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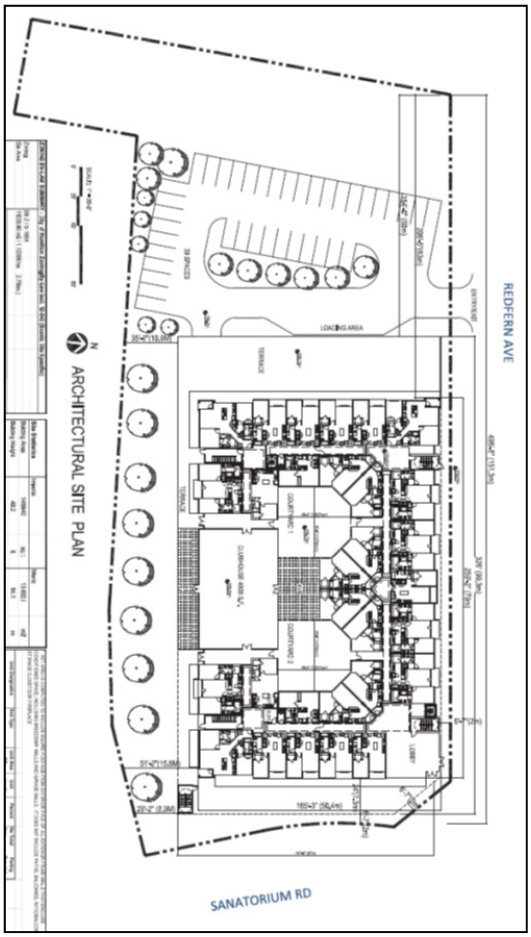
1 Redfern Ave
Traffic Impact Study



Prepared for:

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April 2015

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Project Summary

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Report Date: ..... April 2015
Project Number: 142220

Executive Summary

Content

This report summarizes the traffic impact study prepared for a proposed residential development to be located at 1 Redfern Avenue in the City of Hamilton, Ontario. The report includes an assessment of the impact of traffic related to the development on the adjacent roadways and provides recommendations to accommodate this traffic in a safe and efficient manner.

The subject site encompasses a 1.12 hectare (2.78 acre) parcel of land and is proposed to include up to 144 residential apartment units in a 4-storey building. A total of 216 parking spaces are proposed to serve the parking demands of the site.

Vehicular access to the subject site is proposed via one all-turns roadway connection to Redfern Avenue.

Conclusions

The conclusions of this report are as follows:

Existing Conditions

- The intersections within the study area are currently operating within overall acceptable levels of service with minimal delay and congestion during the AM and PM peak hours;
- The intersection of Scenic Drive/Fennell Avenue West and Garth Street is experiencing congestion on the northbound right turn movement during the AM peak hour and on the westbound left turn movement during the PM peak hour.

Site Generated Traffic

- Upon completion, the development will generate a total of 74 AM peak hour trips and 97 PM peak hour trips.

Background Conditions (2022)

- The intersections within the study area will continue to operate within overall acceptable levels of service during the AM and PM peak hours upon reaching the 2022 background traffic volumes;
- The eastbound left turn movement at the intersection of Mohawk Road and Rice Avenue is forecast to operate at LOS E during the AM peak hour and LOS F during the PM peak hour with a v/c ratios greater than 1.0;
- Several movements at the intersection of Garth Street and Scenic Drive/Fennell Avenue West will operate at LOS E or worse during the AM peak hour with v/c ratios greater than 0.95 indicating congestion on these movements;
- The westbound left turn movement on Fennell Avenue at Garth Street is forecast to operate at LOS F during the PM peak hour with a v/c ratio of 1.18 indicating this movement will be over capacity.

Future Total Conditions (2022)

- The intersections within the study area will continue to operate with overall acceptable levels of service with minimal delay during the AM and PM peak hours upon reaching the 2022 future total traffic volumes;
- The eastbound left turn movement on Mohawk Road at Rice Avenue is forecast to operate at LOS E during the AM peak hour with a v/c ratio of 1.03. During the PM peak hour this movement will operate at LOS F with a v/c ratio of 1.67 indicating the movement will be over capacity; and
- Several movements at the intersection of Garth Street and Scenic Drive/Fennell Avenue West will operate at LOS E or worse during the AM peak hour with v/c ratios greater than 0.95 indicating congestion on these movements;
- The westbound left turn movement on Fennell Avenue at Garth Street is forecast to operate at LOS F during the PM peak hour with a v/c ratio of 1.21 indicating this movement will be over capacity.

Overall Site Impact

- The greatest impact to the overall levels of service at the study area intersections occurs under the background traffic conditions;
- Inclusion of the site generated traffic has a much lower degree of impact to the overall traffic operations at the study area signalized intersections than the background traffic condition;
- If the site is developed with the permitted 80 units, the traffic at the critical study area intersections will increase by about 1% during the peak hours and if the site is developed with the proposed 144 units, the traffic at the critical study area intersections will increase by about 2.5% during the peak hours; and
- The traffic increase that will occur if the site develops with the proposed 144 units can be accommodated on the roadway network without the need for additional improvements beyond those identified to accommodate the background traffic.

Need for Improvements

- An additional eastbound left turn lane (dual left turns) will be required on Scenic Drive at Garth Street upon reaching the future background traffic volumes; and
- Signal timing and phasing changes will be required at the signalized study area intersections in order to provide acceptable levels of service for all movements.

RECOMMENDATIONS

The main recommendations of this report are as follows:

- The site should be allowed to develop as planned with the following improvements:
    - A shared left turn/right turn lane should be provided for the outbound movements on the proposed site access;
    - Stop sign control should be provided at the proposed site driveway connection to Redfern Avenue; and

- Continue to monitor the performance of the study area signalized intersections and adjust signal timings and phasing as required.

- The dual eastbound left turn lane should be provided on Scenic Drive at Garth Street if the background traffic volumes outlined herein are realized; and

- The City should monitor and adjust the signal timing and phasing plans for the signalized intersections within the study area in order to continue to provide acceptable levels of service and delay for the critical movements, including the provision of an eastbound left turn protected/permitted phase on Mohawk Road West at Rice Avenue.

Contents

1.0 Introduction 1

1.1 Overview 1
1.2 Study Purpose and Scope 1
1.3 Study Area Intersections 1

2.0 Existing Conditions 3

2.1 Road Network 3
2.2 Existing Parking Regulations 3
2.3 Existing Transit Network 4
2.4 Existing Bicycle Facilities 5
2.5 Existing Traffic Volumes 9
2.6 Existing Traffic Operations 12

3.0 Development Information 14

3.1 Development Concept 14
3.2 Site Trip Generation 14
3.3 Trip Distribution and Assignment 16

4.0 Assessment of Future Traffic Conditions 21

4.1 Background Traffic Volumes 21
4.2 Background Traffic Operations 21
4.3 Future Total Traffic Operations 26
4.4 Overall Site Impacts 28

5.0 Need for Improvements 31

5.1 Road Network Improvements 31
5.1.1 Left-turn Lanes 31
5.1.2 Traffic Control Signals 31
5.2 Intersection Improvements 31
5.2.1 Background Traffic Operations with Improvements 31
5.2.2 Future Total Traffic Operations with Improvements 32

6.0 Land Use Comparison 34

6.1 Trip Generation Comparison 34
6.2 Operational Impacts Comparison 34

7.0 Conclusions and Recommendations 35

7.1 Conclusions 35
7.2 Recommendations 36

Appendices

Appendix A – Turning Movement Count Data

Appendix B – Existing Peak Hour Traffic Operations

Appendix C – Chedoke Browlands Traffic Assignment

Appendix D – 2022 Background Peak Hour Traffic Operations

Appendix E – 2022 Future Total Peak Hour Traffic Operations

Appendix F – Left Turn Lane Warrants

Appendix G – Traffic Control Signal Warrants

Appendix H – 2022 Background Peak Hour Traffic Operations with Improvements

Appendix I – 2022 Future Total Peak Hour Traffic Operations with Improvements

Figures

Figure 1.1: Development Location 2
Figure 2.1: Existing Lane Configuration and Traffic Control 6
Figure 2.2: Existing Transit Network 7
Figure 2.3: Existing Cycling Facilities 8
Figure 2.4a: Existing AM Peak Hour Traffic Volumes 10
Figure 2.4b: Existing PM Peak Hour Traffic Volumes 11
Figure 3.1: Proposed Site Plan 15
Figure 3.2a: AM Peak Hour Trip Distribution 17
Figure 3.2b: PM Peak Hour Trip Distribution 18
Figure 3.3a: AM Peak Hour Site Generated Trips 19
Figure 3.3b: PM Peak Hour Site Generated Trips 20
Figure 4.1a: Background AM Peak Hour Traffic Volumes 23
Figure 4.1b: Background PM Peak Hour Traffic Volumes 24
Figure 4.2a: Future Total AM Peak Hour Traffic Volumes 27
Figure 4.2b: Future Total PM Peak Hour Traffic Volumes 28

Tables

Table 2.1: Existing Peak Hour Traffic Operations 13
Table 3.1: Estimated Trip Generation 16
Table 3.2: Site Trip Distribution 16
Table 4.1: 2022 Background Peak Hour Traffic Operations 25
Table 4.2a: 2022 Future Total AM Peak Hour Traffic Operations 29
Table 4.2b: 2022 Future Total PM Peak Hour Traffic Operations 30
Table 5.1: Background Traffic Operations with Improvements 32
Table 5.2: Future Total Traffic Operations with Improvements 33
Table 6.1: Trip Generation Comparison 34

1.0 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (PTSL) has been retained by T. Johns Consulting Group Ltd. to undertake a traffic impact study for a proposed residential development to be located at 1 Redfern Avenue in the City of Hamilton, Ontario. The subject site encompasses a 1.12 hectare (2.78 acre) parcel of land and is proposed to include a 4 storey apartment building with a total of 144 residential apartment units. A total of 216 parking spaces are proposed to serve the parking demands of the site. Development and occupancy is expected to occur in 2017.

Vehicular access to the subject site is proposed via one all-turns roadway connection to Redfern Avenue.

The location of the subject site is shown in **Figure 1.1**.

1.2 Study Purpose and Scope

The purpose of this study is to assess the impact of the subject site on the adjacent road network and to determine the improvements required (if any) due to the increase in traffic due to the proposed development. The scope of this study includes determination of the current traffic conditions in the vicinity of the development, the additional traffic that may be generated by the development, analyses of the impact of the traffic, and recommendations on the measures required in order to accommodate the traffic needs in a satisfactory manner.

The horizon year assessed within is the year 2022 which is five years beyond opening/completion as per the City of Hamilton's Traffic Impact Study Guidelines[1].

1.3 Study Area Intersections

Based on the pre-study consultation undertaken with City staff, the following have been identified as the intersections that are required to be investigated with respect to additional traffic due to this development:

- Mohawk Road West and Rice Avenue (signalized);
- Garth Street and Scenic Drive/Fennell Avenue West (signalized);
- Rice Avenue and Chedmac Drive (one-way stop control);
- Rice Avenue and Sanatorium Road (all-way stop control);
- Sanatorium Road and Redfern Avenue (one-way stop control);
- Sanatorium Road and Scenic Drive South (all-way stop control);
- Sanatorium Road and Scenic Drive North (one-way stop control);
- Scenic Drive and Upper Paradise Road (all-way stop control); and
- The proposed roadway connection to Redfern Avenue.

[1] Traffic Impact Study Guidelines, City of Hamilton, July 2009

Source: Google Earth

1 Redfern Avenue
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Figure 1.1
Development Location

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2.0 Existing Conditions

2.1 Road Network

Redfern Avenue, Sanatorium Road, Mohawk Road, Upper Paradise Road, Scenic Drive, Rice Avenue, and Chedmac Drive are the roadways within the study area that will be most impacted by the proposed development. The roadways are described generally as follows:

- **Redfern Avenue** is an east-west local roadway with an urban cross-section. The speed limit is not posted; therefore, it is assumed to be 50 kilometres per hour. Sidewalks are provided on both sides of the roadway within the study area.
- **Sanatorium Road** is a two-lane urban cross-section with on-street bicycle lanes on both sides of the roadway between the intersections of Sanatorium Road and Scenic Drive and Sanatorium Road and Rice Avenue. The posted speed limit is 50 kilometres per hour with a 40 kilometres per hour zone in front of Holbrook Junior Public School. Sidewalks are provided on both sides of the roadway except for the east side of Sanatorium Road, north of Scenic Drive.
- **Mohawk Road** is an east-west arterial roadway with a four-lane urban cross-section. The posted speed limit is 50 kilometres per hour with a flashing 40 kilometres per hour area that begins east of Upper Paradise Road and terminates east of Rice Avenue. Sidewalks are provided on both sides of the roadway.
- **Upper Paradise Road** is a north-south arterial roadway with a two-lane urban cross-section. On-street bicycle lanes are provided on both sides of the roadway between Scenic Drive and Stone Church Road. The posted speed limit is 50 kilometres per hour. Sidewalks are provided on both sides of the roadway within the study area.
- **Scenic Drive** is a two-lane arterial roadway with an urban cross-section. The speed limit is not posted; therefore, it is assumed to be 50 kilometres per hour. Sidewalks are only provided on the south side of the roadway west of Upper Paradise Road. East of Upper Paradise Road sidewalks are not provided on either side of the roadway.
- **Rice Avenue** is a four-lane collector roadway with an urban cross-section. The speed limit is not posted; therefore, it is assumed to be 50 kilometres per hour. Sidewalks are provided on both sides of the roadway within the study area until the area of 60 Rice Avenue, at which point a sidewalk is only provided on the west side of the roadway.
- **Chedmac Drive** is an east-west two-lane local roadway that becomes a north-south roadway at its intersection with Southridge Drive. The speed limit is not posted; therefore, it is assumed to be 50 kilometres per hour. Sidewalks are provided on both sides of the roadway with the exception of the north side of Chedmac Drive between Rice Avenue and Southridge Drive.

The existing lane configurations and traffic control are shown in **Figure 2.1**.

2.2 Existing Parking Regulations

The parking regulations within the study area are as follows:

Redfern Avenue

Parking is prohibited on the south side of Redfern Avenue. One-hour parking between 8 AM and 8 PM Monday through Friday is permitted on the north side of Redfern Avenue between Sanatorium Road and Jewel Street. One-hour parking between 8 AM and 4PM Monday through Friday is permitted on the north side of Redfern Avenue between Jewel Street and Chedmac Drive.

Sanatorium Road

Within the study area, parking is prohibited between the hours of 7:00 AM and 6:00 PM Monday through Friday on the west side of the north-south section of roadway. Parking is prohibited on the south side of the east-west portion of the roadway. In the absence of posted parking regulations on the north side of the east-west portion of the roadway, it is assumed that parking is permitted and is subject to standard City of Hamilton parking regulations.

Mohawk Road

Within the study area, parking is prohibited on both sides of the roadway.

Upper Paradise Road

Within the study area, parking is prohibited on the west side of the roadway. The east side of the roadway is signed "No Parking Snow Route". In the absence of other posted parking regulations on the east side of the roadway it is assumed that parking is permitted and subject to standard City of Hamilton parking regulations.

Scenic Drive

Within the study area, parking is prohibited on both sides of the roadway.

Rice Avenue

Parking is prohibited on the east side of Rice Avenue. The west side of the roadway, from 100 Rice Avenue to a point approximately 75 metres to the north, is signed "No Parking Snow Route". Parking is prohibited on the west side of the roadway from this point northward.

Chedmac Drive

Throughout the study area parking is prohibited both sides of the roadway.

2.3 Existing Transit Network

The Hamilton Street Railway (HSR) operates two transit routes that provide service adjacent to the proposed site: Route 33 Sanatorium and Route 41 Mohawk. Service is provided seven days per week and is as follows:

Route 33 – Sanatorium

- Weekday service operates from approximately 5:20 AM to 1:45AM. Peak hour headways are generally in the order of 15 minutes. Off-peak headways range between 20 and 60 minutes depending on time of day;

- Saturday service operates from approximately 5:45 AM to 2:00 AM. Peak hour headways are typically 30 minutes and off-peak headways are generally 60 minutes; and

- Sunday service is provided from about 6:30 AM to 12:30 AM. Headways are in the order of 30 to 60 minutes throughout the service day.

The westbound bus stops closest to the subject site are located on Sanatorium Road opposite Redfern Avenue approximately 70 metres east of the site and on Redfern Avenue opposite St. Peters Residence at Chedoke approximately 340 metres west of the proposed site. The eastbound bus stops closest to the subject site are located on Scenic Drive East approximately 165 metres east of the site and on Redfern Avenue at Chedmac Drive approximately 460 metres west of the site.

Route 41 – Mohawk

- Weekday service operates from approximately 4:30 AM to 2:00 AM. Peak hour headways are generally in the order of 13 to 30 minutes. Off-peak headways range between 20 and 40 minutes depending on time of day;

- Saturday service operates from approximately 4:50 AM to 1:45 AM. Peak hour headways are typically 18 to 40 minutes and off-peak headways are generally 18 to 60 minutes; and

- Sunday service is provided from about 5:30 AM to 12:30 AM. Headways are in the order of 28 to 60 minutes throughout the service day.

The closest westbound bus stop located on Sanatorium Road opposite Redfern Avenue approximately 70 metres east of the site. The closest eastbound bus stop is located on Sanatorium Road at Scenic Drive East approximately 165 metres east of the site.

The bus route and stop location information is shown in **Figure 2.2**.

2.4 Existing Bicycle Facilities

As noted in **Section 2.1**, bicycle lanes are located on both sides of Sanatorium Road between Rice Avenue and Scenic Drive. These lanes are relatively new and were implemented during the reconstruction of Sanatorium Road. Other cycling facilities in the area include signed on-street bike routes on Rice Avenue and Scenic Drive. Further east on Scenic Drive there are unsigned paved shoulders that cyclists are able to use. According to the City of Hamilton's Urban Bike Routes, Trails, and Parks Map, Mohawk Road West is identified as a cautionary unsigned bike route from west of Scenic Drive until Upper Paradise Road. The cycling facilities outlined herein connect with other routes in the City that provide additional options for north-south and east-west bicycle travel. The existing bicycle facilities are shown in **Figure 2.3**.

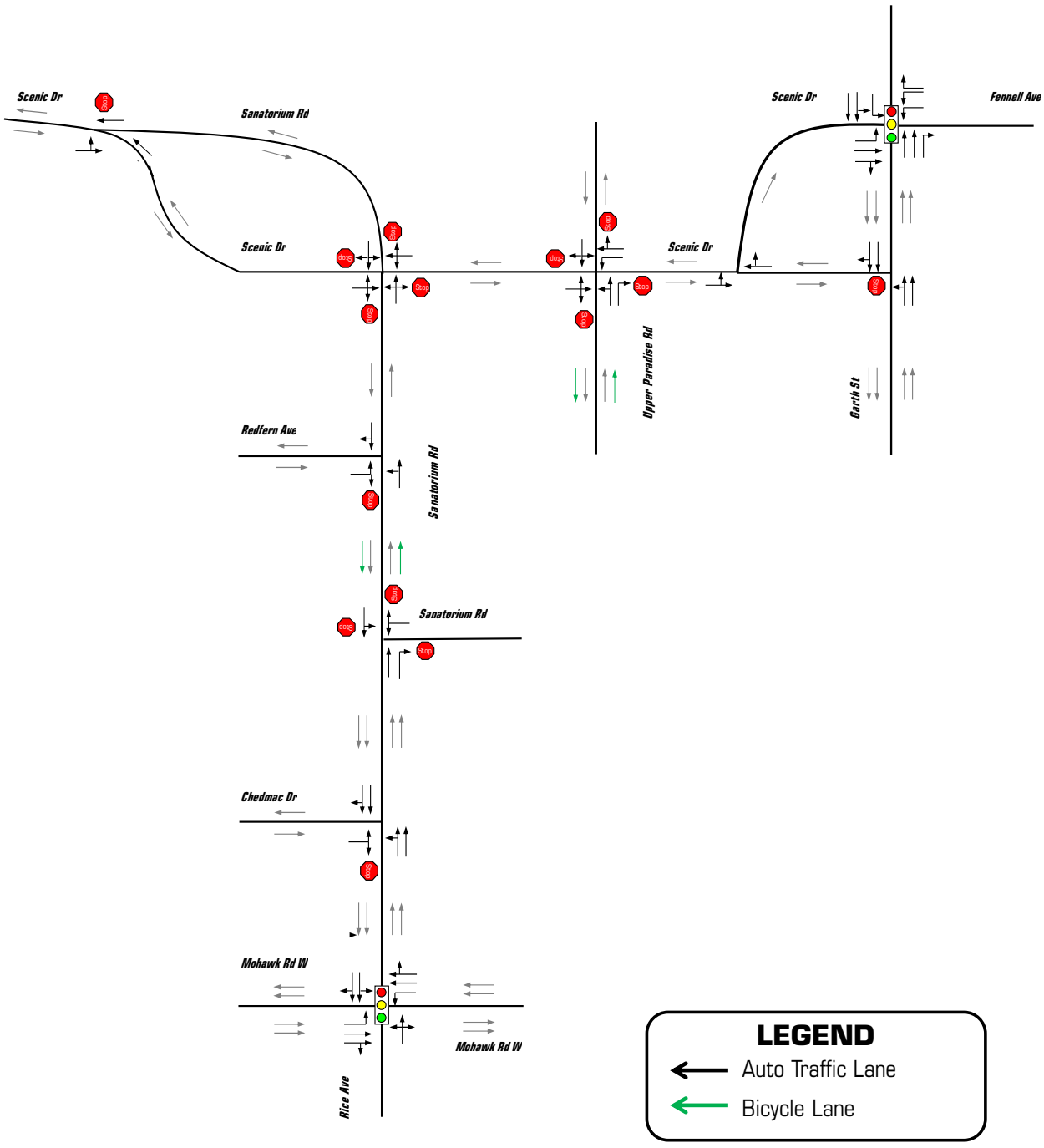

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Figure 2.1
Existing Lane Configuration and Traffic Control

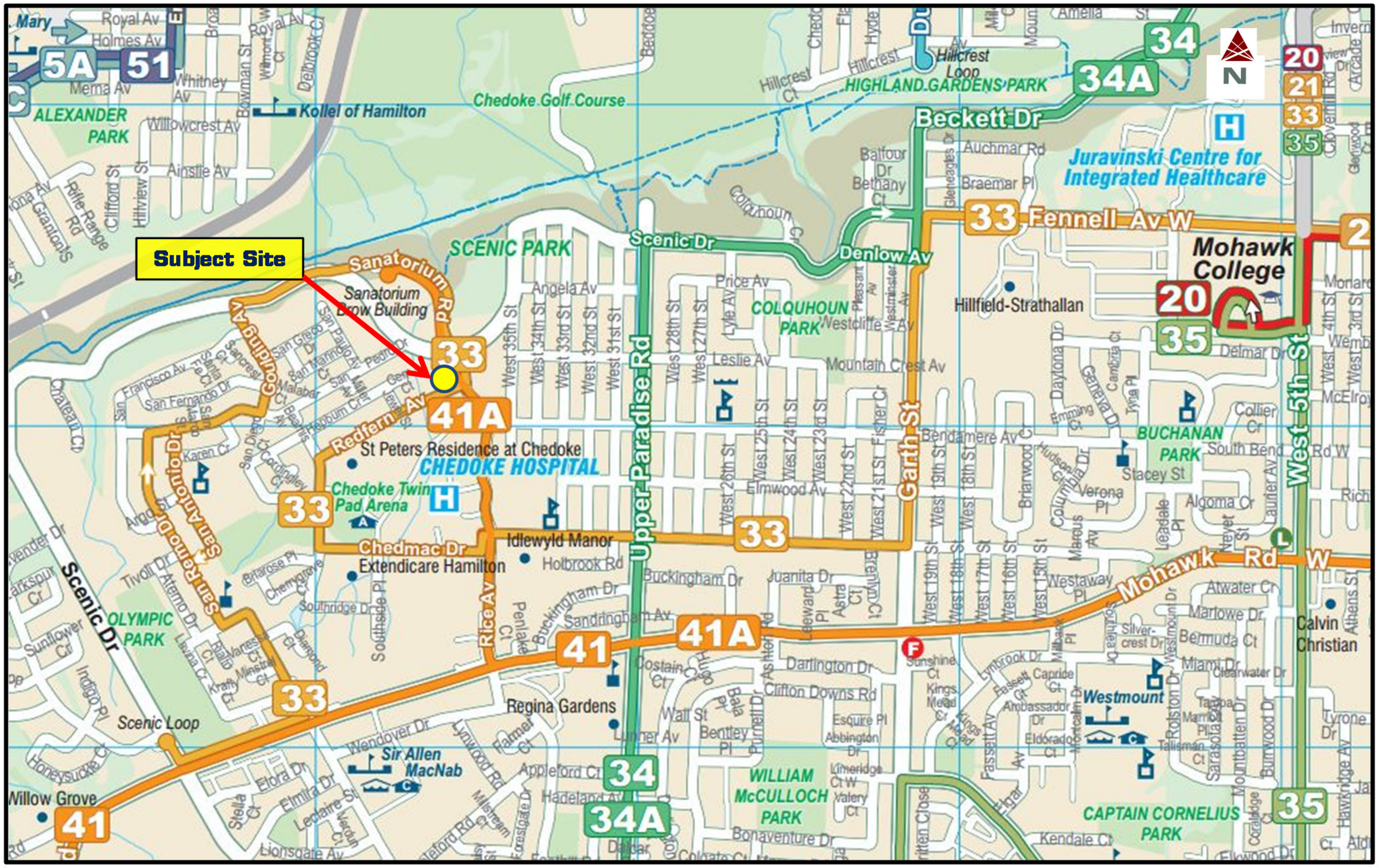

Figure 2.2
Existing Transit Network

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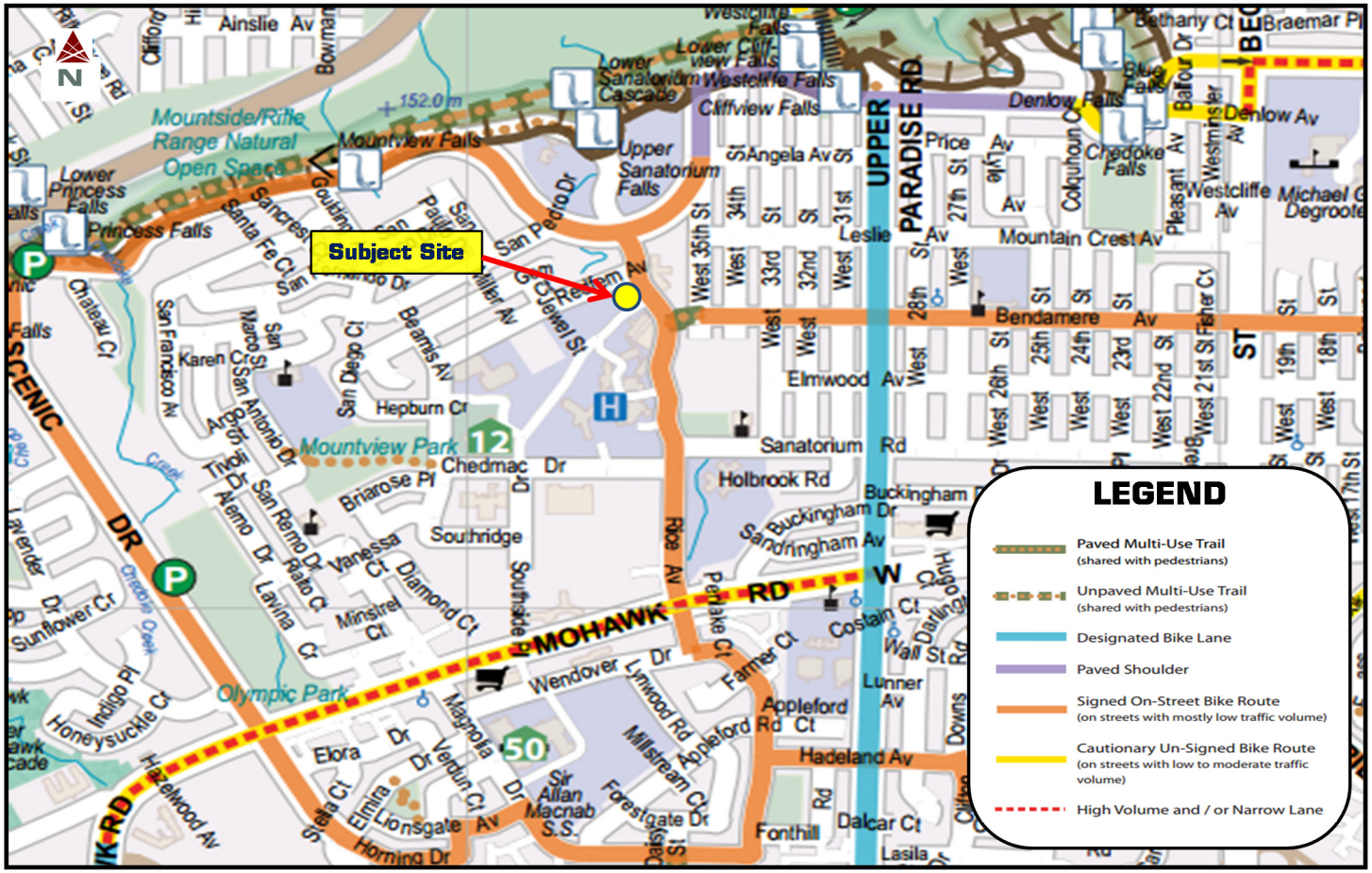

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Figure 2.3
Existing Cycling Facilities

2.5 Existing Traffic Volumes

Weekday AM, mid-day and PM peak hour traffic counts were conducted by Paradigm using Miovision camera equipment during the hours of 7 AM to 9 AM, 11 AM to 2 PM, and 3 PM to 6 PM on the following dates:

- Mohawk Road West and Rice Avenue (Tuesday January 13, 2015);
- Garth Street and Scenic Drive/Fennell Avenue West (Tuesday January 13, 2015);
- Rice Avenue and Chedmac Drive (Tuesday January 13, 2015);
- Rice Avenue and Sanatorium Road (Tuesday January 13, 2015);
- Scenic Drive and Upper Paradise Road (Tuesday January 13, 2015);
- Sanatorium Road and Redfern Avenue (Thursday January 15, 2015);
- Sanatorium Road and Scenic Drive South (Thursday January 15, 2015); and
- Sanatorium Road and Scenic Drive North (Thursday January 15, 2015).

Although not required, mid-day counts were conducted in the event that traffic control signal warrants would need to be conducted for the study area intersections. It must be noted that the PM count at Mohawk Road and Rice Avenue was interrupted by snow covering the camera lens. The gap in data was filled by a manual count starting from the time the lens was covered at 4:40 PM until 6:00 PM on Wednesday February 4, 2015. All count data is provided in Appendix A.

The existing AM and PM peak hour traffic volumes are shown in **Figure 2.4a** and **Figure 2.4b**. Note that these volumes are not balanced due to the urban nature of the area and the degree of likelihood that vehicles parked on the street or in residential driveways are arriving or departing during the peak hours which contributes to the inconsistencies between intersections.

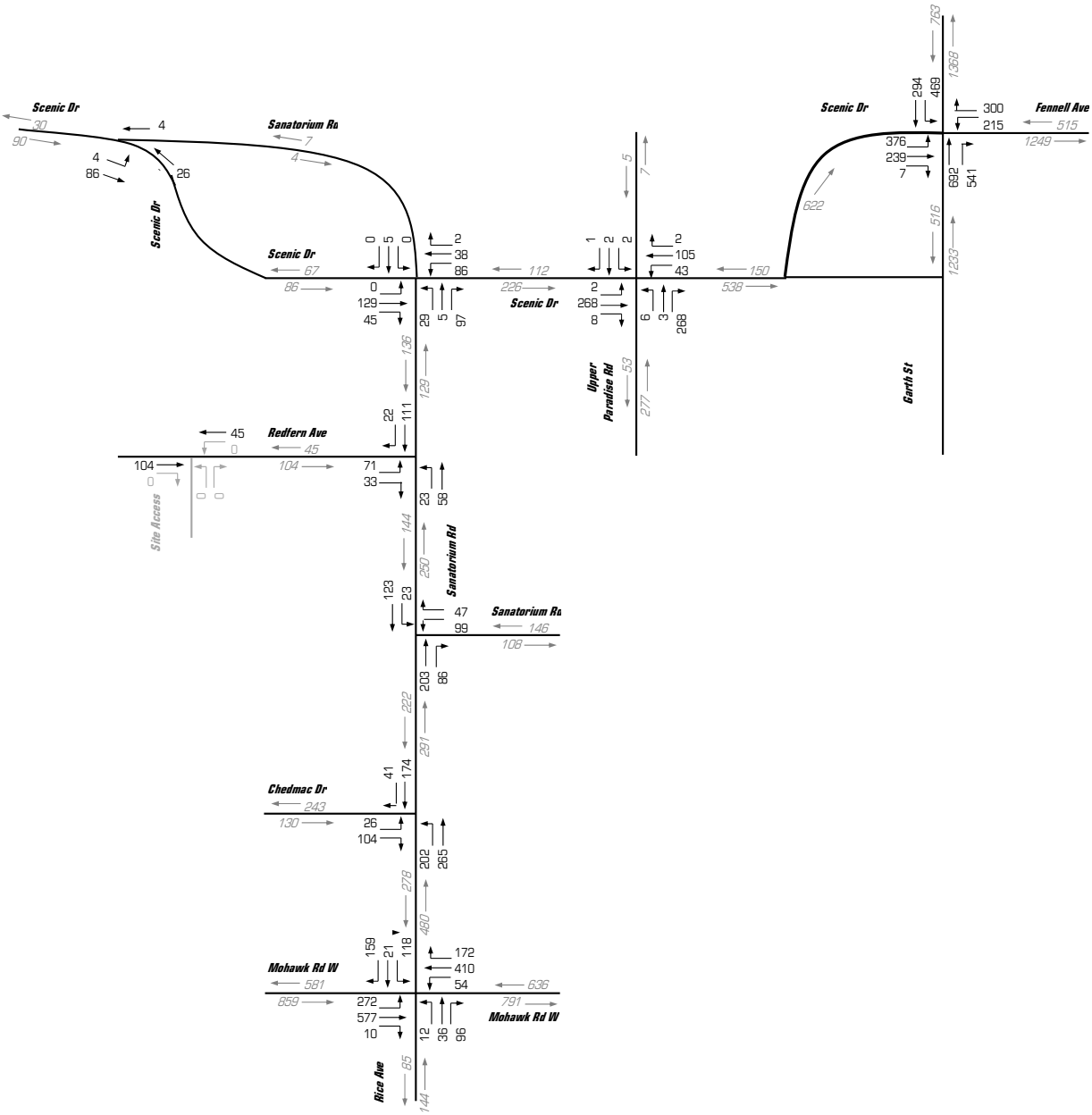

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Figure 2.4a

Existing AM Peak Hour Traffic Volumes

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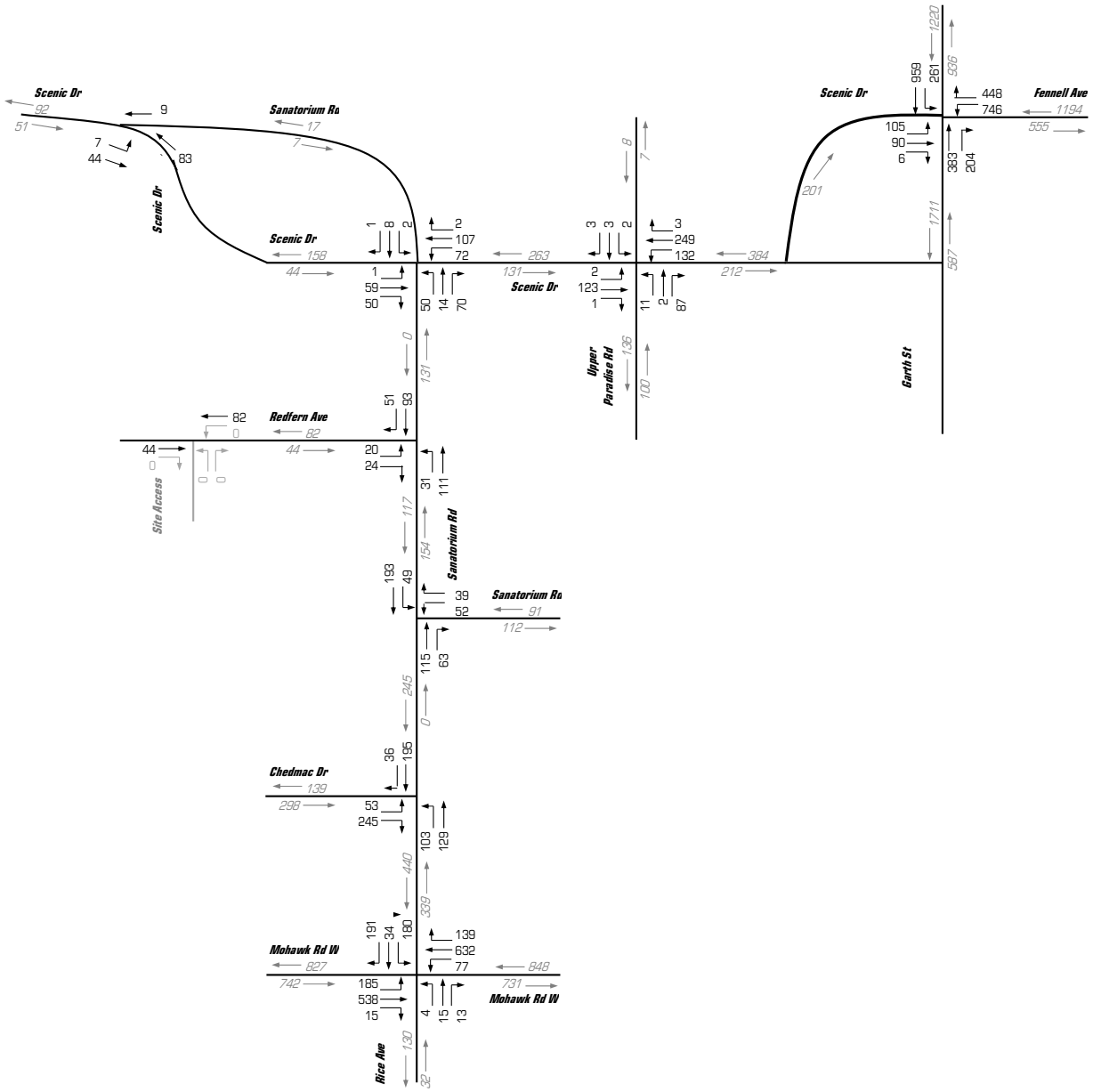

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Figure 2.4b

Existing PM Peak Hour Traffic Volumes

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2.6 Existing Traffic Operations

Intersection Level-of-Service (LOS) is a recognized method of quantifying the efficiency of traffic flow at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a particular movement compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10 seconds per vehicle at both signalized and unsignalized intersections. When the average delay exceeds 80 seconds at signalized intersections and 50 seconds at unsignalized intersections, the movement is classified as LOS F and remedial measures are usually implemented, if they are feasible.

The intersection analysis considered three separate measures of performance:

- The volume to capacity (v/c) ratio for each intersection;
- The level of service (LOS) for each turning movement. LOS is based on the average control delay per vehicle; and
- The 95th percentile queue lengths estimated using Synchro.

Synchro 9 level of service analyses were conducted on the existing traffic volumes for the study area intersections using the lane configurations and traffic control shown in **Figure 2.1**.

The existing intersection operations are summarized in **Table 2.1** and indicate:

- The intersections within the study area are currently operating with acceptable levels of service with minimal delay and congestion during the AM and PM peak hours;
- During the AM peak hour, the northbound right turn movement at the intersection of Garth Street and Scenic Drive/Fennell Avenue West is experiencing congestion as indicated by the v/c ratio of 0.90; and
- During the PM peak hour, the westbound left turn movement at the intersection of Scenic Drive/Fennell Ave West and Garth Street is experiencing congestion as indicated by the v/c ratio of 0.95.

Detailed Synchro 9 output is provided in Appendix B.

TABLE 2.1: EXISTING PEAK HOUR TRAFFIC OPERATIONS

Analysis Period	Control Type	Intersection	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				
				LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	OVERALL
Existing AM Peak Hour Traffic Operations		Mohawk Rd W & Rice Ave	LOS	C	B		**B**	B	B		**B**		B		**B**		B		**A**	**B**
			Delay	25	11		**15**	19	17		**17**		12		**12**		14			**16**
			V/C	0.76	0.37			0.23	0.50				0.33				0.45			**0.76**
			Queue, 95th (m)	47	40			15	49				21				22			
		Garth St & Scenic Dr/ Fennell Ave W	LOS	D	C		**D**	C		B	**B**		D	C	**D**	D	B		**C**	**C**
			Delay	44	35		**40**	24		15	**19**		43	30	**37**	36	18		**23**	**31**
			V/C	0.80	0.35			0.35		0.50			0.81	0.90		0.77	0.55			**0.90**
			Queue, 95th (m)	127	36			26		52			101	118		77	51			
		Rice Ave & Chedmac Dr	LOS	B		B						A	A				A	A		**A**
			Delay	14		14						2	2				0	0		**5**
			V/C	0.26		0.26						0.17	0.17				0.07	0.06		**0.26**
			Queue, 95th (m)	8		8						5	5				0	0		
		Rice Ave & Sanatorium Rd	LOS					A		A			A	A		A	A			**A**
			Delay					10		10			9	7		9	9			**9**
			V/C					0.22		0.22			0.31	0.12		0.22	0.22			**0.31**
			Queue, 95th (m)					0		0			0	0		0	0			
		Sanatorium Rd & Redfern Ave	LOS	B		B						A	A				A	A		**A**
			Delay	11		11						0	2				0	0		**4**
			V/C	0.15		0.15						0.02	0.02				0.09	0.09		**0.15**
			Queue, 95th (m)	4		4						0	0				0	0		
		Sanatorium Rd & Scenic Dr (S)	LOS		A				A				A				A			**A**
			Delay		9				9				8				9			**9**
			V/C		0.23				0.18				0.18				0.01			**0.23**
			Queue, 95th (m)		0				0				0				0			
		Sanatorium Rd & Scenic Dr (N)	LOS	A	A				A							A		A		**A**
			Delay	0	0				0							9		9		**1**
			V/C	0.00	0.00				0.02							0.01		0.01		**0.02**
			Queue, 95th (m)	0	0				0							0		0		
		Scenic Dr & Upper Paradise Rd	LOS		B			A	A	A		A	A	B			A			**B**
			Delay		14			9	9	9		8	8	11			9			**11**
			V/C		0.47			0.08	0.19	0.19		0.02	0.02	0.42			0.01			**0.47**
			Queue, 95th (m)		0			0	0	0		0	0	0			0			
Existing PM Peak Hour Traffic Operations		Mohawk Rd W & Rice Ave	LOS	D	B		**C**	B	B		**B**		B		**B**		B		**B**	**B**
			Delay	50	10		**20**	12	11		**11**		16		**16**		16		**16**	**16**
			V/C	0.85	0.35			0.25	0.49				0.08				0.54			**0.85**
			Queue, 95th (m)	69	36			15	52				9				31			
		Garth St & Scenic Dr/ Fennell Ave W	LOS	C	C		**C**	D		B	**D**		C	A	**C**	C	C		**C**	**C**
			Delay	21	27		**24**	51		11	**36**		33	7	**24**	25	26		**26**	**29**
			V/C	0.21	0.12			0.95		0.65			0.46	0.44		0.66	0.77			**0.95**
			Queue, 95th (m)	27	15			113		56			52	18		55	121			
		Rice Ave & Chedmac Dr	LOS	B		B						A	A				A	A		**A**
			Delay	14		14						1	2				0	0		**7**
			V/C	0.45		0.45						0.09	0.09				0.09	0.07		**0.45**
			Queue, 95th (m)	17		17						2	2				0	0		
		Rice Ave & Sanatorium Rd	LOS					A		A			A	A		A	A			**A**
			Delay					9		9			8	7		10	10			**9**
			V/C					0.14		0.14			0.18	0.08		0.34	0.34			**0.34**
			Queue, 95th (m)					0		0			0	0		0	0			
		Sanatorium Rd & Redfern Ave	LOS	B		B						A	A				A	A		**A**
			Delay	10		10						0	2				0	0		**2**
			V/C	0.06		0.06						0.02	0.02				0.09	0.09		**0.09**
			Queue, 95th (m)	2		2						1	1				0	0		
		Sanatorium Rd & Scenic Dr (S)	LOS		A				A				A				A			**A**
			Delay		8				9				9				9			**9**
			V/C		0.14				0.25				0.18				0.02			**0.25**
			Queue, 95th (m)		0				0				0				0			
		Sanatorium Rd & Scenic Dr (N)	LOS	A	A				A							A		A		**A**
			Delay	0	1				0							9		9		**1**
			V/C	0.01	0.01				0.05							0.01		0.01		**0.05**
			Queue, 95th (m)	0	0				0							0		0		
		Scenic Dr & Upper Paradise Rd	LOS		A			A	A	A		A	A	A			A			**A**
			Delay		10			9	10	10		8	8	8			9			**9**
			V/C		0.20			0.22	0.38	0.38		0.03	0.03	0.14			0.01			**0.38**
			Queue, 95th (m)		0			0	0	0		0	0	0			0			

3.0 Development Information

3.1 Development Concept

The proposed development is located at 1 Redfern Avenue in the City of Hamilton, Ontario. The subject site encompasses a 1.12 hectare (2.78 acre) parcel of land and is proposed to include up to 144 residential apartment units within a 4 storey building. A total of 216 parking spaces are proposed to serve the parking demands of the site. Development completion and occupancy is expected to occur in the year 2017.

Vehicular access to the site is proposed via one all-turns roadway connection to Redfern Avenue located approximately 100 metres west of the intersection of Redfern Avenue and Sanatorium Road.

The proposed site plan is shown in **Figure 3.1**.

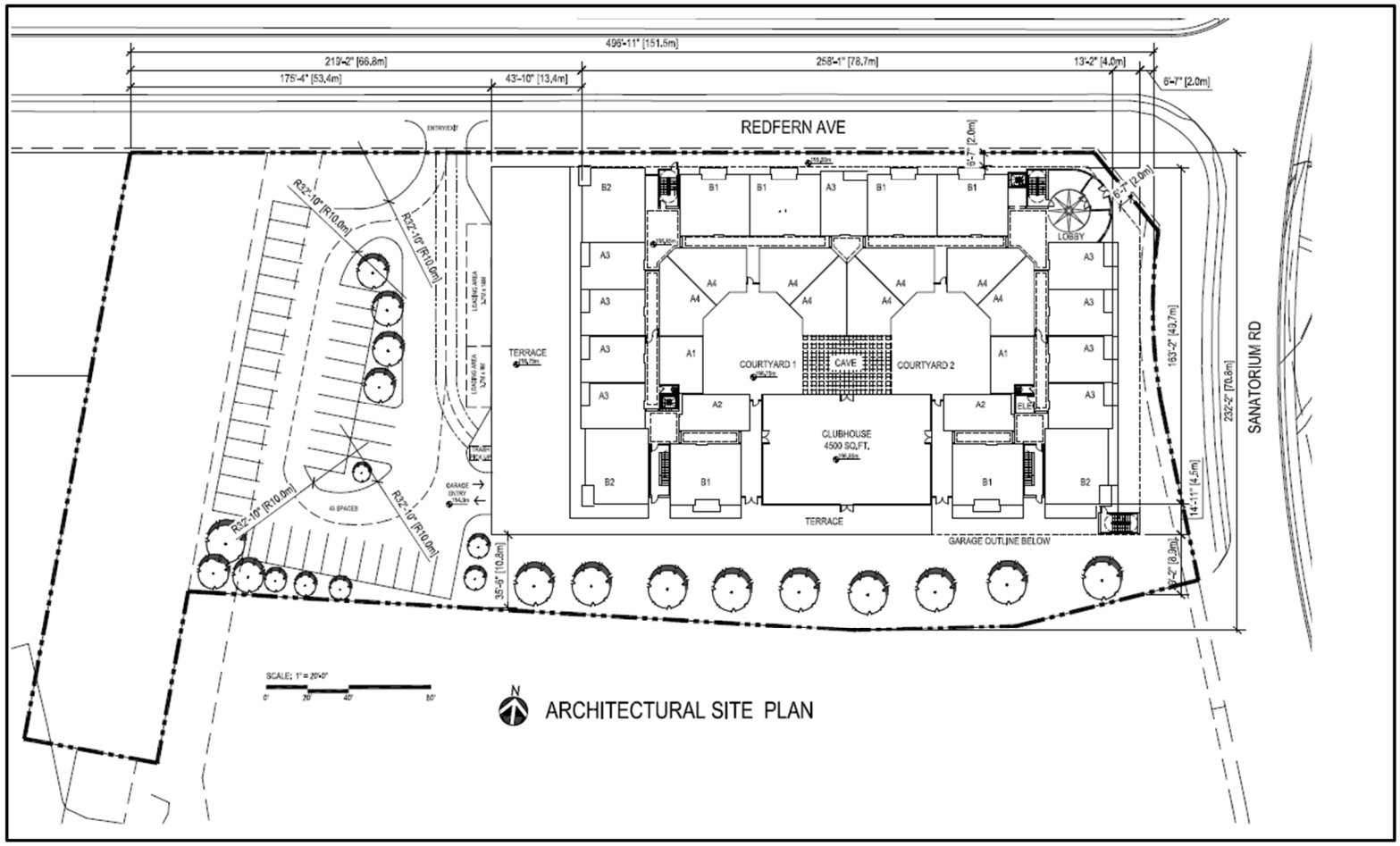
3.2 Site Trip Generation

The vehicle trips generated by the development were estimated for the AM and PM peak hours using the ITE Trip Generation[2] - Land Use Code (LUC) 220 Apartment. LUC 220 Apartment was used (versus LUC 223 Mid-Rise Apartment) in order to provide a more conservative estimate of trips generated by the site. In order to satisfy City requirements, both average and equation rates were used to determine the trip generation for the site. The trip generation is summarized in **Table 3.1** and indicates that at full build-out and occupancy:

- The site will generate a total of 74 AM peak hour trips and 89 PM peak hour trips based on the average rates; and
- The site will generate a total of 74 AM peak hour trips and 97 PM peak hour trips based on the equation rates.

The equation rates are used for the remainder of this report as all criteria for their use were met and as well they provide the most conservatives estimates of site generated traffic and the resulting impact to the roadway network.

[2] Trip Generation 9th Edition, Institute of Transportation Engineers, Washington D.C., 2012



1 Redfern Avenue
Traffic Impact Study

Figure 3.1
Proposed Site Plan

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TABLE 3.1: ESTIMATED TRIP GENERATION

1 Redfern Avenue Trip Generation Average Rates	No. of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 220 Apartment	144	0.51	15	59	74	0.62	58	31	89

1 Redfern Avenue Trip Generation Equation Rates	No. of Units	AM Peak Hour				PM Peak Hour			
		Equation	In	Out	Total	Equation	In	Out	Total
LUC 220 Apartment	144		15	59	74		63	34	97

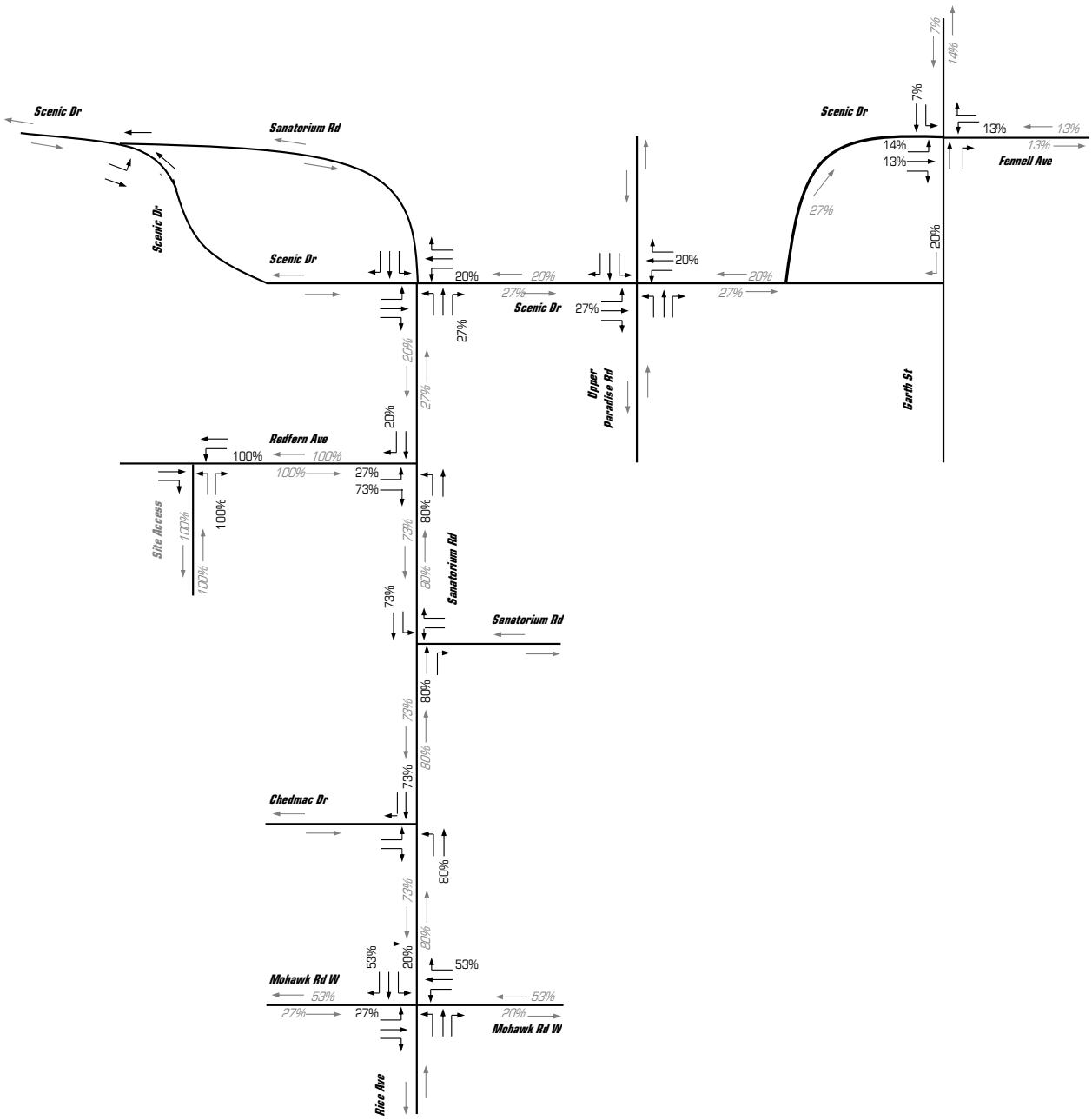
3.3 Trip Distribution and Assignment

The trips were assigned to the road network based on the 2011 Transportation Tomorrow Survey[3] (TTS) and engineering judgment. The TTS data is compiled from *"a time series telephone survey on travel behaviours in the greater Toronto and surrounding are. Data are categorized into household, person and trip tables."* The data is structured so that it can be accessed by traffic analysis zone (TAZ) and by time of day in order to produce more accurate and site specific results. The data was queried to display results for all inbound and outbound trips between the subject site TAZ (5133), the remaining TAZs within Hamilton, and the remaining TTS regional municipalities. The trip distribution is summarized in **Table 3.2** and shown graphically in **Figure 3.2a** and **Figure 3.2b**. The resulting site generated trip assignment is shown in **Figure 3.3a** and **Figure 3.3b**.

TABLE 3.2: SITE TRIP DISTRIBUTION

Route	Direction (From/To)	AM Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound
Sanatorium Rd	North	20%	27%	43%	23%
Beckett Dr/Queen St	North	7%	14%	16%	7%
Fennell Ave	East	13%	13%	27%	16%
Sanatorium Rd	South	80%	73%	57%	77%
Mohawk Rd	East	53%	20%	29%	32%
Mohawk Rd	West	27%	53%	28%	45%
Total		**100%**	**100%**	**100%**	**100%**

[3] www.jpint.utoronto.ca/drs



1 Redfern Avenue
Traffic Impact Study

Figure 3.2a
AM Peak Hour Trip Distribution

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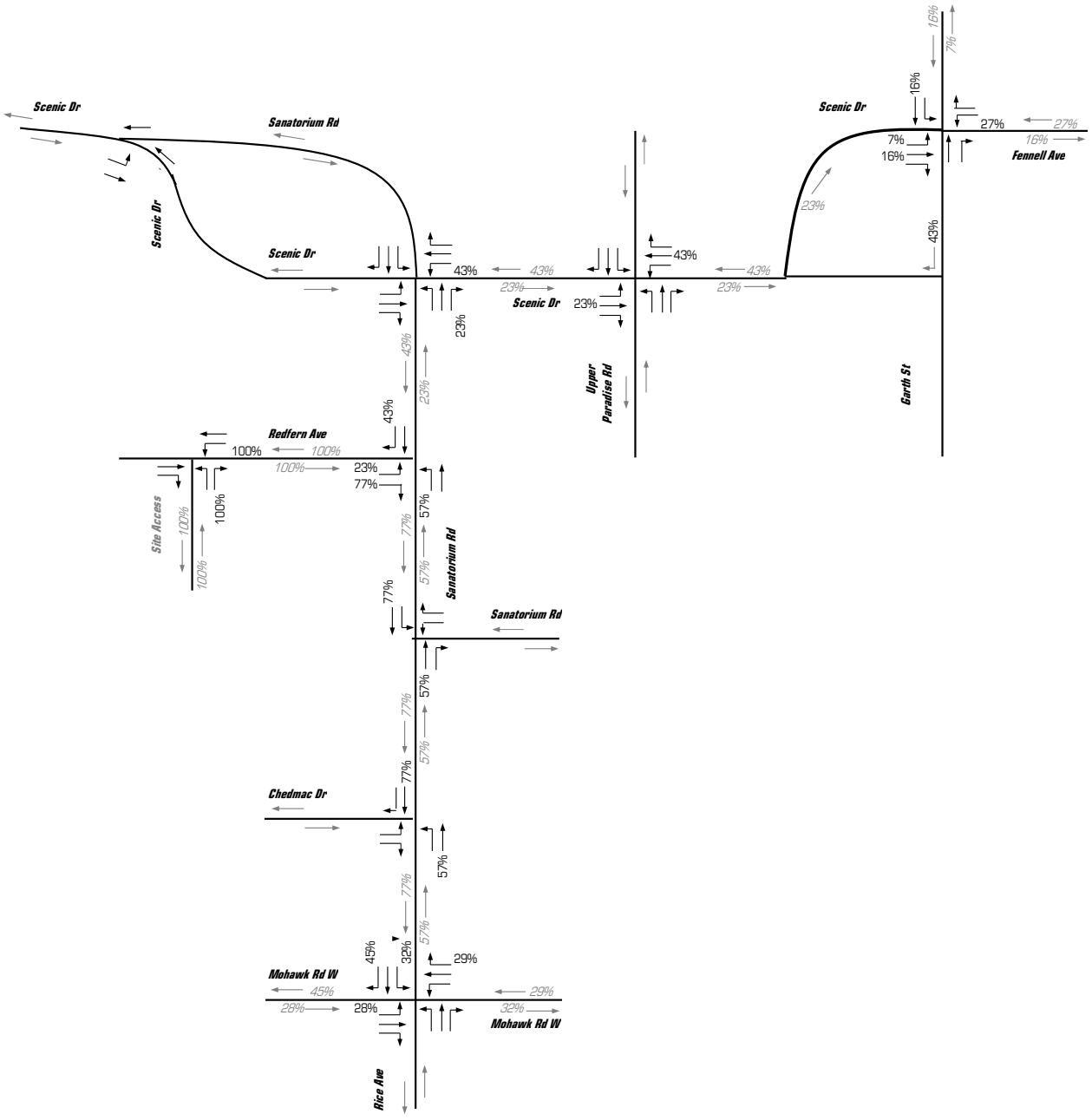

1 Redfern Avenue
Traffic Impact Study

Figure 3.2b

PM Peak Hour Trip Distribution

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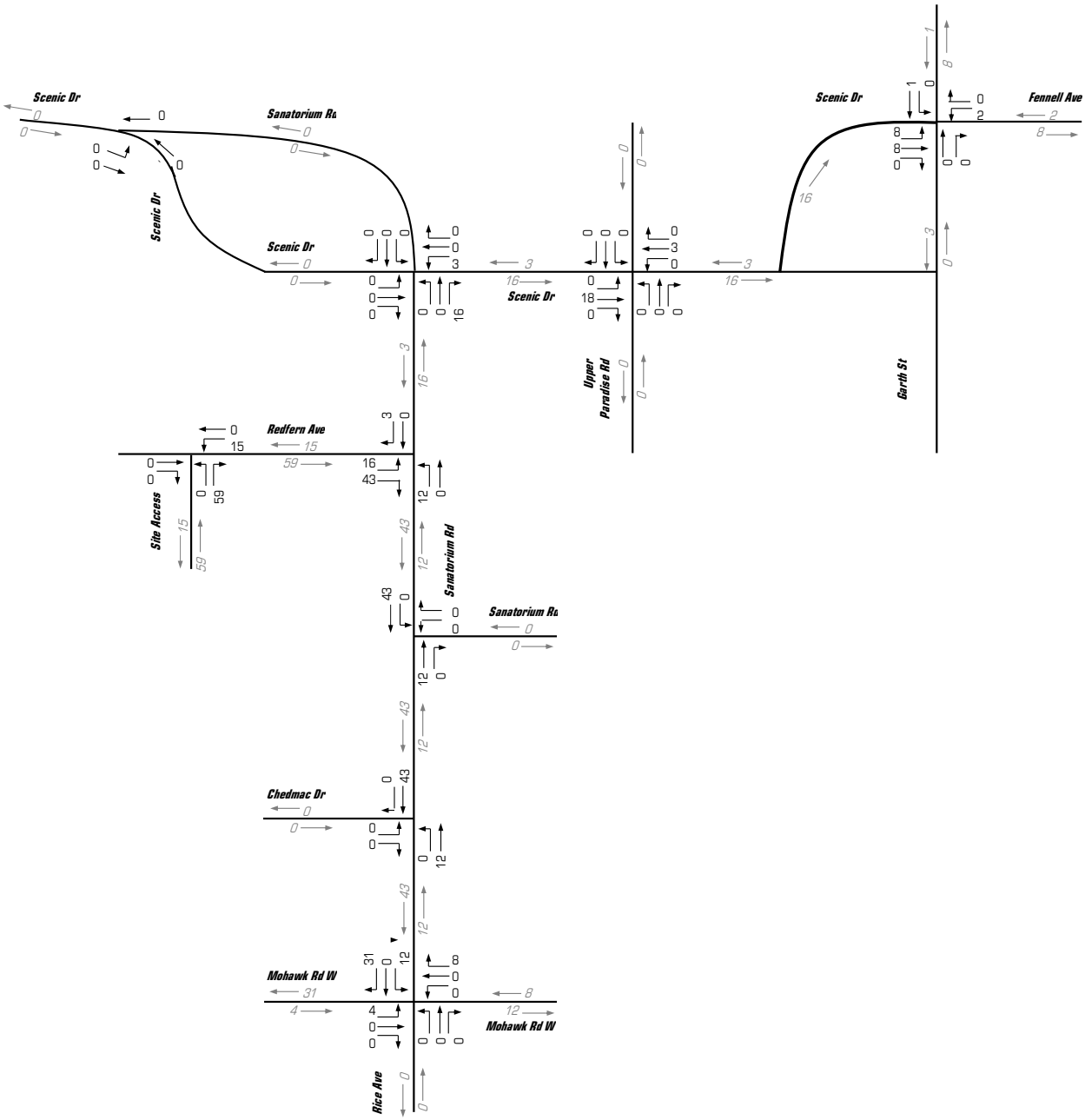

1 Redfern Avenue
Traffic Impact Study

Figure 3.3a

AM Peak Hour
Site Generated Trips

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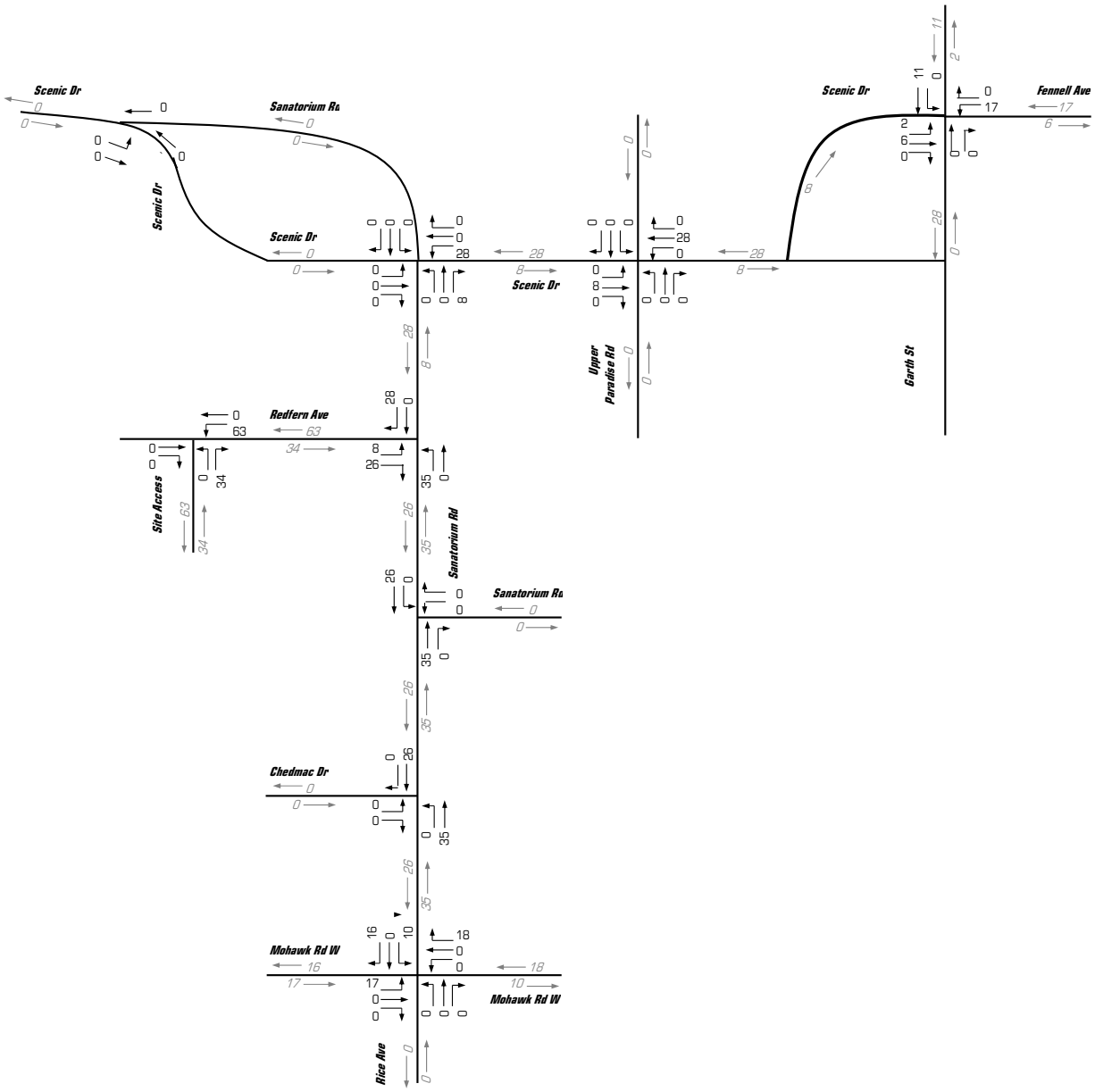

1 Redfern Avenue
Traffic Impact Study

Figure 3.3b

PM Peak Hour
Site Generated Trips

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4.0 Assessment of Future Traffic Conditions

This section provides information regarding the background and future total traffic volumes and resulting analyses for the 2022 horizon.

4.1 Background Traffic Volumes

In order to derive the 2022 background traffic volumes, a growth rate of 2.0% compounded for seven years (total growth of 14.9%) was applied to the existing traffic volumes in the study area. This is the standard City of Hamilton growth factor and its use was approved by City.

In pre-study consultation with City staff, the redevelopment of the Chedoke Browlands was identified as being under construction or completed by 2022. Given the size of the development and its potential impact within the study area, the trips generated by this development may not be adequately accounted for in the general background traffic growth; therefore, they need to be added to the background traffic estimates. The development, which will be located north of Scenic Drive west of Sanatorium Road, will consist of approximately 700 medium-rise apartments and 50 residential townhouses. According to a 2007 Chedoke Lands Redevelopment Transportation Review[4], the site is expected to generate 259 AM peak hour trips and 314 PM peak hour trips. The detailed assignment for the Chedoke Browlands site (taken from the Chedoke Lands report) is provided in Appendix C.

The Chedoke Browlands site generated trips have been added to the general background traffic growth resulting 2022 background traffic forecasts shown in **Figure 4.1a** and **Figure 4.1b**. Note that the background traffic forecast contained herein are considered to be conservative as they account for both the general traffic growth in the area as well as the site specific growth outline above.

4.2 Background Traffic Operations

Level of service analyses were conducted on the background traffic volumes for the study area intersections using the 2022 background traffic volumes shown in **Figure 4.1a** and **Figure 4.1b**, as well as the lane configurations and traffic control shown in **Figure 2.1**. The background traffic intersection operations are summarized in **Table 4.1** and detailed Synchro 9 outputs are provided in Appendix D. The analyses indicate:

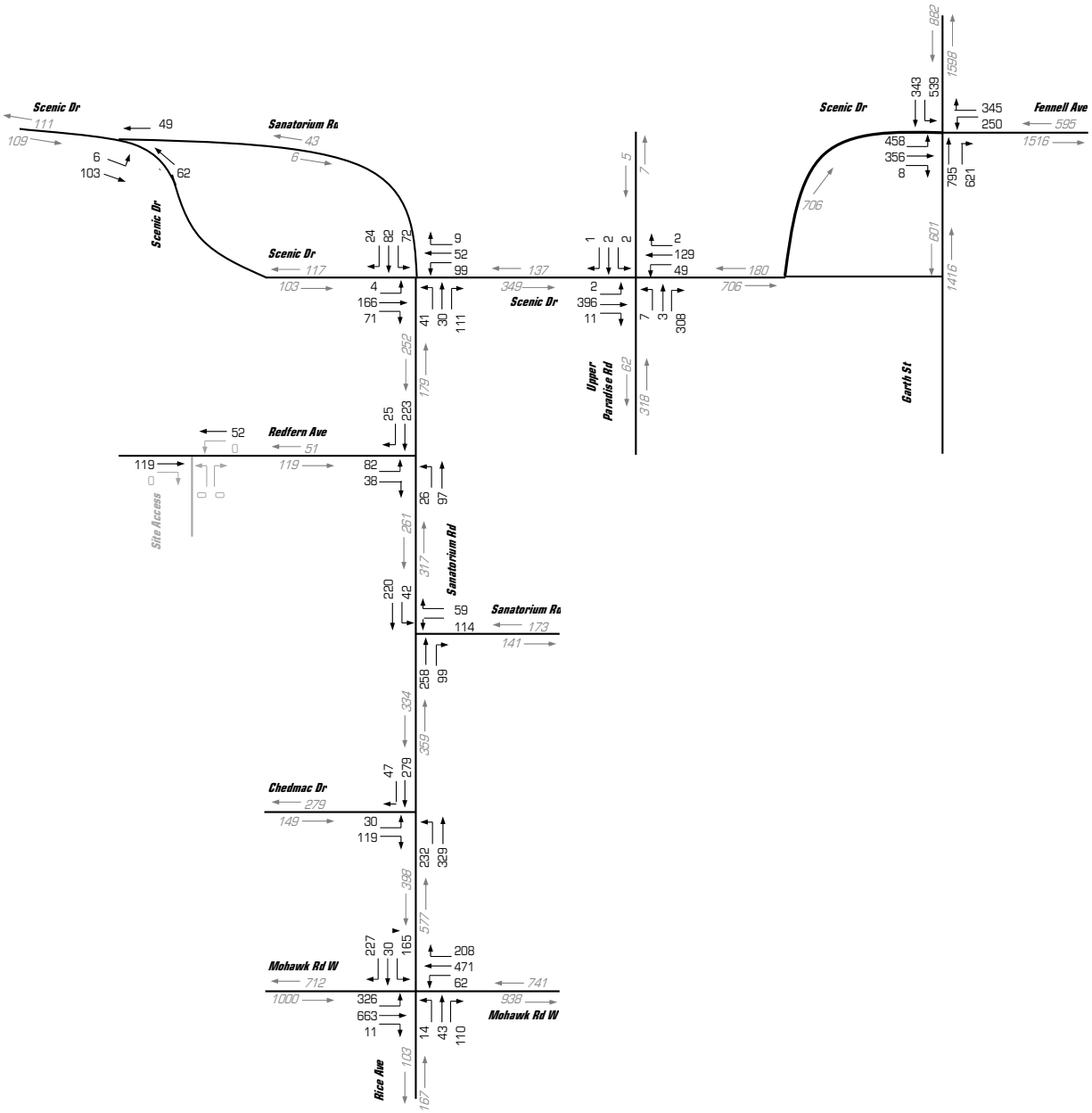
- The intersections within the study area will continue to operate within overall acceptable levels of service during the AM and PM peak hours upon reaching the 2022 background traffic volumes;
- The eastbound left turn movement on Mohawk Road at Rice Avenue is forecast to operate at LOS E during the AM peak hour with a v/c ratio of 1.01 indicating this movement will be operating at capacity and experiencing congestion;
- The eastbound left turn movement on Mohawk Road at Rice Avenue is forecast to operate at LOS F during the PM peak hour with a v/c ratio of 1.53 indicating this movement will be operating over capacity and experiencing congestion;
- The northbound right turn movement on Garth Street at Scenic Drive/Fennell Avenue West is forecast to operate at LOS F during the AM peak hour with a v/c ratio of 1.15 indicating this movement will be

[4] IBI Group. *Chedoke Lands Redevelopment Transportation Review*. July 2007

operating over capacity and experiencing congestion. The eastbound and southbound left turn movements for this intersection are expected to operate at LOS E with v/c ratios of 0.97 and 0.96 respectively which indicate the movements are operating near capacity will experience congestion; and

- The westbound left turn movement on Fennell Avenue West at Garth Street is forecast to operate at LOS F during the PM peak hour with a v/c ratio of 1.18 indicating the movement is operating over capacity and will experience congestion.

The high v/c ratios at the intersections of Garth Street and Scenic Drive/Fennell Avenue West and Mohawk Road at Rice Avenue indicate that these intersections will experience delay and congestion on the auxiliary turning movements during the peak hours. Signal timing and phasing changes and possibly remedial measures may be required in order to improve the levels of service for the critical intersection movements within the study area. More information regarding this is provided in **Section 5.2**.



1 Redfern Avenue
Traffic Impact Study

Figure 4.1a

Background AM Peak Hour Traffic Volumes

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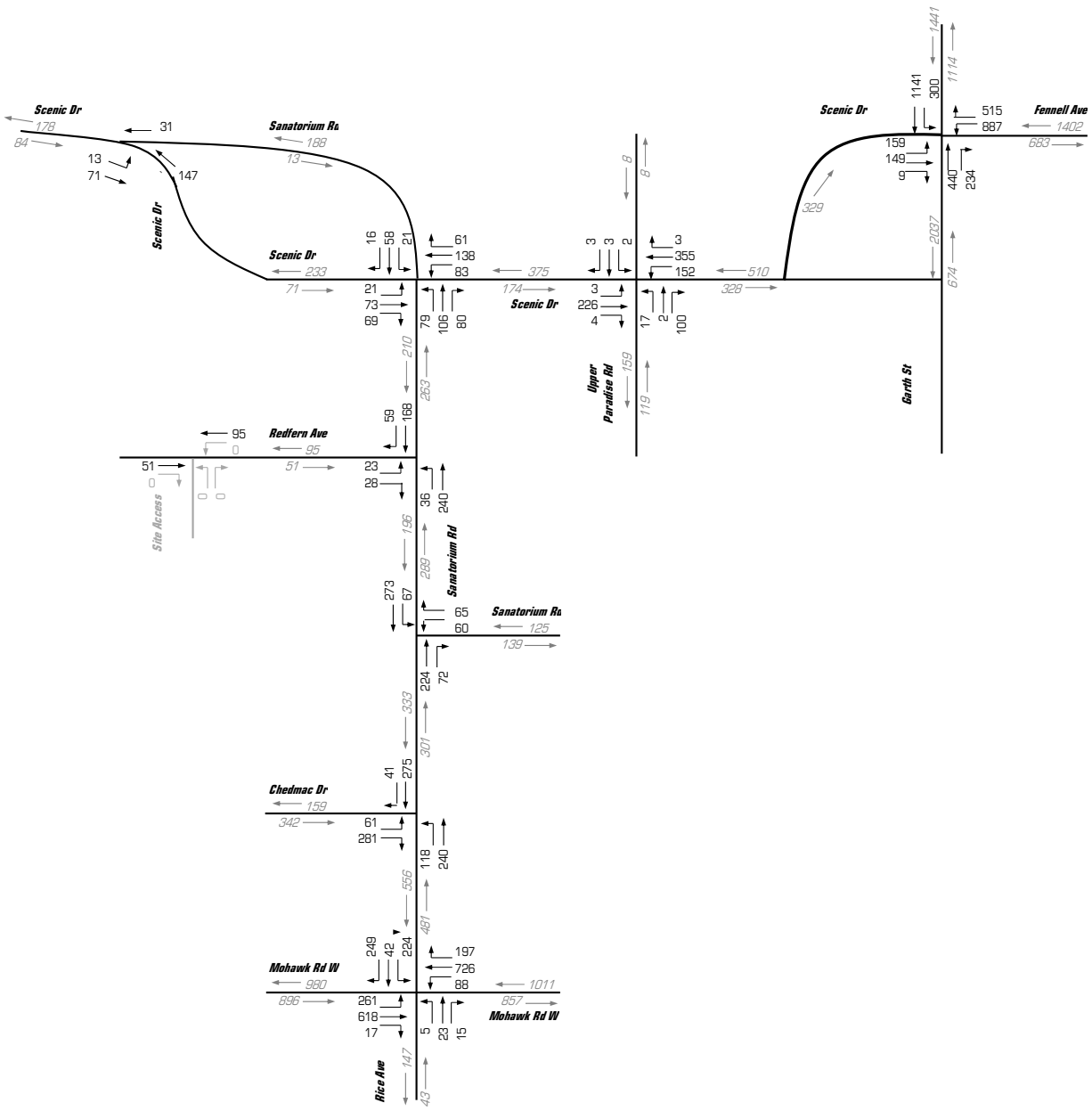

1 Redfern Avenue
Traffic Impact Study

Figure 4.1b

Background PM Peak Hour Traffic Volumes

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TABLE 4.1: 2022 BACKGROUND PEAK HOUR TRAFFIC OPERATIONS

Analysis Period	Control Type	Intersection	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				
				LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	OVERALL
Background AM Peak Hour Traffic Operations		Mohawk Rd W & Rice Ave	LOS	E	B		**C**	C	B		**B**		B		**B**		B		**B**	**C**
			Delay	67	12		**30**	21	19		**19**		13		**13**		16		**16**	**23**
			V/C	1.01	0.43			0.28	0.58				0.39				0.61			**1.01**
			Queue, 95th (m)	84	47			17	60				26				32			
		Garth St & Scenic Dr/ Fennell Ave W	LOS	E	D		**D**	C		B	**C**		D	F	**E**	E	B		**C**	**D**
			Delay	68	38		**55**	26		19	**22**		54	105	**76**	71	19		**35**	**53**
			V/C	0.97	0.52			0.48		0.59			0.93	1.15		0.96	0.92			**1.15**
			Queue, 95th (m)	171	54			30		72			132	190		112	61			
		Rice Ave & Chedmac Dr	LOS	C		C						A	A				A	A		**A**
			Delay	19		19						2	2				0	0		**5**
			V/C	0.38		0.38						0.22	0.22				0.12	0.09		**0.38**
			Queue, 95th (m)	13		13						6	6				0	0		
		Rice Ave & Sanatorium Rd	LOS					B		B			B	A		B	B			**B**
			Delay					11		11			11	7		12	12			**11**
			V/C					0.29		0.29			0.42	0.14		0.41	0.41			**0.42**
			Queue, 95th (m)					0		0			0	0		0	0			
		Sanatorium Rd & Redfern Ave	LOS	B		B						A	A				A	A		**A**
			Delay	13		13						0	2				0	0		**4**
			V/C	0.21		0.21						0.02	0.02				0.16	0.16		**0.21**
			Queue, 95th (m)	6		6						1	1				0	0		
		Sanatorium Rd & Scenic Dr (S)	LOS		B				B				B				B			**B**
			Delay		12				11				11				12			**11**
			V/C		0.39				0.28				0.30				0.33			**0.39**
			Queue, 95th (m)		0				0				0				0			
		Sanatorium Rd & Scenic Dr (N)	LOS	A	A				A							A		A		**A**
			Delay	0	1				0							10		10		**2**
			V/C	0.01	0.01				0.04							0.06		0.06		**0.06**
			Queue, 95th (m)	0	0				0							2		2		
		Scenic Dr & Upper Paradise Rd	LOS		C			A	B	B		A	A	B			B			**C**
			Delay		23			10	10	10		9	9	14			10			**17**
			V/C		0.73			0.10	0.25	0.25		0.02	0.02	0.53			0.01			**0.73**
			Queue, 95th (m)		0			0	0	0		0	0	0			0			
Background PM Peak Hour Traffic Operations		Mohawk Rd W & Rice Ave	LOS	F	B		**F**	B	B		**B**		B		**B**		C		**C**	**D**
			Delay	284	11		**91**	13	13		**13**		17		**17**		24		**24**	**44**
			V/C	1.53	0.40			0.32	0.59				0.10				0.71			**1.53**
			Queue, 95th (m)	84	42			18	66				11				48			
		Garth St & Scenic Dr/ Fennell Ave W	LOS	C	C		**C**	F		C	**F**		C	A	**C**	C	D		**D**	**D**
			Delay	23	29		**26**	123		20	**85**		34	7	**25**	35	37		**36**	**51**
			V/C	0.32	0.20			1.18		0.78			0.53	0.48		0.80	0.92			**1.18**
			Queue, 95th (m)	39	23			164		100			60	19		80	183			
		Rice Ave & Chedmac Dr	LOS	C		C						A	A				A	A		**A**
			Delay	18		18						1	2				0	0		**7**
			V/C	0.59		0.59						0.11	0.11				0.12	0.08		**0.59**
			Queue, 95th (m)	29		29						3	3				0	0		
		Rice Ave & Sanatorium Rd	LOS					A		A			B	A		B	B			**B**
			Delay					10		10			10	7		13	13			**11**
			V/C					0.20		0.20			0.36	0.10		0.51	0.51			**0.51**
			Queue, 95th (m)					0		0			0	0		0	0			
		Sanatorium Rd & Redfern Ave	LOS	B		B						A	A				A	A		**A**
			Delay	12		12						0	1				0	0		**2**
			V/C	0.09		0.09						0.03	0.03				0.15	0.15		**0.15**
			Queue, 95th (m)	2		2						1	1				0	0		
		Sanatorium Rd & Scenic Dr (S)	LOS		B				B				B				B			**B**
			Delay		10				13				13				11			**12**
			V/C		0.27				0.46				0.45				0.19			**0.46**
			Queue, 95th (m)		0				0				0				0			
		Sanatorium Rd & Scenic Dr (N)	LOS	A	A				A							A		A		**A**
			Delay	0	1				0							10		10		**2**
			V/C	0.01	0.01				0.09							0.04		0.04		**0.09**
			Queue, 95th (m)	0	0				0							1		1		
		Scenic Dr & Upper Paradise Rd	LOS		B			A	B	B		A	A	A			A			**B**
			Delay		12			10	14	14		9	9	9			10			**12**
			V/C		0.39			0.26	0.57	0.57		0.04	0.04	0.18			0.02			**0.57**
			Queue, 95th (m)		0			0	0	0		0	0	0			0			

4.3 Future Total Traffic Operations

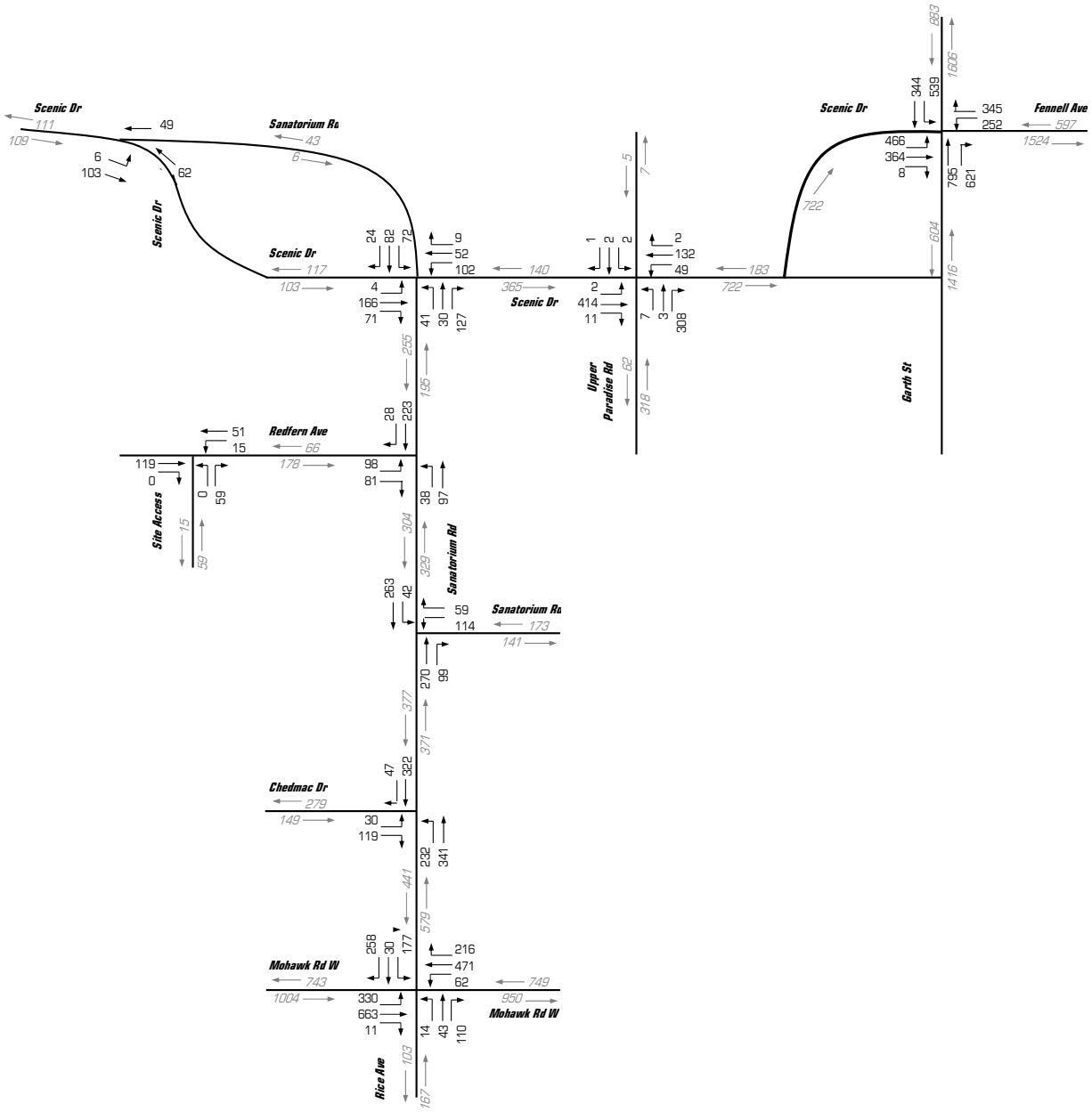
The site generated traffic was added to the 2022 background traffic volumes to produce the 2022 future total traffic volumes shown in **Figure 4.2a** and **Figure 4.2b**.

Synchro 9 Level of Service analyses were conducted on the future total traffic volumes for the study area intersections, including the proposed site driveway connection to Redfern Avenue, using the lane configurations and traffic control shown in **Figure 2.1**. Stop sign control and a shared left turn/right turn outbound lane and one inbound lane was assumed for the development connection to Redfern Avenue. The results of the 2022 future total traffic analyses are summarized in **Table 4.2a** and **Table 4.2b** and indicate the following:

- The intersections within the study area will continue to operate with overall acceptable levels of service with minimal delay during the AM and PM peak hours upon reaching the 2022 future total traffic volumes;
- The eastbound left turn movement on Mohawk Road at Rice Avenue is forecast to operate at LOS E during the AM peak hour with a v/c ratio of 1.03 indicating this movement will be operating at capacity and experiencing congestion;
- The eastbound left turn movement on Mohawk Road at Rice Avenue is forecast to function at LOS F during the PM peak hour with a v/c ratio of 1.67 indicating this movement will be operating over capacity and experiencing congestion;
- The northbound right turn movement on Garth Street at Scenic Drive/Fennell Avenue is forecast to operate at LOS F during the AM peak hour with a v/c ratio of 1.15 indicating this movement will be operating over capacity and experiencing congestion. The eastbound and southbound left turn movements for this intersection are expected to operate at LOS E with v/c ratios of 0.99 and 0.96 respectively indicating the movements are operating near capacity and will experience congestion; and
- The westbound left turn movement on Fennell Avenue West at Garth Street is forecast to operate at LOS F during the PM peak hour with a v/c ratio of 1.21 indicating the movement is operating over capacity and will experience congestion.

The high v/c ratios at the intersections of Garth Street and Scenic Drive/Fennell Avenue West and Mohawk Road at Rice Avenue indicate that these intersections will experience delay and congestion on the auxiliary turning movements during the peak hours. Signal timing and phasing changes and possibly remedial measures may be required in order to improve the levels of service for the critical intersection movements within the study area. More information regarding this is provided in **Section 5.2**.

Detailed Synchro 9 outputs are provided in Appendix E.



1 Redfern Avenue
Traffic Impact Study

Figure 4.2a

Future Total AM Peak Hour Traffic Volumes

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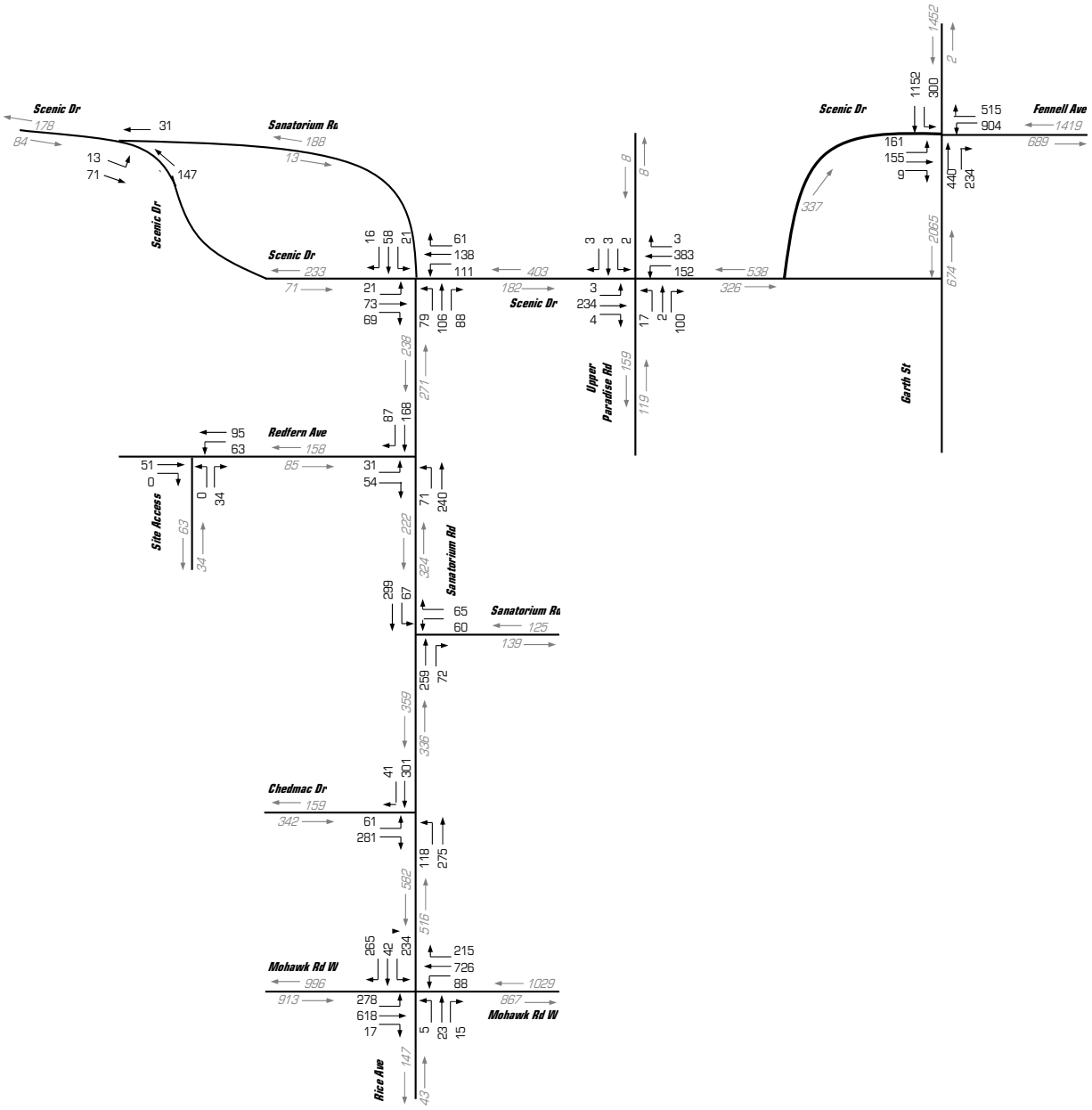

1 Redfern Avenue
Traffic Impact Study

Figure 4.2b

Future Total PM Peak Hour Traffic Volumes

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TABLE 4.2A: 2022 FUTURE TOTAL AM PEAK HOUR TRAFFIC OPERATIONS

Analysis Period	Control Type	Intersection	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				
				LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	OVERALL
Future Total AM Peak Hour Traffic Operations		Mohawk Rd W & Rice Ave	LOS	E	B		**C**	C	B		**B**		B		**B**		B		**B**	**C**
			Delay	74	12		**32**	21	19		**19**		13		**13**		16		**16**	**24**
			V/C	1.03	0.43			0.28	0.59				0.39				0.65			**1.03**
			Queue, 95th (m)	88	47			17	61				26				35			
		Garth St & Scenic Dr/ Fennell Ave W	LOS	E	D		**E**	C		B	**C**		D	F	**E**	E	B		**C**	**D**
			Delay	72	39		**57**	26		20	**22**		54	108	**77**	71	19		**35**	**54**
			V/C	0.99	0.53			0.49		0.59			0.93	1.15		0.96	0.92			**1.15**
			Queue, 95th (m)	175	55			30		72			132	192		112	61			
		Rice Ave & Chedmac Dr	LOS	C		C						A	A				A	A		**A**
			Delay	20		20						2	2				0	0		**5**
			V/C	0.41		0.41						0.23	0.23				0.14	0.10		**0.41**
			Queue, 95th (m)	15		15						7	7				0	0		
		Rice Ave & Sanatorium Rd	LOS					B		B			B	A		B	B			**B**
			Delay					11		11			12	8		13	13			**12**
			V/C					0.30		0.30			0.45	0.15		0.48	0.48			**0.48**
			Queue, 95th (m)					0		0			0	0		0	0			
		Sanatorium Rd & Redfern Ave	LOS	B		B						A	A				A	A		**A**
			Delay	14		14						0	2				0	0		**5**
			V/C	0.32		0.32						0.03	0.03				0.16	0.16		**0.32**
			Queue, 95th (m)	10		10						1	1				0	0		
		Sanatorium Rd & Scenic Dr (S)	LOS		B				B				B				B			**B**
			Delay		12				11				11				12			**12**
			V/C		0.39				0.28				0.33				0.33			**0.39**
			Queue, 95th (m)		0				0				0				0			
		Sanatorium Rd & Scenic Dr (N)	LOS	A	A				A							A		A		**A**
			Delay	0	1				0							10		10		**2**
			V/C	0.01	0.01				0.04							0.06		0.06		**0.06**
			Queue, 95th (m)	0	0				0							2		2		
		Scenic Dr & Upper Paradise Rd	LOS		C			A	B	B		A	A	B			B			**C**
			Delay		26			10	10	10		9	9	14			10			**19**
			V/C		0.77			0.10	0.26	0.26		0.02	0.02	0.54			0.01			**0.77**
			Queue, 95th (m)		0			0	0	0		0	0	0			0			
		Redfern Ave & Site Access	LOS		A			A	A			A		A						**A**
			Delay		0			0	2			9		9						**3**
			V/C		0.08			0.01	0.01			0.07		0.07						**0.08**
			Queue, 95th (m)		0			0	0			2		2						

TABLE 4.2B: 2022 FUTURE TOTAL PM PEAK HOUR TRAFFIC OPERATIONS

Analysis Period	Control Type	Intersection	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				
				LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	OVERALL
Future Total PM Peak Hour Traffic Operations		Mohawk Rd W & Rice Ave	LOS	F	B		**F**	B	B		**B**		B		**B**		C		**C**	**D**
			Delay	345	11		**113**	13	13		**13**		17		**17**		26		**26**	**52**
			V/C	1.67	0.40			0.32	0.60				0.11				0.74			**1.67**
			Queue, 95th (m)	93	42			18	68				11				52			
		Garth St & Scenic Dr/ Fennell Ave W	LOS	C	C		**C**	F		C	**F**		C	A	**C**	C	D		**D**	**D**
			Delay	23	29		**26**	134		20	**93**		34	7	**25**	35	38		**37**	**55**
			V/C	0.33	0.21			1.21		0.78			0.53	0.48		0.80	0.93			**1.21**
			Queue, 95th (m)	40	23			169		100			60	19		80	186			
		Rice Ave & Chedmac Dr	LOS	C		C						A	A				A	A		**A**
			Delay	20		20						1	2				0	0		**7**
			V/C	0.61		0.61						0.11	0.12				0.13	0.09		**0.61**
			Queue, 95th (m)	31		31						3	3				0	0		
		Rice Ave & Sanatorium Rd	LOS					A		A			B	A		B	B			**B**
			Delay					10		10			11	7		14	14			**12**
			V/C					0.21		0.21			0.42	0.10		0.55	0.55			**0.55**
			Queue, 95th (m)					0		0			0	0		0	0			
		Sanatorium Rd & Redfern Ave	LOS	B		B						A	A				A	A		**A**
			Delay	13		13						1	2				0	0		**3**
			V/C	0.16		0.16						0.06	0.06				0.16	0.16		**0.16**
			Queue, 95th (m)	4		4						2	2				0	0		
		Sanatorium Rd & Scenic Dr (S)	LOS		B				B				B				B			**B**
			Delay		11				14				14				11			**13**
			V/C		0.27				0.51				0.48				0.20			**0.51**
			Queue, 95th (m)		0				0				0				0			
		Sanatorium Rd & Scenic Dr (N)	LOS	A	A				A							A		A		**A**
			Delay	0	1				0							10		10		**2**
			V/C	0.01	0.01				0.09							0.04		0.04		**0.09**
			Queue, 95th (m)	0	0				0							0		0		
		Scenic Dr & Upper Paradise Rd	LOS		B			A	B	B		A	A	A			A			**B**
			Delay		12			10	15	15		9	9	9			10			**13**
			V/C		0.41			0.26	0.61	0.61		0.04	0.04	0.18			0.02			**0.61**
			Queue, 95th (m)		0			0	0	0		0	0	0			0			
		Redfern Ave & Site Access	LOS		A			A	A			A		A						**A**
			Delay		0			0	3			9		9						**3**
			V/C		0.03			0.04	0.04			0.04		0.04						**0.04**
			Queue, 95th (m)		0			1	1			1		1						

5.0 Need for Improvements

5.1 Road Network Improvements

5.1.1 Left-turn Lanes

The need for a westbound left turn lane on Redfern Avenue at the proposed site access was assessed based on the Ministry of Transportation (MTO) left turn lane warrants for an undivided two-lane cross section with a 60 kilometre per hour design speed (10 kilometres per hour over the assumed speed limit). The warrants can be found in Appendix F and indicate that based on the estimated future total traffic volumes, a left turn lane is not warranted for the site access connection to Redfern Avenue upon completion of the development.

5.1.2 Traffic Control Signals

City of Hamilton 8-hour traffic control signal warrants were conducted for the intersection of Scenic Drive and Upper Paradise Road to determine if the installation of signals would improve the overall level of service. This intersection was chosen to have traffic signal warrants conducted as it had lower levels of service and higher delay than the other stop-controlled intersections within the study area. The warrants are provided in Appendix G and indicate traffic control signals are not warranted for this intersection based on existing, background or future total traffic volumes.

Note that traffic signal warrants were not conducted for the other stop-controlled intersections within the study area as they are shown to generally have better levels of service and delay than the intersection of Scenic Drive and Upper Paradise Road; therefore, they should not require traffic signals.

5.2 Intersection Improvements

5.2.1 Background Traffic Operations with Improvements

As outlined in **Section 4.2**, the intersections of Mohawk Road West and Rice Avenue and Garth Street and Scenic Drive/Fennell Avenue West will operate within overall acceptable levels of service and delay upon reaching the background traffic volumes. However, several movements will operate at LOS E or LOS F with v/c ratios of 0.96 or greater during the AM and PM peak hours. In order to improve the operations these intersections, Synchro 9 analyses were again conducted on the future background traffic volumes to determine the improvements required to provide acceptable levels of service and delay for the critical movements. The results of the analyses are shown in **Table 5.1** with detailed calculations provided in Appendix H. The results indicate the following improvements are required to provide the levels of service and delay outlined below:

- A protected/permitted phase for the eastbound left turn movement on Mohawk Road West at Rice Avenue;
- An additional eastbound left turn (dual left turn lanes) on Scenic Drive at Garth Street; and
- Minor signal timing and phasing changes for the intersection of Garth Street and Scenic Drive/Fennell Avenue West.

Note that even with the improvements outlined herein the westbound left turn movement on Fennell Avenue West at Garth Street will operate at LOS E with a v/c ratio of 0.99 during the PM peak hour.

TABLE 5.1: BACKGROUND TRAFFIC OPERATIONS WITH IMPROVEMENTS

Analysis Period	Control Type	Intersection	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				
				LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	OVERALL
Background AM Peak Hour Traffic Operations with Improvements		Mohawk Rd W & Rice Ave	LOS	D	B		**C**	C	C		**C**		B		**B**		B		**B**	**B**
			Delay	43	11		**21**	22	21		**21**		14		**14**		17		**17**	**20**
			V/C	0.92	0.42			0.30	0.61				0.40				0.63			**0.92**
			Queue, 95th (m)	73	45			18	63				27				33			
		Garth St & Scenic Dr/ Fennell Ave W	LOS	D	D		**D**	D		C	**D**		C	D	**D**	D	B		**C**	**D**
			Delay	45	50		**47**	53		33	**41**		25	51	**36**	53	14		**26**	**37**
			V/C	0.66	0.60			0.76		0.73			0.58	0.97		0.94	0.89			**0.97**
			Queue, 95th (m)	74	64			42		96			98	217		84	53			
Background PM Peak Hour Traffic Operations with Improvements		Mohawk Rd W & Rice Ave	LOS	C	A		**B**	C	C		**C**		C		**C**		C		**C**	**C**
			Delay	35	10		**17**	25	29		**28**		21		**21**		25		**25**	**23**
			V/C	0.81	0.37			0.39	0.79				0.12				0.73			**0.81**
			Queue, 95th (m)																	
		Garth St & Scenic Dr/ Fennell Ave W	LOS	B	D		**C**	E		B	**D**		D	A	**D**	D	D		**D**	**D**
			Delay	20	37		**28**	57		16	**42**		49	10	**36**	41	52		**50**	**43**
			V/C	0.21	0.24			0.99		0.71			0.70	0.55		0.82	0.98			**0.99**
			Queue, 95th (m)	36	25			96		93			67	22		86	195			

5.2.2 Future Total Traffic Operations with Improvements

Additional Synchro 9 analyses were conducted for the future total traffic volumes for the intersections of Mohawk Road West and Rice Avenue and Garth Street and Scenic Drive/Fennell Avenue West to determine if improvements over and above those required for the background traffic volumes would be required. The results of the analyses are shown in **Table 5.2** with detailed calculations provided in Appendix I. The results indicate the following additional improvements are required to provide the levels of service and delay outlined below:

- Minor signal timing and phasing changes will be required for the intersection of Mohawk Road West and Rice Avenue;
- Minor signal timing and phasing changes for the intersection of Garth Street and Scenic Drive/Fennell Avenue West.

Note that even with the improvements outlined herein the westbound left turn movement and the northbound through movement at the intersection of Garth Street and Scenic Drive/Fennell Avenue West will operate at LOS E with v/c ratios of 0.99 and 0.74 respectively during the PM peak hour.

TABLE 5.2: FUTURE TOTAL TRAFFIC OPERATIONS WITH IMPROVEMENTS

Analysis Period	Control Type	Intersection	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	LEFT	THROUGH	RIGHT	APPROACH	
Future Total AM Peak Hour Traffic Operations with Improvements		Mohawk Rd W & Rice Ave	LOS	C	A		**B**	C	C		**C**		B		**B**		C		**C**	**B**
			Delay	30	10		**17**	25	24		**24**		18		**18**		21		**21**	**20**
			V/C	0.83	0.39			0.31	0.64				0.44				0.72			**0.83**
			Queue, 95th (m)	78	44			20	72				32				40			
		Garth St & Scenic Dr/ Fennell Ave W	LOS	D	D		**D**	D		C	**D**		C	E	**D**	D	B		**C**	**D**
			Delay	45	50		**47**	54		33	**42**		26	55	**39**	50	14		**25**	**38**
			V/C	0.67	0.62			0.77		0.72			0.59	0.99		0.93	0.88			**0.99**
			Queue, 95th (m)	75	66			43		95			100	220		82	53			
Future Total PM Peak Hour Traffic Operations with Improvements		Mohawk Rd W & Rice Ave	LOS	D	A		**C**	C	C		**C**		C		**C**		C		**C**	**C**
			Delay	46	10		**21**	27	33		**32**		21		**21**		27		**27**	**27**
			V/C	0.87	0.37			0.41	0.84				0.12				0.76			**0.87**
			Queue, 95th (m)	83	41			28	114				13				54			
		Garth St & Scenic Dr/ Fennell Ave W	LOS	C	D		**C**	E		B	**D**		E	B	**D**	D	D		**D**	**D**
			Delay	23	43		**33**	57		16	**42**		55	10	**40**	42	55		**53**	**45**
			V/C	0.24	0.28			0.99		0.69			0.74	0.57		0.80	0.98			**0.99**
			Queue, 95th (m)	19	30			115		100			79	24		100	226			

6.0 Land Use Comparison

At present, the site is currently permitted to develop up to 80 residential units; however, 144 units are being proposed. This section will address the difference in trip generation between the permitted and proposed number of units and any potential impacts the difference in trip generation could have on the study area roadway network.

6.1 Trip Generation Comparison

Trip generation estimates were calculated for the site based on the equation rates for the permitted 80 units and the 144 proposed units. Note that only the equation rates are shown here as all future traffic scenarios (background and total) are based on the higher equation rate trip generation as outlined in **Section 3.2**. The estimates are shown in **Table 6.1** and indicate that:

- The site will generate 43 AM and 62 PM peak hour trips if developed with 80 units; and
- The site will generate 74 AM and 97 PM peak hour trips if developed with 144 units.

Table 6.1: Trip Generation Comparison

1 Redfern Avenue Trip Generation Equation Rates	No. of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 220 Apartment	80	Equation	9	34	43	Equation	40	22	62
	144		15	59	74		63	34	97
Difference	**64**		**6**	**25**	**31**		**23**	**12**	**35**

6.2 Operational Impacts Comparison

As outlined in **Section 4** and **Section 5**, the need for remedial measures for the study area intersections is driven by the increase in background traffic. The trips generated by the 144 proposed units represents no more than a 2.5% increase in traffic at the critical study area intersections during the AM and PM peak hours. Based on the difference in trip generation outlined above, it can be expected that the 80 permitted units would increase the overall traffic at the study area intersections by about 1% or less during the peak periods since the overall trip generation for these units is between 28% and 54% of the trips generated by the proposed 144 units.

Overall, the increase in traffic at the critical study area intersections will be approximately 1.5% higher if the site develops with the proposed 144 units. This additional traffic increase can be accommodated on the roadway network without the need for additional improvements if the remedial measures required to accommodate the background traffic are implemented prior to reaching the future total traffic volumes.

7.0 Conclusions and Recommendations

7.1 Conclusions

The conclusions of this report are as follows:

Existing Conditions

- The intersections within the study area are currently operating within overall acceptable levels of service with minimal delay and congestion during the AM and PM peak hours; and
- The intersection of Scenic Drive/Fennell Avenue West and Garth Street is experiencing congestion on the northbound right turn movement during the AM peak hour and on the westbound left turn movement during the PM peak hour.

Site Generated Traffic

- Upon completion, the development will generate a total of 74 AM peak hour trips and 97 PM peak hour trips.

Background Conditions (2022)

- The intersections within the study area will continue to operate within overall acceptable levels of service during the AM and PM peak hours upon reaching the 2022 background traffic volumes. However the following critical movements are noted:
    - The eastbound left turn movement at the intersection of Mohawk Road and Rice Avenue is forecast to operate at LOS E during the AM peak hour and LOS F during the PM peak hour with a v/c ratios greater than 1.0;
    - Several movements at the intersection of Garth Street and Scenic Drive/Fennell Avenue West will operate at LOS E or worse during the AM peak hour with v/c ratios greater than 0.95 indicating congestion on these movements; and
    - The westbound left turn movement on Fennell Avenue at Garth Street is forecast to operate at LOS F during the PM peak hour with a v/c ratio of 1.18 indicating this movement will be over capacity.

Future Total Conditions (2022)

- The intersections within the study area will continue to operate with overall acceptable levels of service with minimal delay during the AM and PM peak hours upon reaching the 2022 future total traffic volumes. However the following critical movements are noted:
    - The eastbound left turn movement on Mohawk Road at Rice Avenue is forecast to operate at LOS E during the AM peak hour with a v/c ratio of 1.03. During the PM peak hour this movement will operate at LOS F with a v/c ratio of 1.67 indicating the movement will be over capacity;
    - Several movements at the intersection of Garth Street and Scenic Drive/Fennell Avenue West will operate at LOS E or worse during the AM peak hour with v/c ratios greater than 0.95 indicating congestion on these movements; and
    - The westbound left turn movement on Fennell Avenue at Garth Street is forecast to operate at LOS F during the PM peak hour with a v/c ratio of 1.21 indicating this movement will be over capacity.

Overall Site Impact

- The greatest impact to the overall levels of service at the study area intersections occurs under the background traffic conditions;
- Inclusion of the site generated traffic has a much lower degree of impact to the overall traffic operations at the study area signalized intersections than the background traffic condition;
- If the site is developed with the permitted 80 units, the traffic at the critical study area intersections will increase by about 1% during the peak hours and if the site is developed with the proposed 144 units, the traffic at the critical study area intersections will increase by about 2.5% during the peak hours; and
- The traffic increase that will occur if the site develops with the proposed 144 units can be accommodated on the roadway network without the need for additional improvements beyond those identified to accommodate the background traffic.

Need for Improvements

- An additional eastbound left turn lane (dual left turn lane) will be required on Scenic Drive at Garth Street upon reaching the future background traffic volumes; and
- Signal timing and phasing changes will be required at the signalized study area intersections in order to provide acceptable levels of service for all movements.

7.2 Recommendations

The main recommendations of this report are as follows:

- The site should be allowed to develop as planned with the following improvements:
  - A shared left turn/right turn lane should be provided for the outbound movements on the proposed site access;
  - Stop sign control should be provided at the proposed site driveway connection to Redfern Avenue; and
  - Continue to monitor the performance of the study area signalized intersections and adjust signal timings and phasing as required.
- The eastbound dual left turn lanes should be provided on Scenic Drive at Garth Street if the background traffic volumes outlined herein are realized; and
- The City should monitor and adjust the signal timing and phasing plans for the signalized intersections within the study area in order to continue to provide acceptable levels of service and delay for the critical movements, including the provision of an eastbound left turn protected/permitted phase on Mohawk Road West at Rice Avenue.

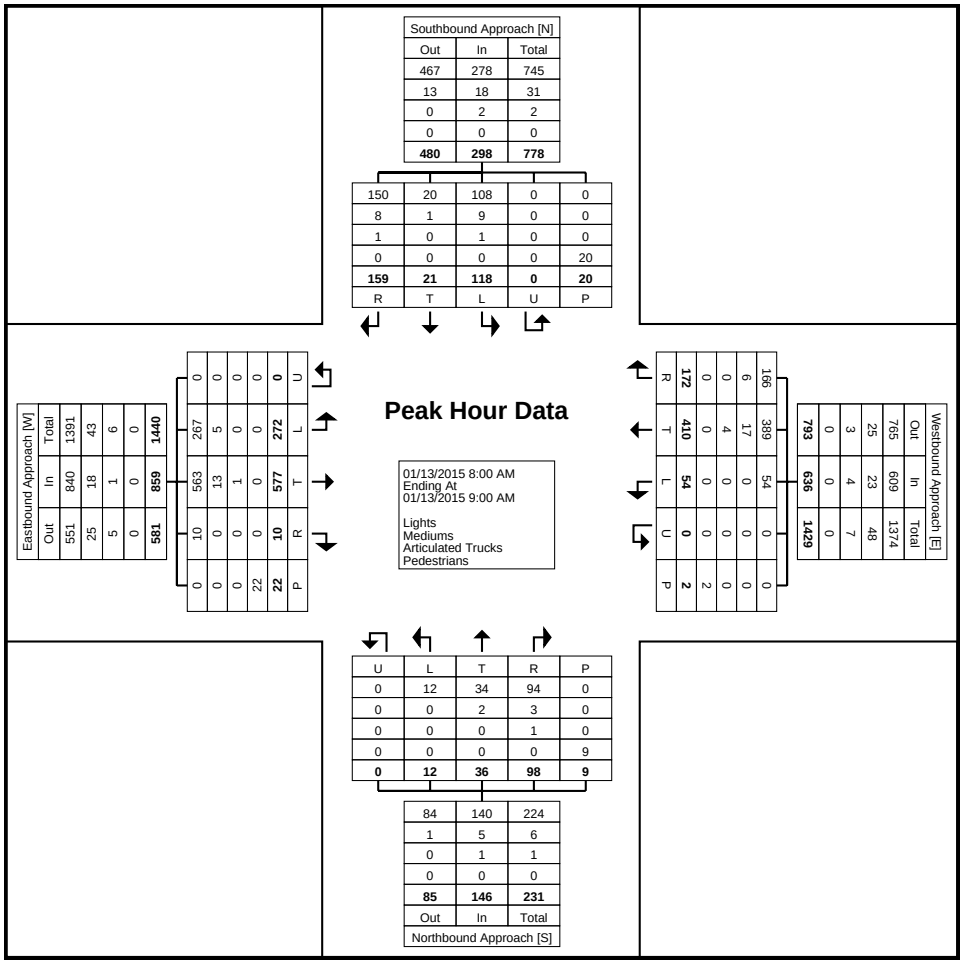
Appendix A

Turning Movement Count Data

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Mohawk Road West and Rice Avenue
Site Code:
Start Date: 01/13/2015

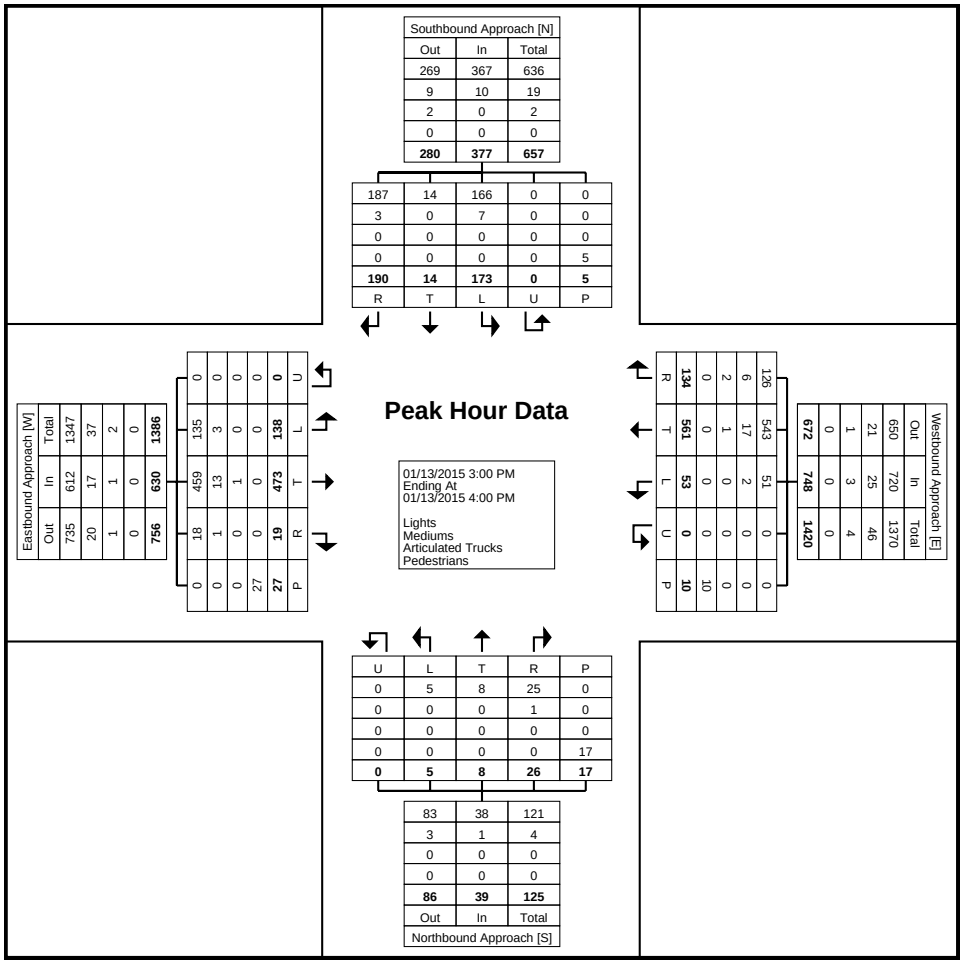


Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Mohawk Road West and Rice Avenue
Site Code:
Start Date: 01/13/2015

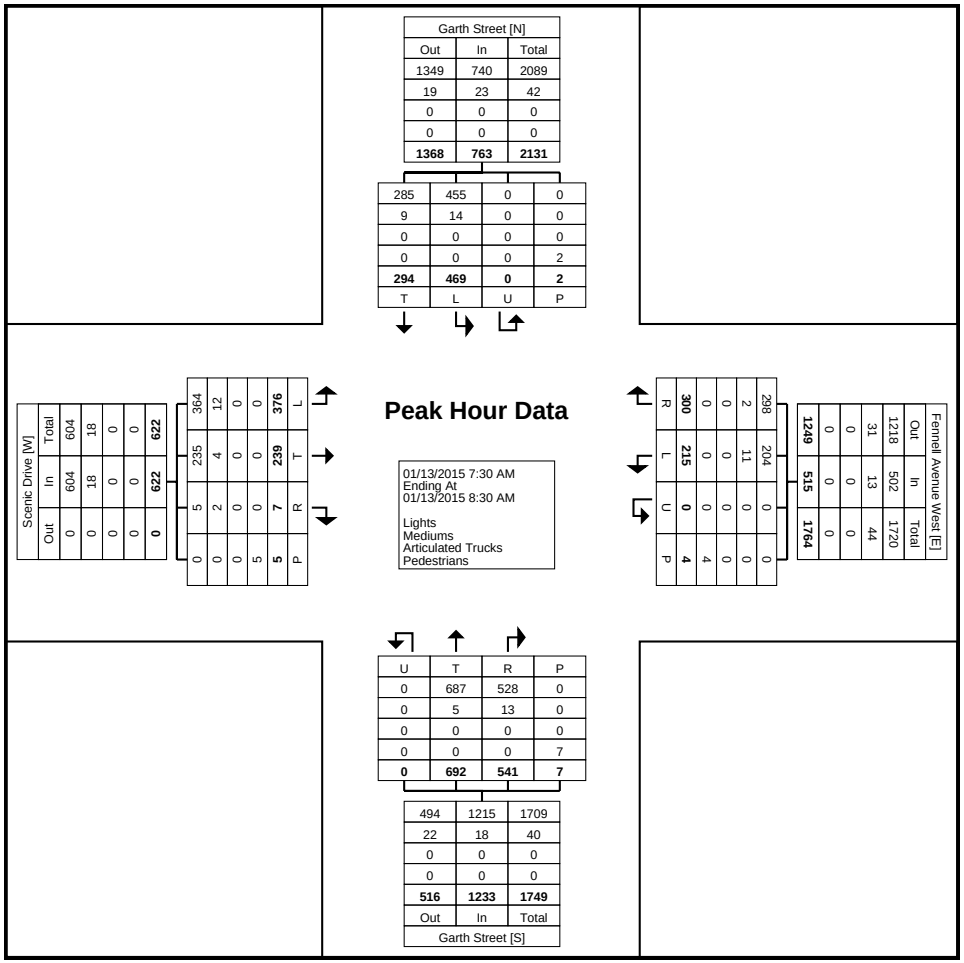


Turning Movement Peak Hour Data Plot (3:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Scenic Drive and Garth Street
Site Code:
Start Date: 01/13/2015

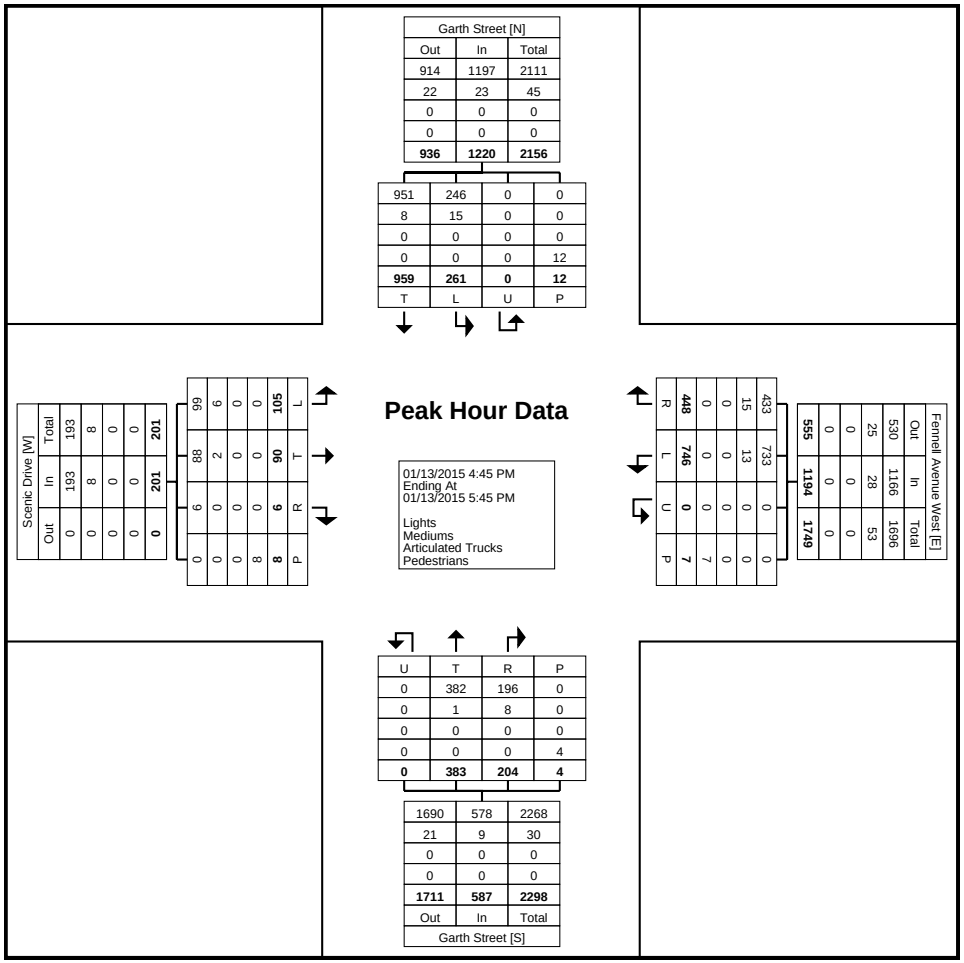


Turning Movement Peak Hour Data Plot (7:30 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

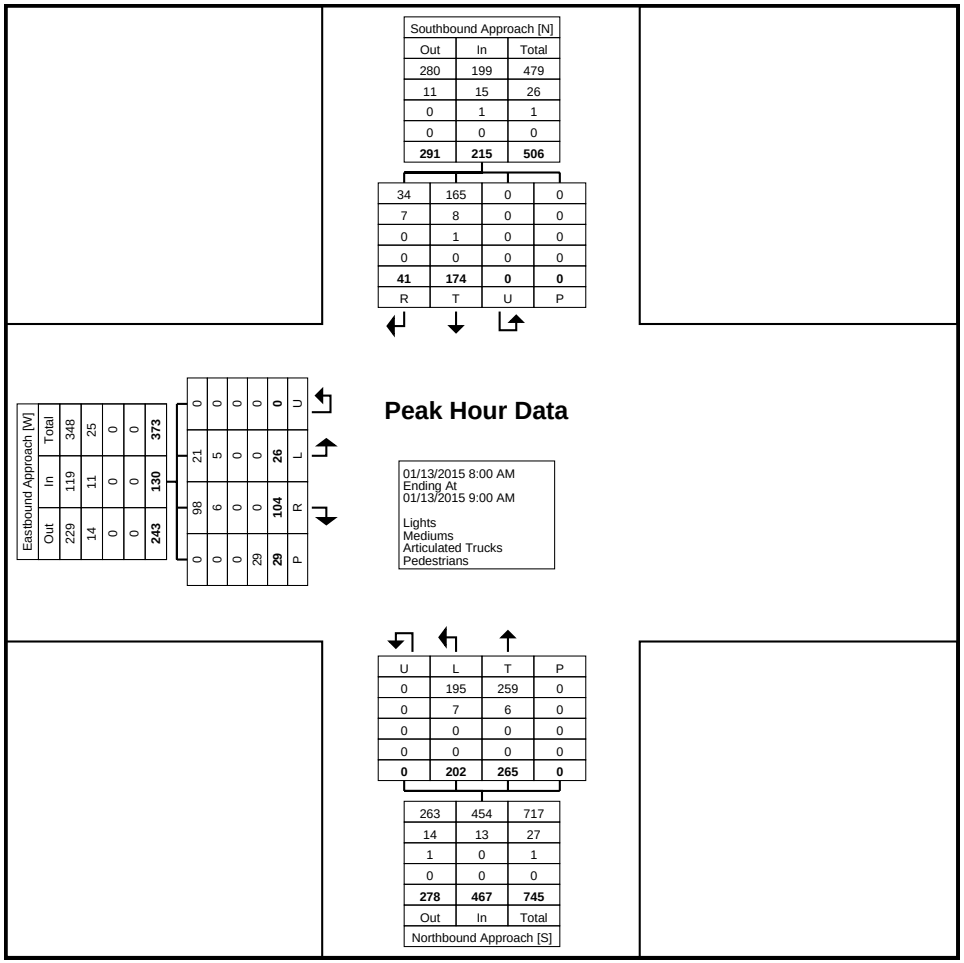
Count Name: Scenic Drive and Garth Street
Site Code:
Start Date: 01/13/2015



Turning Movement Peak Hour Data Plot (4:45 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

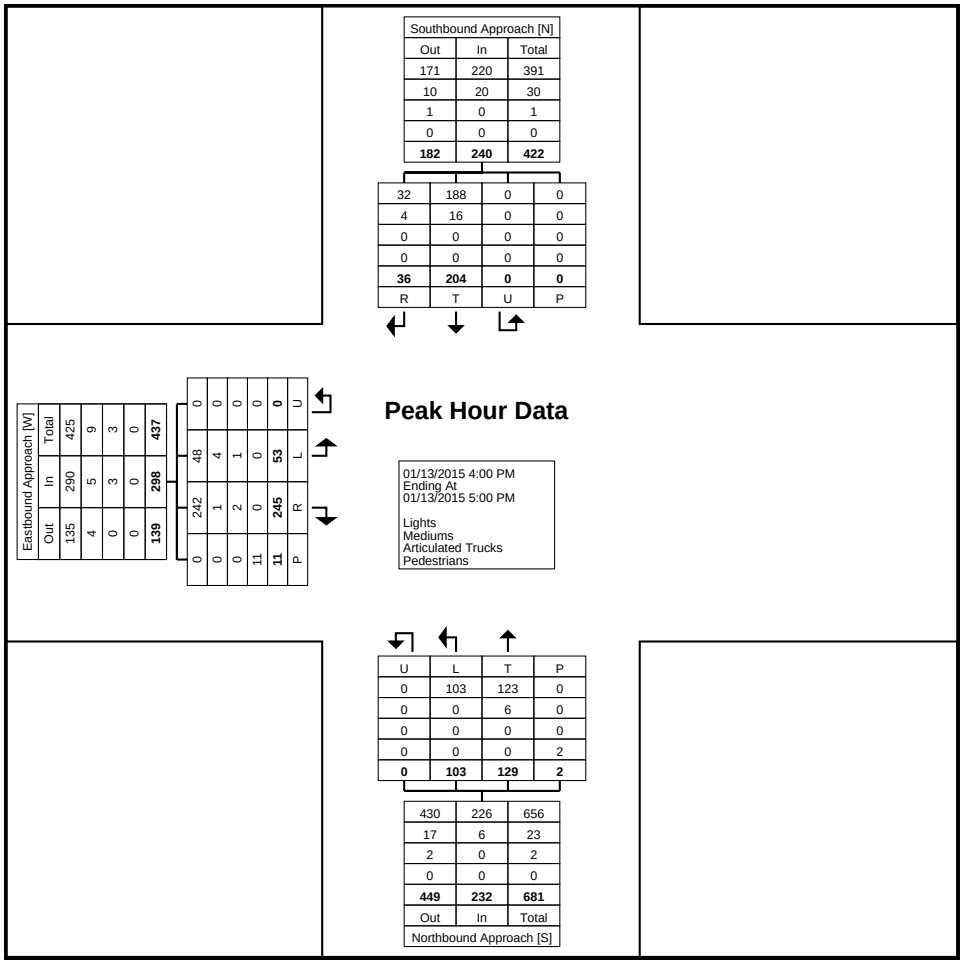


Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Chedmac Drive and Rice Avenue
Site Code:
Start Date: 01/13/2015

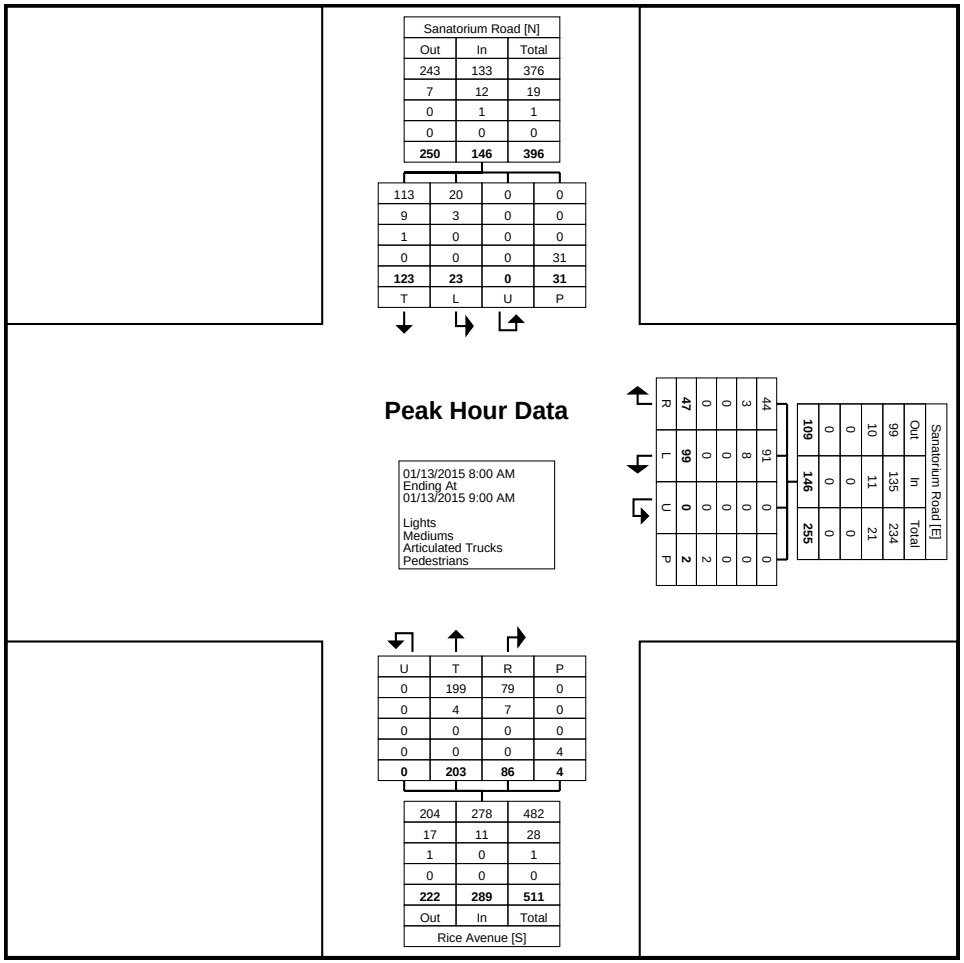


Turning Movement Peak Hour Data Plot (4:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Sanatorium Road and Rice Avenue
Site Code:
Start Date: 01/13/2015

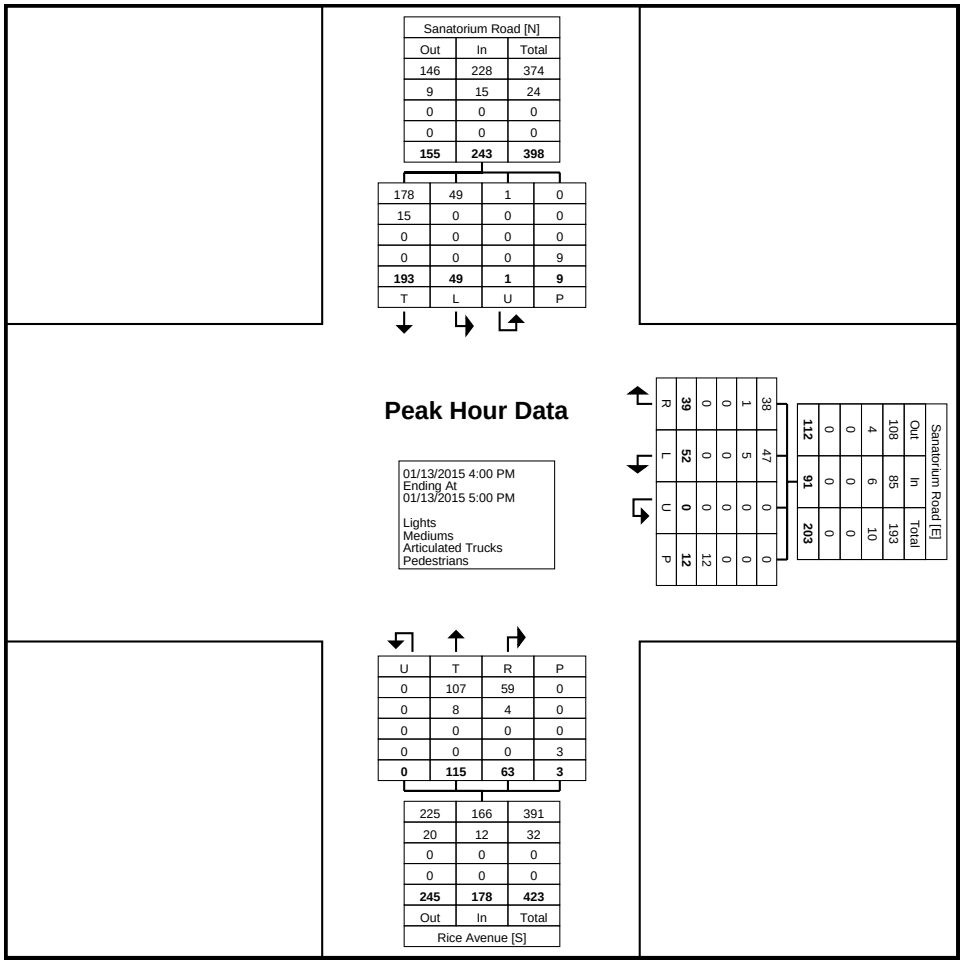


Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Sanatorium Road and Rice Avenue
Site Code:
Start Date: 01/13/2015

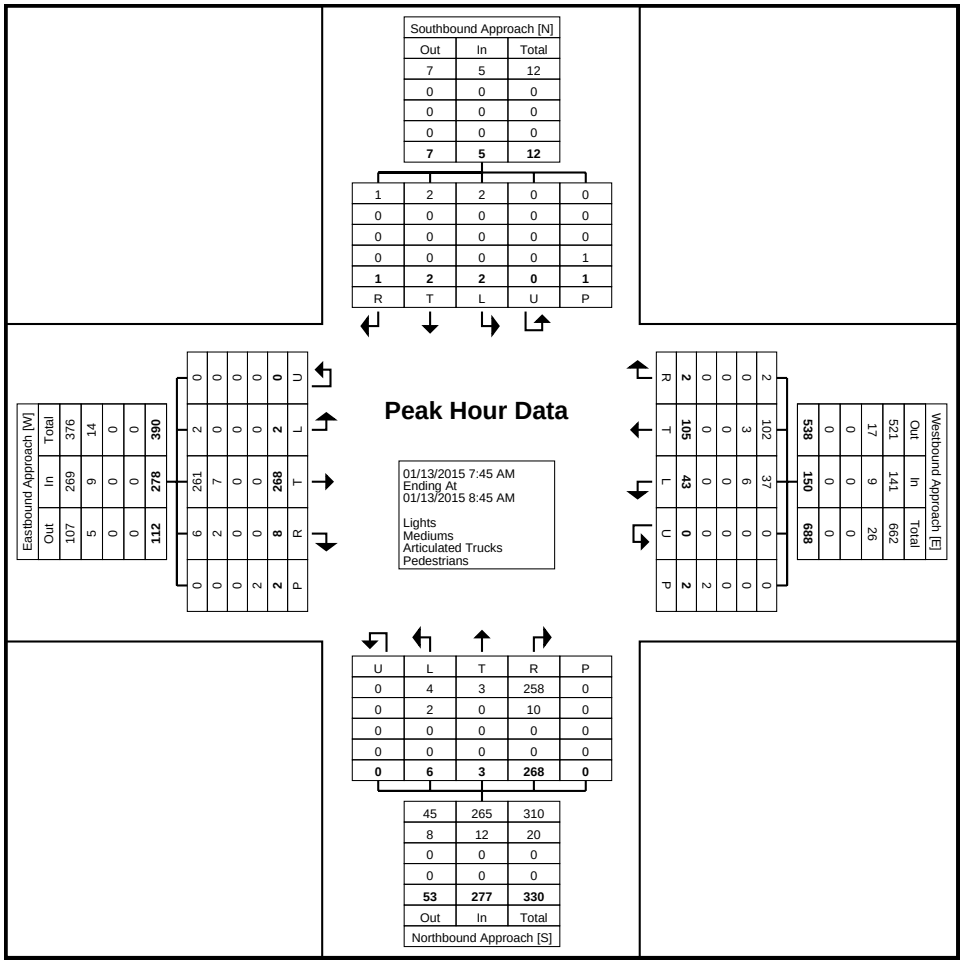


Turning Movement Peak Hour Data Plot (4:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

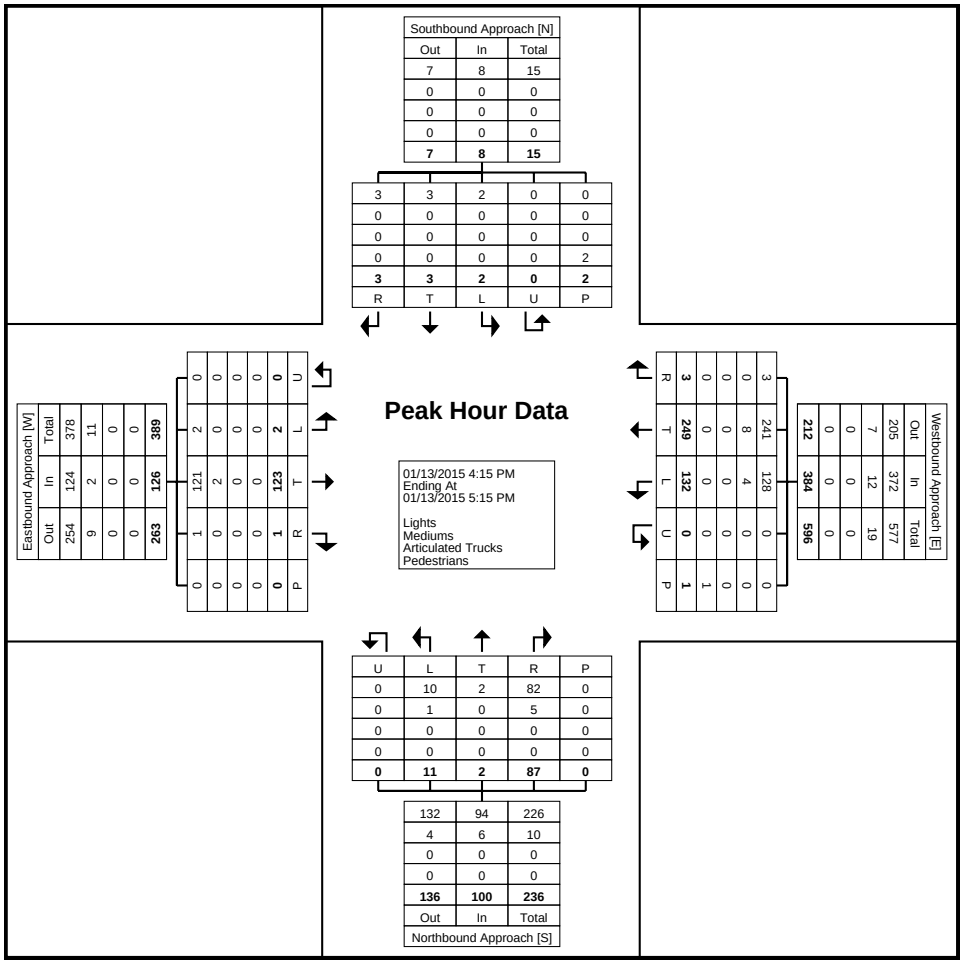
Count Name: Upper Paradise Road and Scenic Drive
Site Code:
Start Date: 01/13/2015



Turning Movement Peak Hour Data Plot (7:45 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

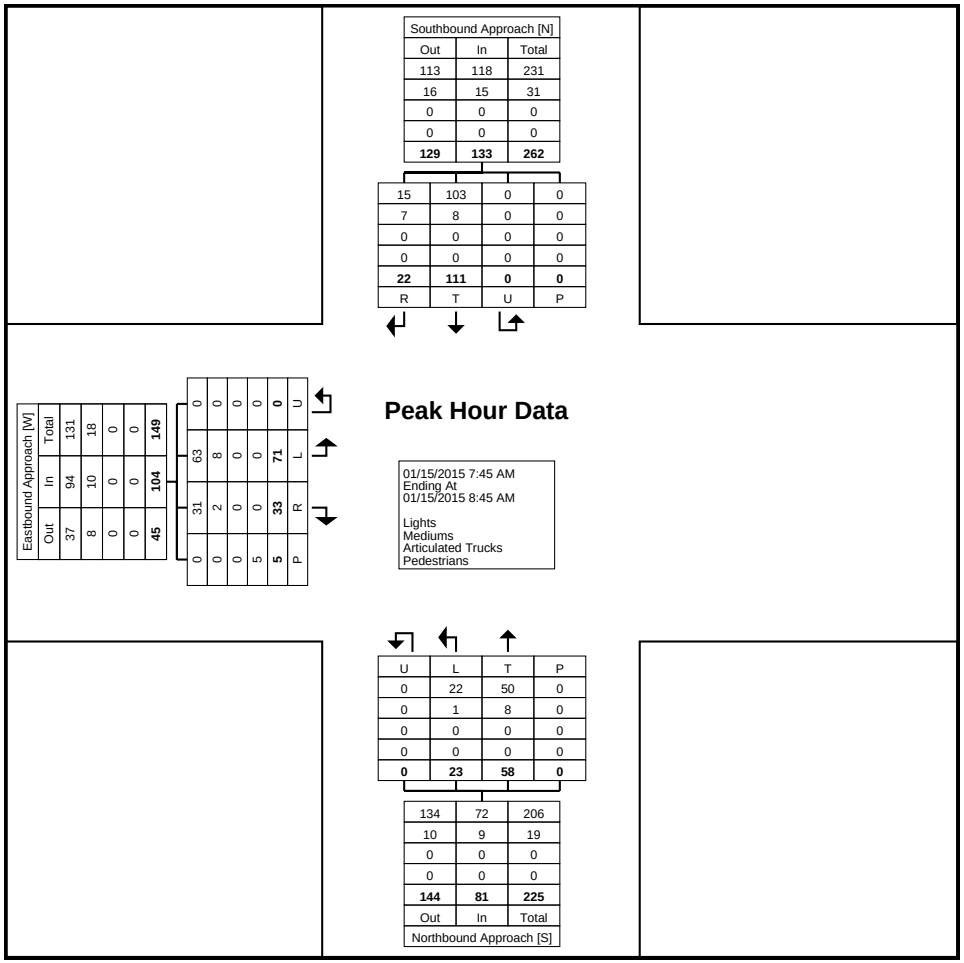


Turning Movement Peak Hour Data Plot (4:15 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Redfern Avenue and Sanatorium Road
Site Code:
Start Date: 01/15/2015

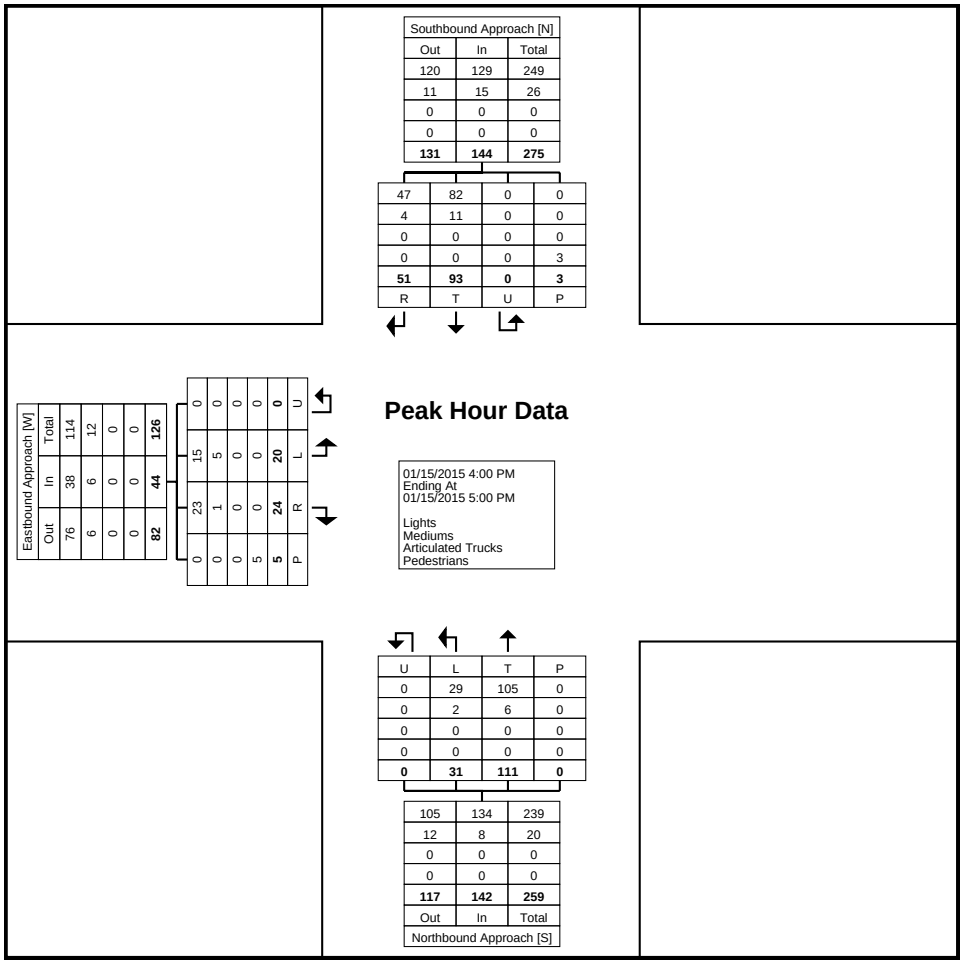


Turning Movement Peak Hour Data Plot (7:45 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Redfern Avenue and Sanatorium Road
Site Code:
Start Date: 01/15/2015

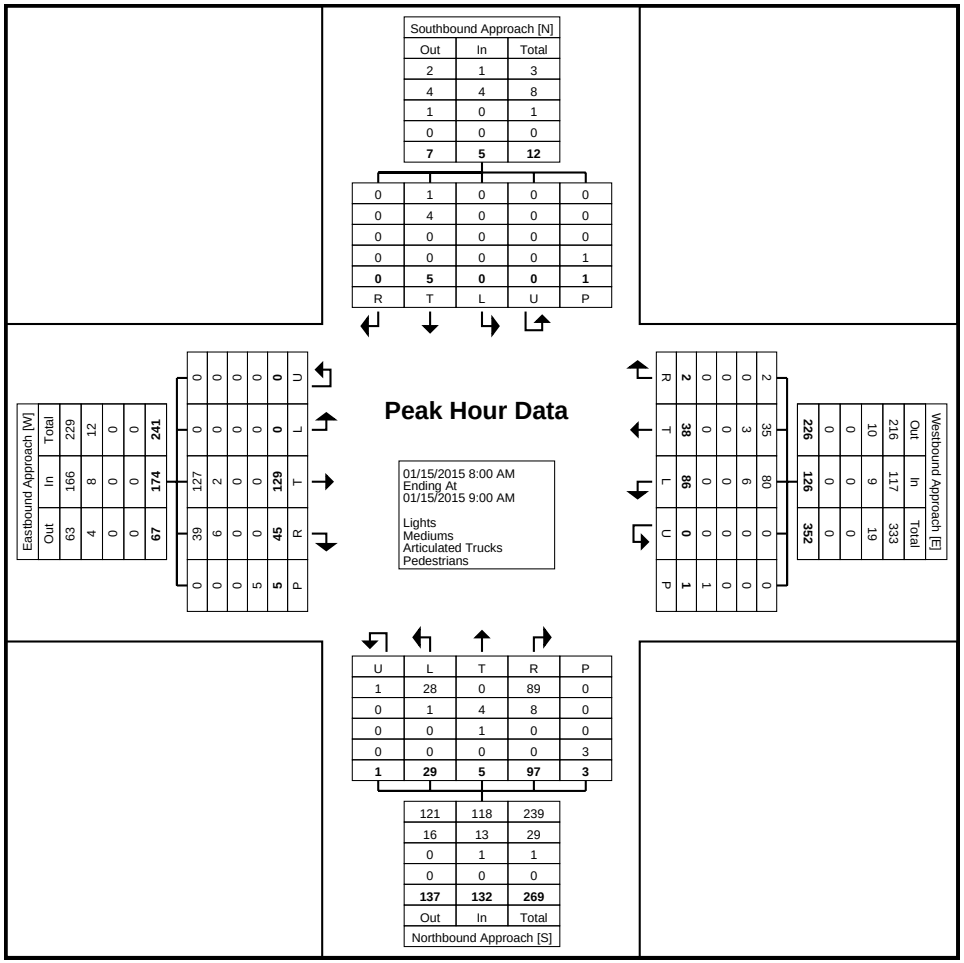


Turning Movement Peak Hour Data Plot (4:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Scenic Drive (S) and Sanatorium Road
Site Code:
Start Date: 01/15/2015

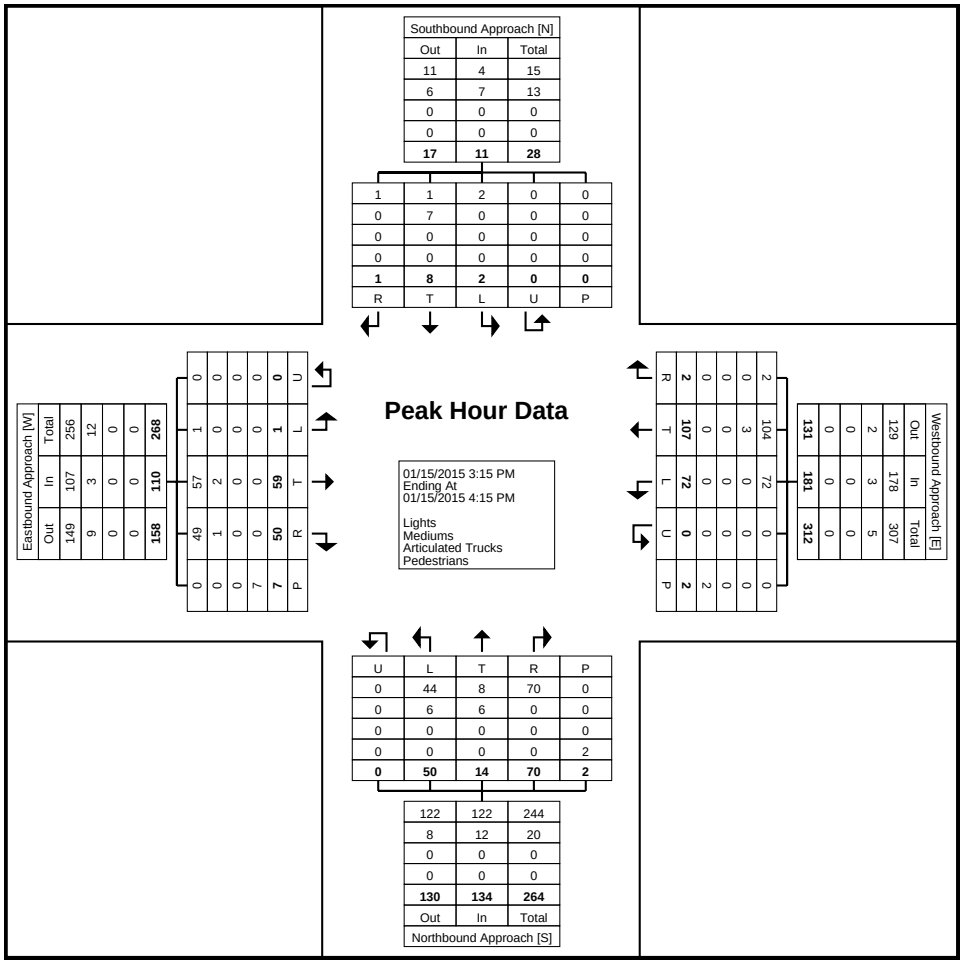


Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Scenic Drive (S) and Sanatorium Road
Site Code:
Start Date: 01/15/2015

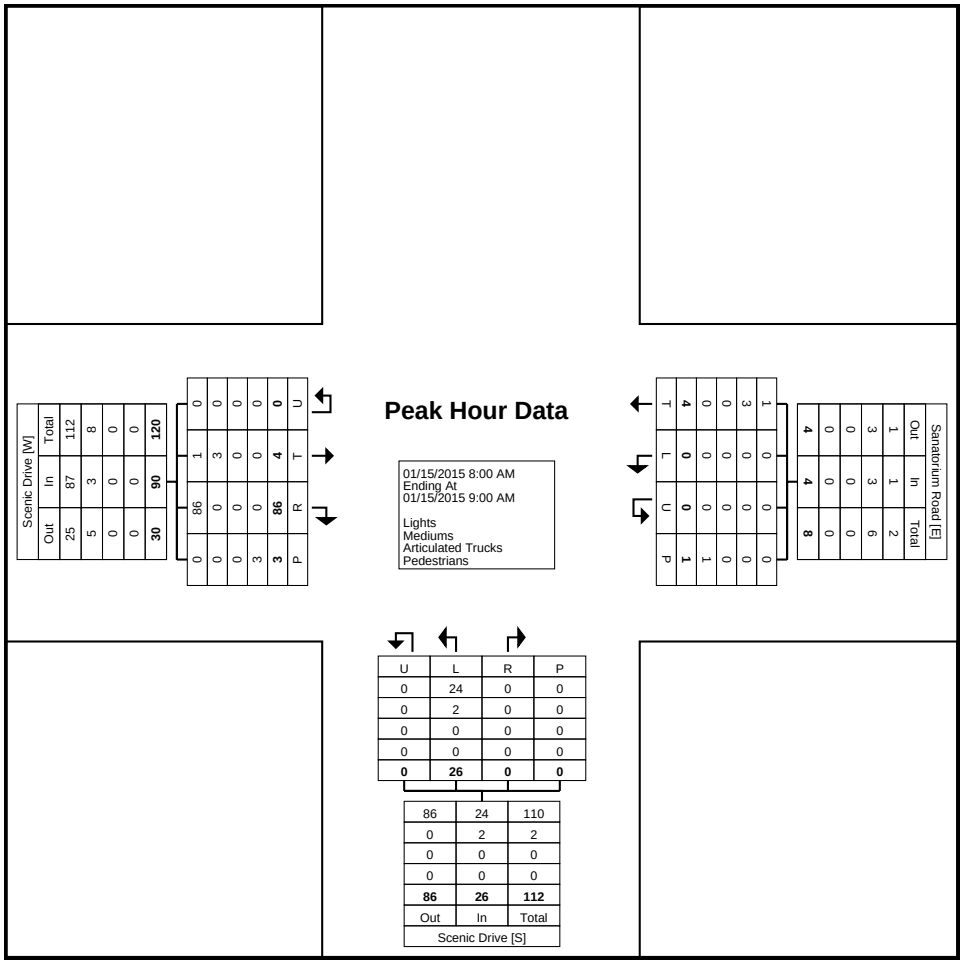


Turning Movement Peak Hour Data Plot (3:15 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Scenic Drive (N) and Sanatorium Road
Site Code:
Start Date: 01/15/2015

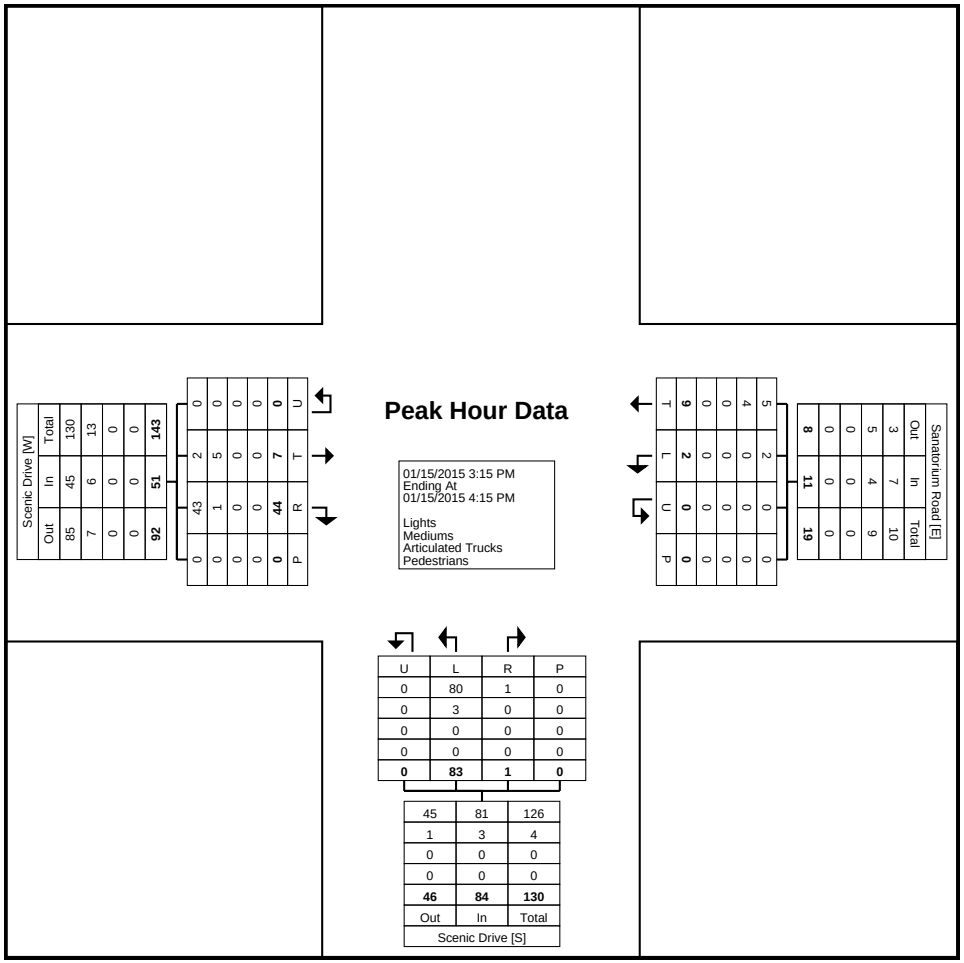


Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 mturco@ptsl.com

Count Name: Scenic Drive (N) and Sanatorium Road
Site Code:
Start Date: 01/15/2015



Turning Movement Peak Hour Data Plot (3:15 PM)

Appendix B

Existing Peak Hour Traffic Operations

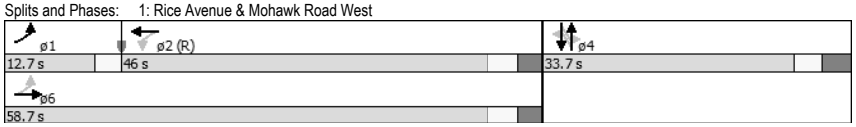
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	577	10	54	410	172	12	36	96	118	21	159
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	0.99			0.98			0.99	
Frt		0.997			0.956			0.910			0.920	
Flt Protected	0.950			0.950				0.996			0.981	
Satd. Flow (prot)	1350	2962	0	1378	2745	0	0	1355	0	0	2544	0
Flt Permitted	0.329			0.410				0.958			0.755	
Satd. Flow (perm)	465	2962	0	592	2745	0	0	1304	0	0	1944	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			90			104			173	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	20		9	9		20	2		22	22		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	0%	0%	5%	4%	0%	6%	4%	8%	5%	6%
Adj. Flow (vph)	296	627	11	59	446	187	13	39	104	128	23	173
Shared Lane Traffic (%)												
Lane Group Flow (vph)	296	638	0	59	633	0	0	156	0	0	324	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	8.0	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	12.7	58.7		46.0	46.0		33.7	33.7		33.7	33.7	
Total Split (%)	13.7%	63.5%		49.8%	49.8%		36.5%	36.5%		36.5%	36.5%	
Maximum Green (s)	9.7	52.6		39.9	39.9		27.4	27.4		27.4	27.4	
Yellow Time (s)	3.0	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	2.0	5.1		5.1	5.1			5.3			5.3	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Walk Time (s)		33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)		17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	56.7	53.6		40.9	40.9			28.4			28.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.61	0.58		0.44	0.44			0.31			0.31	
v/c Ratio	0.76	0.37		0.23	0.50			0.33			0.45	
Control Delay	24.7	11.1		18.9	17.2			11.5			13.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	24.7	11.1		18.9	17.2			11.5			13.8	
LOS	C	B		B	B			B			B	
Approach Delay		15.4			17.3			11.5			13.8	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	23.5	29.1		6.2	34.4			6.6			10.4	
Queue Length 95th (m)	#47.4	39.7		14.9	49.4			21.3			22.2	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	387	1719		262	1265			472			717	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.76	0.37		0.23	0.50			0.33			0.45	

Intersection Summary		
Area Type:	Other	
Cycle Length: 92.4		
Actuated Cycle Length: 92.4		
Offset: 7.3 (8%), Referenced to phase 2:WBTL, Start of Green		
Natural Cycle: 90		
Control Type: Pretimed		
Maximum v/c Ratio: 0.76		
Intersection Signal Delay: 15.5	Intersection LOS: B	
Intersection Capacity Utilization 119.0%	ICU Level of Service H	
Analysis Period (min) 15		

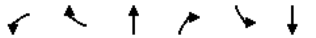
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rice Avenue & Mohawk Road West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	99	47	203	86	23	123
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.957			0.850		
Flt Protected	0.967					0.992
Satd. Flow (prot)	1250	0	1564	1141	0	1454
Flt Permitted	0.967					0.992
Satd. Flow (perm)	1250	0	1564	1141	0	1454
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	4	31		2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	2%	8%	13%	8%
Adj. Flow (vph)	108	51	221	93	25	134
Shared Lane Traffic (%)						
Lane Group Flow (vph)	159	0	221	93	0	159
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	99	47	203	86	23	123
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	51	221	93	25	134

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	159	221	93	159
Volume Left (vph)	108	0	0	25
Volume Right (vph)	51	0	93	0
Hadj (s)	0.07	0.03	-0.56	0.18
Departure Headway (s)	5.1	5.1	4.5	5.0
Degree Utilization, x	0.22	0.31	0.12	0.22
Capacity (veh/h)	660	681	767	690
Control Delay (s)	9.5	9.2	6.9	9.4
Approach Delay (s)	9.5	8.6		9.4
Approach LOS	A	A		A

Intersection Summary			
Delay	9.0		
Level of Service	A		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	26	104	202	265	174	41
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.892				0.971	
Flt Protected	0.990			0.979		
Satd. Flow (prot)	1179	0	0	2884	2742	0
Flt Permitted	0.990			0.979		
Satd. Flow (perm)	1179	0	0	2884	2742	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)			29			29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	19%	6%	4%	2%	5%	17%
Adj. Flow (vph)	28	113	220	288	189	45
Shared Lane Traffic (%)						
Lane Group Flow (vph)	141	0	0	508	234	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	104	202	265	174	41
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)	28	113	220	288	189	45
Pedestrians	29					
Lane Width (m)	3.3					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	824	146	263			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	824	146	263			
tC, single (s)	7.2	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.4	2.2			
p0 queue free %	87	87	83			
cM capacity (veh/h)	226	843	1256			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	141	316	192	126	108
Volume Left	28	220	0	0	0
Volume Right	113	0	0	0	45
cSH	545	1256	1700	1700	1700
Volume to Capacity	0.26	0.17	0.11	0.07	0.06
Queue Length 95th (m)	7.7	4.7	0.0	0.0	0.0
Control Delay (s)	13.9	6.4	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	13.9	4.0		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay		4.5			
Intersection Capacity Utilization		46.3%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	71	33	23	58	111	22
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.957				0.978	
Flt Protected	0.967			0.986		
Satd. Flow (prot)	1226	0	0	1415	1404	0
Flt Permitted	0.967			0.986		
Satd. Flow (perm)	1226	0	0	1415	1404	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	507.0			148.7	106.3	
Travel Time (s)	36.5			10.7	7.7	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	6%	4%	14%	7%	32%
Adj. Flow (vph)	77	36	25	63	121	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	113	0	0	88	145	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	71	33	23	58	111	22
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)	77	36	25	63	121	24
Pedestrians	5					
Lane Width (m)	3.3					
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	251	138	150			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251	138	150			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	89	96	98			
cM capacity (veh/h)	703	897	1414			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	113	88	145
Volume Left	77	25	0
Volume Right	36	0	24
cSH	755	1414	1700
Volume to Capacity	0.15	0.02	0.09
Queue Length 95th (m)	3.9	0.4	0.0
Control Delay (s)	10.6	2.3	0.0
Lane LOS	B	A	
Approach Delay (s)	10.6	2.3	0.0
Approach LOS	B		

Intersection Summary					
Average Delay		4.0			
Intersection Capacity Utilization		31.6%	ICU Level of Service		A
Analysis Period (min)		15			

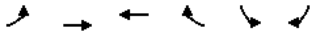
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	0	129	45	86	38	2	29	5	97	0	5	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.965			0.998			0.900				
Flt Protected					0.967			0.989				
Satd. Flow (prot)	0	1468	0	0	1436	0	0	1298	0	0	886	0
Flt Permitted					0.967			0.989				
Satd. Flow (perm)	0	1468	0	0	1436	0	0	1298	0	0	886	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	13%	7%	8%	0%	3%	80%	8%	0%	80%	0%
Adj. Flow (vph)	0	140	49	93	41	2	32	5	105	0	5	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	189	0	0	136	0	0	142	0	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	129	45	86	38	2	29	5	97	0	5	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	140	49	93	41	2	32	5	105	0	5	0

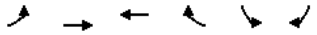
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	189	137	142	5
Volume Left (vph)	0	93	32	0
Volume Right (vph)	49	2	105	0
Hadj (s)	-0.07	0.25	-0.24	1.36
Departure Headway (s)	4.3	4.7	4.4	6.2
Degree Utilization, x	0.23	0.18	0.18	0.01
Capacity (veh/h)	798	727	759	535
Control Delay (s)	8.6	8.7	8.4	9.3
Approach Delay (s)	8.6	8.7	8.4	9.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.6		
Level of Service	A		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	4	86	26	0	0	4
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.998				
Satd. Flow (prot)	0	1544	1477	0	717	0
Flt Permitted		0.998				
Satd. Flow (perm)	0	1544	1477	0	717	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	75%	0%	8%	0%	0%	75%
Adj. Flow (vph)	4	93	28	0	0	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	97	28	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	4	86	26	0	0	4
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)	4	93	28	0	0	4
Pedestrians		3	1			
Lane Width (m)		3.3	3.3			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	28				131	31
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	28				131	31
tC, single (s)	4.8				6.4	7.0
tC, 2 stage (s)						
tF (s)	2.9				3.5	4.0
p0 queue free %	100				100	99
cM capacity (veh/h)	1219				864	865

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	98	28	4
Volume Left	4	0	0
Volume Right	0	0	4
cSH	1219	1700	865
Volume to Capacity	0.00	0.02	0.01
Queue Length 95th (m)	0.1	0.0	0.1
Control Delay (s)	0.4	0.0	9.2
Lane LOS	A		A
Approach Delay (s)	0.4	0.0	9.2
Approach LOS			A

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		19.0%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	268	8	43	105	2	6	3	268	2	2	1
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.997				0.850		0.973	
Flt Protected				0.950				0.966			0.980	
Satd. Flow (prot)	0	1533	0	1208	1545	0	0	1252	1185	0	1521	0
Flt Permitted				0.950				0.966			0.980	
Satd. Flow (perm)	0	1533	0	1208	1545	0	0	1252	1185	0	1521	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	25%	14%	3%	0%	33%	0%	4%	0%	0%	0%
Adj. Flow (vph)	2	291	9	47	114	2	7	3	291	2	2	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	302	0	47	116	0	0	10	291	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	268	8	43	105	2	6	3	268	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	291	9	47	114	2	7	3	291	2	2	1

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	302	47	116	10	291	5
Volume Left (vph)	2	47	0	7	0	2
Volume Right (vph)	9	0	2	0	291	1
Hadj (s)	0.05	0.74	0.04	0.71	-0.63	-0.04
Departure Headway (s)	5.6	6.5	5.8	6.5	5.2	6.3
Degree Utilization, x	0.47	0.08	0.19	0.02	0.42	0.01
Capacity (veh/h)	612	522	586	524	658	506
Control Delay (s)	13.6	8.9	8.9	8.4	10.7	9.3
Approach Delay (s)	13.6	8.9		10.6		9.3
Approach LOS	B	A		B		A

Intersection Summary					
Delay	11.4				
Level of Service	B				
Intersection Capacity Utilization	52.1%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	376	239	7	215	0	300	0	692	541	469	294	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	1.00	1.00		0.99		0.99			0.98	1.00	1.00	
Frt		0.996				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.978	
Satd. Flow (prot)	1337	2934	0	2545	0	1220	0	2971	1208	1217	2756	0
Flt Permitted	0.950			0.545						0.181	0.537	
Satd. Flow (perm)	1334	2934	0	1446	0	1203	0	2971	1187	232	1513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				108			411			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	2		7	7		2	5		4	4		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	29%	5%	0%	1%	0%	2%	2%	3%	3%	0%
Adj. Flow (vph)	409	260	8	234	0	326	0	752	588	510	320	0
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	409	268	0	234	0	326	0	752	588	255	575	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	13.0	41.0		13.0		18.0		40.0	40.0	18.0	58.0	
Total Split (%)	11.6%	36.6%		11.6%		16.1%		35.7%	35.7%	16.1%	51.8%	
Maximum Green (s)	10.0	35.0		10.0		15.0		34.2	34.2	15.0	52.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	43.0	29.0		43.0		55.0		35.2	35.2	63.0	60.2	
Actuated g/C Ratio	0.38	0.26		0.38		0.49		0.31	0.31	0.56	0.54	
v/c Ratio	0.80	0.35		0.35		0.50		0.81	0.90	0.77	0.55	
Control Delay	43.5	35.0		23.8		14.7		43.2	29.5	35.6	17.5	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	43.5	35.0		23.8		14.7		43.2	29.5	35.6	17.5	
LOS	D	D		C		B		D	C	D	B	
Approach Delay		40.2						37.2			23.0	
Approach LOS		D						D			C	
Queue Length 50th (m)	75.0	24.6		16.8		28.6		78.2	41.6	34.3	38.0	
Queue Length 95th (m)	#126.9	36.4		25.6		52.1		101.3	#117.5	#76.8	50.9	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	512	945		663		649		933	654	332	1037	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.80	0.28		0.35		0.50		0.81	0.90	0.77	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 112			
Actuated Cycle Length: 112			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 31.2		Intersection LOS: C	
Intersection Capacity Utilization 104.2%		ICU Level of Service G	

Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	34.0
Total Split (s)	41.0
Total Split (%)	37%
Maximum Green (s)	35.0
Yellow Time (s)	3.3
All-Red Time (s)	2.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

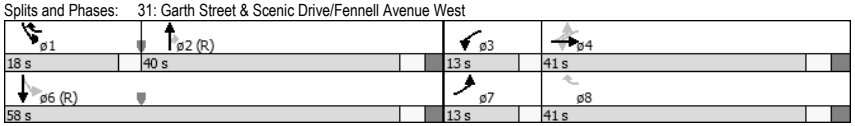
Intersection Summary

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West

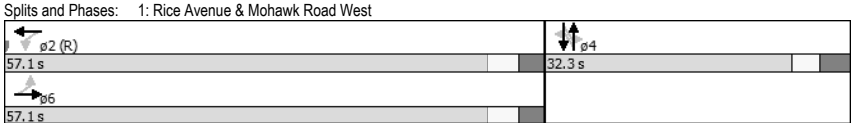


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	538	15	77	632	139	4	15	13	180	34	191
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99			0.99	
Frt		0.996			0.973			0.944			0.929	
Flt Protected	0.950			0.950				0.994			0.978	
Satd. Flow (prot)	1337	2981	0	1378	2888	0	0	1487	0	0	2692	0
Flt Permitted	0.291			0.401				0.949			0.810	
Satd. Flow (perm)	409	2981	0	579	2888	0	0	1419	0	0	2227	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			50			14			208	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	4		10	10		4	7		3	3		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	7%	0%	2%	1%	0%	0%	0%	2%	0%	1%
Adj. Flow (vph)	201	585	16	84	687	151	4	16	14	196	37	208
Shared Lane Traffic (%)												
Lane Group Flow (vph)	201	601	0	84	838	0	0	34	0	0	441	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	56.1	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	57.1	57.1		57.1	57.1		32.3	32.3		32.3	32.3	
Total Split (%)	63.9%	63.9%		63.9%	63.9%		36.1%	36.1%		36.1%	36.1%	
Maximum Green (s)	51.0	51.0		51.0	51.0		26.0	26.0		26.0	26.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.8	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	33.0	33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	52.0	52.0		52.0	52.0			27.0			27.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.30			0.30	
v/c Ratio	0.85	0.35		0.25	0.49			0.08			0.54	
Control Delay	49.6	10.4		11.6	11.4			16.0			16.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	49.6	10.4		11.6	11.4			16.0			16.0	
LOS	D	B		B	B			B			B	
Approach Delay		20.2			11.4			16.0			16.0	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	25.9	25.6		6.4	37.7			2.4			16.2	
Queue Length 95th (m)	#69.4	35.5		14.7	51.6			8.9			30.6	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	237	1736		336	1700			438			817	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.85	0.35		0.25	0.49			0.08			0.54	

Intersection Summary			
Area Type:	Other		
Cycle Length: 89.4			
Actuated Cycle Length: 89.4			
Offset: 7.3 (8%), Referenced to phase 2:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 15.6		Intersection LOS: B	
Intersection Capacity Utilization 92.9%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Rice Avenue & Mohawk Road West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	52	39	115	63	49	193
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.943			0.850		
Flt Protected	0.972					0.990
Satd. Flow (prot)	1242	0	1491	1163	0	1484
Flt Permitted	0.972					0.990
Satd. Flow (perm)	1242	0	1491	1163	0	1484
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	3	9		12	12	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	3%	7%	6%	0%	8%
Adj. Flow (vph)	57	42	125	68	53	210
Shared Lane Traffic (%)						
Lane Group Flow (vph)	99	0	125	68	0	263
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

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

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	52	39	115	63	49	193
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	42	125	68	53	210

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	99	125	68	263
Volume Left (vph)	57	0	0	53
Volume Right (vph)	42	0	68	0
Hadj (s)	-0.02	0.12	-0.60	0.15
Departure Headway (s)	4.9	5.1	4.4	4.6
Degree Utilization, x	0.14	0.18	0.08	0.34
Capacity (veh/h)	672	685	793	754
Control Delay (s)	8.7	8.0	6.6	10.0
Approach Delay (s)	8.7	7.5		10.0
Approach LOS	A	A		A

Intersection Summary				
Delay		8.9		
Level of Service		A		
Intersection Capacity Utilization		36.8%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	53	245	103	129	204	36
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.889				0.978	
Flt Protected	0.991			0.978		
Satd. Flow (prot)	1247	0	0	2884	2733	0
Flt Permitted	0.991			0.978		
Satd. Flow (perm)	1247	0	0	2884	2733	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)		2	11			11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	1%	0%	5%	8%	11%
Adj. Flow (vph)	58	266	112	140	222	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	324	0	0	252	261	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	53	245	103	129	204	36
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)	58	266	112	140	222	39
Pedestrians	11			2		
Lane Width (m)	3.3			3.3		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	546	143	272			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	546	143	272			
tC, single (s)	7.0	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	86	69	91			
cM capacity (veh/h)	408	872	1292			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	324	159	93	148	113
Volume Left	58	112	0	0	0
Volume Right	266	0	0	0	39
cSH	726	1292	1700	1700	1700
Volume to Capacity	0.45	0.09	0.05	0.09	0.07
Queue Length 95th (m)	17.3	2.1	0.0	0.0	0.0
Control Delay (s)	13.9	5.9	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	13.9	3.7		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay		6.5	
Intersection Capacity Utilization		50.2%	ICU Level of Service A
Analysis Period (min)		15	

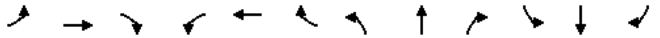
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	20	24	31	111	93	51
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.927				0.952	
Flt Protected	0.978			0.989		
Satd. Flow (prot)	1157	0	0	1480	1373	0
Flt Permitted	0.978			0.989		
Satd. Flow (perm)	1157	0	0	1480	1373	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	507.0			148.7	106.3	
Travel Time (s)	36.5			10.7	7.7	
Confl. Peds. (#/hr)	3		5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	4%	5%	7%	12%	8%
Adj. Flow (vph)	22	26	34	121	101	55
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	0	0	155	156	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	32.0%		ICU Level of Service A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	24	31	111	93	51
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)	22	26	34	121	101	55
Pedestrians	5				3	
Lane Width (m)	3.3				3.3	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	325	134	162			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	325	134	162			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	96	97	98			
cM capacity (veh/h)	606	906	1394			

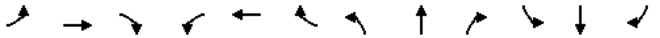
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	48	154	157
Volume Left	22	34	0
Volume Right	26	0	55
cSH	740	1394	1700
Volume to Capacity	0.06	0.02	0.09
Queue Length 95th (m)	1.6	0.6	0.0
Control Delay (s)	10.2	1.8	0.0
Lane LOS	B	A	
Approach Delay (s)	10.2	1.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		32.0%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	59	50	72	107	2	50	14	70	2	8	1
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.939			0.999			0.929			0.989	
Flt Protected					0.980			0.982			0.992	
Satd. Flow (prot)	0	1461	0	0	1534	0	0	1336	0	0	943	0
Flt Permitted					0.980			0.982			0.992	
Satd. Flow (perm)	0	1461	0	0	1534	0	0	1336	0	0	943	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)			2	2			7		2	2		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	0%	3%	0%	12%	43%	0%	0%	88%	0%
Adj. Flow (vph)	1	64	54	78	116	2	54	15	76	2	9	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	119	0	0	196	0	0	145	0	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

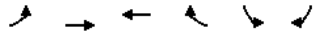
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.3%	ICU Level of Service A	
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	59	50	72	107	2	50	14	70	2	8	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	64	54	78	116	2	54	15	76	2	9	1

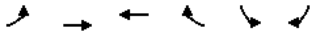
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	120	197	146	12
Volume Left (vph)	1	78	54	2
Volume Right (vph)	54	2	76	1
Hadj (s)	-0.23	0.10	-0.09	1.07
Departure Headway (s)	4.3	4.5	4.6	5.9
Degree Utilization, x	0.14	0.25	0.18	0.02
Capacity (veh/h)	800	759	740	564
Control Delay (s)	8.0	9.0	8.6	9.0
Approach Delay (s)	8.0	9.0	8.6	9.0
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.6	
Level of Service			A	
Intersection Capacity Utilization			40.3%	ICU Level of Service
Analysis Period (min)			15	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	7	44	83	0	0	9
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.993				
Satd. Flow (prot)	0	1416	1534	0	871	0
Flt Permitted		0.993				
Satd. Flow (perm)	0	1416	1534	0	871	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	71%	2%	4%	0%	0%	44%
Adj. Flow (vph)	8	48	90	0	0	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	56	90	0	10	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

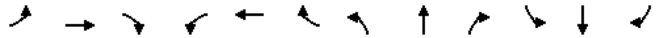
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	19.5%	ICU Level of Service A	
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	7	44	83	0	0	9
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)	8	48	90	0	0	10
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	90				153	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90				153	90
tC, single (s)	4.8				6.4	6.6
tC, 2 stage (s)						
tF (s)	2.8				3.5	3.7
p0 queue free %	99				100	99
cM capacity (veh/h)	1165				838	863

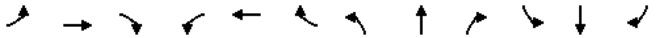
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	55	90	10
Volume Left	8	0	0
Volume Right	0	0	10
cSH	1165	1700	863
Volume to Capacity	0.01	0.05	0.01
Queue Length 95th (m)	0.1	0.0	0.3
Control Delay (s)	1.2	0.0	9.2
Lane LOS	A		A
Approach Delay (s)	1.2	0.0	9.2
Approach LOS			A

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		19.5%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	123	1	132	249	3	11	2	87	2	3	3
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.998				0.850		0.949	
Flt Protected		0.999		0.950				0.959			0.988	
Satd. Flow (prot)	0	1561	0	1337	1546	0	0	1420	1163	0	1495	0
Flt Permitted		0.999		0.950				0.959			0.988	
Satd. Flow (perm)	0	1561	0	1337	1546	0	0	1420	1163	0	1495	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	2					2			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	3%	3%	0%	9%	0%	6%	0%	0%	0%
Adj. Flow (vph)	2	134	1	143	271	3	12	2	95	2	3	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	137	0	143	274	0	0	14	95	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary					
Area Type:	Other				
Control Type: Unsignalized					
Intersection Capacity Utilization 36.6%			ICU Level of Service A		
Analysis Period (min) 15					



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	123	1	132	249	3	11	2	87	2	3	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	134	1	143	271	3	12	2	95	2	3	3

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	137	143	274	14	95	9
Volume Left (vph)	2	143	0	12	0	2
Volume Right (vph)	1	0	3	0	95	3
Hadj (s)	0.03	0.55	0.04	0.55	-0.60	-0.17
Departure Headway (s)	5.3	5.5	5.0	6.4	5.3	5.8
Degree Utilization, x	0.20	0.22	0.38	0.03	0.14	0.01
Capacity (veh/h)	658	635	703	523	631	562
Control Delay (s)	9.6	8.9	9.8	8.4	7.9	8.9
Approach Delay (s)	9.6	9.5		8.0		8.9
Approach LOS	A	A		A		A

Intersection Summary					
Delay	9.3				
Level of Service	A				
Intersection Capacity Utilization	36.6%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	90	6	746	0	448	0	383	204	261	959	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98			0.98	1.00	1.00	
Frt		0.990				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.999	
Satd. Flow (prot)	1300	2942	0	2620	0	1197	0	3000	1185	1183	2868	0
Flt Permitted	0.950			0.686						0.396	0.942	
Satd. Flow (perm)	1281	2942	0	1879	0	1167	0	3000	1159	491	2704	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				313			222			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	12		4	4		12	8		7	7		8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	2%	0%	3%	0%	1%	4%	6%	1%	0%
Adj. Flow (vph)	114	98	7	811	0	487	0	416	222	284	1042	0
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	114	105	0	811	0	487	0	416	222	256	1070	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	12.8	41.0		12.8		18.0		38.0	38.0	18.0	56.0	
Total Split (%)	11.7%	37.3%		11.7%		16.4%		34.6%	34.6%	16.4%	51.0%	
Maximum Green (s)	9.8	35.0		9.8		15.0		32.2	32.2	15.0	50.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	45.6	31.8		45.6		55.0		33.2	33.2	58.2	55.4	
Actuated g/C Ratio	0.42	0.29		0.42		0.50		0.30	0.30	0.53	0.50	
v/c Ratio	0.21	0.12		0.95		0.65		0.46	0.44	0.66	0.77	
Control Delay	20.7	27.3		50.8		10.9		33.0	6.9	24.8	26.4	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	20.7	27.3		50.8		10.9		33.0	6.9	24.8	26.4	
LOS	C	C		D		B		C	A	C	C	
Approach Delay		23.8						23.9			26.1	
Approach LOS		C						C			C	
Queue Length 50th (m)	14.6	8.0		70.8		22.1		37.4	0.0	34.1	94.6	
Queue Length 95th (m)	26.8	14.6		#113.1		55.9		51.7	17.5	55.3	121.1	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	533	969		853		746		907	505	387	1390	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.21	0.11		0.95		0.65		0.46	0.44	0.66	0.77	

Intersection Summary			
Area Type:	Other		
Cycle Length: 109.8			
Actuated Cycle Length: 109.8			
Offset: 18 (16%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 29.2		Intersection LOS: C	
Intersection Capacity Utilization 94.6%		ICU Level of Service F	

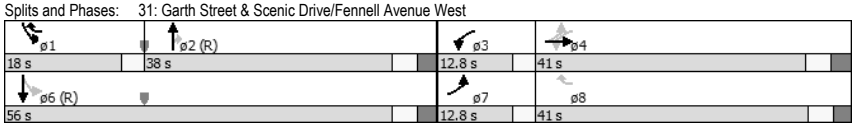
Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	36.8
Total Split (s)	41.0
Total Split (%)	37%
Maximum Green (s)	35.2
Yellow Time (s)	3.3
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	15.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Analysis Period (min) 15

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

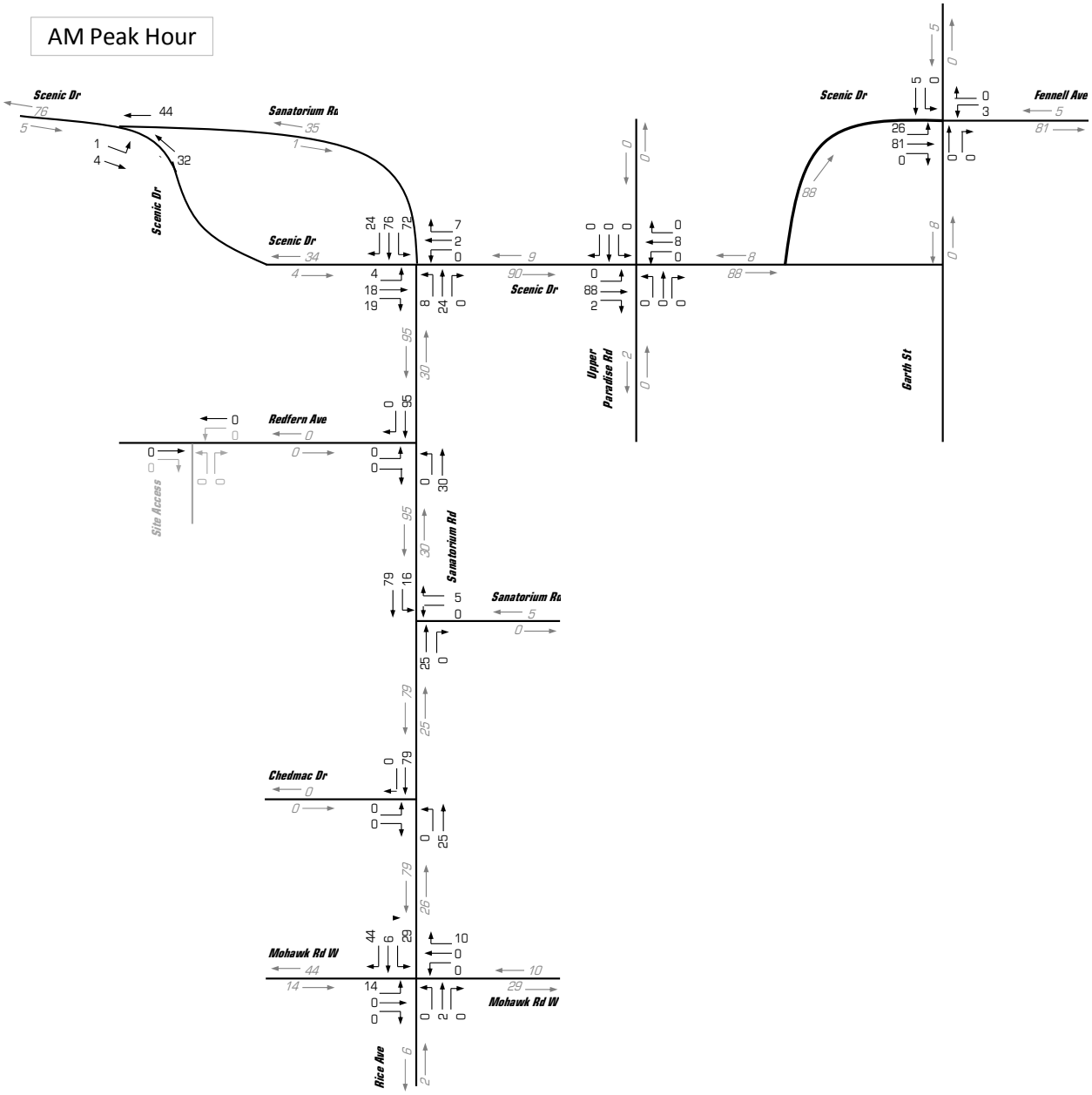
Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West



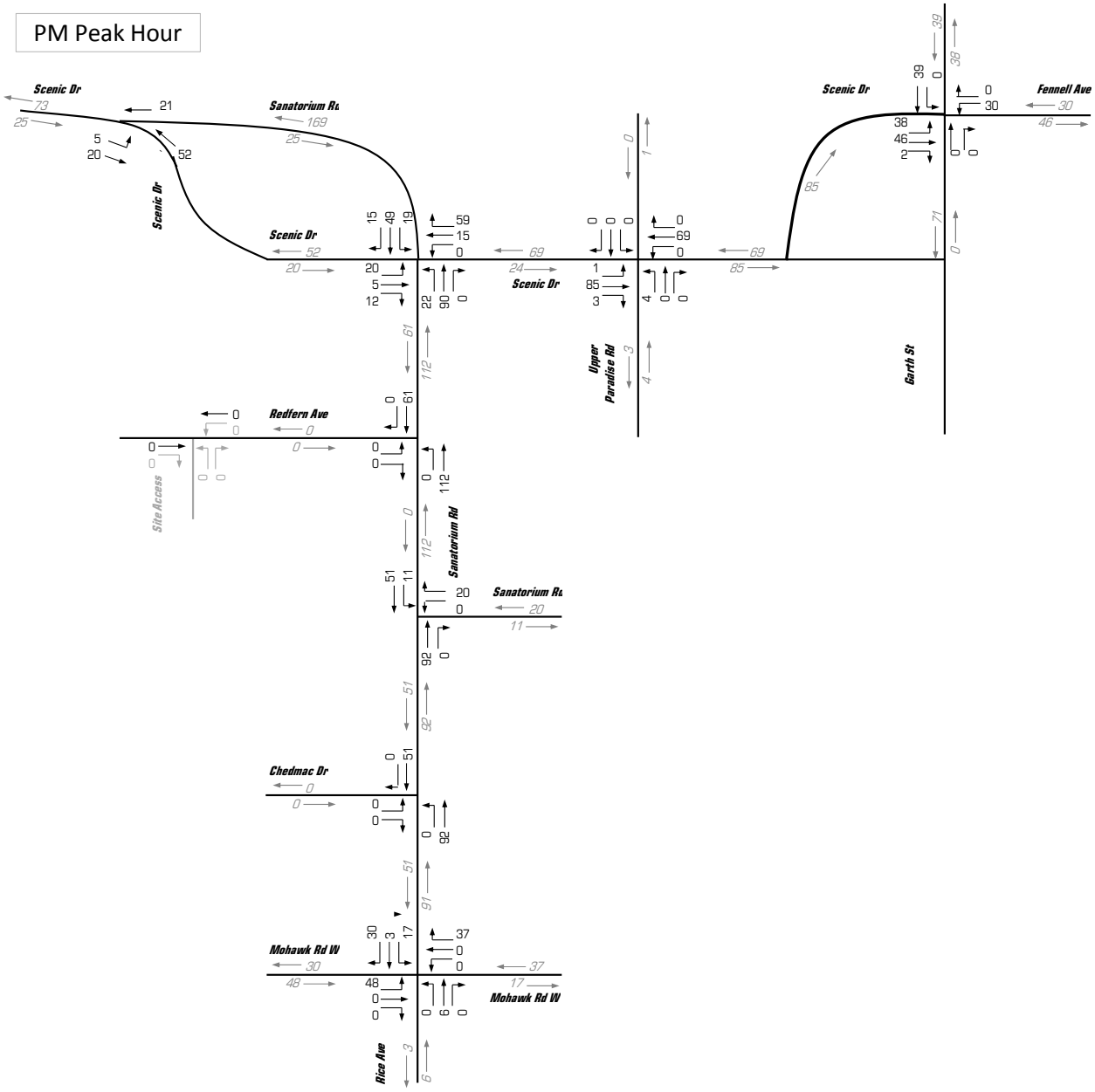
Appendix C

Chedoke Browlands Traffic Assignment

AM Peak Hour


Scenic Dr
Sanatorium Rd
Scenic Dr
Scenic Dr
Fennell Ave
Redfern Ave
Site Access
Sanatorium Rd
Sanatorium Rd
Upper Paradise Rd
Garth St
Chedmac Dr
Mohawk Rd W
Mohawk Rd W
Rice Ave

PM Peak Hour


Scenic Dr
Sanatorium Rd
Scenic Dr
Scenic Dr
Scenic Dr
Fennell Ave
Upper Paradise Rd
Garth St
Redfern Ave
Site Access
Sanatorium Rd
Sanatorium Rd
Chedmac Dr
Mohawk Rd W
Mohawk Rd W
Rice Ave

Appendix D

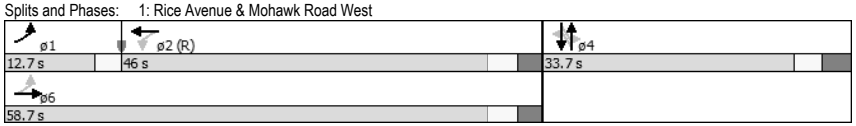
2022 Background Peak Hour Traffic Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	326	663	11	62	471	208	14	43	110	165	30	227
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	0.99			0.98			0.99	
Frt		0.998			0.954			0.911			0.919	
Flt Protected	0.950			0.950				0.996			0.981	
Satd. Flow (prot)	1350	2965	0	1378	2739	0	0	1357	0	0	2541	0
Flt Permitted	0.276			0.373				0.945			0.734	
Satd. Flow (perm)	391	2965	0	539	2739	0	0	1287	0	0	1889	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			98			109			247	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	20		9	9		20	2		22	22		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	0%	0%	5%	4%	0%	6%	4%	8%	5%	6%
Adj. Flow (vph)	354	721	12	67	512	226	15	47	120	179	33	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	354	733	0	67	738	0	0	182	0	0	459	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	8.0	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	12.7	58.7		46.0	46.0		33.7	33.7		33.7	33.7	
Total Split (%)	13.7%	63.5%		49.8%	49.8%		36.5%	36.5%		36.5%	36.5%	
Maximum Green (s)	9.7	52.6		39.9	39.9		27.4	27.4		27.4	27.4	
Yellow Time (s)	3.0	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	2.0	5.1		5.1	5.1			5.3			5.3	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Walk Time (s)		33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)		17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	56.7	53.6		40.9	40.9			28.4			28.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.61	0.58		0.44	0.44			0.31			0.31	
v/c Ratio	1.01	0.43		0.28	0.58			0.39			0.61	
Control Delay	67.1	11.7		20.5	18.8			13.4			16.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	67.1	11.7		20.5	18.8			13.4			16.0	
LOS	E	B		C	B			B			B	
Approach Delay		29.7			18.9			13.4			16.0	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	~30.4	34.8		7.3	42.8			9.4			15.6	
Queue Length 95th (m)	#83.6	47.1		17.2	60.2			26.3			31.8	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	350	1721		238	1267			471			751	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	1.01	0.43		0.28	0.58			0.39			0.61	

Intersection Summary			
Area Type:	Other		
Cycle Length: 92.4			
Actuated Cycle Length: 92.4			
Offset: 7.3 (8%), Referenced to phase 2:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 22.6		Intersection LOS: C	
Intersection Capacity Utilization 119.0%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Rice Avenue & Mohawk Road West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	114	59	258	99	42	220
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.954			0.850		
Flt Protected	0.968					0.992
Satd. Flow (prot)	1248	0	1564	1141	0	1454
Flt Permitted	0.968					0.992
Satd. Flow (perm)	1248	0	1564	1141	0	1454
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	4	31		2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	2%	8%	13%	8%
Adj. Flow (vph)	124	64	280	108	46	239
Shared Lane Traffic (%)						
Lane Group Flow (vph)	188	0	280	108	0	285
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	114	59	258	99	42	220
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	124	64	280	108	46	239

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	188	280	108	285
Volume Left (vph)	124	0	0	46
Volume Right (vph)	64	0	108	0
Hadj (s)	0.05	0.03	-0.56	0.18
Departure Headway (s)	5.5	5.4	4.8	5.2
Degree Utilization, x	0.29	0.42	0.14	0.41
Capacity (veh/h)	597	645	720	663
Control Delay (s)	10.8	11.1	7.4	11.8
Approach Delay (s)	10.8	10.0		11.8
Approach LOS	B	B		B

Intersection Summary			
Delay	10.8		
Level of Service	B		
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	30	119	232	329	279	47
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.892				0.978	
Flt Protected	0.990			0.980		
Satd. Flow (prot)	1179	0	0	2888	2777	0
Flt Permitted	0.990			0.980		
Satd. Flow (perm)	1179	0	0	2888	2777	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)			29			29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	19%	6%	4%	2%	5%	17%
Adj. Flow (vph)	33	129	252	358	303	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	0	0	610	354	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	30	119	232	329	279	47
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)	33	129	252	358	303	51
Pedestrians	29					
Lane Width (m)	3.3					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	1041	206	383			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1041	206	383			
tC, single (s)	7.2	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.4	2.2			
p0 queue free %	78	83	78			
cM capacity (veh/h)	151	770	1132			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	162	371	238	202	152
Volume Left	33	252	0	0	0
Volume Right	129	0	0	0	51
cSH	422	1132	1700	1700	1700
Volume to Capacity	0.38	0.22	0.14	0.12	0.09
Queue Length 95th (m)	13.3	6.4	0.0	0.0	0.0
Control Delay (s)	18.7	6.9	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	18.7	4.2		0.0	
Approach LOS	C				

Intersection Summary					
Average Delay		5.0			
Intersection Capacity Utilization		52.1%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	82	38	26	97	223	25
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.957				0.986	
Flt Protected	0.967			0.990		
Satd. Flow (prot)	1226	0	0	1411	1436	0
Flt Permitted	0.967			0.990		
Satd. Flow (perm)	1226	0	0	1411	1436	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	507.0			148.7	106.3	
Travel Time (s)	36.5			10.7	7.7	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	6%	4%	14%	7%	32%
Adj. Flow (vph)	89	41	28	105	242	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	130	0	0	133	269	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	82	38	26	97	223	25
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)	89	41	28	105	242	27
Pedestrians	5					
Lane Width (m)	3.3					
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	423	261	275			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	423	261	275			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	84	95	98			
cM capacity (veh/h)	556	765	1272			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	130	134	270
Volume Left	89	28	0
Volume Right	41	0	27
cSH	609	1272	1700
Volume to Capacity	0.21	0.02	0.16
Queue Length 95th (m)	6.1	0.5	0.0
Control Delay (s)	12.5	1.8	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	1.8	0.0
Approach LOS	B		

Intersection Summary					
Average Delay		3.5			
Intersection Capacity Utilization		41.5%	ICU Level of Service		A
Analysis Period (min)		15			

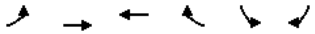
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	166	71	99	52	9	41	30	111	72	82	24
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.960			0.992			0.918			0.982	
Flt Protected		0.999			0.970			0.989			0.980	
Satd. Flow (prot)	0	1454	0	0	1435	0	0	1219	0	0	1121	0
Flt Permitted		0.999			0.970			0.989			0.980	
Satd. Flow (perm)	0	1454	0	0	1435	0	0	1219	0	0	1121	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	13%	7%	8%	0%	3%	80%	8%	0%	80%	0%
Adj. Flow (vph)	4	180	77	108	57	10	45	33	121	78	89	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	175	0	0	199	0	0	193	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	4	166	71	99	52	9	41	30	111	72	82	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	180	77	108	57	10	45	33	121	78	89	26

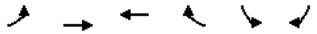
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	262	174	198	193
Volume Left (vph)	4	108	45	78
Volume Right (vph)	77	10	121	26
Hadj (s)	-0.08	0.21	0.00	0.63
Departure Headway (s)	5.3	5.7	5.5	6.1
Degree Utilization, x	0.39	0.28	0.30	0.33
Capacity (veh/h)	632	576	593	544
Control Delay (s)	11.6	10.9	10.9	12.1
Approach Delay (s)	11.6	10.9	10.9	12.1
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.4		
Level of Service	B		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	6	103	62	0	0	49
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.997				
Satd. Flow (prot)	0	1523	1477	0	717	0
Flt Permitted		0.997				
Satd. Flow (perm)	0	1523	1477	0	717	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	75%	0%	8%	0%	0%	75%
Adj. Flow (vph)	7	112	67	0	0	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	119	67	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	6	103	62	0	0	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)	7	112	67	0	0	53
Pedestrians		3	1			
Lane Width (m)		3.3	3.3			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	67				193	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67				193	70
tC, single (s)	4.8				6.4	7.0
tC, 2 stage (s)						
tF (s)	2.9				3.5	4.0
p0 queue free %	99				100	94
cM capacity (veh/h)	1175				795	820

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	118	67	53
Volume Left	7	0	0
Volume Right	0	0	53
cSH	1175	1700	820
Volume to Capacity	0.01	0.04	0.06
Queue Length 95th (m)	0.1	0.0	1.6
Control Delay (s)	0.5	0.0	9.7
Lane LOS	A		A
Approach Delay (s)	0.5	0.0	9.7
Approach LOS			A

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	396	11	49	129	2	7	3	308	2	2	1
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.998				0.850		0.973	
Flt Protected				0.950				0.965			0.980	
Satd. Flow (prot)	0	1534	0	1208	1546	0	0	1241	1185	0	1521	0
Flt Permitted				0.950				0.965			0.980	
Satd. Flow (perm)	0	1534	0	1208	1546	0	0	1241	1185	0	1521	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	25%	14%	3%	0%	33%	0%	4%	0%	0%	0%
Adj. Flow (vph)	2	430	12	53	140	2	8	3	335	2	2	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	444	0	53	142	0	0	11	335	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	396	11	49	129	2	7	3	308	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	430	12	53	140	2	8	3	335	2	2	1

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	445	53	142	11	335	5
Volume Left (vph)	2	53	0	8	0	2
Volume Right (vph)	12	0	2	0	335	1
Hadj (s)	0.05	0.74	0.04	0.74	-0.63	-0.04
Departure Headway (s)	5.9	7.0	6.3	7.1	5.7	7.1
Degree Utilization, x	0.73	0.10	0.25	0.02	0.53	0.01
Capacity (veh/h)	445	479	537	479	587	438
Control Delay (s)	23.4	9.6	10.1	9.1	13.9	10.2
Approach Delay (s)	23.4	10.0		13.7		10.2
Approach LOS	C	A		B		B

Intersection Summary					
Delay	17.3				
Level of Service	C				
Intersection Capacity Utilization	63.2%	ICU Level of Service		B	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	458	356	8	250	0	345	0	795	621	539	343	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	1.00	1.00		0.99		0.99			0.98			
Frt		0.997				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.978	
Satd. Flow (prot)	1337	2943	0	2545	0	1220	0	2971	1208	1217	2756	0
Flt Permitted	0.950			0.413						0.124	0.546	
Satd. Flow (perm)	1334	2943	0	1098	0	1203	0	2971	1187	159	1539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				77			316			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	2		7	7		2	5		4	4		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	29%	5%	0%	1%	0%	2%	2%	3%	3%	0%
Adj. Flow (vph)	498	387	9	272	0	375	0	864	675	586	373	0
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	498	396	0	272	0	375	0	864	675	293	666	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	13.0	41.0		13.0		18.0		40.0	40.0	18.0	58.0	
Total Split (%)	11.6%	36.6%		11.6%		16.1%		35.7%	35.7%	16.1%	51.8%	
Maximum Green (s)	10.0	35.0		10.0		15.0		34.2	34.2	15.0	52.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	43.0	29.0		43.0		55.0		35.2	35.2	63.0	60.2	
Actuated g/C Ratio	0.38	0.26		0.38		0.49		0.31	0.31	0.56	0.54	
v/c Ratio	0.97	0.52		0.48		0.59		0.93	1.15	0.96	0.92dl	
Control Delay	68.1	38.2		25.8		19.4		54.0	104.9	71.3	19.0	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	68.1	38.2		25.8		19.4		54.0	104.9	71.3	19.0	
LOS	E	D		C		B		D	F	E	B	
Approach Delay		54.9						76.3			35.0	
Approach LOS		D						E			D	
Queue Length 50th (m)	100.9	38.4		20.0		42.6		94.5	~121.3	54.1	46.0	
Queue Length 95th (m)	#170.5	53.6		29.5		71.7		#132.0	#190.1	#112.3	60.8	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	512	947		563		633		933	589	306	1046	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.97	0.42		0.48		0.59		0.93	1.15	0.96	0.64	

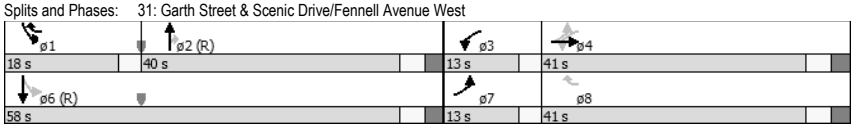
Intersection Summary			
Area Type:	Other		
Cycle Length: 112			
Actuated Cycle Length: 112			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.15			
Intersection Signal Delay: 53.1		Intersection LOS: D	
Intersection Capacity Utilization 110.5%		ICU Level of Service H	

Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	34.0
Total Split (s)	41.0
Total Split (%)	37%
Maximum Green (s)	35.0
Yellow Time (s)	3.3
All-Red Time (s)	2.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West



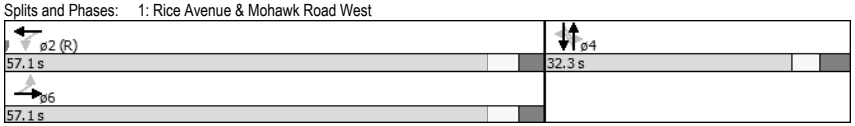
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	618	17	88	726	197	5	23	15	224	42	249
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99			0.99	
Frt		0.996			0.968			0.953			0.927	
Flt Protected	0.950			0.950				0.995			0.979	
Satd. Flow (prot)	1337	2982	0	1378	2873	0	0	1505	0	0	2689	0
Flt Permitted	0.228			0.357				0.939			0.807	
Satd. Flow (perm)	321	2982	0	516	2873	0	0	1419	0	0	2213	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			66			16			181	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	4		10	10		4	7		3	3		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	7%	0%	2%	1%	0%	0%	0%	2%	0%	1%
Adj. Flow (vph)	284	672	18	96	789	214	5	25	16	243	46	271
Shared Lane Traffic (%)												
Lane Group Flow (vph)	284	690	0	96	1003	0	0	46	0	0	560	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	56.1	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	57.1	57.1		57.1	57.1		32.3	32.3		32.3	32.3	
Total Split (%)	63.9%	63.9%		63.9%	63.9%		36.1%	36.1%		36.1%	36.1%	
Maximum Green (s)	51.0	51.0		51.0	51.0		26.0	26.0		26.0	26.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.8	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	33.0	33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	52.0	52.0		52.0	52.0			27.0			27.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.30			0.30	
v/c Ratio	1.53	0.40		0.32	0.59			0.10			0.71	
Control Delay	284.4	10.9		13.3	12.8			17.2			24.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	284.4	10.9		13.3	12.8			17.2			24.0	
LOS	F	B		B	B			B			C	
Approach Delay		90.7			12.8			17.2			24.0	
Approach LOS		F			B			B			C	
Queue Length 50th (m)	~67.9	30.6		7.7	48.9			3.6			29.8	
Queue Length 95th (m)	#83.9	41.8		17.8	66.4			11.2			48.4	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	186	1736		300	1698			439			794	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	1.53	0.40		0.32	0.59			0.10			0.71	

Intersection Summary

Area Type: Other
Cycle Length: 89.4
Actuated Cycle Length: 89.4
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green
Natural Cycle: 130
Control Type: Pretimed
Maximum v/c Ratio: 1.53
Intersection Signal Delay: 43.5 Intersection LOS: D
Intersection Capacity Utilization 93.6% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rice Avenue & Mohawk Road West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	60	65	224	72	67	273
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.930			0.850		
Flt Protected	0.977					0.990
Satd. Flow (prot)	1239	0	1491	1163	0	1484
Flt Permitted	0.977					0.990
Satd. Flow (perm)	1239	0	1491	1163	0	1484
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	3	9		12	12	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	3%	7%	6%	0%	8%
Adj. Flow (vph)	65	71	243	78	73	297
Shared Lane Traffic (%)						
Lane Group Flow (vph)	136	0	243	78	0	370
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 55.1% ICU Level of Service B
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	60	65	224	72	67	273
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	71	243	78	73	297

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	136	243	78	370
Volume Left (vph)	65	0	0	73
Volume Right (vph)	71	0	78	0
Hadj (s)	-0.11	0.12	-0.60	0.15
Departure Headway (s)	5.4	5.4	4.6	4.9
Degree Utilization, x	0.20	0.36	0.10	0.51
Capacity (veh/h)	601	651	745	709
Control Delay (s)	9.8	10.2	7.0	12.9
Approach Delay (s)	9.8	9.4		12.9
Approach LOS	A	A		B

Intersection Summary			
Delay		11.0	
Level of Service		B	
Intersection Capacity Utilization		55.1%	ICU Level of Service B
Analysis Period (min)		15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	61	281	118	240	275	41
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.889				0.980	
Flt Protected	0.991			0.984		
Satd. Flow (prot)	1247	0	0	2885	2740	0
Flt Permitted	0.991			0.984		
Satd. Flow (perm)	1247	0	0	2885	2740	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)		2	11			11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	1%	0%	5%	8%	11%
Adj. Flow (vph)	66	305	128	261	299	45
Shared Lane Traffic (%)						
Lane Group Flow (vph)	371	0	0	389	344	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	59.3%		ICU Level of Service B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	61	281	118	240	275	41
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	305	128	261	299	45
Pedestrians	11			2		
Lane Width (m)	3.3			3.3		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	719	185	354			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	719	185	354			
tC, single (s)	7.0	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	79	63	89			
cM capacity (veh/h)	309	821	1205			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	372	215	174	199	144
Volume Left	66	128	0	0	0
Volume Right	305	0	0	0	45
cSH	633	1205	1700	1700	1700
Volume to Capacity	0.59	0.11	0.10	0.12	0.08
Queue Length 95th (m)	28.6	2.7	0.0	0.0	0.0
Control Delay (s)	18.4	5.3	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	18.4	3.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay		7.2	
Intersection Capacity Utilization		59.3%	ICU Level of Service B
Analysis Period (min)		15	

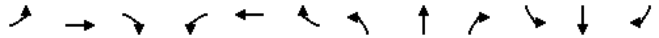
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	23	28	36	240	168	59
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.926				0.965	
Flt Protected	0.978			0.994		
Satd. Flow (prot)	1157	0	0	1485	1387	0
Flt Permitted	0.978			0.994		
Satd. Flow (perm)	1157	0	0	1485	1387	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	507.0			148.7	106.3	
Travel Time (s)	36.5			10.7	7.7	
Confl. Peds. (#/hr)	3		5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	4%	5%	7%	12%	8%
Adj. Flow (vph)	25	30	39	261	183	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	0	300	247	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.1%		ICU Level of Service A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	23	28	36	240	168	59
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)	25	30	39	261	183	64
Pedestrians	5				3	
Lane Width (m)	3.3				3.3	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	562	220	252			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	562	220	252			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	94	96	97			
cM capacity (veh/h)	435	812	1291			

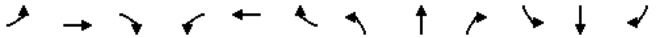
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	55	300	247
Volume Left	25	39	0
Volume Right	30	0	64
cSH	584	1291	1700
Volume to Capacity	0.09	0.03	0.15
Queue Length 95th (m)	2.3	0.7	0.0
Control Delay (s)	11.8	1.3	0.0
Lane LOS	B	A	
Approach Delay (s)	11.8	1.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		45.1%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	73	69	83	138	61	79	106	80	21	58	16
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.943			0.971			0.959			0.978	
Flt Protected		0.994			0.986			0.985			0.989	
Satd. Flow (prot)	0	1463	0	0	1505	0	0	1248	0	0	1003	0
Flt Permitted		0.994			0.986			0.985			0.989	
Satd. Flow (perm)	0	1463	0	0	1505	0	0	1248	0	0	1003	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)			2	2			7		2	2		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	0%	3%	0%	12%	43%	0%	0%	88%	0%
Adj. Flow (vph)	23	79	75	90	150	66	86	115	87	23	63	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	0	0	306	0	0	288	0	0	103	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

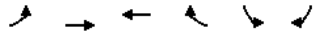
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 62.6%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	21	73	69	83	138	61	79	106	80	21	58	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	79	75	90	150	66	86	115	87	23	63	17

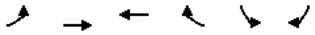
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	177	307	288	103
Volume Left (vph)	23	90	86	23
Volume Right (vph)	75	66	87	17
Hadj (s)	-0.19	-0.05	0.23	0.86
Departure Headway (s)	5.4	5.4	5.7	6.7
Degree Utilization, x	0.27	0.46	0.45	0.19
Capacity (veh/h)	598	630	588	483
Control Delay (s)	10.4	12.8	13.3	11.2
Approach Delay (s)	10.4	12.8	13.3	11.2
Approach LOS	B	B	B	B

Intersection Summary				
Delay			12.3	
Level of Service			B	
Intersection Capacity Utilization			62.6%	ICU Level of Service
Analysis Period (min)			15	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	13	71	147	0	0	31
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.992				
Satd. Flow (prot)	0	1405	1534	0	871	0
Flt Permitted		0.992				
Satd. Flow (perm)	0	1405	1534	0	871	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	71%	2%	4%	0%	0%	44%
Adj. Flow (vph)	14	77	160	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	91	160	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

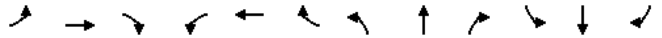
Intersection Summary				
Area Type:	Other			
Control Type: Unsignalized				
Intersection Capacity Utilization	27.1%			ICU Level of Service A
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	13	71	147	0	0	31
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)	14	77	160	0	0	34
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	160				265	160
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160				265	160
tC, single (s)	4.8				6.4	6.6
tC, 2 stage (s)						
tF (s)	2.8				3.5	3.7
p0 queue free %	99				100	96
cM capacity (veh/h)	1090				719	787

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	91	160	34
Volume Left	14	0	0
Volume Right	0	0	34
cSH	1090	1700	787
Volume to Capacity	0.01	0.09	0.04
Queue Length 95th (m)	0.3	0.0	1.0
Control Delay (s)	1.4	0.0	9.8
Lane LOS	A		A
Approach Delay (s)	1.4	0.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay		1.6	
Intersection Capacity Utilization		27.1%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	226	4	152	355	3	17	2	100	2	3	3
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.999				0.850		0.949	
Flt Protected		0.999		0.950				0.957			0.988	
Satd. Flow (prot)	0	1560	0	1337	1547	0	0	1412	1163	0	1495	0
Flt Permitted		0.999		0.950				0.957			0.988	
Satd. Flow (perm)	0	1560	0	1337	1547	0	0	1412	1163	0	1495	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	2					2			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	3%	3%	0%	9%	0%	6%	0%	0%	0%
Adj. Flow (vph)	3	246	4	165	386	3	18	2	109	2	3	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	253	0	165	389	0	0	20	109	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	49.7%	ICU Level of Service A	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	3	226	4	152	355	3	17	2	100	2	3	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	246	4	165	386	3	18	2	109	2	3	3

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	253	165	389	21	109	9
Volume Left (vph)	3	165	0	18	0	2
Volume Right (vph)	4	0	3	0	109	3
Hadj (s)	0.03	0.55	0.04	0.58	-0.60	-0.17
Departure Headway (s)	5.6	5.8	5.2	7.1	5.9	6.5
Degree Utilization, x	0.39	0.26	0.57	0.04	0.18	0.02
Capacity (veh/h)	622	609	674	470	560	487
Control Delay (s)	12.1	9.6	13.7	9.2	8.9	9.6
Approach Delay (s)	12.1	12.5		9.0		9.6
Approach LOS	B	B		A		A

Intersection Summary					
Delay		11.9			
Level of Service		B			
Intersection Capacity Utilization	49.7%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	159	149	9	887	0	515	0	440	234	300	1141	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98			0.98	1.00	1.00	
Frt		0.991				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.999	
Satd. Flow (prot)	1300	2945	0	2620	0	1197	0	3000	1185	1183	2868	0
Flt Permitted	0.950			0.643						0.343	0.938	
Satd. Flow (perm)	1281	2945	0	1762	0	1167	0	3000	1159	425	2692	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				251			254			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	12		4	4		12	8		7	7		8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	2%	0%	3%	0%	1%	4%	6%	1%	0%
Adj. Flow (vph)	173	162	10	964	0	560	0	478	254	326	1240	0
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	173	172	0	964	0	560	0	478	254	293	1273	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	12.8	41.0		12.8		18.0		38.0	38.0	18.0	56.0	
Total Split (%)	11.4%	36.7%		11.4%		16.1%		34.0%	34.0%	16.1%	50.1%	
Maximum Green (s)	9.8	35.0		9.8		15.0		32.2	32.2	15.0	50.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	45.6	31.8		45.6		57.0		33.2	33.2	60.2	57.4	
Actuated g/C Ratio	0.41	0.28		0.41		0.51		0.30	0.30	0.54	0.51	
v/c Ratio	0.33	0.20		1.20		0.77		0.54	0.49	0.77	0.90	
Control Delay	23.7	30.1		133.0		19.7		35.5	7.2	31.7	34.6	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	23.7	30.1		133.0		19.7		35.5	7.2	31.7	34.6	
LOS	C	C		F		B		D	A	C	C	
Approach Delay		26.9						25.7			34.0	
Approach LOS		C						C			C	
Queue Length 50th (m)	24.2	14.2		~123.5		50.9		45.2	0.0	40.6	126.9	
Queue Length 95th (m)	40.6	23.0		#168.7		99.5		61.5	19.4	#70.7	#169.0	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	524	1004		801		723		890	522	379	1412	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.33	0.17		1.20		0.77		0.54	0.49	0.77	0.90	

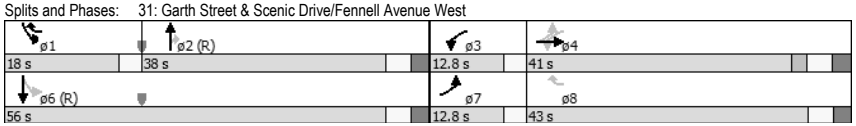
Intersection Summary			
Area Type:	Other		
Cycle Length: 111.8			
Actuated Cycle Length: 111.8			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.20			
Intersection Signal Delay: 53.0		Intersection LOS: D	
Intersection Capacity Utilization 126.4%		ICU Level of Service H	

Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	36.8
Total Split (s)	43.0
Total Split (%)	38%
Maximum Green (s)	37.2
Yellow Time (s)	3.3
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	15.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West



Appendix E

2022 Future Total Peak Hour Traffic Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	663	11	62	471	216	14	43	110	177	30	258
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	0.99			0.98			0.99	
Frt		0.998			0.953			0.911			0.917	
Flt Protected	0.950			0.950				0.996			0.981	
Satd. Flow (prot)	1350	2965	0	1378	2736	0	0	1357	0	0	2535	0
Flt Permitted	0.271			0.373				0.941			0.737	
Satd. Flow (perm)	384	2965	0	539	2736	0	0	1282	0	0	1893	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			104			109			280	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	20		9	9		20	2		22	22		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	0%	0%	5%	4%	0%	6%	4%	8%	5%	6%
Adj. Flow (vph)	359	721	12	67	512	235	15	47	120	192	33	280
Shared Lane Traffic (%)												
Lane Group Flow (vph)	359	733	0	67	747	0	0	182	0	0	505	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	8.0	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	12.7	58.7		46.0	46.0		33.7	33.7		33.7	33.7	
Total Split (%)	13.7%	63.5%		49.8%	49.8%		36.5%	36.5%		36.5%	36.5%	
Maximum Green (s)	9.7	52.6		39.9	39.9		27.4	27.4		27.4	27.4	
Yellow Time (s)	3.0	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	2.0	5.1		5.1	5.1			5.3			5.3	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Walk Time (s)		33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)		17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	56.7	53.6		40.9	40.9			28.4			28.4	

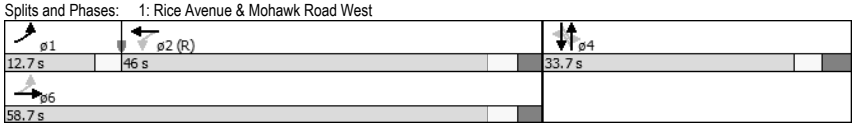
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.61	0.58		0.44	0.44			0.31			0.31	
v/c Ratio	1.03	0.43		0.28	0.59			0.39			0.65	
Control Delay	73.8	11.7		20.5	18.7			13.4			16.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	73.8	11.7		20.5	18.7			13.4			16.4	
LOS	E	B		C	B			B			B	
Approach Delay		32.1			18.9			13.4			16.4	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	~32.9	34.8		7.3	43.2			9.4			17.0	
Queue Length 95th (m)	#87.6	47.1		17.2	60.9			26.4			34.5	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	347	1721		238	1269			469			775	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	1.03	0.43		0.28	0.59			0.39			0.65	

Intersection Summary		
Area Type:	Other	
Cycle Length: 92.4		
Actuated Cycle Length: 92.4		
Offset: 7.3 (8%), Referenced to phase 2:WBTL, Start of Green		
Natural Cycle: 90		
Control Type: Pretimed		
Maximum v/c Ratio: 1.03		
Intersection Signal Delay: 23.6	Intersection LOS: C	
Intersection Capacity Utilization 119.0%	ICU Level of Service H	
Analysis Period (min) 15		

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

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

Splits and Phases: 1: Rice Avenue & Mohawk Road West



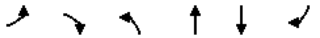
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	114	59	270	99	42	263
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.954			0.850		
Flt Protected	0.968					0.993
Satd. Flow (prot)	1248	0	1564	1141	0	1457
Flt Permitted	0.968					0.993
Satd. Flow (perm)	1248	0	1564	1141	0	1457
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	4	31		2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	2%	8%	13%	8%
Adj. Flow (vph)	124	64	293	108	46	286
Shared Lane Traffic (%)						
Lane Group Flow (vph)	188	0	293	108	0	332
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	114	59	270	99	42	263
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	124	64	293	108	46	286

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	188	293	108	332
Volume Left (vph)	124	0	0	46
Volume Right (vph)	64	0	108	0
Hadj (s)	0.05	0.03	-0.56	0.18
Departure Headway (s)	5.7	5.5	4.9	5.2
Degree Utilization, x	0.30	0.45	0.15	0.48
Capacity (veh/h)	580	637	710	661
Control Delay (s)	11.0	11.6	7.5	13.0
Approach Delay (s)	11.0	10.5		13.0
Approach LOS	B	B		B

Intersection Summary			
Delay	11.5		
Level of Service	B		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	30	119	232	341	322	47
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.892				0.981	
Flt Protected	0.990			0.980		
Satd. Flow (prot)	1179	0	0	2889	2791	0
Flt Permitted	0.990			0.980		
Satd. Flow (perm)	1179	0	0	2889	2791	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)			29			29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	19%	6%	4%	2%	5%	17%
Adj. Flow (vph)	33	129	252	371	350	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	0	0	623	401	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	30	119	232	341	322	47
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)	33	129	252	371	350	51
Pedestrians	29					
Lane Width (m)	3.3					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	1094	230	430			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1094	230	430			
tC, single (s)	7.2	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.4	2.2			
p0 queue free %	76	83	77			
cM capacity (veh/h)	137	744	1087			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	162	376	247	233	168
Volume Left	33	252	0	0	0
Volume Right	129	0	0	0	51
cSH	394	1087	1700	1700	1700
Volume to Capacity	0.41	0.23	0.15	0.14	0.10
Queue Length 95th (m)	14.7	6.7	0.0	0.0	0.0
Control Delay (s)	20.4	7.0	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	20.4	4.2		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	53.0%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	98	81	38	97	223	28
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939				0.985	
Flt Protected	0.973			0.986		
Satd. Flow (prot)	1218	0	0	1414	1431	0
Flt Permitted	0.973			0.986		
Satd. Flow (perm)	1218	0	0	1414	1431	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	195.1			148.7	106.3	
Travel Time (s)	14.0			10.7	7.7	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	6%	4%	14%	7%	32%
Adj. Flow (vph)	107	88	41	105	242	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	195	0	0	146	272	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	98	81	38	97	223	28
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)	107	88	41	105	242	30
Pedestrians	5					
Lane Width (m)	3.3					
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	451	263	278			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	451	263	278			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	80	88	97			
cM capacity (veh/h)	530	763	1269			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	195	147	273
Volume Left	107	41	0
Volume Right	88	0	30
cSH	615	1269	1700
Volume to Capacity	0.32	0.03	0.16
Queue Length 95th (m)	10.1	0.8	0.0
Control Delay (s)	13.5	2.4	0.0
Lane LOS	B	A	
Approach Delay (s)	13.5	2.4	0.0
Approach LOS	B		

Intersection Summary					
Average Delay		4.9			
Intersection Capacity Utilization		47.0%	ICU Level of Service		A
Analysis Period (min)		15			

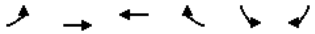
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	166	71	102	52	9	41	30	127	72	82	24
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.960			0.992			0.914			0.982	
Flt Protected		0.999			0.970			0.990			0.980	
Satd. Flow (prot)	0	1454	0	0	1435	0	0	1224	0	0	1121	0
Flt Permitted		0.999			0.970			0.990			0.980	
Satd. Flow (perm)	0	1454	0	0	1435	0	0	1224	0	0	1121	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	13%	7%	8%	0%	3%	80%	8%	0%	80%	0%
Adj. Flow (vph)	4	180	77	111	57	10	45	33	138	78	89	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	178	0	0	216	0	0	193	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	4	166	71	102	52	9	41	30	127	72	82	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	180	77	111	57	10	45	33	138	78	89	26

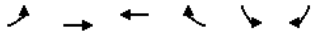
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	262	177	215	193
Volume Left (vph)	4	111	45	78
Volume Right (vph)	77	10	138	26
Hadj (s)	-0.08	0.21	-0.04	0.63
Departure Headway (s)	5.4	5.8	5.5	6.2
Degree Utilization, x	0.39	0.28	0.33	0.33
Capacity (veh/h)	623	568	595	539
Control Delay (s)	11.7	11.1	11.1	12.2
Approach Delay (s)	11.7	11.1	11.1	12.2
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.5		
Level of Service	B		
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	6	103	62	0	0	49
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.997				
Satd. Flow (prot)	0	1523	1477	0	717	0
Flt Permitted		0.997				
Satd. Flow (perm)	0	1523	1477	0	717	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	75%	0%	8%	0%	0%	75%
Adj. Flow (vph)	7	112	67	0	0	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	119	67	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	6	103	62	0	0	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)	7	112	67	0	0	53
Pedestrians		3	1			
Lane Width (m)		3.3	3.3			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	67				193	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67				193	70
tC, single (s)	4.8				6.4	7.0
tC, 2 stage (s)						
tF (s)	2.9				3.5	4.0
p0 queue free %	99				100	94
cM capacity (veh/h)	1175				795	820

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	118	67	53
Volume Left	7	0	0
Volume Right	0	0	53
cSH	1175	1700	820
Volume to Capacity	0.01	0.04	0.06
Queue Length 95th (m)	0.1	0.0	1.6
Control Delay (s)	0.5	0.0	9.7
Lane LOS	A		A
Approach Delay (s)	0.5	0.0	9.7
Approach LOS			A

Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		22.4%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	414	11	49	132	2	7	3	308	2	2	1
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.998				0.850		0.973	
Flt Protected				0.950				0.965			0.980	
Satd. Flow (prot)	0	1536	0	1208	1546	0	0	1241	1185	0	1521	0
Flt Permitted				0.950				0.965			0.980	
Satd. Flow (perm)	0	1536	0	1208	1546	0	0	1241	1185	0	1521	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	25%	14%	3%	0%	33%	0%	4%	0%	0%	0%
Adj. Flow (vph)	2	450	12	53	143	2	8	3	335	2	2	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	464	0	53	145	0	0	11	335	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	414	11	49	132	2	7	3	308	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	450	12	53	143	2	8	3	335	2	2	1

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	464	53	146	11	335	5
Volume Left (vph)	2	53	0	8	0	2
Volume Right (vph)	12	0	2	0	335	1
Hadj (s)	0.05	0.74	0.04	0.74	-0.63	-0.04
Departure Headway (s)	5.9	7.0	6.3	7.2	5.8	7.2
Degree Utilization, x	0.77	0.10	0.26	0.02	0.54	0.01
Capacity (veh/h)	464	476	533	474	580	436
Control Delay (s)	25.8	9.6	10.3	9.1	14.2	10.3
Approach Delay (s)	25.8	10.1		14.0		10.3
Approach LOS	D	B		B		B

Intersection Summary			
Delay	18.6		
Level of Service	C		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	466	364	8	252	0	345	0	795	621	539	344	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	1.00	1.00		0.99		0.99			0.98			
Frt		0.997				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.979	
Satd. Flow (prot)	1337	2944	0	2545	0	1220	0	2971	1208	1217	2759	0
Flt Permitted	0.950			0.405						0.124	0.546	
Satd. Flow (perm)	1334	2944	0	1077	0	1203	0	2971	1187	159	1539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				75			311			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	2		7	7		2	5		4	4		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	29%	5%	0%	1%	0%	2%	2%	3%	3%	0%
Adj. Flow (vph)	507	396	9	274	0	375	0	864	675	586	374	0
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	507	405	0	274	0	375	0	864	675	293	667	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	13.0	41.0		13.0		18.0		40.0	40.0	18.0	58.0	
Total Split (%)	11.6%	36.6%		11.6%		16.1%		35.7%	35.7%	16.1%	51.8%	
Maximum Green (s)	10.0	35.0		10.0		15.0		34.2	34.2	15.0	52.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	43.0	29.0		43.0		55.0		35.2	35.2	63.0	60.2	
Actuated g/C Ratio	0.38	0.26		0.38		0.49		0.31	0.31	0.56	0.54	
v/c Ratio	0.99	0.53		0.49		0.59		0.93	1.15	0.96	0.92dl	
Control Delay	72.3	38.5		25.9		19.6		54.0	107.5	71.3	19.0	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	72.3	38.5		25.9		19.6		54.0	107.5	71.3	19.0	
LOS	E	D		C		B		D	F	E	B	
Approach Delay		57.3						77.4			35.0	
Approach LOS		E						E			C	
Queue Length 50th (m)	103.9	39.4		20.1		42.9		94.5	~122.9	54.1	46.1	
Queue Length 95th (m)	#175.0	54.8		29.7		72.0		#132.0	#191.7	#112.3	60.9	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	512	947		557		632		933	586	306	1047	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.99	0.43		0.49		0.59		0.93	1.15	0.96	0.64	

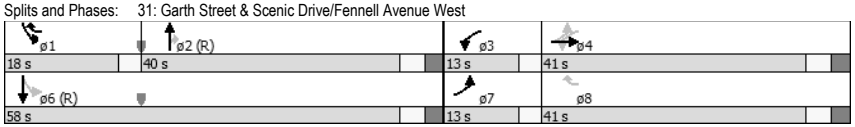
Intersection Summary			
Area Type:	Other		
Cycle Length: 112			
Actuated Cycle Length: 112			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.15			
Intersection Signal Delay: 54.1		Intersection LOS: D	
Intersection Capacity Utilization 110.5%		ICU Level of Service H	

Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	34.0
Total Split (s)	41.0
Total Split (%)	37%
Maximum Green (s)	35.0
Yellow Time (s)	3.3
All-Red Time (s)	2.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	119	0	15	52	0	59
Ideal Flow (vphpl)	1650	1500	1500	1650	1500	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.989		
Satd. Flow (prot)	1564	0	0	1547	1230	0
Flt Permitted				0.989		
Satd. Flow (perm)	1564	0	0	1547	1230	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	311.9			195.1	78.3	
Travel Time (s)	22.5			14.0	5.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	129	0	16	57	0	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	0	0	73	64	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.40	1.40	1.25	1.40	1.40
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	119	0	15	52	0	59
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)	129	0	16	57	0	64
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			129		218	129
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			129		218	129
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	93
cM capacity (veh/h)			1456		761	920

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	129	73	64
Volume Left	0	16	0
Volume Right	0	0	64
cSH	1700	1456	920
Volume to Capacity	0.08	0.01	0.07
Queue Length 95th (m)	0.0	0.3	1.7
Control Delay (s)	0.0	1.7	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	1.7	9.2
Approach LOS			A

Intersection Summary			
Average Delay			2.7
Intersection Capacity Utilization			22.1%
Analysis Period (min)			15
ICU Level of Service			A

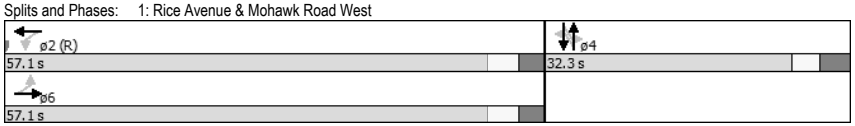
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	278	618	17	88	726	215	5	23	15	234	42	265
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99			0.99	
Frt		0.996			0.966			0.953			0.927	
Flt Protected	0.950			0.950				0.995			0.979	
Satd. Flow (prot)	1337	2982	0	1378	2867	0	0	1505	0	0	2688	0
Flt Permitted	0.222			0.357				0.936			0.808	
Satd. Flow (perm)	312	2982	0	516	2867	0	0	1415	0	0	2216	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			74			16			181	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	4		10	10		4	7		3	3		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	7%	0%	2%	1%	0%	0%	0%	2%	0%	1%
Adj. Flow (vph)	302	672	18	96	789	234	5	25	16	254	46	288
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	690	0	96	1023	0	0	46	0	0	588	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	56.1	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	57.1	57.1		57.1	57.1		32.3	32.3		32.3	32.3	
Total Split (%)	63.9%	63.9%		63.9%	63.9%		36.1%	36.1%		36.1%	36.1%	
Maximum Green (s)	51.0	51.0		51.0	51.0		26.0	26.0		26.0	26.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.8	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	33.0	33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	52.0	52.0		52.0	52.0			27.0			27.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.30			0.30	
v/c Ratio	1.67	0.40		0.32	0.60			0.11			0.74	
Control Delay	345.2	10.9		13.3	12.9			17.2			25.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	345.2	10.9		13.3	12.9			17.2			25.6	
LOS	F	B		B	B			B			C	
Approach Delay		112.7			12.9			17.2			25.6	
Approach LOS		F			B			B			C	
Queue Length 50th (m)	~75.2	30.6		7.7	50.1			3.6			32.6	
Queue Length 95th (m)	#93.4	41.8		17.8	68.0			11.2			52.3	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	181	1736		300	1698			438			795	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	1.67	0.40		0.32	0.60			0.11			0.74	

Intersection Summary

Area Type: Other
Cycle Length: 89.4
Actuated Cycle Length: 89.4
Offset: 7.3 (8%), Referenced to phase 2:WBTL, Start of Green
Natural Cycle: 130
Control Type: Pretimed
Maximum v/c Ratio: 1.67
Intersection Signal Delay: 51.8 Intersection LOS: D
Intersection Capacity Utilization 94.3% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rice Avenue & Mohawk Road West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	60	65	259	72	67	299
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.930			0.850		
Flt Protected	0.977					0.991
Satd. Flow (prot)	1239	0	1491	1163	0	1484
Flt Permitted	0.977					0.991
Satd. Flow (perm)	1239	0	1491	1163	0	1484
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	3	9		12	12	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	3%	7%	6%	0%	8%
Adj. Flow (vph)	65	71	282	78	73	325
Shared Lane Traffic (%)						
Lane Group Flow (vph)	136	0	282	78	0	398
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 58.8% ICU Level of Service B
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	60	65	259	72	67	299
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	71	282	78	73	325

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	136	282	78	398
Volume Left (vph)	65	0	0	73
Volume Right (vph)	71	0	78	0
Hadj (s)	-0.11	0.12	-0.60	0.15
Departure Headway (s)	5.6	5.4	4.7	5.0
Degree Utilization, x	0.21	0.42	0.10	0.55
Capacity (veh/h)	581	647	740	702
Control Delay (s)	10.0	11.1	7.0	13.9
Approach Delay (s)	10.0	10.2		13.9
Approach LOS	B	B		B

Intersection Summary			
Delay	11.8		
Level of Service	B		
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	61	281	118	275	301	41
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.889				0.982	
Flt Protected	0.991			0.985		
Satd. Flow (prot)	1247	0	0	2884	2746	0
Flt Permitted	0.991			0.985		
Satd. Flow (perm)	1247	0	0	2884	2746	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)		2	11			11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	1%	0%	5%	8%	11%
Adj. Flow (vph)	66	305	128	299	327	45
Shared Lane Traffic (%)						
Lane Group Flow (vph)	371	0	0	427	372	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	61	281	118	275	301	41
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	305	128	299	327	45
Pedestrians	11			2		
Lane Width (m)	3.3			3.3		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	766	199	383			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766	199	383			
tC, single (s)	7.0	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	77	62	89			
cM capacity (veh/h)	287	804	1177			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	372	228	199	218	154
Volume Left	66	128	0	0	0
Volume Right	305	0	0	0	45
cSH	608	1177	1700	1700	1700
Volume to Capacity	0.61	0.11	0.12	0.13	0.09
Queue Length 95th (m)	31.0	2.7	0.0	0.0	0.0
Control Delay (s)	19.8	5.2	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.8	2.8		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay		7.3	
Intersection Capacity Utilization		61.0%	ICU Level of Service B
Analysis Period (min)		15	

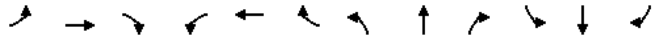
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	31	54	71	240	168	87
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.914				0.954	
Flt Protected	0.982			0.989		
Satd. Flow (prot)	1165	0	0	1481	1375	0
Flt Permitted	0.982			0.989		
Satd. Flow (perm)	1165	0	0	1481	1375	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	197.7			148.7	106.3	
Travel Time (s)	14.2			10.7	7.7	
Confl. Peds. (#/hr)	3		5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	4%	5%	7%	12%	8%
Adj. Flow (vph)	34	59	77	261	183	95
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	0	0	338	278	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.9%		ICU Level of Service A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	31	54	71	240	168	87
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)	34	59	77	261	183	95
Pedestrians	5				3	
Lane Width (m)	3.3				3.3	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	653	235	282			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	653	235	282			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	91	93	94			
cM capacity (veh/h)	371	796	1258			

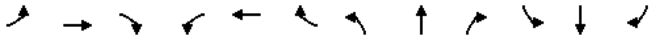
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	92	338	277
Volume Left	34	77	0
Volume Right	59	0	95
cSH	562	1258	1700
Volume to Capacity	0.16	0.06	0.16
Queue Length 95th (m)	4.4	1.5	0.0
Control Delay (s)	12.7	2.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.7	2.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		51.9%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	73	69	111	138	61	79	106	88	21	58	16
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.943			0.974			0.956			0.978	
Flt Protected		0.994			0.982			0.986			0.989	
Satd. Flow (prot)	0	1463	0	0	1505	0	0	1252	0	0	1003	0
Flt Permitted		0.994			0.982			0.986			0.989	
Satd. Flow (perm)	0	1463	0	0	1505	0	0	1252	0	0	1003	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)			2	2			7		2	2		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	0%	3%	0%	12%	43%	0%	0%	88%	0%
Adj. Flow (vph)	23	79	75	121	150	66	86	115	96	23	63	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	0	0	337	0	0	297	0	0	103	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

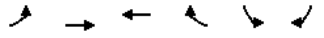
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	65.0%	ICU Level of Service C	
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	21	73	69	111	138	61	79	106	88	21	58	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	79	75	121	150	66	86	115	96	23	63	17

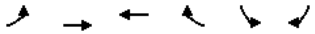
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	177	337	297	103
Volume Left (vph)	23	121	86	23
Volume Right (vph)	75	66	96	17
Hadj (s)	-0.19	-0.02	0.21	0.86
Departure Headway (s)	5.5	5.4	5.8	6.8
Degree Utilization, x	0.27	0.51	0.48	0.20
Capacity (veh/h)	584	624	579	469
Control Delay (s)	10.6	13.9	13.9	11.4
Approach Delay (s)	10.6	13.9	13.9	11.4
Approach LOS	B	B	B	B

Intersection Summary				
Delay			13.0	
Level of Service			B	
Intersection Capacity Utilization			65.0%	ICU Level of Service
Analysis Period (min)			15	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	13	71	147	0	0	31
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.992				
Satd. Flow (prot)	0	1405	1534	0	871	0
Flt Permitted		0.992				
Satd. Flow (perm)	0	1405	1534	0	871	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	71%	2%	4%	0%	0%	44%
Adj. Flow (vph)	14	77	160	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	91	160	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

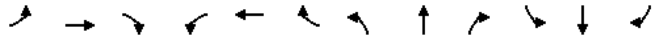
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	27.1%	ICU Level of Service A	
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	13	71	147	0	0	31
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)	14	77	160	0	0	34
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	160				265	160
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160				265	160
tC, single (s)	4.8				6.4	6.6
tC, 2 stage (s)						
tF (s)	2.8				3.5	3.7
p0 queue free %	99				100	96
cM capacity (veh/h)	1090				719	787

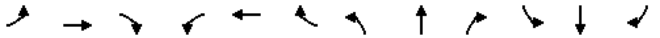
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	91	160	34
Volume Left	14	0	0
Volume Right	0	0	34
cSH	1090	1700	787
Volume to Capacity	0.01	0.09	0.04
Queue Length 95th (m)	0.3	0.0	1.0
Control Delay (s)	1.4	0.0	9.8
Lane LOS	A		A
Approach Delay (s)	1.4	0.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay		1.6	
Intersection Capacity Utilization		27.1%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	234	4	152	383	3	17	2	100	2	3	3
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.999				0.850		0.949	
Flt Protected		0.999		0.950				0.957			0.988	
Satd. Flow (prot)	0	1560	0	1337	1547	0	0	1412	1163	0	1495	0
Flt Permitted		0.999		0.950				0.957			0.988	
Satd. Flow (perm)	0	1560	0	1337	1547	0	0	1412	1163	0	1495	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	2					2			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	3%	3%	0%	9%	0%	6%	0%	0%	0%
Adj. Flow (vph)	3	254	4	165	416	3	18	2	109	2	3	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	165	419	0	0	20	109	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary				
Area Type:	Other			
Control Type: Unsignalized				
Intersection Capacity Utilization	51.9%		ICU Level of Service A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	3	234	4	152	383	3	17	2	100	2	3	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	254	4	165	416	3	18	2	109	2	3	3

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	262	165	420	21	109	9
Volume Left (vph)	3	165	0	18	0	2
Volume Right (vph)	4	0	3	0	109	3
Hadj (s)	0.03	0.55	0.05	0.58	-0.60	-0.17
Departure Headway (s)	5.6	5.8	5.3	7.1	5.9	6.6
Degree Utilization, x	0.41	0.26	0.61	0.04	0.18	0.02
Capacity (veh/h)	618	608	673	464	552	479
Control Delay (s)	12.4	9.6	15.1	9.2	9.0	9.7
Approach Delay (s)	12.4	13.5		9.1		9.7
Approach LOS	B	B		A		A

Intersection Summary				
Delay	12.6			
Level of Service	B			
Intersection Capacity Utilization	51.9%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	161	155	9	904	0	515	0	440	234	300	1152	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	0.99	1.00		0.99		0.98			0.98	1.00	1.00	
Frt		0.992				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.999	
Satd. Flow (prot)	1300	2948	0	2620	0	1197	0	3000	1185	1183	2868	0
Flt Permitted	0.950			0.640						0.348	0.938	
Satd. Flow (perm)	1281	2948	0	1754	0	1167	0	3000	1159	431	2692	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				252			254			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	12		4	4		12	8		7	7		8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	2%	0%	3%	0%	1%	4%	6%	1%	0%
Adj. Flow (vph)	175	168	10	983	0	560	0	478	254	326	1252	0
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	175	178	0	983	0	560	0	478	254	293	1285	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	12.8	41.0		12.8		18.0		38.0	38.0	18.0	56.0	
Total Split (%)	11.7%	37.3%		11.7%		16.4%		34.6%	34.6%	16.4%	51.0%	
Maximum Green (s)	9.8	35.0		9.8		15.0		32.2	32.2	15.0	50.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	45.6	31.8		45.6		55.0		33.2	33.2	58.2	55.4	
Actuated g/C Ratio	0.42	0.29		0.42		0.50		0.30	0.30	0.53	0.50	
v/c Ratio	0.33	0.21		1.21		0.78		0.53	0.48	0.80	0.93	
Control Delay	22.7	29.2		134.4		20.4		34.3	7.0	34.8	37.8	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	22.7	29.2		134.4		20.4		34.3	7.0	34.8	37.8	
LOS	C	C		F		C		C	A	C	D	
Approach Delay		26.0						24.9			37.2	
Approach LOS		C						C			D	
Queue Length 50th (m)	23.7	14.4		~124.3		50.6		44.0	0.0	40.6	129.0	
Queue Length 95th (m)	39.9	23.3		#168.9		100.0		60.0	19.0	#79.6	#186.0	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	533	970		813		715		907	527	366	1386	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.33	0.18		1.21		0.78		0.53	0.48	0.80	0.93	

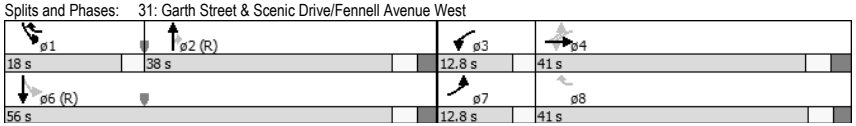
Intersection Summary			
Area Type:	Other		
Cycle Length: 109.8			
Actuated Cycle Length: 109.8			
Offset: 18 (16%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.21			
Intersection Signal Delay: 54.6		Intersection LOS: D	
Intersection Capacity Utilization 127.3%		ICU Level of Service H	

Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	36.8
Total Split (s)	41.0
Total Split (%)	37%
Maximum Green (s)	35.2
Yellow Time (s)	3.3
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	15.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	51	0	63	95	0	34
Ideal Flow (vphpl)	1650	1500	1500	1650	1500	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.981		
Satd. Flow (prot)	1564	0	0	1534	1230	0
Flt Permitted				0.981		
Satd. Flow (perm)	1564	0	0	1534	1230	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	309.3			197.7	84.7	
Travel Time (s)	22.3			14.2	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	0	68	103	0	37
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	0	171	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.40	1.40	1.25	1.40	1.40
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	51	0	63	95	0	34
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)	55	0	68	103	0	37
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			55		296	55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			55		296	55
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		100	96
cM capacity (veh/h)			1549		665	1011

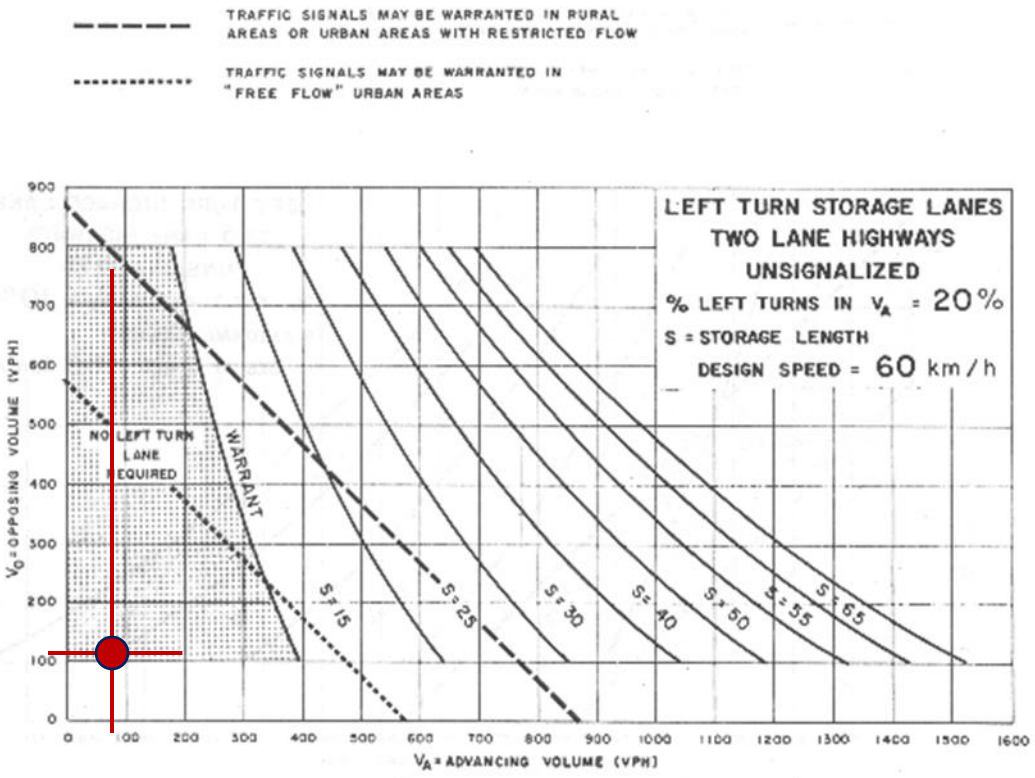
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	55	172	37
Volume Left	0	68	0
Volume Right	0	0	37
cSH	1700	1549	1011
Volume to Capacity	0.03	0.04	0.04
Queue Length 95th (m)	0.0	1.0	0.9
Control Delay (s)	0.0	3.2	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	3.2	8.7
Approach LOS			A

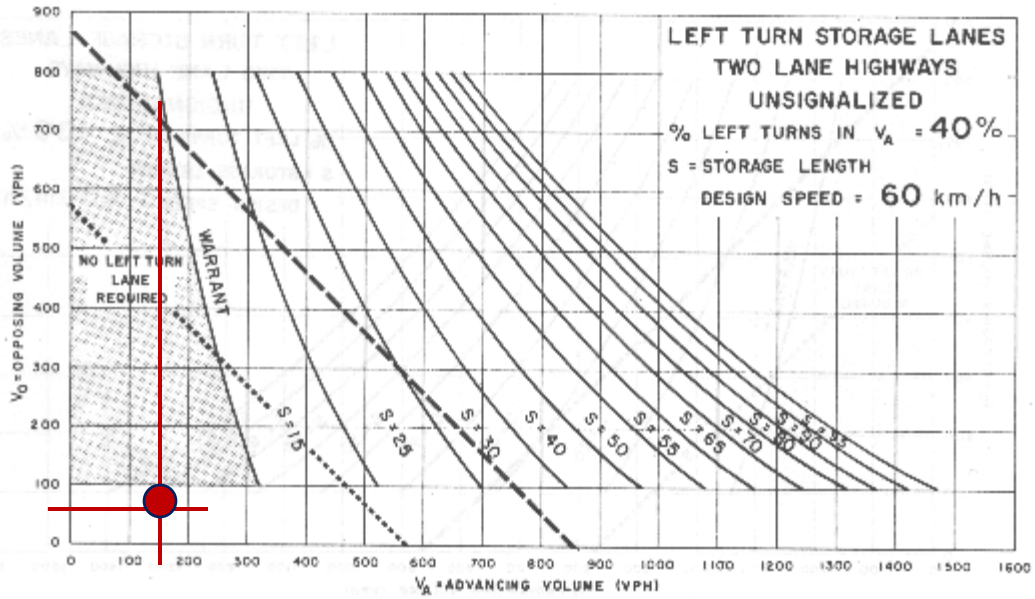
Intersection Summary				
Average Delay		3.3		
Intersection Capacity Utilization		26.4%	ICU Level of Service	A
Analysis Period (min)		15		

Appendix F

Left Turn Lane Warrants

Redfern Ave & Site Driveway – 2022 Future Total





Appendix G

Traffic Control Signal Warrants

MTO SIGNAL WARRANT CALCULATIONS

INTERSECTION:	**Scenic Dr & Upper Paradise Rd**		
DATE OF COUNT:	**Tuesday January 13, 2015**	**MINOR/MAJOR CHECK:**	
MINOR STREET:	**Upper Paradise Rd**	**(MINOR STREET)**	
MAJOR STREET:	**Scenic Dr**	**(MAJOR STREET)**	
DIRECTION (E/W OR N/S):		**E/W**	
INTERSECTION CONFIGURATION (CROSS OR T):		**CROSS**	
TOTAL NUMBER OF THROUGH LANES ON MAJOR STREET:		**1**	
FREE FLOW=F OR RESTRICTED=R:		**R**	
NUMBER OF STREETS WHICH CARRY TWO-WAY TRAFFIC:		**2**	

VOLUME DATA FOR WARRANTS

TIME PER.	Scenic Dr EASTBOUND L	S	R	Scenic Dr WESTBOUND L	S	R	Upper Paradise Rd NORTHBOUND L	S	R	Upper Paradise Rd SOUTHBOUND L	S	R	PEDESTRIANS N & S WALKS	E & W WALKS	WARRANT VOLUMES 1A	1B	2A	2B
7-8	2	238	3	27	59	1	1	1	218	1	4	2	1	0	557	227	330	7
8-9	2	239	8	44	113	3	12	5	241	2	5	1	2	5	670	261	409	16
11-12	0	86	3	43	75	0	4	3	64	2	2	0	0	1	282	75	207	9
12-13	0	91	6	41	106	4	3	3	59	0	3	0	0	2	316	68	248	6
13-14	7	88	1	37	90	1	10	4	55	2	6	3	2	3	304	80	224	20
15-16	4	107	1	96	147	1	9	3	90	0	3	2	1	7	463	107	356	13
16-17	2	120	3	129	237	3	10	1	83	2	3	2	1	1	595	101	494	16
17-18	1	107	4	134	221	2	8	4	92	0	1	1	5	0	575	106	469	17

TRAFFIC SIGNAL WARRANT DETAILS

APPLICABLE VOLUME WARRANT		HOUR OF DAY 7-8	8-9	11-12	12-1	1-2	3-4	4-5	5-6	COMPLIANCE PERCENTAGE	WARRANT SECTIONAL
1. MINIMUM VEHICULAR VOLUME											
1A) ALL APPROACHES:	900	557	670	282	316	304	463	595	575	52	
PERCENTAGE WARRANT:		62	74	31	35	34	51	66	64		**52**
1B) MINOR STREET:	170	227	261	75	68	80	107	101	106	64	
PERCENTAGE WARRANT:		100	100	44	40	47	63	59	62		
2. DELAY TO CROSS STREET											
2A) MAJOR STREET:	900	330	409	207	248	224	356	494	469	38	
PERCENTAGE WARRANT:		37	45	23	28	25	40	55	52		**17**
2B) MINOR STREET:	75	7	16	9	6	20	13	16	17	17	
PERCENTAGE WARRANT:		9	21	12	8	27	17	21	23		

ACCIDENTS

YEAR	TOTAL	PREVENT.

MTO SIGNAL WARRANT CALCULATIONS

INTERSECTION:	**Scenic Dr & Upper Paradise Rd**	**MINOR/MAJOR CHECK:**	
DATE OF COUNT:	**Future Total 2022**	**(MINOR STREET)**	
MINOR STREET:	**Upper Paradise Rd**	**(MAJOR STREET)**	
MAJOR STREET:	**Scenic Dr**		
DIRECTION (E/W OR N/S):		**E/W**	
INTERSECTION CONFIGURATION (CROSS OR T):		**CROSS**	
TOTAL NUMBER OF THROUGH LANES ON MAJOR STREET:		**1**	
FREE FLOW=F OR RESTRICTED=R:		**R**	
NUMBER OF STREETS WHICH CARRY TWO-WAY TRAFFIC:		**2**	

VOLUME DATA FOR WARRANTS

TIME PER.	Scenic Dr EASTBOUND L	S	R	Scenic Dr WESTBOUND L	S	R	Upper Paradise Rd NORTHBOUND L	S	R	Upper Paradise Rd SOUTHBOUND L	S	R	PEDESTRIANS N & S WALKS	E & W WALKS	WARRANT VOLUMES 1A	1B	2A	2B
7-8	2	273	3	31	68	1	1	1	250	1	5	2	1	0	640	261	379	8
8-9	2	293	9	51	133	3	14	6	277	2	6	1	2	6	791	300	491	18
11-12	0	99	3	49	86	0	5	3	74	2	2	0	0	1	324	86	238	10
12-13	0	105	7	47	122	5	3	3	68	0	3	0	0	2	363	78	285	7
13-14	8	101	1	43	103	1	11	5	63	2	7	3	2	3	349	92	257	23
15-16	5	123	1	110	169	1	10	3	103	0	3	2	1	8	532	123	409	15
16-17	2	146	3	148	300	3	11	1	95	2	3	2	1	1	719	116	603	18
17-18	1	123	5	154	254	2	9	5	106	0	1	1	6	0	660	122	539	20

TRAFFIC SIGNAL WARRANT DETAILS

APPLICABLE VOLUME WARRANT		HOUR OF DAY 7-8	8-9	11-12	12-1	1-2	3-4	4-5	5-6	COMPLIANCE PERCENTAGE	WARRANT SECTIONAL
1. MINIMUM VEHICULAR VOLUME											
1A) ALL APPROACHES:	900	640	791	324	363	349	532	719	660	60	
PERCENTAGE WARRANT:		71	80	36	40	39	59	80	73		**60**
1B) MINOR STREET:	170	261	300	86	78	92	123	116	122	70	
PERCENTAGE WARRANT:		100	100	51	46	54	72	68	72		
2. DELAY TO CROSS STREET											
2A) MAJOR STREET:	900	379	491	238	285	257	409	603	539	44	
PERCENTAGE WARRANT:		42	55	26	32	29	45	67	60		**20**
2B) MINOR STREET:	75	8	18	10	7	23	15	18	20	20	
PERCENTAGE WARRANT:		11	25	14	9	31	20	25	26		

ACCIDENTS

YEAR	TOTAL	PREVENT.

MTO SIGNAL WARRANT CALCULATIONS

INTERSECTION:	**Scenic Dr & Upper Paradise Rd**	**MINOR/MAJOR CHECK:**	
DATE OF COUNT:	**Background 2022**	**(MINOR STREET)**	
MINOR STREET:	**Upper Paradise Rd**	**(MAJOR STREET)**	
MAJOR STREET:	**Scenic Dr**		
	DIRECTION (E/W OR N/S):	**E/W**	
	INTERSECTION CONFIGURATION (CROSS OR T):	**CROSS**	
	TOTAL NUMBER OF THROUGH LANES ON MAJOR STREET:	**1**	
	FREE FLOW=F OR RESTRICTED=R:	**R**	
	NUMBER OF STREETS WHICH CARRY TWO-WAY TRAFFIC:	**2**	

VOLUME DATA FOR WARRANTS

TIME PER.	Scenic Dr EASTBOUND L	S	R	Scenic Dr WESTBOUND L	S	R	Upper Paradise Rd NORTHBOUND L	S	R	Upper Paradise Rd SOUTHBOUND L	S	R	PEDESTRIANS N & S WALKS	E & W WALKS	WARRANT VOLUMES 1A	1B	2A	2B
7-8	2	273	3	31	68	1	1	1	250	1	5	2	1	0	640	261	379	8
8-9	2	275	9	51	130	3	14	6	277	2	6	1	2	6	770	300	470	18
11-12	0	99	3	49	86	0	5	3	74	2	2	0	0	1	324	86	238	10
12-13	0	105	7	47	122	5	3	3	68	0	3	0	0	2	363	78	285	7
13-14	8	101	1	43	103	1	11	5	63	2	7	3	2	3	349	92	257	23
15-16	5	123	1	110	169	1	10	3	103	0	3	2	1	8	532	123	409	15
16-17	2	138	3	148	272	3	11	1	95	2	3	2	1	1	683	116	567	18
17-18	1	123	5	154	254	2	9	5	106	0	1	1	6	0	660	122	539	20

TRAFFIC SIGNAL WARRANT DETAILS

APPLICABLE VOLUME WARRANT		HOUR OF DAY 7-8	8-9	11-12	12-1	1-2	3-4	4-5	5-6	COMPLIANCE PERCENTAGE	WARRANT SECTIONAL
1. MINIMUM VEHICULAR VOLUME											
1A) ALL APPROACHES:	900	640	770	324	363	349	532	683	660	59	
PERCENTAGE WARRANT:		71	80	36	40	39	59	76	73		**59**
1B) MINOR STREET:	170	261	300	86	78	92	123	116	122	70	
PERCENTAGE WARRANT:		100	100	51	46	54	72	68	72		
2. DELAY TO CROSS STREET											
2A) MAJOR STREET:	900	379	470	238	285	257	409	567	539	44	
PERCENTAGE WARRANT:		42	52	26	32	29	45	63	60		**20**
2B) MINOR STREET:	75	8	18	10	7	23	15	18	20	20	
PERCENTAGE WARRANT:		11	25	14	9	31	20	25	26		

ACCIDENTS

YEAR	TOTAL	PREVENT.

Appendix H

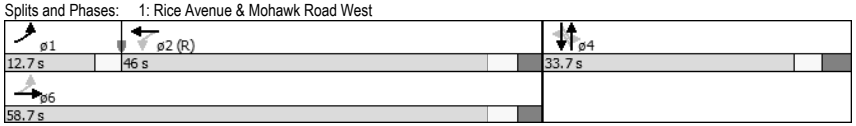
2022 Background Traffic Operations with Improvements

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	326	663	11	62	471	208	14	43	110	165	30	227
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	0.99			0.98			0.99	
Frt		0.998			0.954			0.911			0.919	
Flt Protected	0.950			0.950				0.996			0.981	
Satd. Flow (prot)	1350	2965	0	1378	2739	0	0	1357	0	0	2541	0
Flt Permitted	0.276			0.373				0.945			0.734	
Satd. Flow (perm)	391	2965	0	539	2739	0	0	1287	0	0	1889	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			98			109			247	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	20		9	9		20	2		22	22		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	0%	0%	5%	4%	0%	6%	4%	8%	5%	6%
Adj. Flow (vph)	354	721	12	67	512	226	15	47	120	179	33	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	354	733	0	67	738	0	0	182	0	0	459	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	8.0	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	12.7	58.7		46.0	46.0		33.7	33.7		33.7	33.7	
Total Split (%)	13.7%	63.5%		49.8%	49.8%		36.5%	36.5%		36.5%	36.5%	
Maximum Green (s)	9.7	52.6		39.9	39.9		27.4	27.4		27.4	27.4	
Yellow Time (s)	3.0	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	2.0	5.1		5.1	5.1			5.3			5.3	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Walk Time (s)		33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)		17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	56.7	53.6		40.9	40.9			28.4			28.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.61	0.58		0.44	0.44			0.31			0.31	
v/c Ratio	1.01	0.43		0.28	0.58			0.39			0.61	
Control Delay	67.1	11.7		20.5	18.8			13.4			16.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	67.1	11.7		20.5	18.8			13.4			16.0	
LOS	E	B		C	B			B			B	
Approach Delay		29.7			18.9			13.4			16.0	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	~30.4	34.8		7.3	42.8			9.4			15.6	
Queue Length 95th (m)	#83.6	47.1		17.2	60.2			26.3			31.8	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	350	1721		238	1267			471			751	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	1.01	0.43		0.28	0.58			0.39			0.61	

Intersection Summary			
Area Type:	Other		
Cycle Length: 92.4			
Actuated Cycle Length: 92.4			
Offset: 7.3 (8%), Referenced to phase 2:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 22.6		Intersection LOS: C	
Intersection Capacity Utilization 119.0%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Rice Avenue & Mohawk Road West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	114	59	258	99	42	220
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.954			0.850		
Flt Protected	0.968					0.992
Satd. Flow (prot)	1248	0	1564	1141	0	1454
Flt Permitted	0.968					0.992
Satd. Flow (perm)	1248	0	1564	1141	0	1454
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	4	31		2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	2%	8%	13%	8%
Adj. Flow (vph)	124	64	280	108	46	239
Shared Lane Traffic (%)						
Lane Group Flow (vph)	188	0	280	108	0	285
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	114	59	258	99	42	220
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	124	64	280	108	46	239

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	188	280	108	285
Volume Left (vph)	124	0	0	46
Volume Right (vph)	64	0	108	0
Hadj (s)	0.05	0.03	-0.56	0.18
Departure Headway (s)	5.5	5.4	4.8	5.2
Degree Utilization, x	0.29	0.42	0.14	0.41
Capacity (veh/h)	597	645	720	663
Control Delay (s)	10.8	11.1	7.4	11.8
Approach Delay (s)	10.8	10.0		11.8
Approach LOS	B	B		B

Intersection Summary			
Delay	10.8		
Level of Service	B		
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	30	119	232	329	279	47
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.892				0.978	
Flt Protected	0.990			0.980		
Satd. Flow (prot)	1179	0	0	2888	2777	0
Flt Permitted	0.990			0.980		
Satd. Flow (perm)	1179	0	0	2888	2777	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)			29			29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	19%	6%	4%	2%	5%	17%
Adj. Flow (vph)	33	129	252	358	303	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	0	0	610	354	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	30	119	232	329	279	47
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)	33	129	252	358	303	51
Pedestrians	29					
Lane Width (m)	3.3					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	1041	206	383			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1041	206	383			
tC, single (s)	7.2	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.4	2.2			
p0 queue free %	78	83	78			
cM capacity (veh/h)	151	770	1132			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	162	371	238	202	152
Volume Left	33	252	0	0	0
Volume Right	129	0	0	0	51
cSH	422	1132	1700	1700	1700
Volume to Capacity	0.38	0.22	0.14	0.12	0.09
Queue Length 95th (m)	13.3	6.4	0.0	0.0	0.0
Control Delay (s)	18.7	6.9	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	18.7	4.2		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	82	38	26	97	223	25
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.957				0.986	
Flt Protected	0.967			0.990		
Satd. Flow (prot)	1226	0	0	1411	1436	0
Flt Permitted	0.967			0.990		
Satd. Flow (perm)	1226	0	0	1411	1436	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	507.0			148.7	106.3	
Travel Time (s)	36.5			10.7	7.7	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	6%	4%	14%	7%	32%
Adj. Flow (vph)	89	41	28	105	242	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	130	0	0	133	269	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	82	38	26	97	223	25
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)	89	41	28	105	242	27
Pedestrians	5					
Lane Width (m)	3.3					
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	423	261	275			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	423	261	275			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	84	95	98			
cM capacity (veh/h)	556	765	1272			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	130	134	270
Volume Left	89	28	0
Volume Right	41	0	27
cSH	609	1272	1700
Volume to Capacity	0.21	0.02	0.16
Queue Length 95th (m)	6.1	0.5	0.0
Control Delay (s)	12.5	1.8	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	1.8	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	41.5%	ICU Level of Service	A	
Analysis Period (min)	15			

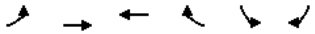
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	166	71	99	52	9	41	30	111	72	82	24
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.960			0.992			0.918			0.982	
Flt Protected		0.999			0.970			0.989			0.980	
Satd. Flow (prot)	0	1454	0	0	1435	0	0	1219	0	0	1121	0
Flt Permitted		0.999			0.970			0.989			0.980	
Satd. Flow (perm)	0	1454	0	0	1435	0	0	1219	0	0	1121	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	13%	7%	8%	0%	3%	80%	8%	0%	80%	0%
Adj. Flow (vph)	4	180	77	108	57	10	45	33	121	78	89	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	175	0	0	199	0	0	193	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	4	166	71	99	52	9	41	30	111	72	82	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	180	77	108	57	10	45	33	121	78	89	26

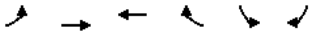
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	262	174	198	193
Volume Left (vph)	4	108	45	78
Volume Right (vph)	77	10	121	26
Hadj (s)	-0.08	0.21	0.00	0.63
Departure Headway (s)	5.3	5.7	5.5	6.1
Degree Utilization, x	0.39	0.28	0.30	0.33
Capacity (veh/h)	632	576	593	544
Control Delay (s)	11.6	10.9	10.9	12.1
Approach Delay (s)	11.6	10.9	10.9	12.1
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.4		
Level of Service	B		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	6	103	62	0	0	49
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.997				
Satd. Flow (prot)	0	1523	1477	0	717	0
Flt Permitted		0.997				
Satd. Flow (perm)	0	1523	1477	0	717	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	75%	0%	8%	0%	0%	75%
Adj. Flow (vph)	7	112	67	0	0	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	119	67	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.4%	ICU Level of Service A	
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	6	103	62	0	0	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)	7	112	67	0	0	53
Pedestrians		3	1			
Lane Width (m)		3.3	3.3			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	67				193	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67				193	70
tC, single (s)	4.8				6.4	7.0
tC, 2 stage (s)						
tF (s)	2.9				3.5	4.0
p0 queue free %	99				100	94
cM capacity (veh/h)	1175				795	820

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	118	67	53
Volume Left	7	0	0
Volume Right	0	0	53
cSH	1175	1700	820
Volume to Capacity	0.01	0.04	0.06
Queue Length 95th (m)	0.1	0.0	1.6
Control Delay (s)	0.5	0.0	9.7
Lane LOS	A		A
Approach Delay (s)	0.5	0.0	9.7
Approach LOS			A

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	396	11	49	129	2	7	3	308	2	2	1
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.998				0.850		0.973	
Flt Protected				0.950				0.965			0.980	
Satd. Flow (prot)	0	1534	0	1208	1546	0	0	1241	1185	0	1521	0
Flt Permitted				0.950				0.965			0.980	
Satd. Flow (perm)	0	1534	0	1208	1546	0	0	1241	1185	0	1521	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	25%	14%	3%	0%	33%	0%	4%	0%	0%	0%
Adj. Flow (vph)	2	430	12	53	140	2	8	3	335	2	2	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	444	0	53	142	0	0	11	335	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	396	11	49	129	2	7	3	308	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	430	12	53	140	2	8	3	335	2	2	1

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	445	53	142	11	335	5
Volume Left (vph)	2	53	0	8	0	2
Volume Right (vph)	12	0	2	0	335	1
Hadj (s)	0.05	0.74	0.04	0.74	-0.63	-0.04
Departure Headway (s)	5.9	7.0	6.3	7.1	5.7	7.1
Degree Utilization, x	0.73	0.10	0.25	0.02	0.53	0.01
Capacity (veh/h)	445	479	537	479	587	438
Control Delay (s)	23.4	9.6	10.1	9.1	13.9	10.2
Approach Delay (s)	23.4	10.0		13.7		10.2
Approach LOS	C	A		B		B

Intersection Summary					
Delay	17.3				
Level of Service	C				
Intersection Capacity Utilization	63.2%	ICU Level of Service		B	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	458	356	8	250	0	345	0	795	621	539	343	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	2		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	1.00	1.00		0.99		0.99			0.98	1.00	1.00	
Frt		0.997				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.978	
Satd. Flow (prot)	2595	2943	0	2545	0	1220	0	2971	1208	1217	2756	0
Flt Permitted	0.950			0.371						0.235	0.515	
Satd. Flow (perm)	2582	2943	0	986	0	1202	0	2971	1186	301	1451	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				109			199			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	2		7	7		2	5		4	4		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	29%	5%	0%	1%	0%	2%	2%	3%	3%	0%
Adj. Flow (vph)	498	387	9	272	0	375	0	864	675	586	373	0
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	498	396	0	272	0	375	0	864	675	293	666	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	8.0	34.0		8.0		18.0		70.0	70.0	18.0	88.0	
Total Split (%)	6.2%	26.2%		6.2%		13.8%		53.8%	53.8%	13.8%	67.7%	
Maximum Green (s)	5.0	28.0		5.0		15.0		64.2	64.2	15.0	82.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	38.0	29.0		38.0		48.0		65.2	65.2	86.0	83.2	
Actuated g/C Ratio	0.29	0.22		0.29		0.37		0.50	0.50	0.66	0.64	
v/c Ratio	0.66	0.60		0.76		0.73		0.58	0.97	0.94	0.89dl	
Control Delay	44.8	49.5		52.5		33.2		24.7	51.0	52.9	14.4	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	44.8	49.5		52.5		33.2		24.7	51.0	52.9	14.4	
LOS	D	D		D		C		C	D	D	B	
Approach Delay		46.9						36.3			26.2	
Approach LOS		D						D			C	
Queue Length 50th (m)	55.5	47.4		27.4		57.3		78.5	129.7	33.6	41.0	
Queue Length 95th (m)	73.7	64.1		#41.6		95.6		98.1	#217.3	#83.8	52.6	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	755	658		360		514		1490	694	311	1061	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.66	0.60		0.76		0.73		0.58	0.97	0.94	0.63	

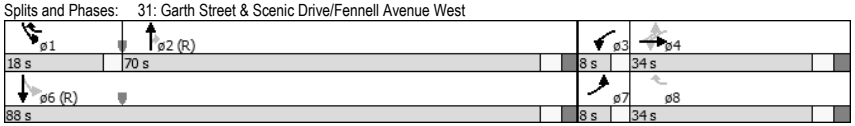
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 37.0		Intersection LOS: D	
Intersection Capacity Utilization 110.5%		ICU Level of Service H	

Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	34.0
Total Split (s)	34.0
Total Split (%)	26%
Maximum Green (s)	28.0
Yellow Time (s)	3.3
All-Red Time (s)	2.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West

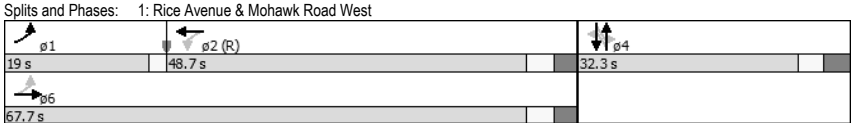


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	618	17	88	726	197	5	23	15	224	42	249
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99			0.99	
Frt		0.996			0.968			0.953			0.927	
Flt Protected	0.950			0.950				0.995			0.979	
Satd. Flow (prot)	1337	2982	0	1378	2873	0	0	1504	0	0	2687	0
Flt Permitted	0.162			0.389				0.937			0.807	
Satd. Flow (perm)	228	2982	0	562	2873	0	0	1416	0	0	2212	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			44			16			234	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	4		10	10		4	7		3	3		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	7%	0%	2%	1%	0%	0%	0%	2%	0%	1%
Adj. Flow (vph)	284	672	18	96	789	214	5	25	16	243	46	271
Shared Lane Traffic (%)												
Lane Group Flow (vph)	284	690	0	96	1003	0	0	46	0	0	560	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	8.0	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	19.0	67.7		48.7	48.7		32.3	32.3		32.3	32.3	
Total Split (%)	19.0%	67.7%		48.7%	48.7%		32.3%	32.3%		32.3%	32.3%	
Maximum Green (s)	17.0	61.6		42.6	42.6		26.0	26.0		26.0	26.0	
Yellow Time (s)	2.0	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	1.0	5.1		5.1	5.1			5.3			5.3	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Walk Time (s)		33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)		17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	66.7	62.6		43.6	43.6			27.0			27.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.67	0.63		0.44	0.44			0.27			0.27	
v/c Ratio	0.81	0.37		0.39	0.79			0.12			0.73	
Control Delay	34.5	9.7		25.2	28.5			20.9			25.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	34.5	9.7		25.2	28.5			20.9			25.2	
LOS	C	A		C	C			C			C	
Approach Delay		17.0			28.2			20.9			25.2	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	27.7	30.6		12.2	81.0			4.3			30.0	
Queue Length 95th (m)	#69.0	40.9		26.5	106.6			12.8			50.0	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	351	1868		245	1277			394			768	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.81	0.37		0.39	0.79			0.12			0.73	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 23.3		Intersection LOS: C	
Intersection Capacity Utilization 93.6%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Rice Avenue & Mohawk Road West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	60	65	224	72	67	273
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.930			0.850		
Flt Protected	0.977					0.990
Satd. Flow (prot)	1239	0	1491	1163	0	1484
Flt Permitted	0.977					0.990
Satd. Flow (perm)	1239	0	1491	1163	0	1484
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	3	9		12	12	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	3%	7%	6%	0%	8%
Adj. Flow (vph)	65	71	243	78	73	297
Shared Lane Traffic (%)						
Lane Group Flow (vph)	136	0	243	78	0	370
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 55.1%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	60	65	224	72	67	273
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	71	243	78	73	297

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	136	243	78	370
Volume Left (vph)	65	0	0	73
Volume Right (vph)	71	0	78	0
Hadj (s)	-0.11	0.12	-0.60	0.15
Departure Headway (s)	5.4	5.4	4.6	4.9
Degree Utilization, x	0.20	0.36	0.10	0.51
Capacity (veh/h)	601	651	745	709
Control Delay (s)	9.8	10.2	7.0	12.9
Approach Delay (s)	9.8	9.4		12.9
Approach LOS	A	A		B

Intersection Summary			
Delay		11.0	
Level of Service		B	
Intersection Capacity Utilization		55.1%	ICU Level of Service B
Analysis Period (min)		15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	61	281	118	240	275	41
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.889				0.980	
Flt Protected	0.991			0.984		
Satd. Flow (prot)	1247	0	0	2885	2740	0
Flt Permitted	0.991			0.984		
Satd. Flow (perm)	1247	0	0	2885	2740	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)		2	11			11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	1%	0%	5%	8%	11%
Adj. Flow (vph)	66	305	128	261	299	45
Shared Lane Traffic (%)						
Lane Group Flow (vph)	371	0	0	389	344	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	59.3%		ICU Level of Service B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	61	281	118	240	275	41
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	305	128	261	299	45
Pedestrians	11			2		
Lane Width (m)	3.3			3.3		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	719	185	354			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	719	185	354			
tC, single (s)	7.0	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	79	63	89			
cM capacity (veh/h)	309	821	1205			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	372	215	174	199	144
Volume Left	66	128	0	0	0
Volume Right	305	0	0	0	45
cSH	633	1205	1700	1700	1700
Volume to Capacity	0.59	0.11	0.10	0.12	0.08
Queue Length 95th (m)	28.6	2.7	0.0	0.0	0.0
Control Delay (s)	18.4	5.3	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	18.4	3.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay		7.2	
Intersection Capacity Utilization		59.3%	ICU Level of Service B
Analysis Period (min)		15	

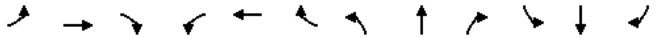
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	23	28	36	240	168	59
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.926				0.965	
Flt Protected	0.978			0.994		
Satd. Flow (prot)	1157	0	0	1485	1387	0
Flt Permitted	0.978			0.994		
Satd. Flow (perm)	1157	0	0	1485	1387	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	507.0			148.7	106.3	
Travel Time (s)	36.5			10.7	7.7	
Confl. Peds. (#/hr)	3		5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	4%	5%	7%	12%	8%
Adj. Flow (vph)	25	30	39	261	183	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	0	300	247	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.1%		ICU Level of Service A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	23	28	36	240	168	59
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)	25	30	39	261	183	64
Pedestrians	5				3	
Lane Width (m)	3.3				3.3	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	562	220	252			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	562	220	252			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	94	96	97			
cM capacity (veh/h)	435	812	1291			

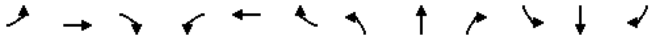
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	55	300	247
Volume Left	25	39	0
Volume Right	30	0	64
cSH	584	1291	1700
Volume to Capacity	0.09	0.03	0.15
Queue Length 95th (m)	2.3	0.7	0.0
Control Delay (s)	11.8	1.3	0.0
Lane LOS	B	A	
Approach Delay (s)	11.8	1.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		45.1%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	73	69	83	138	61	79	106	80	21	58	16
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.943			0.971			0.959			0.978	
Flt Protected		0.994			0.986			0.985			0.989	
Satd. Flow (prot)	0	1463	0	0	1505	0	0	1248	0	0	1003	0
Flt Permitted		0.994			0.986			0.985			0.989	
Satd. Flow (perm)	0	1463	0	0	1505	0	0	1248	0	0	1003	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)			2	2			7		2	2		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	0%	3%	0%	12%	43%	0%	0%	88%	0%
Adj. Flow (vph)	23	79	75	90	150	66	86	115	87	23	63	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	0	0	306	0	0	288	0	0	103	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

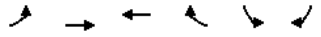
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 62.6%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	21	73	69	83	138	61	79	106	80	21	58	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	79	75	90	150	66	86	115	87	23	63	17

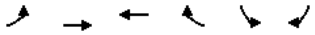
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	177	307	288	103
Volume Left (vph)	23	90	86	23
Volume Right (vph)	75	66	87	17
Hadj (s)	-0.19	-0.05	0.23	0.86
Departure Headway (s)	5.4	5.4	5.7	6.7
Degree Utilization, x	0.27	0.46	0.45	0.19
Capacity (veh/h)	598	630	588	483
Control Delay (s)	10.4	12.8	13.3	11.2
Approach Delay (s)	10.4	12.8	13.3	11.2
Approach LOS	B	B	B	B

Intersection Summary				
Delay			12.3	
Level of Service			B	
Intersection Capacity Utilization			62.6%	ICU Level of Service
Analysis Period (min)			15	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	13	71	147	0	0	31
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.992				
Satd. Flow (prot)	0	1405	1534	0	871	0
Flt Permitted		0.992				
Satd. Flow (perm)	0	1405	1534	0	871	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	71%	2%	4%	0%	0%	44%
Adj. Flow (vph)	14	77	160	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	91	160	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

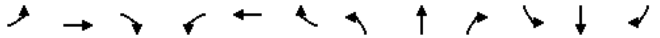
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	27.1%	ICU Level of Service A	
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	13	71	147	0	0	31
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)	14	77	160	0	0	34
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	160				265	160
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160				265	160
tC, single (s)	4.8				6.4	6.6
tC, 2 stage (s)						
tF (s)	2.8				3.5	3.7
p0 queue free %	99				100	96
cM capacity (veh/h)	1090				719	787

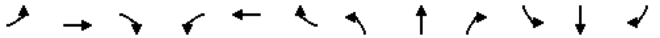
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	91	160	34
Volume Left	14	0	0
Volume Right	0	0	34
cSH	1090	1700	787
Volume to Capacity	0.01	0.09	0.04
Queue Length 95th (m)	0.3	0.0	1.0
Control Delay (s)	1.4	0.0	9.8
Lane LOS	A		A
Approach Delay (s)	1.4	0.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay		1.6	
Intersection Capacity Utilization		27.1%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	226	4	152	355	3	17	2	100	2	3	3
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.999				0.850		0.949	
Flt Protected		0.999		0.950				0.957			0.988	
Satd. Flow (prot)	0	1560	0	1337	1547	0	0	1412	1163	0	1495	0
Flt Permitted		0.999		0.950				0.957			0.988	
Satd. Flow (perm)	0	1560	0	1337	1547	0	0	1412	1163	0	1495	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	2					2			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	3%	3%	0%	9%	0%	6%	0%	0%	0%
Adj. Flow (vph)	3	246	4	165	386	3	18	2	109	2	3	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	253	0	165	389	0	0	20	109	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary				
Area Type:	Other			
Control Type: Unsignalized				
Intersection Capacity Utilization	49.7%		ICU Level of Service A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	3	226	4	152	355	3	17	2	100	2	3	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	246	4	165	386	3	18	2	109	2	3	3

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	253	165	389	21	109	9
Volume Left (vph)	3	165	0	18	0	2
Volume Right (vph)	4	0	3	0	109	3
Hadj (s)	0.03	0.55	0.04	0.58	-0.60	-0.17
Departure Headway (s)	5.6	5.8	5.2	7.1	5.9	6.5
Degree Utilization, x	0.39	0.26	0.57	0.04	0.18	0.02
Capacity (veh/h)	622	609	674	470	560	487
Control Delay (s)	12.1	9.6	13.7	9.2	8.9	9.6
Approach Delay (s)	12.1	12.5		9.0		9.6
Approach LOS	B	B		A		A

Intersection Summary					
Delay		11.9			
Level of Service		B			
Intersection Capacity Utilization	49.7%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	159	149	9	887	0	515	0	440	234	300	1141	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	2		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	0.97	1.00		0.99		0.97			0.98	1.00	1.00	
Frt		0.991				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.999	
Satd. Flow (prot)	2521	2945	0	2620	0	1197	0	3000	1185	1183	2868	0
Flt Permitted	0.950			0.643						0.277	0.941	
Satd. Flow (perm)	2456	2945	0	1761	0	1166	0	3000	1158	343	2701	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				164			254			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	12		4	4		12	8		7	7		8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	2%	0%	3%	0%	1%	4%	6%	1%	0%
Adj. Flow (vph)	173	162	10	964	0	560	0	478	254	326	1240	0
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	173	172	0	964	0	560	0	478	254	293	1273	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	10.0	34.0		25.0		29.0		32.0	32.0	29.0	61.0	
Total Split (%)	8.3%	28.3%		20.8%		24.2%		26.7%	26.7%	24.2%	50.8%	
Maximum Green (s)	7.0	28.0		22.0		26.0		26.2	26.2	26.0	55.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	40.0	29.0		55.0		74.0		27.2	27.2	59.0	56.2	
Actuated g/C Ratio	0.33	0.24		0.46		0.62		0.23	0.23	0.49	0.47	
v/c Ratio	0.21	0.24		0.99		0.71		0.70	0.55	0.82	0.98	
Control Delay	19.8	36.6		56.5		15.8		49.1	9.8	41.3	52.2	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	19.8	36.6		56.5		15.8		49.1	9.8	41.3	52.2	
LOS	B	D		E		B		D	A	D	D	
Approach Delay		28.2						35.5			50.2	
Approach LOS		C						D			D	
Queue Length 50th (m)	11.3	16.4		93.4		55.2		54.1	0.0	49.1	151.6	
Queue Length 95th (m)	17.9	26.1		#150.5		96.0		72.5	22.7	#93.8	#208.7	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	823	715		971		788		680	458	357	1298	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.21	0.24		0.99		0.71		0.70	0.55	0.82	0.98	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 42.6		Intersection LOS: D	
Intersection Capacity Utilization 126.4%		ICU Level of Service H	

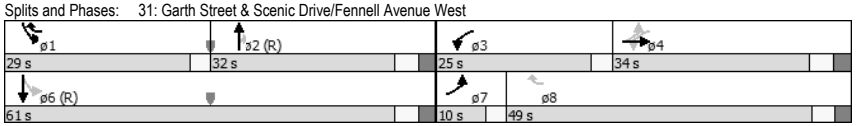
Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	36.8
Total Split (s)	49.0
Total Split (%)	41%
Maximum Green (s)	43.2
Yellow Time (s)	3.3
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	15.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Analysis Period (min) 15

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

Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West



Appendix I

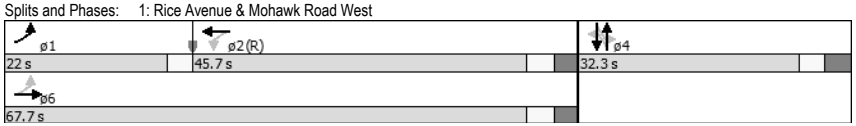
2022 Future Total Traffic Operations with Improvements

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	663	11	62	471	216	14	43	110	177	30	258
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	0.99			0.98			0.99	
Frt		0.998			0.953			0.911			0.917	
Flt Protected	0.950			0.950				0.996			0.981	
Satd. Flow (prot)	1350	2965	0	1378	2735	0	0	1355	0	0	2535	0
Flt Permitted	0.251			0.373				0.938			0.719	
Satd. Flow (perm)	355	2965	0	539	2735	0	0	1276	0	0	1846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			90			95			280	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	20		9	9		20	2		22	22		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	0%	0%	5%	4%	0%	6%	4%	8%	5%	6%
Adj. Flow (vph)	359	721	12	67	512	235	15	47	120	192	33	280
Shared Lane Traffic (%)												
Lane Group Flow (vph)	359	733	0	67	747	0	0	182	0	0	505	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	8.0	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	22.0	67.7		45.7	45.7		32.3	32.3		32.3	32.3	
Total Split (%)	22.0%	67.7%		45.7%	45.7%		32.3%	32.3%		32.3%	32.3%	
Maximum Green (s)	19.0	61.6		39.6	39.6		26.0	26.0		26.0	26.0	
Yellow Time (s)	3.0	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	2.0	5.1		5.1	5.1			5.3			5.3	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Walk Time (s)		33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)		17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	65.7	62.6		40.6	40.6			27.0			27.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.66	0.63		0.41	0.41			0.27			0.27	
v/c Ratio	0.83	0.39		0.31	0.64			0.44			0.72	
Control Delay	29.7	10.0		25.1	23.8			18.4			20.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	29.7	10.0		25.1	23.8			18.4			20.9	
LOS	C	B		C	C			B			C	
Approach Delay		16.5			23.9			18.4			20.9	
Approach LOS		B			C			B			C	
Queue Length 50th (m)	29.5	33.3		8.5	52.1			13.1			20.2	
Queue Length 95th (m)	#76.7	44.3		19.7	71.7			32.4			39.7	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	432	1857		218	1163			413			702	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.83	0.39		0.31	0.64			0.44			0.72	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green		
Natural Cycle: 90		
Control Type: Pretimed		
Maximum v/c Ratio: 0.83		
Intersection Signal Delay: 19.8	Intersection LOS: B	
Intersection Capacity Utilization 119.0%	ICU Level of Service H	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Rice Avenue & Mohawk Road West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	114	59	270	99	42	263
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.954			0.850		
Flt Protected	0.968					0.993
Satd. Flow (prot)	1248	0	1564	1141	0	1457
Flt Permitted	0.968					0.993
Satd. Flow (perm)	1248	0	1564	1141	0	1457
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	4	31		2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	2%	8%	13%	8%
Adj. Flow (vph)	124	64	293	108	46	286
Shared Lane Traffic (%)						
Lane Group Flow (vph)	188	0	293	108	0	332
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	114	59	270	99	42	263
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	124	64	293	108	46	286

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	188	293	108	332
Volume Left (vph)	124	0	0	46
Volume Right (vph)	64	0	108	0
Hadj (s)	0.05	0.03	-0.56	0.18
Departure Headway (s)	5.7	5.5	4.9	5.2
Degree Utilization, x	0.30	0.45	0.15	0.48
Capacity (veh/h)	580	637	710	661
Control Delay (s)	11.0	11.6	7.5	13.0
Approach Delay (s)	11.0	10.5		13.0
Approach LOS	B	B		B

Intersection Summary			
Delay	11.5		
Level of Service	B		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	30	119	232	341	322	47
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.892				0.981	
Flt Protected	0.990			0.980		
Satd. Flow (prot)	1179	0	0	2889	2791	0
Flt Permitted	0.990			0.980		
Satd. Flow (perm)	1179	0	0	2889	2791	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)			29			29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	19%	6%	4%	2%	5%	17%
Adj. Flow (vph)	33	129	252	371	350	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	0	0	623	401	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	30	119	232	341	322	47
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)	33	129	252	371	350	51
Pedestrians	29					
Lane Width (m)	3.3					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	1094	230	430			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1094	230	430			
tC, single (s)	7.2	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.4	2.2			
p0 queue free %	76	83	77			
cM capacity (veh/h)	137	744	1087			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	162	376	247	233	168
Volume Left	33	252	0	0	0
Volume Right	129	0	0	0	51
cSH	394	1087	1700	1700	1700
Volume to Capacity	0.41	0.23	0.15	0.14	0.10
Queue Length 95th (m)	14.7	6.7	0.0	0.0	0.0
Control Delay (s)	20.4	7.0	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	20.4	4.2		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	98	81	38	97	223	28
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939				0.985	
Flt Protected	0.973			0.986		
Satd. Flow (prot)	1218	0	0	1414	1431	0
Flt Permitted	0.973			0.986		
Satd. Flow (perm)	1218	0	0	1414	1431	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	195.1			148.7	106.3	
Travel Time (s)	14.0			10.7	7.7	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	6%	4%	14%	7%	32%
Adj. Flow (vph)	107	88	41	105	242	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	195	0	0	146	272	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	98	81	38	97	223	28
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)	107	88	41	105	242	30
Pedestrians	5					
Lane Width (m)	3.3					
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	451	263	278			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	451	263	278			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	80	88	97			
cM capacity (veh/h)	530	763	1269			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	195	147	273
Volume Left	107	41	0
Volume Right	88	0	30
cSH	615	1269	1700
Volume to Capacity	0.32	0.03	0.16
Queue Length 95th (m)	10.1	0.8	0.0
Control Delay (s)	13.5	2.4	0.0
Lane LOS	B	A	
Approach Delay (s)	13.5	2.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

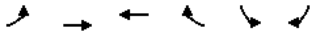
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	4	166	71	102	52	9	41	30	127	72	82	24
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.960			0.992			0.914			0.982	
Flt Protected		0.999			0.970			0.990			0.980	
Satd. Flow (prot)	0	1454	0	0	1435	0	0	1224	0	0	1121	0
Flt Permitted		0.999			0.970			0.990			0.980	
Satd. Flow (perm)	0	1454	0	0	1435	0	0	1224	0	0	1121	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)	1		3	3		1	5		1	1		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	13%	7%	8%	0%	3%	80%	8%	0%	80%	0%
Adj. Flow (vph)	4	180	77	111	57	10	45	33	138	78	89	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	178	0	0	216	0	0	193	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	4	166	71	102	52	9	41	30	127	72	82	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	180	77	111	57	10	45	33	138	78	89	26

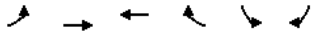
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	262	177	215	193
Volume Left (vph)	4	111	45	78
Volume Right (vph)	77	10	138	26
Hadj (s)	-0.08	0.21	-0.04	0.63
Departure Headway (s)	5.4	5.8	5.5	6.2
Degree Utilization, x	0.39	0.28	0.33	0.33
Capacity (veh/h)	623	568	595	539
Control Delay (s)	11.7	11.1	11.1	12.2
Approach Delay (s)	11.7	11.1	11.1	12.2
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.5		
Level of Service	B		
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	6	103	62	0	0	49
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.997				
Satd. Flow (prot)	0	1523	1477	0	717	0
Flt Permitted		0.997				
Satd. Flow (perm)	0	1523	1477	0	717	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	75%	0%	8%	0%	0%	75%
Adj. Flow (vph)	7	112	67	0	0	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	119	67	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	6	103	62	0	0	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)	7	112	67	0	0	53
Pedestrians		3	1			
Lane Width (m)		3.3	3.3			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	67				193	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67				193	70
tC, single (s)	4.8				6.4	7.0
tC, 2 stage (s)						
tF (s)	2.9				3.5	4.0
p0 queue free %	99				100	94
cM capacity (veh/h)	1175				795	820

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	118	67	53
Volume Left	7	0	0
Volume Right	0	0	53
cSH	1175	1700	820
Volume to Capacity	0.01	0.04	0.06
Queue Length 95th (m)	0.1	0.0	1.6
Control Delay (s)	0.5	0.0	9.7
Lane LOS	A		A
Approach Delay (s)	0.5	0.0	9.7
Approach LOS			A

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	414	11	49	132	2	7	3	308	2	2	1
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.998				0.850		0.973	
Flt Protected				0.950				0.965			0.980	
Satd. Flow (prot)	0	1536	0	1208	1546	0	0	1241	1185	0	1521	0
Flt Permitted				0.950				0.965			0.980	
Satd. Flow (perm)	0	1536	0	1208	1546	0	0	1241	1185	0	1521	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	25%	14%	3%	0%	33%	0%	4%	0%	0%	0%
Adj. Flow (vph)	2	450	12	53	143	2	8	3	335	2	2	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	464	0	53	145	0	0	11	335	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	414	11	49	132	2	7	3	308	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	450	12	53	143	2	8	3	335	2	2	1

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	464	53	146	11	335	5
Volume Left (vph)	2	53	0	8	0	2
Volume Right (vph)	12	0	2	0	335	1
Hadj (s)	0.05	0.74	0.04	0.74	-0.63	-0.04
Departure Headway (s)	5.9	7.0	6.3	7.2	5.8	7.2
Degree Utilization, x	0.77	0.10	0.26	0.02	0.54	0.01
Capacity (veh/h)	464	476	533	474	580	436
Control Delay (s)	25.8	9.6	10.3	9.1	14.2	10.3
Approach Delay (s)	25.8	10.1		14.0		10.3
Approach LOS	D	B		B		B

Intersection Summary			
Delay	18.6		
Level of Service	C		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	466	364	8	252	0	345	0	795	621	539	344	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	2		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	1.00	1.00		0.99		0.99			0.98	1.00	1.00	
Frt		0.997				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.979	
Satd. Flow (prot)	2595	2943	0	2545	0	1220	0	2971	1208	1217	2759	0
Flt Permitted	0.950			0.362						0.232	0.514	
Satd. Flow (perm)	2582	2943	0	962	0	1202	0	2971	1186	297	1448	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				105			195			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	2		7	7		2	5		4	4		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	29%	5%	0%	1%	0%	2%	2%	3%	3%	0%
Adj. Flow (vph)	507	396	9	274	0	375	0	864	675	586	374	0
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	507	405	0	274	0	375	0	864	675	293	667	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	8.0	34.0		8.0		19.0		69.0	69.0	19.0	88.0	
Total Split (%)	6.2%	26.2%		6.2%		14.6%		53.1%	53.1%	14.6%	67.7%	
Maximum Green (s)	5.0	28.0		5.0		16.0		63.2	63.2	16.0	82.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	38.0	29.0		38.0		49.0		64.2	64.2	86.0	83.2	
Actuated g/C Ratio	0.29	0.22		0.29		0.38		0.49	0.49	0.66	0.64	
v/c Ratio	0.67	0.62		0.77		0.72		0.59	0.99	0.93	0.88dl	
Control Delay	45.2	49.9		54.1		32.6		25.5	55.1	50.0	14.2	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	45.2	49.9		54.1		32.6		25.5	55.1	50.0	14.2	
LOS	D	D		D		C		C	E	D	B	
Approach Delay		47.3						38.5			25.2	
Approach LOS		D						D			C	
Queue Length 50th (m)	56.8	48.6		27.6		57.5		79.8	133.4	33.6	41.0	
Queue Length 95th (m)	75.3	65.6		#42.8		95.4		99.7	#220.0	#81.9	52.8	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	755	658		354		520		1467	684	316	1069	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.67	0.62		0.77		0.72		0.59	0.99	0.93	0.62	

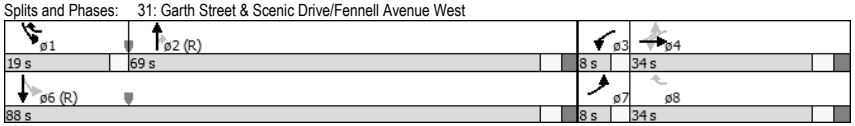
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 37.8		Intersection LOS: D	
Intersection Capacity Utilization 110.5%		ICU Level of Service H	

Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	34.0
Total Split (s)	34.0
Total Split (%)	26%
Maximum Green (s)	28.0
Yellow Time (s)	3.3
All-Red Time (s)	2.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West



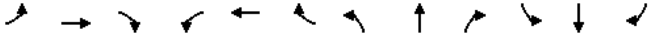
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	119	0	15	52	0	59
Ideal Flow (vphpl)	1650	1500	1500	1650	1500	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.989		
Satd. Flow (prot)	1564	0	0	1547	1230	0
Flt Permitted				0.989		
Satd. Flow (perm)	1564	0	0	1547	1230	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	311.9			195.1	78.3	
Travel Time (s)	22.5			14.0	5.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	129	0	16	57	0	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	0	0	73	64	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.40	1.40	1.25	1.40	1.40
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	119	0	15	52	0	59
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)	129	0	16	57	0	64
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			129		218	129
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			129		218	129
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	93
cM capacity (veh/h)			1456		761	920

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	129	73	64
Volume Left	0	16	0
Volume Right	0	0	64
cSH	1700	1456	920
Volume to Capacity	0.08	0.01	0.07
Queue Length 95th (m)	0.0	0.3	1.7
Control Delay (s)	0.0	1.7	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	1.7	9.2
Approach LOS			A

Intersection Summary			
Average Delay			2.7
Intersection Capacity Utilization			22.1%
Analysis Period (min)			15
ICU Level of Service			A

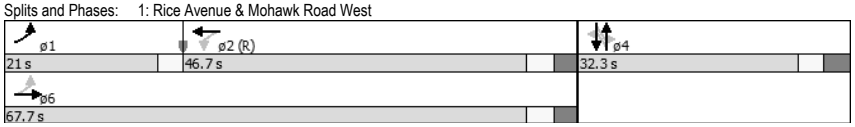


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	278	618	17	88	726	215	5	23	15	234	42	265
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99			0.99	
Frt		0.996			0.966			0.953			0.927	
Flt Protected	0.950			0.950				0.995			0.979	
Satd. Flow (prot)	1337	2982	0	1378	2867	0	0	1504	0	0	2687	0
Flt Permitted	0.140			0.389				0.935			0.808	
Satd. Flow (perm)	197	2982	0	562	2867	0	0	1413	0	0	2215	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			47			16			237	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		591.6			444.5			132.2			78.7	
Travel Time (s)		42.6			32.0			9.5			5.7	
Confl. Peds. (#/hr)	4		10	10		4	7		3	3		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	7%	0%	2%	1%	0%	0%	0%	2%	0%	1%
Adj. Flow (vph)	302	672	18	96	789	234	5	25	16	254	46	288
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	690	0	96	1023	0	0	46	0	0	588	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases	6			2			4			4		
Minimum Split (s)	8.0	56.1		44.1	44.1		32.3	32.3		32.3	32.3	
Total Split (s)	21.0	67.7		46.7	46.7		32.3	32.3		32.3	32.3	
Total Split (%)	21.0%	67.7%		46.7%	46.7%		32.3%	32.3%		32.3%	32.3%	
Maximum Green (s)	18.0	61.6		40.6	40.6		26.0	26.0		26.0	26.0	
Yellow Time (s)	3.0	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	2.8		2.8	2.8		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	2.0	5.1		5.1	5.1			5.3			5.3	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Walk Time (s)		33.0		21.0	21.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)		17.0		17.0	17.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	65.7	62.6		41.6	41.6			27.0			27.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.66	0.63		0.42	0.42			0.27			0.27	
v/c Ratio	0.87	0.37		0.41	0.84			0.12			0.76	
Control Delay	46.0	9.7		27.4	32.5			20.9			27.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	46.0	9.7		27.4	32.5			20.9			27.0	
LOS	D	A		C	C			C			C	
Approach Delay		20.8			32.1			20.9			27.0	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	36.2	30.6		12.7	86.7			4.3			33.0	
Queue Length 95th (m)	#83.2	40.9		27.5	114.2			12.8			53.7	
Internal Link Dist (m)		567.6			420.5			108.2			54.7	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	346	1868		233	1220			393			771	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.87	0.37		0.41	0.84			0.12			0.76	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 26.7		Intersection LOS: C	
Intersection Capacity Utilization 94.3%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Rice Avenue & Mohawk Road West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	60	65	259	72	67	299
Ideal Flow (vphpl)	1500	1500	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.930			0.850		
Flt Protected	0.977					0.991
Satd. Flow (prot)	1239	0	1491	1163	0	1484
Flt Permitted	0.977					0.991
Satd. Flow (perm)	1239	0	1491	1163	0	1484
Link Speed (k/h)	50		50			50
Link Distance (m)	460.0		57.7			67.4
Travel Time (s)	33.1		4.2			4.9
Confl. Peds. (#/hr)	3	9		12	12	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	3%	7%	6%	0%	8%
Adj. Flow (vph)	65	71	282	78	73	325
Shared Lane Traffic (%)						
Lane Group Flow (vph)	136	0	282	78	0	398
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Stop			Stop

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 58.8%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	60	65	259	72	67	299
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	71	282	78	73	325

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	136	282	78	398
Volume Left (vph)	65	0	0	73
Volume Right (vph)	71	0	78	0
Hadj (s)	-0.11	0.12	-0.60	0.15
Departure Headway (s)	5.6	5.4	4.7	5.0
Degree Utilization, x	0.21	0.42	0.10	0.55
Capacity (veh/h)	581	647	740	702
Control Delay (s)	10.0	11.1	7.0	13.9
Approach Delay (s)	10.0	10.2		13.9
Approach LOS	B	B		B

Intersection Summary			
Delay	11.8		
Level of Service	B		
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	61	281	118	275	301	41
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.889				0.982	
Flt Protected	0.991			0.985		
Satd. Flow (prot)	1247	0	0	2884	2746	0
Flt Permitted	0.991			0.985		
Satd. Flow (perm)	1247	0	0	2884	2746	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	526.0			168.9	57.7	
Travel Time (s)	37.9			12.2	4.2	
Confl. Peds. (#/hr)		2	11			11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	1%	0%	5%	8%	11%
Adj. Flow (vph)	66	305	128	299	327	45
Shared Lane Traffic (%)						
Lane Group Flow (vph)	371	0	0	427	372	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	61	281	118	275	301	41
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	305	128	299	327	45
Pedestrians	11			2		
Lane Width (m)	3.3			3.3		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				358		
pX, platoon unblocked						
vC, conflicting volume	766	199	383			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766	199	383			
tC, single (s)	7.0	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	77	62	89			
cM capacity (veh/h)	287	804	1177			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	372	228	199	218	154
Volume Left	66	128	0	0	0
Volume Right	305	0	0	0	45
cSH	608	1177	1700	1700	1700
Volume to Capacity	0.61	0.11	0.12	0.13	0.09
Queue Length 95th (m)	31.0	2.7	0.0	0.0	0.0
Control Delay (s)	19.8	5.2	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.8	2.8		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay		7.3	
Intersection Capacity Utilization		61.0%	ICU Level of Service B
Analysis Period (min)		15	

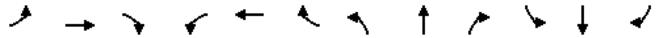
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	31	54	71	240	168	87
Ideal Flow (vphpl)	1500	1500	1500	1650	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.914				0.954	
Flt Protected	0.982			0.989		
Satd. Flow (prot)	1165	0	0	1481	1375	0
Flt Permitted	0.982			0.989		
Satd. Flow (perm)	1165	0	0	1481	1375	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	197.7			148.7	106.3	
Travel Time (s)	14.2			10.7	7.7	
Confl. Peds. (#/hr)	3		5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	4%	5%	7%	12%	8%
Adj. Flow (vph)	34	59	77	261	183	95
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	0	0	338	278	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.40	1.40	1.40	1.25	1.25	1.40
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.9%		ICU Level of Service A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	31	54	71	240	168	87
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)	34	59	77	261	183	95
Pedestrians	5				3	
Lane Width (m)	3.3				3.3	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	653	235	282			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	653	235	282			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	91	93	94			
cM capacity (veh/h)	371	796	1258			

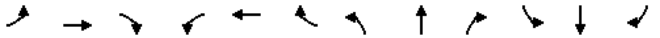
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	92	338	277
Volume Left	34	77	0
Volume Right	59	0	95
cSH	562	1258	1700
Volume to Capacity	0.16	0.06	0.16
Queue Length 95th (m)	4.4	1.5	0.0
Control Delay (s)	12.7	2.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.7	2.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		51.9%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	73	69	111	138	61	79	106	88	21	58	16
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.943			0.974			0.956			0.978	
Flt Protected		0.994			0.982			0.986			0.989	
Satd. Flow (prot)	0	1463	0	0	1505	0	0	1252	0	0	1003	0
Flt Permitted		0.994			0.982			0.986			0.989	
Satd. Flow (perm)	0	1463	0	0	1505	0	0	1252	0	0	1003	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.2			285.3			106.3			70.2	
Travel Time (s)		13.0			20.5			7.7			5.1	
Confl. Peds. (#/hr)			2	2			7		2	2		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	0%	3%	0%	12%	43%	0%	0%	88%	0%
Adj. Flow (vph)	23	79	75	121	150	66	86	115	96	23	63	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	0	0	337	0	0	297	0	0	103	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

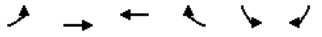
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	65.0%	ICU Level of Service C	
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	21	73	69	111	138	61	79	106	88	21	58	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	79	75	121	150	66	86	115	96	23	63	17

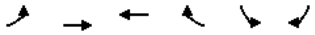
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	177	337	297	103
Volume Left (vph)	23	121	86	23
Volume Right (vph)	75	66	96	17
Hadj (s)	-0.19	-0.02	0.21	0.86
Departure Headway (s)	5.5	5.4	5.8	6.8
Degree Utilization, x	0.27	0.51	0.48	0.20
Capacity (veh/h)	584	624	579	469
Control Delay (s)	10.6	13.9	13.9	11.4
Approach Delay (s)	10.6	13.9	13.9	11.4
Approach LOS	B	B	B	B

Intersection Summary				
Delay			13.0	
Level of Service			B	
Intersection Capacity Utilization			65.0%	ICU Level of Service
Analysis Period (min)			15	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	13	71	147	0	0	31
Ideal Flow (vphpl)	1650	1650	1650	1500	1500	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.992				
Satd. Flow (prot)	0	1405	1534	0	871	0
Flt Permitted		0.992				
Satd. Flow (perm)	0	1405	1534	0	871	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.9	127.5		208.7	
Travel Time (s)		6.1	9.2		15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	71%	2%	4%	0%	0%	44%
Adj. Flow (vph)	14	77	160	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	91	160	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.3	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.25	1.25	1.40	1.40	1.25
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

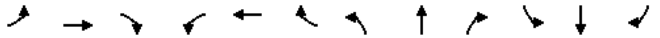
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	27.1%	ICU Level of Service A	
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	13	71	147	0	0	31
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)	14	77	160	0	0	34
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	160				265	160
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160				265	160
tC, single (s)	4.8				6.4	6.6
tC, 2 stage (s)						
tF (s)	2.8				3.5	3.7
p0 queue free %	99				100	96
cM capacity (veh/h)	1090				719	787

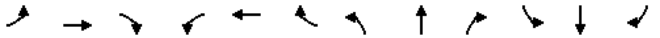
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	91	160	34
Volume Left	14	0	0
Volume Right	0	0	34
cSH	1090	1700	787
Volume to Capacity	0.01	0.09	0.04
Queue Length 95th (m)	0.3	0.0	1.0
Control Delay (s)	1.4	0.0	9.8
Lane LOS	A		A
Approach Delay (s)	1.4	0.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay		1.6	
Intersection Capacity Utilization		27.1%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	234	4	152	383	3	17	2	100	2	3	3
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	0.0		0.0	30.0		0.0	0.0		35.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.999				0.850		0.949	
Flt Protected		0.999		0.950				0.957			0.988	
Satd. Flow (prot)	0	1560	0	1337	1547	0	0	1412	1163	0	1495	0
Flt Permitted		0.999		0.950				0.957			0.988	
Satd. Flow (perm)	0	1560	0	1337	1547	0	0	1412	1163	0	1495	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		91.4			259.2			150.4			94.8	
Travel Time (s)		6.6			18.7			10.8			6.8	
Confl. Peds. (#/hr)	2					2			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	3%	3%	0%	9%	0%	6%	0%	0%	0%
Adj. Flow (vph)	3	254	4	165	416	3	18	2	109	2	3	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	165	419	0	0	20	109	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

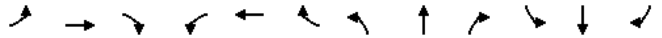
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.9%	ICU Level of Service A	
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	3	234	4	152	383	3	17	2	100	2	3	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	254	4	165	416	3	18	2	109	2	3	3

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	262	165	420	21	109	9
Volume Left (vph)	3	165	0	18	0	2
Volume Right (vph)	4	0	3	0	109	3
Hadj (s)	0.03	0.55	0.05	0.58	-0.60	-0.17
Departure Headway (s)	5.6	5.8	5.3	7.1	5.9	6.6
Degree Utilization, x	0.41	0.26	0.61	0.04	0.18	0.02
Capacity (veh/h)	618	608	673	464	552	479
Control Delay (s)	12.4	9.6	15.1	9.2	9.0	9.7
Approach Delay (s)	12.4	13.5		9.1		9.7
Approach LOS	B	B		A		A

Intersection Summary				
Delay	12.6			
Level of Service	B			
Intersection Capacity Utilization	51.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	161	155	9	904	0	515	0	440	234	300	1152	0
Ideal Flow (vphpl)	1500	1650	1500	1500	1650	1500	1500	1650	1500	1500	1650	1500
Storage Length (m)	60.0		0.0	45.0		0.0	0.0		75.0	30.0		0.0
Storage Lanes	2		0	1		1	0		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Ped Bike Factor	0.97	1.00		0.99		0.97			0.98	1.00	1.00	
Frt		0.992				0.850			0.850			
Flt Protected	0.950			0.950						0.950	0.999	
Satd. Flow (prot)	2521	2948	0	2620	0	1197	0	3000	1185	1183	2868	0
Flt Permitted	0.950			0.626						0.261	0.941	
Satd. Flow (perm)	2451	2948	0	1714	0	1165	0	3000	1157	324	2701	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				132			254			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		142.3			296.5			152.7			262.1	
Travel Time (s)		10.2			21.3			11.0			18.9	
Confl. Peds. (#/hr)	12		4	4		12	8		7	7		8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	2%	0%	3%	0%	1%	4%	6%	1%	0%
Adj. Flow (vph)	175	168	10	983	0	560	0	478	254	326	1252	0
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	175	178	0	983	0	560	0	478	254	293	1285	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.6			6.6			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40	1.40	1.25	1.40
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1		1		2	1	1	2	
Detector Template	Left	Thru		Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1		6.1		30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1		6.1		1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7						28.7			28.7	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	pm+pt	NA		D.P+P		pm+ov		NA	Perm	pm+pt	NA	

Lane Group	ø8
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3		1		2		1	6	
Permitted Phases	4			4		8			2	6		
Detector Phase	7	4		3		1		2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0		5.0		10.0	10.0	5.0	10.0	
Minimum Split (s)	8.0	34.0		8.0		8.0		28.8	28.8	8.0	36.8	
Total Split (s)	9.0	33.0		31.0		33.0		33.0	33.0	33.0	66.0	
Total Split (%)	6.9%	25.4%		23.8%		25.4%		25.4%	25.4%	25.4%	50.8%	
Maximum Green (s)	6.0	27.0		28.0		30.0		27.2	27.2	30.0	60.2	
Yellow Time (s)	3.0	3.3		3.0		3.0		3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.7		0.0		0.0		2.5	2.5	0.0	2.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0		-1.0		-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	2.0	5.0		2.0		2.0		4.8	4.8	2.0	4.8	
Lead/Lag	Lead	Lag		Lead		Lead		Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Recall Mode	Max	Ped		Max		Max		C-Max	C-Max	Max	C-Max	
Walk Time (s)		7.0						7.0	7.0		15.0	
Flash Dont Walk (s)		21.0						16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	38.0	28.0		60.0		84.0		28.2	28.2	64.0	61.2	
Actuated g/C Ratio	0.29	0.22		0.46		0.65		0.22	0.22	0.49	0.47	
v/c Ratio	0.24	0.28		0.99		0.69		0.74	0.57	0.80	0.98	
Control Delay	23.0	43.0		57.1		15.5		55.1	10.4	41.8	54.9	
Queue Delay	0.0	0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	23.0	43.0		57.1		15.5		55.1	10.4	41.8	54.9	
LOS	C	D		E		B		E	B	D	D	
Approach Delay		33.1						39.6			52.5	
Approach LOS		C						D			D	
Queue Length 50th (m)	12.5	19.4		104.8		60.6		59.7	0.0	53.5	167.4	
Queue Length 95th (m)	19.4	30.0		#114.6		100.1		78.7	23.9	#99.7	#225.7	
Internal Link Dist (m)		118.3			272.5			128.7			238.1	
Turn Bay Length (m)	60.0			45.0					75.0	30.0		
Base Capacity (vph)	720	638		993		807		650	449	364	1307	
Starvation Cap Reductn	0	0		0		0		0	0	0	0	
Spillback Cap Reductn	0	0		0		0		0	0	0	0	
Storage Cap Reductn	0	0		0		0		0	0	0	0	
Reduced v/c Ratio	0.24	0.28		0.99		0.69		0.74	0.57	0.80	0.98	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 44.8		Intersection LOS: D	
Intersection Capacity Utilization 127.3%		ICU Level of Service H	

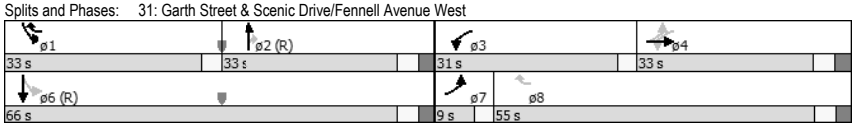
Lane Group	ø8
Protected Phases	8
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	36.8
Total Split (s)	55.0
Total Split (%)	42%
Maximum Green (s)	49.2
Yellow Time (s)	3.3
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	15.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Analysis Period (min) 15

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

Splits and Phases: 31: Garth Street & Scenic Drive/Fennell Avenue West



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	51	0	63	95	0	34
Ideal Flow (vphpl)	1650	1500	1500	1650	1500	1500
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.981		
Satd. Flow (prot)	1564	0	0	1534	1230	0
Flt Permitted				0.981		
Satd. Flow (perm)	1564	0	0	1534	1230	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	309.3			197.7	84.7	
Travel Time (s)	22.3			14.2	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	0	68	103	0	37
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	0	171	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.25	1.40	1.40	1.25	1.40	1.40
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	51	0	63	95	0	34
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)	55	0	68	103	0	37
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			55		296	55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			55		296	55
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		100	96
cM capacity (veh/h)			1549		665	1011

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	55	172	37
Volume Left	0	68	0
Volume Right	0	0	37
cSH	1700	1549	1011
Volume to Capacity	0.03	0.04	0.04
Queue Length 95th (m)	0.0	1.0	0.9
Control Delay (s)	0.0	3.2	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	3.2	8.7
Approach LOS			A

Intersection Summary				
Average Delay		3.3		
Intersection Capacity Utilization		26.4%	ICU Level of Service	A
Analysis Period (min)		15		