	187	0	5	0	1	0	3	0	7	0	5	0	7	0	27	0
16:15:00	510	54	155	27	205	18	5	0	1	0	3	0	7	0	6	1	7	0	28	1
16:30:00	579	69	173	18	217	12	5	0	1	0	3	0	7	0	6	0	8	1	28	0
16:45:00	653	74	189	16	230	13	5	0	1	0	3	0	8	1	6	0	9	1	28	0
17:00:00	704	51	206	17	242	12	5	0	1	0	3	0	8	0	6	0	9	0	30	2
17:15:00	750	46	229	23	249	7	5	0	1	0	3	0	8	0	6	0	10	1	30	0
17:30:00	821	71	249	20	256	7	5	0	2	1	3	0	8	0	6	0	10	0	33	3
17:45:00	871	50	266	17	269	13	5	0	2	0	3	0	8	0	6	0	11	1	34	1
18:00:00	939	68	285	19	282	13	5	0	2	0	3	0	8	0	6	0	11	0	35	1
18:15:00	939	0	285	0	282	0	5	0	2	0	3	0	8	0	6	0	11	0	35	0
18:15:15	939	0	285	0	282	0	5	0	2	0	3	0	8	0	6	0	11	0	35	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600001

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	15	15	41	41	15	15	0	0	1	1	1	1	0	0	1	1	1	1	0	0
7:30:00	23	8	90	49	39	24	0	0	1	0	1	0	0	0	3	2	3	2	1	1
7:45:00	34	11	147	57	64	25	0	0	2	1	2	1	2	2	11	8	6	3	1	0
8:00:00	41	7	244	97	109	45	0	0	2	0	2	0	5	3	22	11	8	2	3	2
8:15:00	50	9	309	65	166	57	0	0	4	2	2	0	6	1	25	3	8	0	3	0
8:30:00	62	12	359	50	232	66	0	0	7	3	3	1	6	0	25	0	9	1	5	2
8:45:00	73	11	407	48	274	42	1	1	8	1	3	0	9	3	26	1	10	1	6	1
9:00:00	91	18	454	47	329	55	1	0	9	1	3	0	12	3	28	2	11	1	6	0
9:15:00	91	0	454	0	329	0	1	0	9	0	3	0	12	0	28	0	11	0	6	0
16:00:00	91	0	454	0	329	0	1	0	9	0	3	0	12	0	28	0	11	0	6	0
16:15:00	122	31	559	105	407	78	1	0	10	1	3	0	12	0	30	2	12	1	7	1
16:30:00	159	37	657	98	486	79	1	0	11	1	3	0	15	3	30	0	12	0	7	0
16:45:00	189	30	758	101	588	102	1	0	11	0	3	0	15	0	32	2	13	1	8	1
17:00:00	234	45	872	114	677	89	1	0	11	0	3	0	15	0	32	0	13	0	9	1
17:15:00	269	35	981	109	762	85	1	0	11	0	3	0	16	1	32	0	13	0	9	0
17:30:00	309	40	1082	101	831	69	1	0	12	1	3	0	17	1	33	1	14	1	9	0
17:45:00	341	32	1168	86	909	78	1	0	13	1	3	0	18	1	34	1	14	0	9	0
18:00:00	381	40	1254	86	983	74	1	0	13	0	3	0	19	1	34	0	14	0	11	2
18:15:00	381	0	1254	0	983	0	1	0	13	0	3	0	19	0	34	0	14	0	11	0
18:15:15	381	0	1254	0	983	0	1	0	13	0	3	0	19	0	34	0	14	0	11	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600001

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	7	7	8	8	16	16	0	0	0	0	0	0	0	0	1	1	0	0	0	0
7:30:00	16	9	14	6	46	30	0	0	0	0	0	0	0	0	2	1	0	0	0	0
7:45:00	28	12	23	9	70	24	0	0	0	0	0	0	0	0	4	2	1	1	0	0
8:00:00	69	41	38	15	96	26	0	0	0	0	0	0	1	1	6	2	2	1	0	0
8:15:00	83	14	54	16	134	38	0	0	0	0	1	1	1	0	11	5	6	4	0	0
8:30:00	93	10	95	41	181	47	0	0	2	2	2	1	1	0	16	5	7	1	0	0
8:45:00	102	9	117	22	212	31	0	0	2	0	2	0	1	0	18	2	10	3	0	0
9:00:00	108	6	130	13	250	38	0	0	3	1	2	0	2	1	20	2	12	2	0	0
9:15:00	108	0	130	0	250	0	0	0	3	0	2	0	2	0	20	0	12	0	0	0
16:00:00	108	0	130	0	250	0	0	0	3	0	2	0	2	0	20	0	12	0	0	0
16:15:00	122	14	156	26	290	40	0	0	3	0	2	0	3	1	20	0	13	1	0	0
16:30:00	131	9	176	20	315	25	0	0	3	0	2	0	3	0	21	1	13	0	1	1
16:45:00	139	8	196	20	350	35	0	0	3	0	2	0	3	0	22	1	15	2	1	0
17:00:00	148	9	212	16	400	50	0	0	4	1	2	0	3	0	23	1	15	0	2	1
17:15:00	157	9	243	31	446	46	0	0	4	0	2	0	3	0	23	0	17	2	2	0
17:30:00	167	10	261	18	476	30	0	0	4	0	2	0	3	0	24	1	17	0	2	0
17:45:00	177	10	278	17	501	25	0	0	4	0	2	0	3	0	24	0	18	1	2	0
18:00:00	184	7	292	14	536	35	0	0	4	0	2	0	3	0	25	1	18	0	2	0
18:15:00	184	0	292	0	536	0	0	0	4	0	2	0	3	0	25	0	18	0	2	0
18:15:15	184	0	292	0	536	0	0	0	4	0	2	0	3	0	25	0	18	0	2	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600001

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	2	2	39	39	6	6	0	0	1	1	0	0	0	0	1	1	0	0	1	1
7:30:00	8	6	98	59	13	7	0	0	2	1	0	0	1	1	2	1	0	0	1	0
7:45:00	16	8	174	76	24	11	0	0	2	0	0	0	1	0	8	6	0	0	1	0
8:00:00	26	10	250	76	34	10	0	0	2	0	0	0	1	0	15	7	2	2	3	2
8:15:00	49	23	345	95	47	13	0	0	2	0	0	0	3	2	20	5	2	0	4	1
8:30:00	63	14	425	80	54	7	0	0	2	0	0	0	3	0	23	3	2	0	5	1
8:45:00	76	13	506	81	59	5	0	0	3	1	0	0	3	0	23	0	2	0	5	0
9:00:00	89	13	607	101	68	9	0	0	6	3	0	0	3	0	27	4	2	0	8	3
9:15:00	89	0	607	0	68	0	0	0	6	0	0	0	3	0	27	0	2	0	8	0
16:00:00	89	0	607	0	68	0	0	0	6	0	0	0	3	0	27	0	2	0	8	0
16:15:00	99	10	675	68	77	9	2	2	6	0	0	0	3	0	30	3	2	0	8	0
16:30:00	111	12	791	116	94	17	2	0	6	0	0	0	3	0	30	0	3	1	10	2
16:45:00	119	8	923	132	101	7	2	0	7	1	0	0	3	0	31	1	3	0	10	0
17:00:00	125	6	1036	113	108	7	2	0	9	2	0	0	3	0	33	2	3	0	10	0
17:15:00	136	11	1110	74	115	7	2	0	9	0	0	0	3	0	34	1	3	0	10	0
17:30:00	146	10	1210	100	119	4	2	0	9	0	0	0	3	0	36	2	3	0	10	0
17:45:00	151	5	1322	112	125	6	2	0	9	0	0	0	3	0	37	1	3	0	10	0
18:00:00	157	6	1406	84	140	15	2	0	9	0	0	0	3	0	37	0	3	0	10	0
18:15:00	157	0	1406	0	140	0	2	0	9	0	0	0	3	0	37	0	3	0	10	0
18:15:15	157	0	1406	0	140	0	2	0	9	0	0	0	3	0	37	0	3	0	10	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

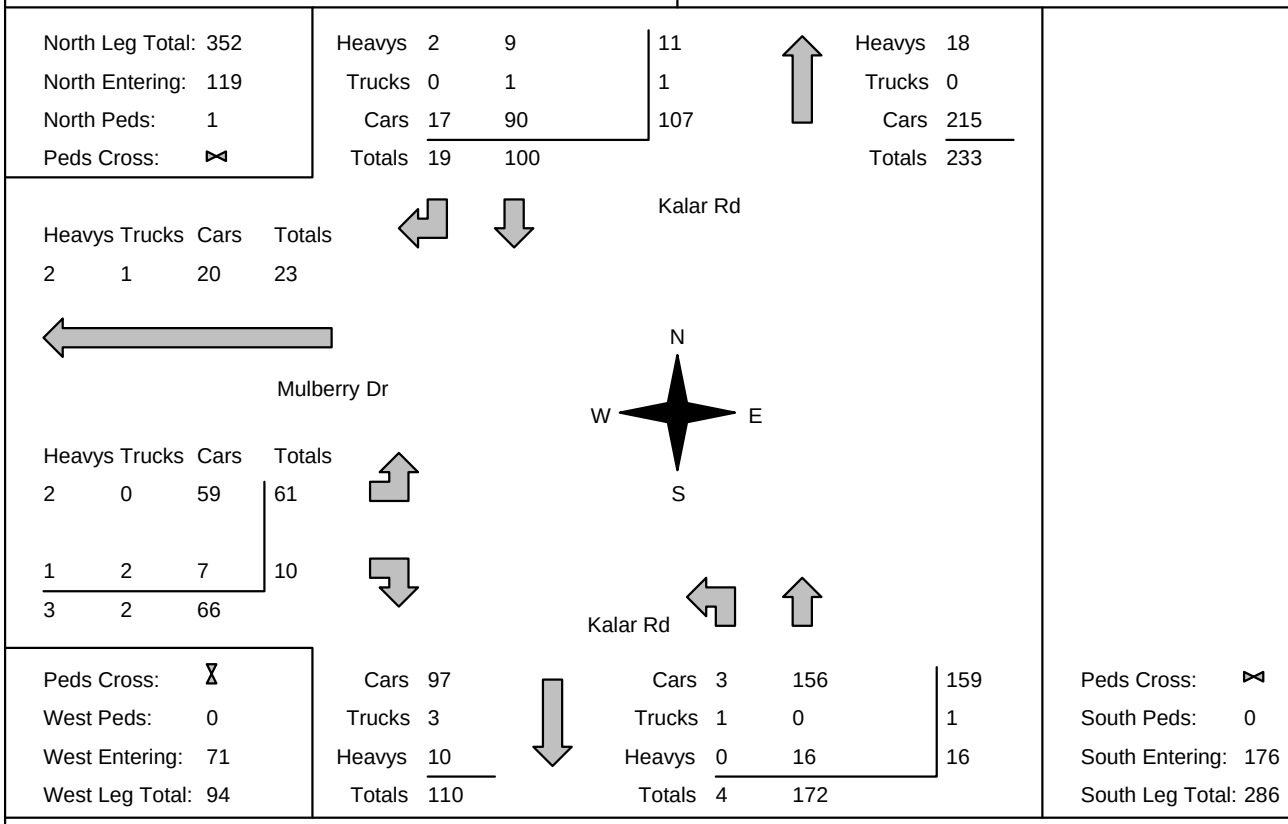
Municipality: Niagara Falls
Site #: 2221600002
Intersection: Kalar Rd & Mulberry Dr
TFR File #: 1
Count date: 16-Nov-22

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Kalar Rd runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

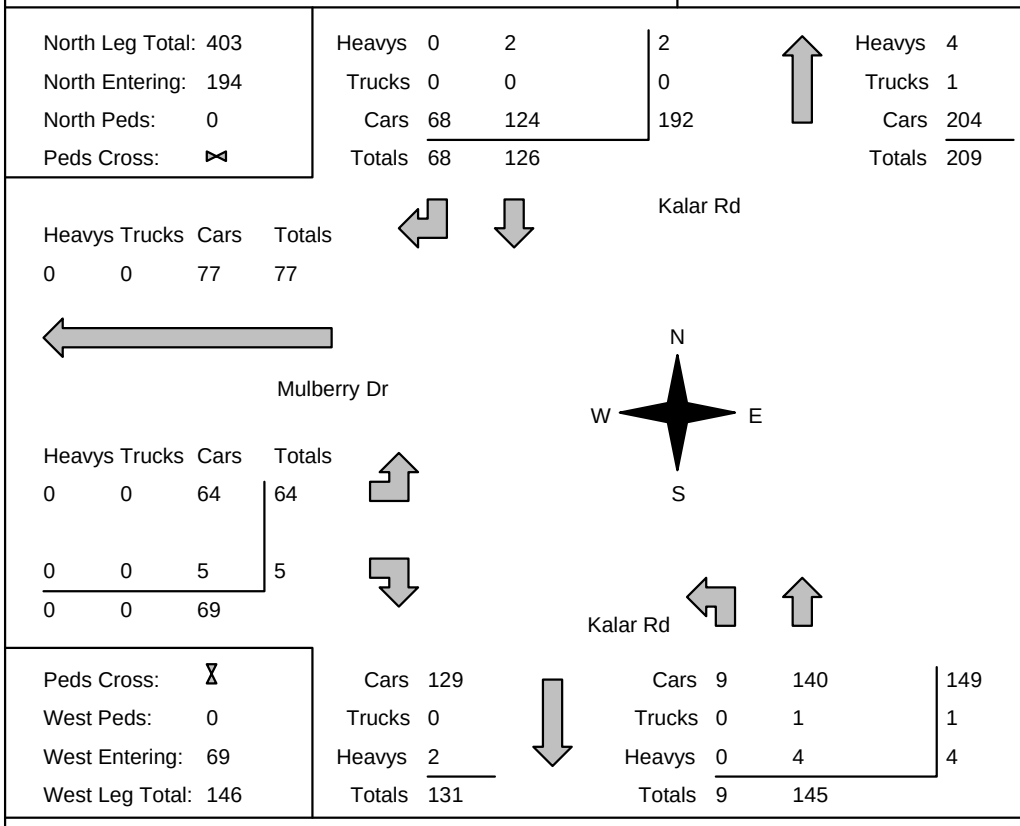
Municipality: Niagara Falls
Site #: 2221600002
Intersection: Kalar Rd & Mulberry Dr
TFR File #: 1
Count date: 16-Nov-22

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Kalar Rd runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Total Count Diagram

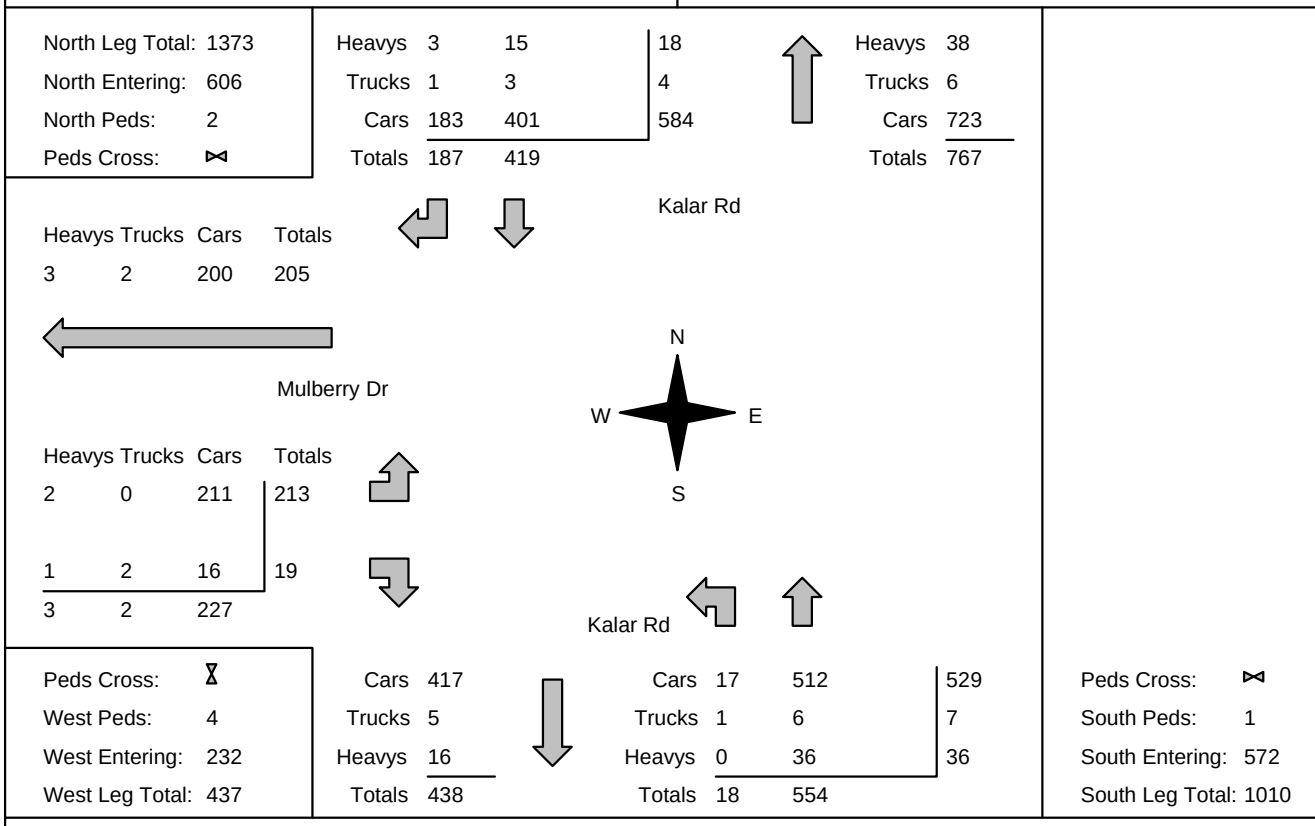
Municipality: Niagara Falls
Site #: 2221600002
Intersection: Kalar Rd & Mulberry Dr
TFR File #: 1
Count date: 16-Nov-22

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Kalar Rd runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Traffic Count Summary

Intersection: Kalar Rd & Mulberry Dr | **Count Date:** 16-Nov-22 | **Municipality:** Niagara Falls

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*0*	*83*	*17*	*100*	*0*
9:00:00	*0*	*90*	*28*	*118*	*2*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*0*	*130*	*69*	*199*	*0*
18:00:00	*0*	*116*	*73*	*189*	*0*
Totals:	0	419	187	606	2

North/South Total Approaches: 1178

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*2*	*122*	*0*	*124*	*0*
9:00:00	*4*	*161*	*0*	*165*	*0*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*7*	*149*	*0*	*156*	*1*
18:00:00	*5*	*122*	*0*	*127*	*0*
S Totals:	18	554	0	572	1

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*0*	*0*	*0*	*0*	*0*
9:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*0*	*0*	*0*	*0*	*0*
18:00:00	*0*	*0*	*0*	*0*	*0*
Totals:	0	0	0	0	0

East/West Total Approaches: 232

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*36*	*0*	*9*	*45*	*1*
9:00:00	*64*	*0*	*2*	*66*	*2*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*57*	*0*	*4*	*61*	*1*
18:00:00	*56*	*0*	*4*	*60*	*0*
W Totals:	213	0	19	232	4

Calculated Values for Traffic Crossing Major Street

Hours Ending:	*7:00*	*8:00*	*9:00*	*16:00*	*17:00*	*18:00*	*0:00*	*0:00*
Crossing Values:	*0*	*36*	*66*	*0*	*58*	*56*	*0*	*0*

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600002

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	11	11	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	25	14	8	4	0	0	1	1	1	1	0	0	0	0	0	0	0	0
7:45:00	0	0	51	26	13	5	0	0	1	0	1	0	0	0	1	1	0	0	0	0
8:00:00	0	0	77	26	15	2	0	0	1	0	1	0	0	0	5	4	1	1	0	0
8:15:00	0	0	98	21	18	3	0	0	1	0	1	0	0	0	6	1	1	0	0	0
8:30:00	0	0	114	16	26	8	0	0	1	0	1	0	0	0	7	1	2	1	1	1
8:45:00	0	0	141	27	30	4	0	0	2	1	1	0	0	0	10	3	2	0	1	0
9:00:00	0	0	159	18	42	12	0	0	2	0	1	0	0	0	12	2	2	0	2	1
9:15:00	0	0	159	0	42	0	0	0	2	0	1	0	0	0	12	0	2	0	2	0
16:00:00	0	0	159	0	42	0	0	0	2	0	1	0	0	0	12	0	2	0	2	0
16:15:00	0	0	193	34	56	14	0	0	2	0	1	0	0	0	12	0	3	1	2	0
16:30:00	0	0	238	45	70	14	0	0	2	0	1	0	0	0	14	2	3	0	2	0
16:45:00	0	0	256	18	93	23	0	0	2	0	1	0	0	0	14	0	3	0	2	0
17:00:00	0	0	287	31	110	17	0	0	2	0	1	0	0	0	14	0	3	0	2	0
17:15:00	0	0	317	30	124	14	0	0	2	0	1	0	0	0	14	0	3	0	2	0
17:30:00	0	0	342	25	149	25	0	0	3	1	1	0	0	0	14	0	3	0	2	0
17:45:00	0	0	370	28	167	18	0	0	3	0	1	0	0	0	14	0	3	0	2	0
18:00:00	0	0	401	31	183	16	0	0	3	0	1	0	0	0	15	1	3	0	2	0
18:15:00	0	0	401	0	183	0	0	0	3	0	1	0	0	0	15	0	3	0	2	0
18:15:15	0	0	401	0	183	0	0	0	3	0	1	0	0	0	15	0	3	0	2	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600002

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600002

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	19	19	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
7:30:00	0	0	39	20	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0
7:45:00	0	0	68	29	0	0	0	0	0	0	0	0	0	0	5	3	0	0	0	0
8:00:00	1	1	114	46	0	0	1	1	0	0	0	0	0	0	8	3	0	0	0	0
8:15:00	1	0	150	36	0	0	1	0	0	0	0	0	0	0	14	6	0	0	0	0
8:30:00	1	0	198	48	0	0	1	0	0	0	0	0	0	0	17	3	0	0	0	0
8:45:00	3	2	224	26	0	0	1	0	0	0	0	0	0	0	21	4	0	0	0	0
9:00:00	5	2	251	27	0	0	1	0	5	5	0	0	0	0	27	6	0	0	0	0
9:15:00	5	0	251	0	0	0	1	0	5	0	0	0	0	0	27	0	0	0	0	0
16:00:00	5	0	251	0	0	0	1	0	5	0	0	0	0	0	27	0	0	0	0	0
16:15:00	6	1	292	41	0	0	1	0	5	0	0	0	0	0	28	1	0	0	0	0
16:30:00	10	4	320	28	0	0	1	0	5	0	0	0	0	0	29	1	0	0	0	0
16:45:00	12	2	355	35	0	0	1	0	5	0	0	0	0	0	30	1	0	0	0	0
17:00:00	12	0	395	40	0	0	1	0	6	1	0	0	0	0	31	1	0	0	1	1
17:15:00	15	3	432	37	0	0	1	0	6	0	0	0	0	0	32	1	0	0	1	0
17:30:00	16	1	456	24	0	0	1	0	6	0	0	0	0	0	34	2	0	0	1	0
17:45:00	17	1	481	25	0	0	1	0	6	0	0	0	0	0	35	1	0	0	1	0
18:00:00	17	0	512	31	0	0	1	0	6	0	0	0	0	0	36	1	0	0	1	0
18:15:00	17	0	512	0	0	0	1	0	6	0	0	0	0	0	36	0	0	0	1	0
18:15:15	17	0	512	0	0	0	1	0	6	0	0	0	0	0	36	0	0	0	1	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600002

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	14	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
7:45:00	23	9	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
8:00:00	36	13	0	0	6	5	0	0	0	0	2	2	0	0	0	0	1	1	1	0
8:15:00	53	17	0	0	7	1	0	0	0	0	2	0	1	1	0	0	1	0	1	0
8:30:00	73	20	0	0	8	1	0	0	0	0	2	0	1	0	0	0	1	0	1	0
8:45:00	82	9	0	0	8	0	0	0	0	0	2	0	2	1	0	0	1	0	1	0
9:00:00	98	16	0	0	8	0	0	0	0	0	2	0	2	0	0	0	1	0	3	2
9:15:00	98	0	0	0	8	0	0	0	0	0	2	0	2	0	0	0	1	0	3	0
16:00:00	98	0	0	0	8	0	0	0	0	0	2	0	2	0	0	0	1	0	3	0
16:15:00	112	14	0	0	9	1	0	0	0	0	2	0	2	0	0	0	1	0	4	1
16:30:00	125	13	0	0	9	0	0	0	0	0	2	0	2	0	0	0	1	0	4	0
16:45:00	136	11	0	0	11	2	0	0	0	0	2	0	2	0	0	0	1	0	4	0
17:00:00	155	19	0	0	12	1	0	0	0	0	2	0	2	0	0	0	1	0	4	0
17:15:00	176	21	0	0	14	2	0	0	0	0	2	0	2	0	0	0	1	0	4	0
17:30:00	190	14	0	0	14	0	0	0	0	0	2	0	2	0	0	0	1	0	4	0
17:45:00	204	14	0	0	16	2	0	0	0	0	2	0	2	0	0	0	1	0	4	0
18:00:00	211	7	0	0	16	0	0	0	0	0	2	0	2	0	0	0	1	0	4	0
18:15:00	211	0	0	0	16	0	0	0	0	0	2	0	2	0	0	0	1	0	4	0
18:15:15	211	0	0	0	16	0	0	0	0	0	2	0	2	0	0	0	1	0	4	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: Niagara Falls
Site #: 2221600003
Intersection: Kalar Rd & Brown Rd
TFR File #: 1
Count date: 16-Nov-22

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Kalar Rd runs W/E

North Leg Total: 171
North Entering: 71
North Peds: 0
Peds Cross: ⋈

Heavys	2	2	4
Trucks	0	0	0
Cars	28	39	67
Totals	30	41	

Heavys	13
Trucks	0
Cars	87
Totals	100

East Leg Total: 140
East Entering: 67
East Peds: 0
Peds Cross: ⧖

Brown Rd

Heavys	Trucks	Cars	Totals
5	1	52	58

Kalar Rd

Heavys	Trucks	Cars	Totals
7	0	54	61
2	1	29	32
9	1	83	

N
W E
S

Cars	Trucks	Heavys	Totals
33	0	6	39
24	1	3	28
57	1	9	

Kalar Rd

Cars	Trucks	Heavys	Totals
68	1	4	73

Peds Cross: ⧖
West Peds: 0
West Entering: 93
West Leg Total: 151

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:00:00
To: 17:00:00

Municipality: Niagara Falls
Site #: 2221600003
Intersection: Kalar Rd & Brown Rd
TFR File #: 1
Count date: 16-Nov-22

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Kalar Rd runs W/E

North Leg Total: 192
North Entering: 82
North Peds: 2
Peds Cross: ⋈

Heavys	1	0	1
Trucks	1	0	1
Cars	42	38	80
Totals	44	38	

Heavys	4
Trucks	2
Cars	104
Totals	110

East Leg Total: 184
East Entering: 115
East Peds: 0
Peds Cross: ⧖

Brown Rd

Heavys	Trucks	Cars	Totals
4	2	99	105

Kalar Rd

Heavys	Trucks	Cars	Totals
2	0	54	56
1	0	30	31
3	0	84	

N
W E
S

Cars	Trucks	Heavys	Totals
50	2	2	54
57	1	3	61
107	3	5	

Kalar Rd

Cars	Trucks	Heavys	Totals
68	0	1	69

Peds Cross: ⧖
West Peds: 0
West Entering: 87
West Leg Total: 192

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Total Count Diagram

Municipality: Niagara Falls
Site #: 2221600003
Intersection: Kalar Rd & Brown Rd
TFR File #: 1
Count date: 16-Nov-22

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Kalar Rd runs W/E

North Leg Total:	642		
North Entering:	279		
North Peds:	4		
Peds Cross:	⋈		
Heavys	5	3	8
Trucks	1	5	6
Cars	136	129	265
Totals	142	137	
Heavys	29		
Trucks	5		
Cars	329		
Totals	363		
East Leg Total:	599		
East Entering:	334		
East Peds:	0		
Peds Cross:	⧖		

Brown Rd

Heavys	Trucks	Cars	Totals
15	3	297	315

Kalar Rd

Heavys	Trucks	Cars	Totals
14	0	188	202
5	1	122	128
19	1	310	

N
W E
S

Cars	Trucks	Heavys	Totals
141	5	15	161
161	2	10	173
302	7	25	

Kalar Rd

Cars	Trucks	Heavys	Totals
251	6	8	265

Peds Cross:	⧖
West Peds:	0
West Entering:	330
West Leg Total:	645

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Traffic Count Summary

Intersection: Kalar Rd & Brown Rd | **Count Date:** 16-Nov-22 | **Municipality:** Niagara Falls

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*32*	*0*	*28*	*60*	*0*
9:00:00	*37*	*0*	*32*	*69*	*1*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*38*	*0*	*44*	*82*	*2*
18:00:00	*30*	*0*	*38*	*68*	*1*
Totals:	137	0	142	279	4

North/South Total Approaches: *279*

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*0*	*0*	*0*	*0*	*0*
9:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*0*	*0*	*0*	*0*	*0*
18:00:00	*0*	*0*	*0*	*0*	*0*
S Totals:	0	0	0	0	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*0*	*23*	*32*	*55*	*0*
9:00:00	*0*	*31*	*32*	*63*	*0*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*0*	*61*	*54*	*115*	*0*
18:00:00	*0*	*58*	*43*	*101*	*0*
Totals:	0	173	161	334	0

East/West Total Approaches: *664*

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*34*	*34*	*0*	*68*	*0*
9:00:00	*65*	*23*	*0*	*88*	*0*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*56*	*31*	*0*	*87*	*0*
18:00:00	*47*	*40*	*0*	*87*	*0*
W Totals:	202	128	0	330	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	*7:00*	*8:00*	*9:00*	*16:00*	*17:00*	*18:00*	*0:00*	*0:00*
Crossing Values:	*0*	*32*	*37*	*0*	*38*	*30*	*0*	*0*

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600003

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	4	4	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	9	5	0	0	10	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	20	11	0	0	20	10	1	0	0	0	0	0	0	0	0	0	1	1	0	0
8:00:00	31	11	0	0	27	7	1	0	0	0	0	0	0	0	0	0	1	0	0	0
8:15:00	40	9	0	0	34	7	1	0	0	0	0	0	1	1	0	0	2	1	0	0
8:30:00	48	8	0	0	38	4	1	0	0	0	0	0	2	1	0	0	2	0	0	0
8:45:00	54	6	0	0	52	14	4	3	0	0	0	0	2	0	0	0	3	1	1	1
9:00:00	63	9	0	0	56	4	4	0	0	0	0	0	2	0	0	0	4	1	1	0
9:15:00	63	0	0	0	56	0	4	0	0	0	0	0	2	0	0	0	4	0	1	0
16:00:00	63	0	0	0	56	0	4	0	0	0	0	0	2	0	0	0	4	0	1	0
16:15:00	71	8	0	0	68	12	4	0	0	0	1	1	2	0	0	0	4	0	1	0
16:30:00	84	13	0	0	81	13	4	0	0	0	1	0	2	0	0	0	5	1	1	0
16:45:00	93	9	0	0	86	5	4	0	0	0	1	0	2	0	0	0	5	0	1	0
17:00:00	101	8	0	0	98	12	4	0	0	0	1	0	2	0	0	0	5	0	3	2
17:15:00	110	9	0	0	109	11	4	0	0	0	1	0	2	0	0	0	5	0	4	1
17:30:00	116	6	0	0	120	11	5	1	0	0	1	0	2	0	0	0	5	0	4	0
17:45:00	124	8	0	0	126	6	5	0	0	0	1	0	2	0	0	0	5	0	4	0
18:00:00	129	5	0	0	136	10	5	0	0	0	1	0	3	1	0	0	5	0	4	0
18:15:00	129	0	0	0	136	0	5	0	0	0	1	0	3	0	0	0	5	0	4	0
18:15:15	129	0	0	0	136	0	5	0	0	0	1	0	3	0	0	0	5	0	4	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600003

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	1	1	4	4	0	0	0	0	0	0	0	0	0	0	1	1	0	0
7:30:00	0	0	4	3	9	5	0	0	0	0	0	0	0	0	1	1	2	1	0	0
7:45:00	0	0	10	6	15	6	0	0	1	1	0	0	0	0	1	0	4	2	0	0
8:00:00	0	0	21	11	27	12	0	0	1	0	0	0	0	0	1	0	5	1	0	0
8:15:00	0	0	24	3	33	6	0	0	1	0	0	0	0	0	3	2	6	1	0	0
8:30:00	0	0	28	4	42	9	0	0	1	0	0	0	0	0	4	1	8	2	0	0
8:45:00	0	0	37	9	47	5	0	0	1	0	0	0	0	0	4	0	9	1	0	0
9:00:00	0	0	47	10	50	3	0	0	1	0	3	3	0	0	6	2	11	2	0	0
9:15:00	0	0	47	0	50	0	0	0	1	0	3	0	0	0	6	0	11	0	0	0
16:00:00	0	0	47	0	50	0	0	0	1	0	3	0	0	0	6	0	11	0	0	0
16:15:00	0	0	62	15	69	19	0	0	1	0	4	1	0	0	6	0	11	0	0	0
16:30:00	0	0	80	18	79	10	0	0	1	0	4	0	0	0	8	2	12	1	0	0
16:45:00	0	0	90	10	93	14	0	0	2	1	4	0	0	0	9	1	12	0	0	0
17:00:00	0	0	104	14	100	7	0	0	2	0	5	1	0	0	9	0	13	1	0	0
17:15:00	0	0	122	18	115	15	0	0	2	0	5	0	0	0	9	0	13	0	0	0
17:30:00	0	0	138	16	128	13	0	0	2	0	5	0	0	0	10	1	14	1	0	0
17:45:00	0	0	147	9	137	9	0	0	2	0	5	0	0	0	10	0	14	0	0	0
18:00:00	0	0	161	14	141	4	0	0	2	0	5	0	0	0	10	0	15	1	0	0
18:15:00	0	0	161	0	141	0	0	0	2	0	5	0	0	0	10	0	15	0	0	0
18:15:15	0	0	161	0	141	0	0	0	2	0	5	0	0	0	10	0	15	0	0	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600003

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

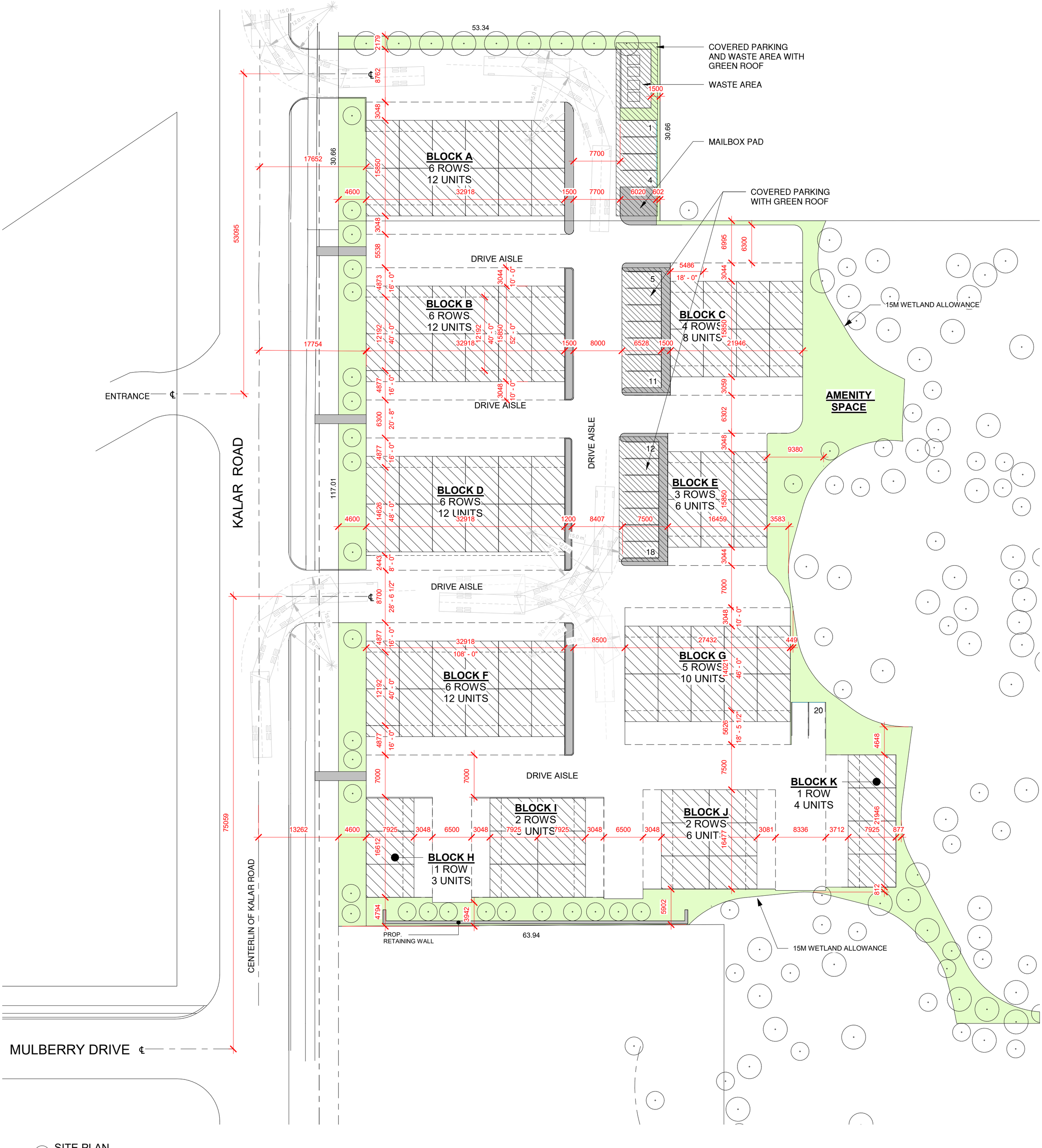
Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 16-Nov-22 Site #: 2221600003

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	5	5	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	14	9	14	8	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
7:45:00	25	11	20	6	0	0	0	0	1	1	0	0	2	2	1	0	0	0	0	0
8:00:00	32	7	32	12	0	0	0	0	1	0	0	0	2	0	1	0	0	0	0	0
8:15:00	50	18	39	7	0	0	0	0	1	0	0	0	7	5	2	1	0	0	0	0
8:30:00	68	18	43	4	0	0	0	0	1	0	0	0	7	0	3	1	0	0	0	0
8:45:00	77	9	46	3	0	0	0	0	1	0	0	0	9	2	4	1	0	0	0	0
9:00:00	89	12	52	6	0	0	0	0	1	0	0	0	10	1	4	0	0	0	0	0
9:15:00	89	0	52	0	0	0	0	0	1	0	0	0	10	0	4	0	0	0	0	0
16:00:00	89	0	52	0	0	0	0	0	1	0	0	0	10	0	4	0	0	0	0	0
16:15:00	103	14	57	5	0	0	0	0	1	0	0	0	11	1	5	1	0	0	0	0
16:30:00	111	8	64	7	0	0	0	0	1	0	0	0	11	0	5	0	0	0	0	0
16:45:00	126	15	72	8	0	0	0	0	1	0	0	0	12	1	5	0	0	0	0	0
17:00:00	143	17	82	10	0	0	0	0	1	0	0	0	12	0	5	0	0	0	0	0
17:15:00	156	13	92	10	0	0	0	0	1	0	0	0	13	1	5	0	0	0	0	0
17:30:00	166	10	106	14	0	0	0	0	1	0	0	0	13	0	5	0	0	0	0	0
17:45:00	176	10	114	8	0	0	0	0	1	0	0	0	14	1	5	0	0	0	0	0
18:00:00	188	12	122	8	0	0	0	0	1	0	0	0	14	0	5	0	0	0	0	0
18:15:00	188	0	122	0	0	0	0	0	1	0	0	0	14	0	5	0	0	0	0	0
18:15:15	188	0	122	0	0	0	0	0	1	0	0	0	14	0	5	0	0	0	0	0

Appendix B

Site Plan



1 SITE PLAN
1 : 400

N

CONCEPTUAL SITE STATISTICS

LOT AREA (TOTAL):	50,761 SQ.M. (5.076 HECTARES)
LOT AREA (ENVIRONMENTAL):	41,124 SQ.M. (4.112 HECTARES)
TOTAL BUILDABLE AREA:	9,637 SQ. M. (0.9637 HECTARES)

TOTAL LOT COVERAGE	41.0% (3,956 SQ. M.)
LANDSCAPING	28.0% (2,700 SQ. M.)
BUILDING HEIGHT	12.8m
PROPOSED DENSITY	94 UNITS/HECTARE
PROPOSED PARKING	20 SPACES (VISITOR)
PROPOSED UNITS	91 DWELLINGS (PREVIOUSLY 99)

organica studio + inc.
architecture | interiors | design | research

PROP. KALAR RESDENTIAL DEVELOPMENT - TYPICAL UNITS

KALAR ROAD, LOT 186. NIAGARA FALLS, ON

M5V DEVELOPMENTS

20071

REVISION 14 - 2022.12.08

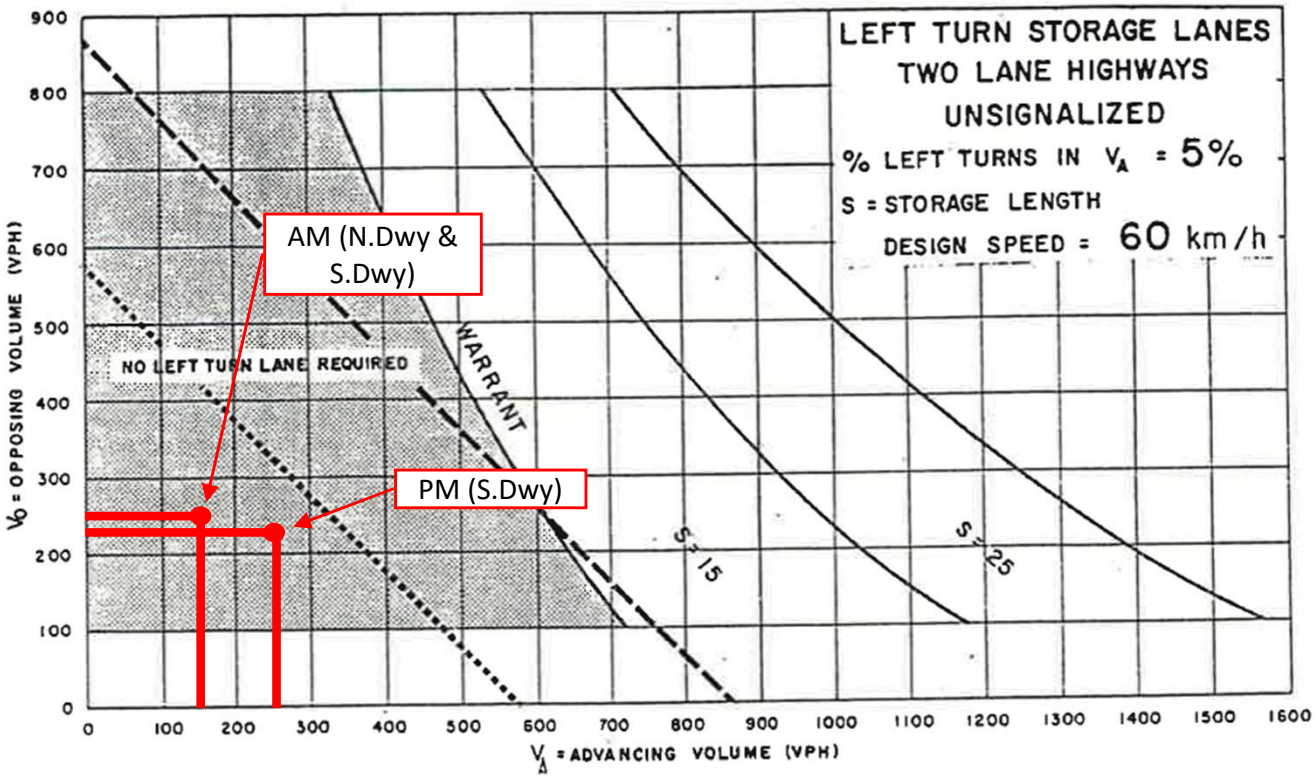
|7-145 Birmingham Street|Toronto ON|M8V3Z8||905 832 5758|organicastudio.ca|info@organicastudio.ca|

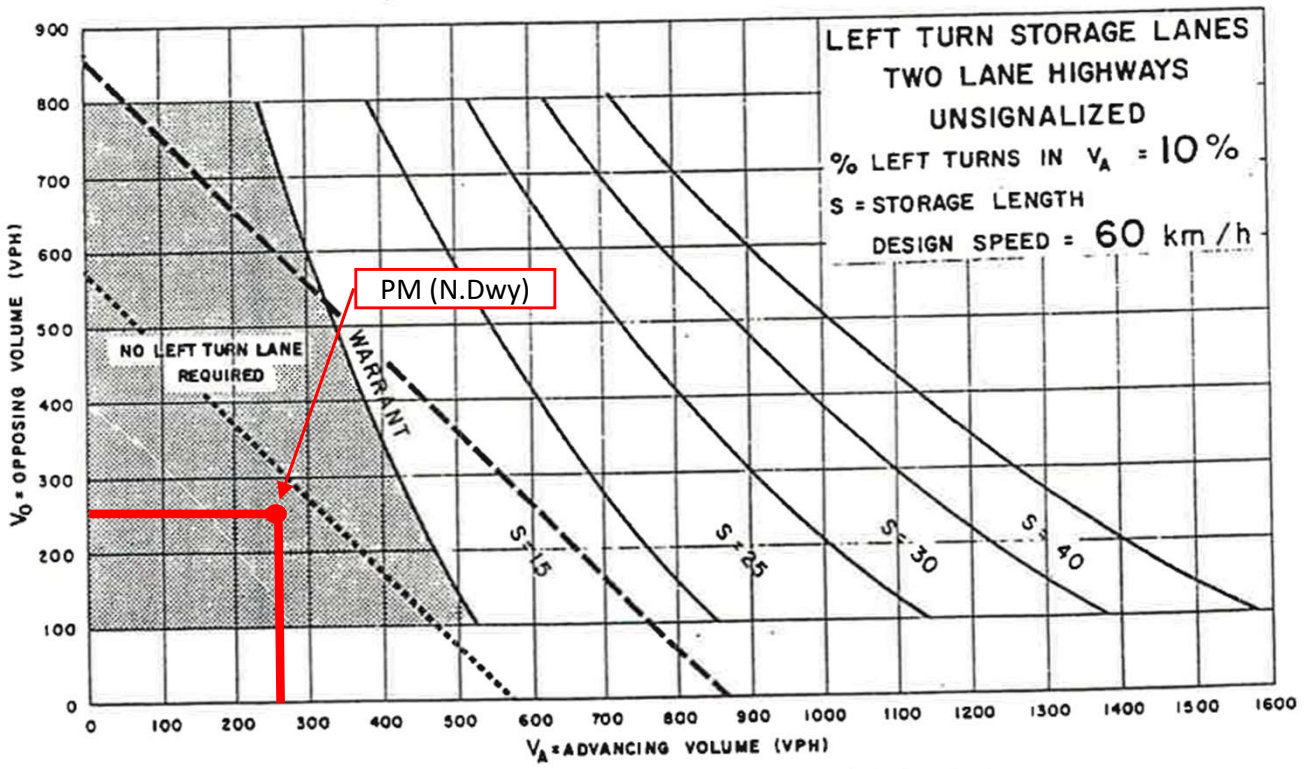
05/17/21

FILE NAME: Z:\Organica Projects\2020\20071 - Kalar Lot 186\Revit Model\2022.02.10 - Kalar - Lot 186 - PLOT DATE: 12/8/2022 6:22:00 PM

Appendix C

MTO Left-Turn Lane Warrants





TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

Appendix D

Trip Generation Sheets

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE : 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

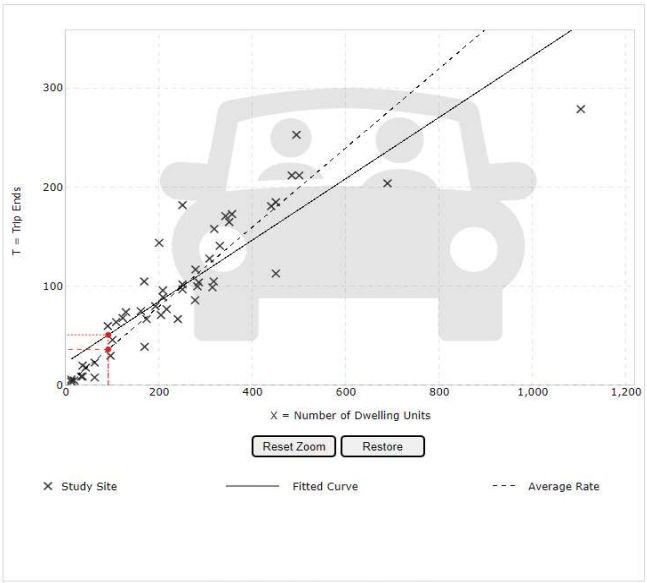
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 91 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
49

Avg. Num. of Dwelling Units:
249

Average Rate:
0.40

Range of Rates:
0.13 - 0.73

Standard Deviation:
0.12

Fitted Curve Equation:
T = 0.31(X) + 22.85

R^2:
0.79

Directional Distribution:
24% entering, 76% exiting

Calculated Trip Ends:
Average Rate: 36 (Total), 8 (Entry), 28 (Exit)
Fitted Curve: 51 (Total), 12 (Entry), 39 (Exit)

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE : 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

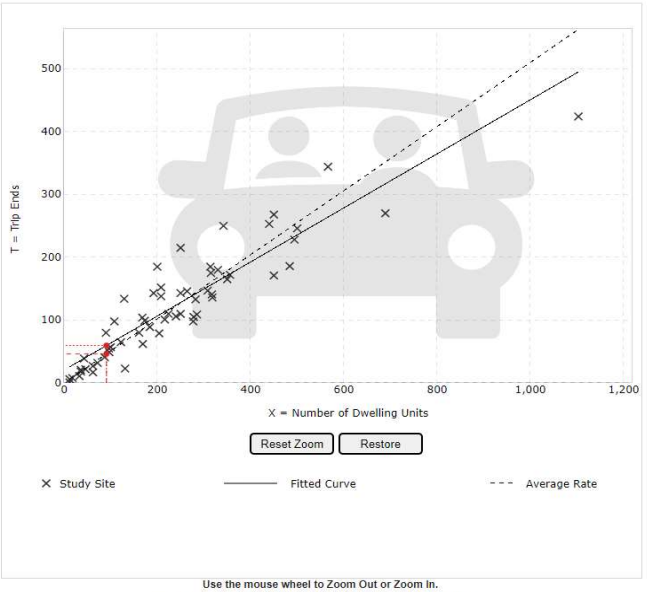
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 91 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
59

Avg. Num. of Dwelling Units:
241

Average Rate:
0.51

Range of Rates:
0.08 - 1.04

Standard Deviation:
0.15

Fitted Curve Equation:
T = 0.43(X) + 20.55

R^2:
0.84

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 46 (Total), 29 (Entry), 17 (Exit)
Fitted Curve: 60 (Total), 38 (Entry), 22 (Exit)

Appendix E

Transportation Tomorrow Survey Data

Wed Nov 23 2022 14:04:37 GMT-0500 (Eastern Standard Time) - Run Time: 1649ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: Planning district of employment - pd_emp

RowG:(57)
ColG:
TblG:

Filters:
(2006 GTA zone of household - gta06_hhld In 6225)

Trip 2016
Table:

	Not employ	PD 10 of Toro	Mississauga	Oakville	Stoney Cre	Hamilton	Grimsby	Niagara-on	St. Catharir	Thorold	Niagara Falls	Welland	Fort Erie	No Usual Place
1	1826	147	7	119	27	509	60	69	687	11	2720	99	140	229

Toronto	Mississauga	Oakville	Stoney Cre	Hamilton	Grimsby	Niagara-on	St. Catharir	Thorold	Niagara Falls	Welland	Fort Erie	TOTAL
147	7	119	27	509	60	69	687	11	2720	99	140	**4595**
3%	0%	3%	1%	11%	1%	2%	15%	0%	59%	2%	3%	**100%**
B	B	B	B	B	B	B	B	C	A (10%)	D	B	
									B (50%)			
									C (20%)			
									D (10%)			
									E (10%)			

			AM		PM	
ROUTES		**TRIP PROP.**	**IN**	**OUT**	**IN**	**OUT**
A	McLeod W	6%	1	2	2	1
B	McLeod E	68%	8	27	26	15
C	Kalar N	12%	1	5	5	3
D	Brown W	8%	1	3	3	2
E	Brown E	6%	1	2	2	1
	TOTAL	**100%**	**12**	**39**	**38**	**22**
		Check	**12**	**39**	**38**	**22**

Appendix F

Signal Timing Plan

Signal Code: KLRMCL

Intersection: MCLEOD RD. & KALAR RD.

Municipality: niagarafalls

Owner: city

Last Modified: 2011-10-19 11:42:12 AM

Timing Parameters	EBD ADV. MCLEOD RD.	EBD/WBD THRU MCLEOD RD.	SBD ADV. KALAR RD.	NBD/SBD THRU KALAR RD.	n/a	n/a
Min Green	6	10	6	8	0	0
Walk	0	14	0	14	0	0
Ped Clearance	0	25	0	24	0	0
Vehicle Ext.	2.5	2.5	2.5	2.5	0	0
Max Green	11	30.7	12	34.7	0	0
Yellow	3	3.3	3	3.3	0	0
All Red	0	3.1	0	3	0	0

		Offset
Minimum Cycle	30.7	0
Pedestrian Cycle	89.7	
Maximum Cycle	107.1	0
Operation	FA	

Installed On:	2008-11-18
Count Date:	--/--/----

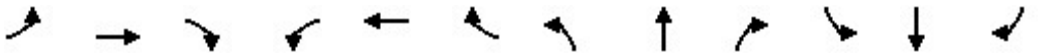
FA = Fully Actuated SA = Semi Actuated FT = Fixed Time

Appendix G

Capacity Analysis Reports

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	418	51	305	234	82	286	316	236
v/c Ratio	0.23	0.51	0.41	0.62	0.63	0.18	0.42	0.49	0.13
Control Delay	24.1	29.4	46.0	42.1	17.6	19.3	17.2	11.5	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	29.4	46.0	42.1	17.6	19.3	17.2	11.5	4.3
Queue Length 50th (m)	8.9	33.0	8.7	28.2	7.7	9.2	27.7	24.3	3.5
Queue Length 95th (m)	18.4	46.8	21.1	43.3	32.0	22.1	57.3	48.8	10.3
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	321	1894	357	1404	718	466	689	656	1792
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.22	0.14	0.22	0.33	0.18	0.42	0.48	0.13

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	348	37	47	281	215	75	110	153	291	87	130
Future Volume (vph)	62	348	37	47	281	215	75	110	153	291	87	130
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1605	3148		1511	3167	1396	1643	1470		1644	2890	
Flt Permitted	0.43	1.00		0.51	1.00	1.00	0.60	1.00		0.50	1.00	
Satd. Flow (perm)	726	3148		807	3167	1396	1046	1470		866	2890	
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)	67	378	40	51	305	234	82	120	166	316	95	141
RTOR Reduction (vph)	0	9	0	0	0	158	0	34	0	0	57	0
Lane Group Flow (vph)	67	409	0	51	305	76	82	252	0	316	179	0
Confl. Peds. (#/hr)	20					20	4		5	5		4
Heavy Vehicles (%)	3%	4%	5%	10%	5%	2%	1%	10%	6%	1%	5%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	23.8	23.8		14.0	14.0	14.0	40.2	40.2		54.1	54.1	
Effective Green, g (s)	23.8	23.8		14.0	14.0	14.0	40.2	40.2		54.1	54.1	
Actuated g/C Ratio	0.26	0.26		0.15	0.15	0.15	0.44	0.44		0.60	0.60	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	256	826		124	489	215	464	652		610	1725	
v/s Ratio Prot	0.02	c0.13			c0.10			0.17		c0.06	0.06	
v/s Ratio Perm	0.05			0.06		0.05	0.08			c0.25		
v/c Ratio	0.26	0.50		0.41	0.62	0.35	0.18	0.39		0.52	0.10	
Uniform Delay, d1	25.8	28.3		34.6	35.8	34.2	15.2	16.9		9.4	7.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.3		1.6	2.1	0.7	0.8	1.7		0.6	0.1	
Delay (s)	26.2	28.7		36.2	38.0	35.0	16.0	18.7		10.0	8.0	
Level of Service	C	C		D	D	C	B	B		A	A	
Approach Delay (s)		28.3			36.6			18.1			9.1	
Approach LOS		C			D			B			A	

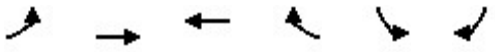
Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.6	Sum of lost time (s)	18.7
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	61	10	4	172	100	19
Future Volume (Veh/h)	61	10	4	172	100	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	11	4	187	109	21
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	316	120	130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	120	130			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	90	99	100			
cM capacity (veh/h)	673	911	1468			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	77	191	130
Volume Left	66	4	0
Volume Right	11	0	21
cSH	699	1468	1700
Volume to Capacity	0.11	0.00	0.08
Queue Length 95th (m)	3.0	0.1	0.0
Control Delay (s)	10.8	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.8	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		



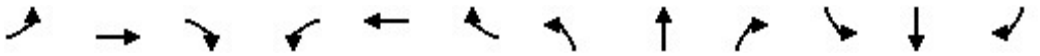
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	61	32	28	39	41	30
Future Volume (Veh/h)	61	32	28	39	41	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	35	30	42	45	33
Pedestrians						
Lane Width (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	72				218	51
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	72				218	51
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	96				94	97
cM capacity (veh/h)	1479				729	1003

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	66	35	72	45	33
Volume Left	66	0	0	45	0
Volume Right	0	0	42	0	33
cSH	1479	1700	1700	729	1003
Volume to Capacity	0.04	0.02	0.04	0.06	0.03
Queue Length 95th (m)	1.1	0.0	0.0	1.6	0.8
Control Delay (s)	7.5	0.0	0.0	10.3	8.7
Lane LOS	A			B	A
Approach Delay (s)	4.9		0.0	9.6	
Approach LOS				A	

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	41	521	159	461	380	45	259	271	148
v/c Ratio	0.14	0.50	0.79	0.54	0.73	0.10	0.38	0.45	0.09
Control Delay	19.9	27.1	61.5	34.2	24.3	25.1	19.4	16.5	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	27.1	61.5	34.2	24.3	25.1	19.4	16.5	9.1
Queue Length 50th (m)	5.3	42.8	31.2	44.1	34.5	6.0	26.4	28.2	4.4
Queue Length 95th (m)	11.9	56.9	58.4	61.6	70.6	17.1	60.5	60.9	12.4
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	332	1786	319	1337	703	462	675	613	1696
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	0.12	0.29	0.50	0.34	0.54	0.10	0.38	0.44	0.09

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	438	41	146	424	350	41	86	153	249	79	57
Future Volume (vph)	38	438	41	146	424	350	41	86	153	249	79	57
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3240		1628	3292	1438	1628	1531		1661	3030	
Flt Permitted	0.35	1.00		0.46	1.00	1.00	0.66	1.00		0.51	1.00	
Satd. Flow (perm)	604	3240		787	3292	1438	1128	1531		887	3030	
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)	41	476	45	159	461	380	45	93	166	271	86	62
RTOR Reduction (vph)	0	7	0	0	0	150	0	47	0	0	28	0
Lane Group Flow (vph)	41	514	0	159	461	230	45	212	0	271	120	0
Confl. Peds. (#/hr)	3		2	2		3	2		3	3		2
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	2%	3%	2%	0%	1%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	33.1	33.1		25.6	25.6	25.6	41.0	41.0		54.9	54.9	
Effective Green, g (s)	33.1	33.1		25.6	25.6	25.6	41.0	41.0		54.9	54.9	
Actuated g/C Ratio	0.33	0.33		0.25	0.25	0.25	0.41	0.41		0.55	0.55	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	245	1064		200	836	365	459	623		567	1651	
v/s Ratio Prot	0.01	c0.16			0.14			0.14		c0.05	0.04	
v/s Ratio Perm	0.05			c0.20		0.16	0.04			c0.21		
v/c Ratio	0.17	0.48		0.80	0.55	0.63	0.10	0.34		0.48	0.07	
Uniform Delay, d1	23.6	27.0		35.1	32.6	33.3	18.4	20.5		12.7	10.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.3		18.7	0.6	3.1	0.4	1.5		0.5	0.1	
Delay (s)	23.9	27.2		53.8	33.2	36.4	18.9	22.0		13.2	10.9	
Level of Service	C	C		D	C	D	B	C		B	B	
Approach Delay (s)		27.0			37.7			21.6			12.4	
Approach LOS		C			D			C			B	

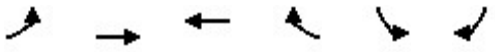
Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.7	Sum of lost time (s)	18.7
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	5	9	145	126	68
Future Volume (Veh/h)	64	5	9	145	126	68
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	5	10	158	137	74
Pedestrians				1		
Lane Width (m)				3.6		
Walking Speed (m/s)				1.2		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	352	175	211			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	352	175	211			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	99	99			
cM capacity (veh/h)	645	873	1372			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	75	168	211
Volume Left	70	10	0
Volume Right	5	0	74
cSH	656	1372	1700
Volume to Capacity	0.11	0.01	0.12
Queue Length 95th (m)	3.1	0.2	0.0
Control Delay (s)	11.2	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.2	0.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		



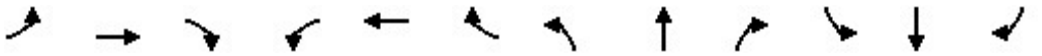
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	56	31	61	54	38	44
Future Volume (Veh/h)	56	31	61	54	38	44
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	34	66	59	41	48
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	127				254	98
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	127				254	98
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				94	95
cM capacity (veh/h)	1444				707	957

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	61	34	125	41	48
Volume Left	61	0	0	41	0
Volume Right	0	0	59	0	48
cSH	1444	1700	1700	707	957
Volume to Capacity	0.04	0.02	0.07	0.06	0.05
Queue Length 95th (m)	1.1	0.0	0.0	1.5	1.3
Control Delay (s)	7.6	0.0	0.0	10.4	9.0
Lane LOS	A			B	A
Approach Delay (s)	4.9		0.0	9.6	
Approach LOS				A	

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	483	62	326	238	85	340	385	272
v/c Ratio	0.30	0.56	0.50	0.62	0.63	0.20	0.52	0.66	0.15
Control Delay	24.8	30.0	50.6	41.9	18.9	20.6	20.3	16.9	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	30.0	50.6	41.9	18.9	20.6	20.3	16.9	4.6
Queue Length 50th (m)	11.9	39.2	10.9	30.8	10.1	9.9	37.2	33.3	4.4
Queue Length 95th (m)	23.0	54.2	24.8	46.0	34.9	23.7	73.7	64.9	12.2
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	323	1854	328	1375	702	428	659	587	1768
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.26	0.19	0.24	0.34	0.20	0.52	0.66	0.15

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	401	43	57	300	219	78	127	186	354	102	148
Future Volume (vph)	82	401	43	57	300	219	78	127	186	354	102	148
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1605	3148		1511	3167	1395	1643	1467		1645	2893	
Flt Permitted	0.41	1.00		0.48	1.00	1.00	0.58	1.00		0.44	1.00	
Satd. Flow (perm)	694	3148		758	3167	1395	1010	1467		754	2893	
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)	89	436	47	62	326	238	85	138	202	385	111	161
RTOR Reduction (vph)	0	9	0	0	0	149	0	38	0	0	67	0
Lane Group Flow (vph)	89	474	0	62	326	89	85	302	0	385	205	0
Confl. Peds. (#/hr)	20					20	4		5	5		4
Heavy Vehicles (%)	3%	4%	5%	10%	5%	2%	1%	10%	6%	1%	5%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	25.6	25.6		15.2	15.2	15.2	39.0	39.0		54.1	54.1	
Effective Green, g (s)	25.6	25.6		15.2	15.2	15.2	39.0	39.0		54.1	54.1	
Actuated g/C Ratio	0.28	0.28		0.16	0.16	0.16	0.42	0.42		0.59	0.59	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	265	872		124	520	229	426	619		558	1693	
v/s Ratio Prot	0.03	c0.15			0.10			0.21		c0.09	0.07	
v/s Ratio Perm	0.07			0.08		0.06	0.08			c0.31		
v/c Ratio	0.34	0.54		0.50	0.63	0.39	0.20	0.49		0.69	0.12	
Uniform Delay, d1	25.7	28.4		35.1	36.0	34.5	16.8	19.4		11.1	8.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.6		2.3	2.0	0.8	1.1	2.7		3.3	0.1	
Delay (s)	26.2	29.0		37.4	38.0	35.3	17.9	22.2		14.4	8.7	
Level of Service	C	C		D	D	D	B	C		B	A	
Approach Delay (s)		28.6			36.9			21.3			12.0	
Approach LOS		C			D			C			B	

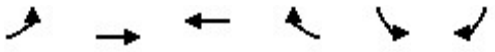
Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	92.4	Sum of lost time (s)	18.7
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	10	4	182	118	19
Future Volume (Veh/h)	62	10	4	182	118	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	11	4	198	128	21
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	346	138	149			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	346	138	149			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	90	99	100			
cM capacity (veh/h)	647	889	1445			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	78	202	149
Volume Left	67	4	0
Volume Right	11	0	21
cSH	673	1445	1700
Volume to Capacity	0.12	0.00	0.09
Queue Length 95th (m)	3.1	0.1	0.0
Control Delay (s)	11.1	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.1	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	33	29	44	52	37
Future Volume (Veh/h)	65	33	29	44	52	37
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)	71	36	32	48	57	40
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	80				234	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	80				234	56
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	95				92	96
cM capacity (veh/h)	1469				711	997

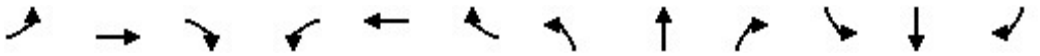
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	71	36	80	57	40
Volume Left	71	0	0	57	0
Volume Right	0	0	48	0	40
cSH	1469	1700	1700	711	997
Volume to Capacity	0.05	0.02	0.05	0.08	0.04
Queue Length 95th (m)	1.2	0.0	0.0	2.1	1.0
Control Delay (s)	7.6	0.0	0.0	10.5	8.8
Lane LOS	A			B	A
Approach Delay (s)	5.0		0.0	9.8	
Approach LOS				A	

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	65	562	192	517	388	51	303	325	207
v/c Ratio	0.21	0.46	0.88	0.54	0.71	0.13	0.49	0.64	0.13
Control Delay	19.5	25.2	74.4	34.5	25.2	28.8	25.7	25.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	25.2	74.4	34.5	25.2	28.8	25.7	25.5	9.9
Queue Length 50th (m)	8.6	47.1	41.3	51.7	41.4	8.3	43.1	46.1	7.4
Queue Length 95th (m)	17.0	61.8	#82.7	70.4	79.4	19.3	76.8	75.4	15.7
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	342	1641	282	1228	651	395	615	510	1566
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.34	0.68	0.42	0.60	0.13	0.49	0.64	0.13

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)	60	473	44	177	476	357	47	105	174	299	103	87
Future Volume (vph)	60	473	44	177	476	357	47	105	174	299	103	87
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3241		1628	3292	1437	1628	1535		1662	3005	
Flt Permitted	0.32	1.00		0.44	1.00	1.00	0.62	1.00		0.43	1.00	
Satd. Flow (perm)	563	3241		756	3292	1437	1066	1535		761	3005	
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)	65	514	48	192	517	388	51	114	189	325	112	95
RTOR Reduction (vph)	0	6	0	0	0	131	0	46	0	0	47	0
Lane Group Flow (vph)	65	556	0	192	517	257	51	257	0	325	160	0
Confl. Peds. (#/hr)	3		2	2		3	2		3	3		2
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	2%	3%	2%	0%	1%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	41.2	41.2		31.3	31.3	31.3	40.2	40.2		54.7	54.7	
Effective Green, g (s)	41.2	41.2		31.3	31.3	31.3	40.2	40.2		54.7	54.7	
Actuated g/C Ratio	0.38	0.38		0.29	0.29	0.29	0.37	0.37		0.50	0.50	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	283	1229		217	948	414	394	568		478	1513	
v/s Ratio Prot	0.01	c0.17			0.16			0.17		c0.07	0.05	
v/s Ratio Perm	0.07			c0.25		0.18	0.05			c0.27		
v/c Ratio	0.23	0.45		0.88	0.55	0.62	0.13	0.45		0.68	0.11	
Uniform Delay, d1	22.3	25.2		36.9	32.6	33.5	22.6	25.9		18.4	14.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		31.8	0.5	2.5	0.7	2.6		3.5	0.1	
Delay (s)	22.6	25.4		68.7	33.1	36.0	23.3	28.5		21.9	14.3	
Level of Service	C	C		E	C	D	C	C		C	B	
Approach Delay (s)		25.1			40.4			27.7			18.9	
Approach LOS		C			D			C			B	

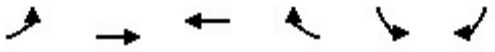
Intersection Summary			
HCM 2000 Control Delay	30.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	108.6	Sum of lost time (s)	18.7
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	5	9	166	140	69
Future Volume (Veh/h)	65	5	9	166	140	69
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	5	10	180	152	75
Pedestrians				1		
Lane Width (m)				3.6		
Walking Speed (m/s)				1.2		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	390	190	227			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	390	190	227			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	99	99			
cM capacity (veh/h)	614	856	1353			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	76	190	227
Volume Left	71	10	0
Volume Right	5	0	75
cSH	625	1353	1700
Volume to Capacity	0.12	0.01	0.13
Queue Length 95th (m)	3.3	0.2	0.0
Control Delay (s)	11.6	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	0.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	63	32	62	67	46	49
Future Volume (Veh/h)	63	32	62	67	46	49
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)	68	35	67	73	50	53
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	142				276	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	142				276	106
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				93	94
cM capacity (veh/h)	1426				682	947

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	68	35	140	50	53
Volume Left	68	0	0	50	0
Volume Right	0	0	73	0	53
cSH	1426	1700	1700	682	947
Volume to Capacity	0.05	0.02	0.08	0.07	0.06
Queue Length 95th (m)	1.2	0.0	0.0	1.9	1.4
Control Delay (s)	7.7	0.0	0.0	10.7	9.0
Lane LOS	A			B	A
Approach Delay (s)	5.1		0.0	9.8	
Approach LOS				A	

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	484	71	326	238	87	375	385	273
v/c Ratio	0.29	0.55	0.55	0.61	0.62	0.20	0.57	0.69	0.15
Control Delay	24.5	29.6	53.7	41.2	18.4	21.2	21.9	19.3	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	29.6	53.7	41.2	18.4	21.2	21.9	19.3	4.8
Queue Length 50th (m)	11.9	39.2	12.7	30.8	10.1	10.2	42.3	33.3	4.5
Queue Length 95th (m)	23.0	54.0	27.9	45.7	34.6	24.7	85.7	#76.1	12.7
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	326	1845	327	1368	699	426	658	554	1762
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	0.27	0.26	0.22	0.24	0.34	0.20	0.57	0.69	0.15

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)	82	401	44	65	300	219	80	132	213	354	103	148
Future Volume (vph)	82	401	44	65	300	219	80	132	213	354	103	148
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1605	3147		1511	3167	1395	1643	1462		1645	2894	
Flt Permitted	0.41	1.00		0.48	1.00	1.00	0.58	1.00		0.40	1.00	
Satd. Flow (perm)	700	3147		757	3167	1395	1009	1462		691	2894	
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)	89	436	48	71	326	238	87	143	232	385	112	161
RTOR Reduction (vph)	0	9	0	0	0	148	0	42	0	0	67	0
Lane Group Flow (vph)	89	475	0	71	326	90	87	333	0	385	206	0
Confl. Peds. (#/hr)	20					20	4		5	5		4
Heavy Vehicles (%)	3%	4%	5%	10%	5%	2%	1%	10%	6%	1%	5%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	26.1	26.1		15.7	15.7	15.7	39.0	39.0		54.1	54.1	
Effective Green, g (s)	26.1	26.1		15.7	15.7	15.7	39.0	39.0		54.1	54.1	
Actuated g/C Ratio	0.28	0.28		0.17	0.17	0.17	0.42	0.42		0.58	0.58	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	268	884		127	535	235	423	613		526	1685	
v/s Ratio Prot	0.03	c0.15			0.10			0.23		c0.10	0.07	
v/s Ratio Perm	0.07			0.09		0.06	0.09			c0.33		
v/c Ratio	0.33	0.54		0.56	0.61	0.38	0.21	0.54		0.73	0.12	
Uniform Delay, d1	25.6	28.3		35.4	35.8	34.3	17.1	20.3		11.7	8.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.5		4.2	1.7	0.8	1.1	3.4		4.9	0.1	
Delay (s)	26.1	28.8		39.6	37.4	35.1	18.2	23.7		16.6	8.9	
Level of Service	C	C		D	D	D	B	C		B	A	
Approach Delay (s)		28.4			36.8			22.7			13.4	
Approach LOS		C			D			C			B	

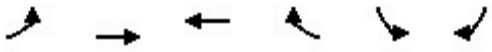
Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	92.9	Sum of lost time (s)	18.7
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	10	4	184	123	19
Future Volume (Veh/h)	62	10	4	184	123	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	11	4	200	134	21
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	354	144	155			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354	144	155			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	90	99	100			
cM capacity (veh/h)	640	882	1438			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	78	204	155
Volume Left	67	4	0
Volume Right	11	0	21
cSH	666	1438	1700
Volume to Capacity	0.12	0.00	0.09
Queue Length 95th (m)	3.2	0.1	0.0
Control Delay (s)	11.1	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.1	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	25.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	66	33	29	45	54	40
Future Volume (Veh/h)	66	33	29	45	54	40
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)	72	36	32	49	59	43
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	81				236	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	81				236	56
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	95				92	96
cM capacity (veh/h)	1467				709	996

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	72	36	81	59	43
Volume Left	72	0	0	59	0
Volume Right	0	0	49	0	43
cSH	1467	1700	1700	709	996
Volume to Capacity	0.05	0.02	0.05	0.08	0.04
Queue Length 95th (m)	1.2	0.0	0.0	2.2	1.1
Control Delay (s)	7.6	0.0	0.0	10.5	8.8
Lane LOS	A			B	A
Approach Delay (s)	5.1		0.0	9.8	
Approach LOS				A	

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	26	252	0	8	139
Future Volume (Veh/h)	1	26	252	0	8	139
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	28	274	0	9	151
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			47			
pX, platoon unblocked						
vC, conflicting volume	443	274			274	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	443	274			274	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			99	
cM capacity (veh/h)	568	765			1289	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	29	274	160
Volume Left	1	0	9
Volume Right	28	0	0
cSH	756	1700	1289
Volume to Capacity	0.04	0.16	0.01
Queue Length 95th (m)	1.0	0.0	0.2
Control Delay (s)	10.0	0.0	0.5
Lane LOS	A		A
Approach Delay (s)	10.0	0.0	0.5
Approach LOS	A		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		25.0%	ICU Level of Service
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	8	244	2	2	138
Future Volume (Veh/h)	4	8	244	2	2	138
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	9	265	2	2	150
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			45			
pX, platoon unblocked						
vC, conflicting volume	420	266			267	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	420	266			267	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	589	773			1297	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	267	152
Volume Left	4	0	2
Volume Right	9	2	0
cSH	705	1700	1297
Volume to Capacity	0.02	0.16	0.00
Queue Length 95th (m)	0.5	0.0	0.0
Control Delay (s)	10.2	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization		24.1%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	65	564	221	517	388	52	322	325	212
v/c Ratio	0.19	0.43	0.92	0.49	0.67	0.14	0.55	0.71	0.14
Control Delay	19.0	24.2	80.6	33.0	23.2	29.8	27.8	29.9	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	24.2	80.6	33.0	23.2	29.8	27.8	29.9	10.4
Queue Length 50th (m)	8.6	47.2	50.2	51.7	41.5	8.9	48.9	49.2	8.2
Queue Length 95th (m)	17.0	62.0	#100.9	70.4	79.4	19.5	82.4	#79.1	16.2
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	361	1571	269	1175	631	373	590	461	1507
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.36	0.82	0.44	0.61	0.14	0.55	0.70	0.14

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)	60	473	46	203	476	357	48	108	189	299	108	87
Future Volume (vph)	60	473	46	203	476	357	48	108	189	299	108	87
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3239		1628	3292	1437	1628	1532		1662	3012	
Flt Permitted	0.34	1.00		0.44	1.00	1.00	0.62	1.00		0.40	1.00	
Satd. Flow (perm)	590	3239		754	3292	1437	1061	1532		695	3012	
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)	65	514	50	221	517	388	52	117	205	325	117	95
RTOR Reduction (vph)	0	7	0	0	0	126	0	51	0	0	49	0
Lane Group Flow (vph)	65	557	0	221	517	262	52	271	0	325	163	0
Confl. Peds. (#/hr)	3		2	2		3	2		3	3		2
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	2%	3%	2%	0%	1%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	45.7	45.7		35.6	35.6	35.6	39.5	39.5		54.3	54.3	
Effective Green, g (s)	45.7	45.7		35.6	35.6	35.6	39.5	39.5		54.3	54.3	
Actuated g/C Ratio	0.41	0.41		0.32	0.32	0.32	0.35	0.35		0.48	0.48	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	306	1313		238	1039	453	371	536		436	1451	
v/s Ratio Prot	0.01	c0.17			0.16			0.18		c0.08	0.05	
v/s Ratio Perm	0.07			c0.29		0.18	0.05			c0.28		
v/c Ratio	0.21	0.42		0.93	0.50	0.58	0.14	0.51		0.75	0.11	
Uniform Delay, d1	21.2	24.1		37.3	31.3	32.3	25.0	28.9		21.6	16.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		38.8	0.3	1.5	0.8	3.4		6.5	0.2	
Delay (s)	21.5	24.2		76.1	31.6	33.7	25.8	32.3		28.1	16.2	
Level of Service	C	C		E	C	C	C	C		C	B	
Approach Delay (s)		23.9			41.1			31.4			23.4	
Approach LOS		C			D			C			C	

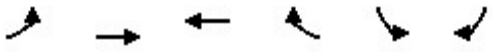
Intersection Summary			
HCM 2000 Control Delay	32.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	112.7	Sum of lost time (s)	18.7
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	5	9	171	143	69
Future Volume (Veh/h)	65	5	9	171	143	69
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	5	10	186	155	75
Pedestrians				1		
Lane Width (m)				3.6		
Walking Speed (m/s)				1.2		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	398	194	230			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	194	230			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	99	99			
cM capacity (veh/h)	606	852	1350			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	76	196	230
Volume Left	71	10	0
Volume Right	5	0	75
cSH	618	1350	1700
Volume to Capacity	0.12	0.01	0.14
Queue Length 95th (m)	3.3	0.2	0.0
Control Delay (s)	11.6	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	0.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	66	32	69	62	47	51
Future Volume (Veh/h)	66	32	69	62	47	51
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)	72	35	75	67	51	55
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	144				290	110
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	144				290	110
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				92	94
cM capacity (veh/h)	1424				669	941

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	72	35	142	51	55
Volume Left	72	0	0	51	0
Volume Right	0	0	67	0	55
cSH	1424	1700	1700	669	941
Volume to Capacity	0.05	0.02	0.08	0.08	0.06
Queue Length 95th (m)	1.3	0.0	0.0	2.0	1.5
Control Delay (s)	7.7	0.0	0.0	10.8	9.1
Lane LOS	A			B	A
Approach Delay (s)	5.2		0.0	9.9	
Approach LOS				A	

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	14	236	1	25	217
Future Volume (Veh/h)	1	14	236	1	25	217
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	15	257	1	27	236
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			47			
pX, platoon unblocked						
vC, conflicting volume	548	258			258	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	548	258			258	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			98	
cM capacity (veh/h)	487	781			1307	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	16	258	263
Volume Left	1	0	27
Volume Right	15	1	0
cSH	753	1700	1307
Volume to Capacity	0.02	0.15	0.02
Queue Length 95th (m)	0.5	0.0	0.5
Control Delay (s)	9.9	0.0	1.0
Lane LOS	A		A
Approach Delay (s)	9.9	0.0	1.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		40.8%	ICU Level of Service
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	5	232	4	8	210
Future Volume (Veh/h)	2	5	232	4	8	210
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	5	252	4	9	228
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			45			
pX, platoon unblocked						
vC, conflicting volume	500	254			256	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	500	254			256	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	527	785			1309	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	256	237
Volume Left	2	0	9
Volume Right	5	4	0
cSH	688	1700	1309
Volume to Capacity	0.01	0.15	0.01
Queue Length 95th (m)	0.2	0.0	0.2
Control Delay (s)	10.3	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	0.4
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	92	505	73	341	251	90	390	401	283
v/c Ratio	0.30	0.56	0.56	0.61	0.64	0.22	0.60	0.75	0.16
Control Delay	24.4	29.6	53.6	40.9	19.3	21.9	23.3	22.9	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	29.6	53.6	40.9	19.3	21.9	23.3	22.9	4.9
Queue Length 50th (m)	12.4	41.3	13.1	32.4	11.9	10.7	45.9	35.9	4.7
Queue Length 95th (m)	23.6	56.6	28.6	47.7	37.9	26.1	92.1	#91.6	13.3
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	326	1827	317	1355	696	417	652	534	1748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.28	0.23	0.25	0.36	0.22	0.60	0.75	0.16

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)	85	419	46	67	314	231	83	138	221	369	107	154
Future Volume (vph)	85	419	46	67	314	231	83	138	221	369	107	154
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1606	3147		1511	3167	1395	1643	1463		1645	2894	
Flt Permitted	0.40	1.00		0.47	1.00	1.00	0.58	1.00		0.38	1.00	
Satd. Flow (perm)	679	3147		742	3167	1395	1000	1463		661	2894	
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)	92	455	50	73	341	251	90	150	240	401	116	167
RTOR Reduction (vph)	0	9	0	0	0	149	0	41	0	0	71	0
Lane Group Flow (vph)	92	496	0	73	341	102	90	349	0	401	212	0
Confl. Peds. (#/hr)	20					20	4		5	5		4
Heavy Vehicles (%)	3%	4%	5%	10%	5%	2%	1%	10%	6%	1%	5%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	27.0	27.0		16.5	16.5	16.5	39.1	39.1		54.2	54.2	
Effective Green, g (s)	27.0	27.0		16.5	16.5	16.5	39.1	39.1		54.2	54.2	
Actuated g/C Ratio	0.29	0.29		0.18	0.18	0.18	0.42	0.42		0.58	0.58	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	269	904		130	556	245	416	609		508	1670	
v/s Ratio Prot	0.03	c0.16			0.11			0.24		c0.10	0.07	
v/s Ratio Perm	0.07			0.10		0.07	0.09			c0.35		
v/c Ratio	0.34	0.55		0.56	0.61	0.42	0.22	0.57		0.79	0.13	
Uniform Delay, d1	25.4	28.3		35.4	35.8	34.4	17.6	21.0		12.9	9.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.5		4.4	1.7	0.8	1.2	3.9		7.7	0.2	
Delay (s)	26.0	28.8		39.8	37.5	35.2	18.8	24.9		20.6	9.2	
Level of Service	C	C		D	D	D	B	C		C	A	
Approach Delay (s)		28.4			36.9			23.7			15.9	
Approach LOS		C			D			C			B	

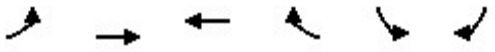
Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	93.9	Sum of lost time (s)	18.7
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	11	4	193	128	20
Future Volume (Veh/h)	65	11	4	193	128	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	12	4	210	139	22
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	369	150	161			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	369	150	161			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	89	99	100			
cM capacity (veh/h)	627	876	1430			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	83	214	161
Volume Left	71	4	0
Volume Right	12	0	22
cSH	654	1430	1700
Volume to Capacity	0.13	0.00	0.09
Queue Length 95th (m)	3.5	0.1	0.0
Control Delay (s)	11.3	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.3	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		25.8%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	69	34	30	47	56	41
Future Volume (Veh/h)	69	34	30	47	56	41
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)	75	37	33	51	61	45
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	84				246	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	84				246	58
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	95				91	95
cM capacity (veh/h)	1464				699	993

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	75	37	84	61	45
Volume Left	75	0	0	61	0
Volume Right	0	0	51	0	45
cSH	1464	1700	1700	699	993
Volume to Capacity	0.05	0.02	0.05	0.09	0.05
Queue Length 95th (m)	1.3	0.0	0.0	2.3	1.1
Control Delay (s)	7.6	0.0	0.0	10.6	8.8
Lane LOS	A			B	A
Approach Delay (s)	5.1		0.0	9.9	
Approach LOS				A	

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	26	264	0	8	145
Future Volume (Veh/h)	1	26	264	0	8	145
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	28	287	0	9	158
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			47			
pX, platoon unblocked						
vC, conflicting volume	463	287			287	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	463	287			287	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			99	
cM capacity (veh/h)	553	752			1275	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	29	287	167
Volume Left	1	0	9
Volume Right	28	0	0
cSH	743	1700	1275
Volume to Capacity	0.04	0.17	0.01
Queue Length 95th (m)	1.0	0.0	0.2
Control Delay (s)	10.0	0.0	0.5
Lane LOS	B		A
Approach Delay (s)	10.0	0.0	0.5
Approach LOS	B		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		25.4%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	8	256	2	2	144
Future Volume (Veh/h)	4	8	256	2	2	144
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	9	278	2	2	157
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			45			
pX, platoon unblocked						
vC, conflicting volume	440	279			280	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	440	279			280	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	574	760			1283	

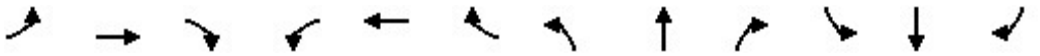
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	280	159
Volume Left	4	0	2
Volume Right	9	2	0
cSH	691	1700	1283
Volume to Capacity	0.02	0.16	0.00
Queue Length 95th (m)	0.5	0.0	0.0
Control Delay (s)	10.3	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization		24.8%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	591	229	541	408	54	336	339	220
v/c Ratio	0.20	0.44	0.95	0.50	0.68	0.15	0.59	0.78	0.15
Control Delay	19.0	24.1	85.5	32.9	24.6	30.1	29.5	35.4	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	24.1	85.5	32.9	24.6	30.1	29.5	35.4	10.6
Queue Length 50th (m)	8.9	50.0	53.5	54.6	46.8	9.3	52.4	52.0	8.6
Queue Length 95th (m)	17.4	65.3	#107.1	74.0	87.1	20.2	87.0	#94.5	16.8
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	359	1540	256	1151	622	359	574	434	1481
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.38	0.89	0.47	0.66	0.15	0.59	0.78	0.15

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)	62	496	48	211	498	375	50	112	197	312	112	90
Future Volume (vph)	62	496	48	211	498	375	50	112	197	312	112	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3239		1628	3292	1437	1628	1532		1662	3013	
Flt Permitted	0.33	1.00		0.43	1.00	1.00	0.61	1.00		0.37	1.00	
Satd. Flow (perm)	572	3239		735	3292	1437	1052	1532		650	3013	
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)	67	539	52	229	541	408	54	122	214	339	122	98
RTOR Reduction (vph)	0	6	0	0	0	124	0	51	0	0	52	0
Lane Group Flow (vph)	67	585	0	229	541	284	54	285	0	339	168	0
Confl. Peds. (#/hr)	3		2	2		3	2		3	3		2
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	2%	3%	2%	0%	1%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	47.7	47.7		37.5	37.5	37.5	39.0	39.0		54.1	54.1	
Effective Green, g (s)	47.7	47.7		37.5	37.5	37.5	39.0	39.0		54.1	54.1	
Actuated g/C Ratio	0.42	0.42		0.33	0.33	0.33	0.34	0.34		0.47	0.47	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	306	1349		240	1078	470	358	521		414	1423	
v/s Ratio Prot	0.01	c0.18			0.16			0.19		c0.09	0.06	
v/s Ratio Perm	0.08			c0.31		0.20	0.05			c0.30		
v/c Ratio	0.22	0.43		0.95	0.50	0.60	0.15	0.55		0.82	0.12	
Uniform Delay, d1	20.9	23.8		37.7	31.0	32.3	26.2	30.6		24.0	16.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		45.1	0.3	1.9	0.9	4.1		11.7	0.2	
Delay (s)	21.2	23.9		82.7	31.3	34.1	27.1	34.7		35.7	17.0	
Level of Service	C	C		F	C	C	C	C		D	B	
Approach Delay (s)		23.7			42.3			33.6			28.3	
Approach LOS		C			D			C			C	

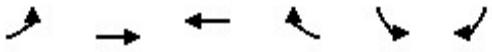
Intersection Summary			
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	114.5	Sum of lost time (s)	18.7
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	69	5	10	178	149	73
Future Volume (Veh/h)	69	5	10	178	149	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	75	5	11	193	162	79
Pedestrians				1		
Lane Width (m)				3.6		
Walking Speed (m/s)				1.2		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	416	202	241			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	416	202	241			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	99	99			
cM capacity (veh/h)	592	843	1337			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	80	204	241
Volume Left	75	11	0
Volume Right	5	0	79
cSH	603	1337	1700
Volume to Capacity	0.13	0.01	0.14
Queue Length 95th (m)	3.6	0.2	0.0
Control Delay (s)	11.9	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.9	0.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	69	33	65	72	42	49
Future Volume (Veh/h)	69	33	65	72	42	49
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)	75	36	71	78	46	53
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	151				298	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	151				298	112
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				93	94
cM capacity (veh/h)	1415				659	939

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	75	36	149	46	53
Volume Left	75	0	0	46	0
Volume Right	0	0	78	0	53
cSH	1415	1700	1700	659	939
Volume to Capacity	0.05	0.02	0.09	0.07	0.06
Queue Length 95th (m)	1.3	0.0	0.0	1.8	1.4
Control Delay (s)	7.7	0.0	0.0	10.9	9.1
Lane LOS	A			B	A
Approach Delay (s)	5.2		0.0	9.9	
Approach LOS				A	

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	14	247	1	25	227
Future Volume (Veh/h)	1	14	247	1	25	227
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	15	268	1	27	247
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			47			
pX, platoon unblocked						
vC, conflicting volume	570	268			269	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	570	268			269	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			98	
cM capacity (veh/h)	473	770			1295	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	16	269	274
Volume Left	1	0	27
Volume Right	15	1	0
cSH	741	1700	1295
Volume to Capacity	0.02	0.16	0.02
Queue Length 95th (m)	0.5	0.0	0.5
Control Delay (s)	10.0	0.0	0.9
Lane LOS	A		A
Approach Delay (s)	10.0	0.0	0.9
Approach LOS	A		

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		42.0%	ICU Level of Service
Analysis Period (min)		15	

A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	5	243	4	8	220
Future Volume (Veh/h)	2	5	243	4	8	220
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	5	264	4	9	239
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			45			
pX, platoon unblocked						
vC, conflicting volume	523	266			268	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	523	266			268	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	511	773			1296	

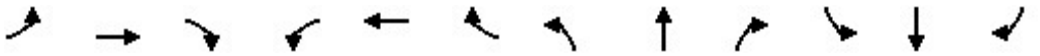
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	268	248
Volume Left	2	0	9
Volume Right	5	4	0
cSH	674	1700	1296
Volume to Capacity	0.01	0.16	0.01
Queue Length 95th (m)	0.3	0.0	0.2
Control Delay (s)	10.4	0.0	0.3
Lane LOS	B		A
Approach Delay (s)	10.4	0.0	0.3
Approach LOS	B		

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization		29.6%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	92	505	73	341	251	90	390	401	283
v/c Ratio	0.37	0.64	0.57	0.61	0.64	0.20	0.57	0.68	0.15
Control Delay	29.8	35.0	54.6	42.0	19.9	20.0	21.0	16.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	35.0	54.6	42.0	19.9	20.0	21.0	16.4	4.0
Queue Length 50th (m)	13.6	45.2	13.5	33.5	12.7	10.5	44.4	32.3	4.3
Queue Length 95th (m)	25.7	61.8	28.8	48.1	38.3	24.7	86.6	#64.9	11.8
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	247	1582	301	1289	669	441	686	586	1853
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	0.37	0.32	0.24	0.26	0.38	0.20	0.57	0.68	0.15

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)	85	419	46	67	314	231	83	138	221	369	107	154
Future Volume (vph)	85	419	46	67	314	231	83	138	221	369	107	154
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1606	3147		1511	3167	1394	1643	1463		1645	2893	
Flt Permitted	0.40	1.00		0.47	1.00	1.00	0.58	1.00		0.39	1.00	
Satd. Flow (perm)	670	3147		742	3167	1394	1000	1463		682	2893	
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)	92	455	50	73	341	251	90	150	240	401	116	167
RTOR Reduction (vph)	0	9	0	0	0	148	0	42	0	0	64	0
Lane Group Flow (vph)	92	496	0	73	341	103	90	348	0	401	219	0
Confl. Peds. (#/hr)	20					20	4		5	5		4
Heavy Vehicles (%)	3%	4%	5%	10%	5%	2%	1%	10%	6%	1%	5%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	24.6	24.6		16.9	16.9	16.9	42.5	42.5		59.6	59.6	
Effective Green, g (s)	24.6	24.6		16.9	16.9	16.9	42.5	42.5		59.6	59.6	
Actuated g/C Ratio	0.25	0.25		0.17	0.17	0.17	0.44	0.44		0.62	0.62	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	215	798		129	552	243	438	641		559	1779	
v/s Ratio Prot	0.02	c0.16			0.11			0.24		c0.10	0.08	
v/s Ratio Perm	0.09			0.10		0.07	0.09			c0.34		
v/c Ratio	0.43	0.62		0.57	0.62	0.42	0.21	0.54		0.72	0.12	
Uniform Delay, d1	28.8	32.0		36.6	37.0	35.7	16.8	20.1		10.8	7.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.3		4.6	1.8	0.9	1.1	3.3		4.1	0.1	
Delay (s)	29.8	33.3		41.2	38.8	36.5	17.8	23.3		14.8	7.9	
Level of Service	C	C		D	D	D	B	C		B	A	
Approach Delay (s)		32.8			38.2			22.3			12.0	
Approach LOS		C			D			C			B	

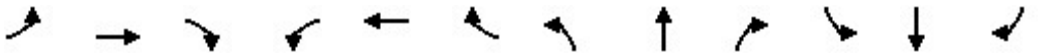
Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	96.9	Sum of lost time (s)	18.7
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	591	229	541	408	54	336	339	220
v/c Ratio	0.22	0.46	0.93	0.49	0.67	0.14	0.56	0.75	0.14
Control Delay	19.8	25.1	79.9	31.2	21.9	29.5	28.2	32.2	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	25.1	79.9	31.2	21.9	29.5	28.2	32.2	10.3
Queue Length 50th (m)	9.0	50.8	52.1	53.3	43.1	9.4	53.0	53.0	8.8
Queue Length 95th (m)	17.7	66.4	#101.1	70.1	79.6	19.9	85.6	#88.5	16.5
Internal Link Dist (m)		484.4		528.2			624.0		280.6
Turn Bay Length (m)	30.0		40.0		15.0	25.0		140.0	
Base Capacity (vph)	306	1529	285	1283	678	375	596	454	1523
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	0.22	0.39	0.80	0.42	0.60	0.14	0.56	0.75	0.14

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)	62	496	48	211	498	375	50	112	197	312	112	90
Future Volume (vph)	62	496	48	211	498	375	50	112	197	312	112	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3239		1628	3292	1437	1628	1532		1662	3013	
Flt Permitted	0.33	1.00		0.43	1.00	1.00	0.61	1.00		0.38	1.00	
Satd. Flow (perm)	581	3239		731	3292	1437	1052	1532		671	3013	
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)	67	539	52	229	541	408	54	122	214	339	122	98
RTOR Reduction (vph)	0	7	0	0	0	129	0	51	0	0	50	0
Lane Group Flow (vph)	67	584	0	229	541	279	54	285	0	339	170	0
Confl. Peds. (#/hr)	3		2	2		3	2		3	3		2
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	2%	3%	2%	0%	1%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	45.7	45.7		38.1	38.1	38.1	40.3	40.3		55.3	55.3	
Effective Green, g (s)	45.7	45.7		38.1	38.1	38.1	40.3	40.3		55.3	55.3	
Actuated g/C Ratio	0.40	0.40		0.34	0.34	0.34	0.35	0.35		0.49	0.49	
Clearance Time (s)	3.0	6.4		6.4	6.4	6.4	6.3	6.3		3.0	6.3	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	277	1301		244	1103	481	372	543		430	1465	
v/s Ratio Prot	0.01	c0.18			0.16			0.19		c0.08	0.06	
v/s Ratio Perm	0.09			c0.31		0.19	0.05			c0.30		
v/c Ratio	0.24	0.45		0.94	0.49	0.58	0.15	0.52		0.79	0.12	
Uniform Delay, d1	21.7	24.8		36.7	30.1	31.2	25.0	29.1		22.4	15.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		40.6	0.3	1.5	0.8	3.6		9.0	0.2	
Delay (s)	22.1	25.0		77.2	30.3	32.7	25.8	32.7		31.3	16.1	
Level of Service	C	C		E	C	C	C	C		C	B	
Approach Delay (s)		24.7			40.3			31.8			25.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	113.7	Sum of lost time (s)	18.7
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group