1842 King Street East Residential Redevelopment Transportation Impact Study, TDM Options and Access and Circulation Review

Paradigm Transportation Solutions Limited

April 2021
200384

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Project Summary

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Project Number
200384

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Executive Summary

Content

New Horizon retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Assessment, Access and Circulation Review and Transportation Demand Management (TDM) Options Review for a proposed residential redevelopment located at 1842 King Street East in the City of Hamilton.

The purpose of this study is to:

- Determine the net impacts of the proposed redevelopment on the surrounding road network;
- Outline the TDM measures proposed for the site; and
- Assess site ingress, circulation and access for the various vehicles that will access the site.

The findings, conclusions and recommendations of this study are summarized below and outlined in detail in the body of the report.

Development Concept

The site is currently occupied by the 6,000 m^2 (64,600 sq. ft.) Brock University Hamilton campus which focuses on teacher education. The site is supported by approximately 100 demarcated parking spaces and a large, unmarked parking area on the southwest corner of the site. The site is accessed via two all-turns driveway connections to King Street East and one all-turns driveway connection to Lawrence Road. The existing building, parking areas and driveways will be removed to permit the development to proceed.

The applicant proposes to redevelop the site in two phases to include approximately 1,461 units: 1,381 condominium units in four 12-storey buildings and 80 stacked townhouse units:

- Phase 1:
  - 40 stacked townhouses; and
  - 665 high-rise apartment units.

  Buildout of Phase 1 is expected in 2022.
- Phase 2:
  - 40 stacked townhouses; and
  - 716 high-rise apartment units.

Buildout of Phase 2 is expected in 2025

Access to the redeveloped site will be provided via one driveway connection to King Street East (Phases 1 and 2) and one driveway connection to Lawrence Road (Phase 2).

A total of 1,688 parking spaces are proposed to service the redeveloped site.

The final unit count and parking provisions may vary to reflect current market conditions at the time of construction.

Conclusions

Based on the investigations carried out, it is concluded that:

- **Existing Traffic Operations:** The study area intersections are operating with overall acceptable levels of service and within capacity.

  The side street approaches on Cameron Avenue South are operating at LOS E during the peak hours with low v/c ratios. The southbound approach on Barons Avenue South is operating at LOS with a moderate v/c ratio during the PM peak hour.

- **Site Generated Traffic:** The site is forecast to generate at total of 449 AM peak hour trips and 533 PM peak hour trips including:

  - Phase 1: 213 AM peak hour trips and 257 PM peak hour trips; and
  - Phase 2: 236 AM peak hour trips and 276 PM peak hour trips

- **2027 Background Traffic Operations:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The side street approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS D or worse during the peak hours, with low to moderate v/c ratios during the peak hours.

- **2027 Future Total Traffic Operations:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The side street approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS F during

the peak hours, with v/c ratios of 0.50 to 1.83 during the peak hours.

Inclusion of the site generated traffic increases delay at the study area intersections by 6 seconds or less during the AM peak hour and by 20 seconds or less during the PM peak hour. The largest increases in delay occur at King Street East and Barons Avenue South/Site Access 1 where all site traffic is assigned to the south approach.

2030 Background Traffic Operations: The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

The side street approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS D or LOS F with v/c ratios of 0.31 to 2.29 during the peak hours.

- **2030 Future Total Traffic Operations:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The side street approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS D or LOS F with v/c ratios of 0.66 to 4.75 and greater during the peak hours.

  Inclusion of the site generated traffic generally increases delay at the study area intersections by 2 seconds or less during the AM and PM peak hours. Significant increases in delay (>700 seconds) are forecast at King Street East and Barons Avenue South/Site Access 1 where all site traffic is assigned to the south approach.

- **Remedial Measures:** No offsite remedial measures are required to support redevelopment of the site.

- **Site Driveway Operations:** Limiting the site driveway to right-turn out only was the preferred alternative selected for further assessment to improve operations of the King Street East Site Access.

- **2027 Future Total Traffic Operations – with Trip Re-assignment:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The southbound approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS F with v/c ratios of 0.45 to 1.87 during the peak hours.

- **2030 Future Total Traffic Operations – with Trip Re-assignment:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The southbound approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS F with v/c ratios of 0.59 to an undefined value (PM peak hour at Barons Avenue South).

  Overall, restricting the King Street East Site Access to right-turn out only will provide adequate levels of service on the driveway as well as the study area intersections.

- **Transportation Demand Management Measures:** The applicant has developed a comprehensive transportation demand management (TDM) plan for the site that will help increase travel by sustainable modes and decrease the need for residents to own a vehicles, thereby reducing the demand for onsite parking. Proposed TDM measures include:

  - Adequate onsite bike parking;
  - Exterior lighting and overhead weather protection;
  - Enhanced on site pedestrian amenities including benches, landscaping and lighting;
  - Transit incentives;
  - Carshare vehicle/parking; and
  - Onsite wayfinding and travel planning, including a Welcome Package.

Recommendations

Based on the findings of this study, it is recommended that:

- The City of Hamilton recognize the conclusions drawn above;
- The site be permitted to develop with the site access turning restriction; and
- The applicant implements the proposed TDM program.

Contents

Appendices

Figures

Tables

1 Introduction

1.1 Overview

New Horizon retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Assessment for a residential redevelopment located at 1842 King Street East in the City of Hamilton.

Figure 1.1 illustrates the subject site location and study area limits.

The site is currently occupied by the 6,000 m^2 (64,600 sq. ft.) Brock University Hamilton campus which focuses on teacher education. The site is supported by approximately 100 demarcated parking spaces and a large, unmarked parking area on the southwest corner of the site. The site is accessed via two all-turns driveway connections to King Street East and one all-turns driveway connection to Lawrence Road. The existing building, parking areas and driveways will be removed to permit the development to proceed.

The applicant proposes to redevelop the site in two phases to include a total of 1,461 units: 1,381 condominium units in four 12-storey buildings and 80 stacked townhouse units:

- Phase 1:
  - 40 stacked townhouses; and
  - 665 high-rise apartment units.

  Buildout of Phase 1 is expected in 2022.
- Phase 2:
  - 40 stacked townhouses; and
  - 716 high-rise apartment units.

  Buildout of Phase 2 (full buildout) is expected in 2025

Access to the site is proposed via one driveway connection to King Street East opposite Barons Avenue South (the main entrance) at (Phases 1 and 2) and one all-turns driveway connection to Lawrence Road (Phase 2).

A total of 1,688 parking spaces are proposed to service the redeveloped site.

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Study Area and Development Location

1.2 Purpose and Scope

The purpose of the study is to:

- determine and assess the current study area traffic conditions;
- estimate background traffic growth in the area;
- estimate the traffic generated by the redevelopment;
- assess the AM and PM peak hour future background and total traffic within the study area;
- recommend any necessary remedial measures required to mitigate the impacts of the additional site traffic;
- outline the Transportation Demand Management (TDM) Measures planned for the site; and
- conduct an access and circulation review.

This report is prepared to meet City of Hamilton[1] (the City) Guidelines and as such will analyze the 2027 horizon (five years beyond buildout of Phase 1) and the 2030 horizon (five years beyond full buildout).

A pre-study consultation was undertaken with City of Hamilton staff in February 2021. The consultation established the work plan, general assumptions and requirements for the study.

Appendix A contains the pre-study consultation materials.

1.3 Study Area

The intersections that are assessed in this study, and confirmed by City staff, include:

- King Street East and Rosedale Avenue;
- Lawrence Road and Rosedale Avenue;
- King Street East and Barons Avenue South/Site Access 1;
- King Street East and Cameron Avenue South; and
- Lawrence Road and Site Access 2.

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

2 Existing Conditions

This section documents current traffic conditions, operational deficiencies and constraints experienced by the public travelling at the intersections within the study area. The operational deficiencies and constraints identified at this stage will be fundamental to the process of defining the required remedial measures.

2.1 Roadway Characteristics

Details of the study area roadways are as follows:

- **King Street East**
  - Direction: east-west
  - Urban Hamilton Official Plan[2] (UHOP) Designation: Minor Arterial
  - Cross-Section: Four-lane urban
  - Stopping/Parking Restrictions: In general, parking is prohibited at all times and stopping is prohibited between 7:00 AM and 9:00 AM and 4:00 PM and 6:00 PM Monday to Friday throughout the study area. Parking is permitted on Sundays on the north side in front of the Church of Nativity located between Cameron Avenue South and Barons Avenue South.
  - Speed Limit: Not posted; therefore, assumed to be 50 km/h
  - Surrounding Land Use: Mix of residential and commercial and institutional land uses
- **Lawrence Road**
  - Direction: east-west
  - UHOP Designation: Minor Arterial
  - Cross-Section: three-lane urban (one travel lane in each direction plus a central two-way left-turn lane)
  - Stopping/Parking Restrictions: Stopping is prohibited on both sides of the roadway for about 60 metres both east and west of Rosedale Avenue, then parking is prohibited throughout the remainder of the study area.
  - Posted Speed Limit: 50 km/h

[2] Schedule C Functional Road Classification, Urban Hamilton Official Plan, City of Hamilton, 2013

- Surrounding Land Use: Mainly residential

- **Rosedale Avenue**
  - Direction: north-south
  - UHOP Designation:
    - North of Lawrence Road: Local
    - South of Lawrence Road: Collector
  - Cross-Section: Two-lane urban
  - Stopping/Parking Restrictions:
    - West side King Street East to Lawrence Road: stopping is prohibited for approximately 70 south of King Street East, then parking is permitted for up to one hour for a 40-metre section, then stopping is prohibited southward to Lawrence Road;
    - West side south of Lawrence Road: stopping is prohibited for approximately 30 metres south of Lawrence Road, then parking is prohibited between December and March and from the 1st to 15th April to November, then stopping is prohibited from about 30 metres north of the tracks to south of the tracks;
    - West side King Street East to Lawrence Road: Stopping is prohibited for approximately 35 metres north of Lawrence Road, then parking is permitted for up to one hour to the plaza entrance, then stopping is prohibited northward to King Street East;
    - East side King Street East to Lawrence Road: parking is prohibited 16th to the end of the month April to November, then stopping is prohibited from about 30 metres south of Lawrence Road.
  - Posted Speed Limit: 40 km/h
  - Surrounding Land Use: Mainly residential

- **Barons Avenue South**
  - Direction: north-south
  - UHOP Designation: Local
  - Cross-Section: two-lane urban
  - Stopping/Parking Restrictions:
    - West side: Parking is prohibited from the 1st to 15th of the month April to November; and

        - East side: parking is prohibited from the 16th to the end of the month April to November
    - Posted Speed Limit: 40 km/h
    - Surrounding Land Use: Residential
- **Cameron Avenue South**
    - Direction: north-south
    - UHOP Designation: Local
    - Cross-Section: Two lane urban
    - Stopping/Parking Restrictions:
        - West side: Parking is prohibited from the 16th to the end of the month April to November; and
        - East side: parking is prohibited from the 1st to the 15th April to November
    - Posted Speed Limit: 40 km/h
        - Surrounding Land Use: mainly residential

Figure 2.1 details the existing lane configurations and traffic control at the study area intersections.

2.2 Active Transportation Facilities

2.2.1 Walking

Sidewalks are provided on both sides of all study area roadways.

Crosswalks are provided in the study area as follows:

- King Street East and Rosedale Avenue and Lawrence Road and Rosedale Avenue:
    - Painted crosswalks are provided on all legs of the intersection;
    - Curb let-downs are present on all four corners; and
    - Pedestrian crossing phases are automated and included as part of the signal timing on all approaches; therefore, pedestrian push buttons are not provided.

Walk Score is an online tool that assigns a numerical walkability score between 0 and 100 for addresses in Australia, Canada, United States, and New Zealand. Walk Score ranks communities nationwide based on how many businesses, parks, theatres, schools and other common destinations are within walking distance of any given address. The

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Existing Lane Configurations and Traffic Control

subject site has a Walk Score of 60 and is considered "Somewhat Walkable" which means some errands can be accomplished on foot[3]. The site is within a two-minute walk of a local shopping plaza containing a grocery store, several personal and business service establishments and restaurants.

2.2.2 Cycling

The City's cycling infrastructure consists of on-street and off-street facilities. On-street facilities include bike lanes, paved shoulders and shared use lanes (sharrows). Off-road facilities include multi-use paths, either adjacent to a roadway, or on a designated off-road route.

The City's Urban Bikeways Map[4] indicates the following cycling infrastructure near the subject site: Paved should on Lawrence Road throughout the study area.

Shifting Gears: Hamilton's Cycling Master Plan[5] does not identify any planned cycling infrastructure for the remainder of the study area.

2.3 Transit Service

2.3.1 Hamilton Street Railway

The Hamilton Street Railway (HSR) operates two bus routes within 400-metres (six-minute walk) of the site:

- 5 – Delaware; and
- 41 – Mohawk.

Table 2.1 summarizes the existing transit routes servicing the site. Note that due to the COVID-19 pandemic, all HSR routes are currently operating on a reduced schedule during the week.

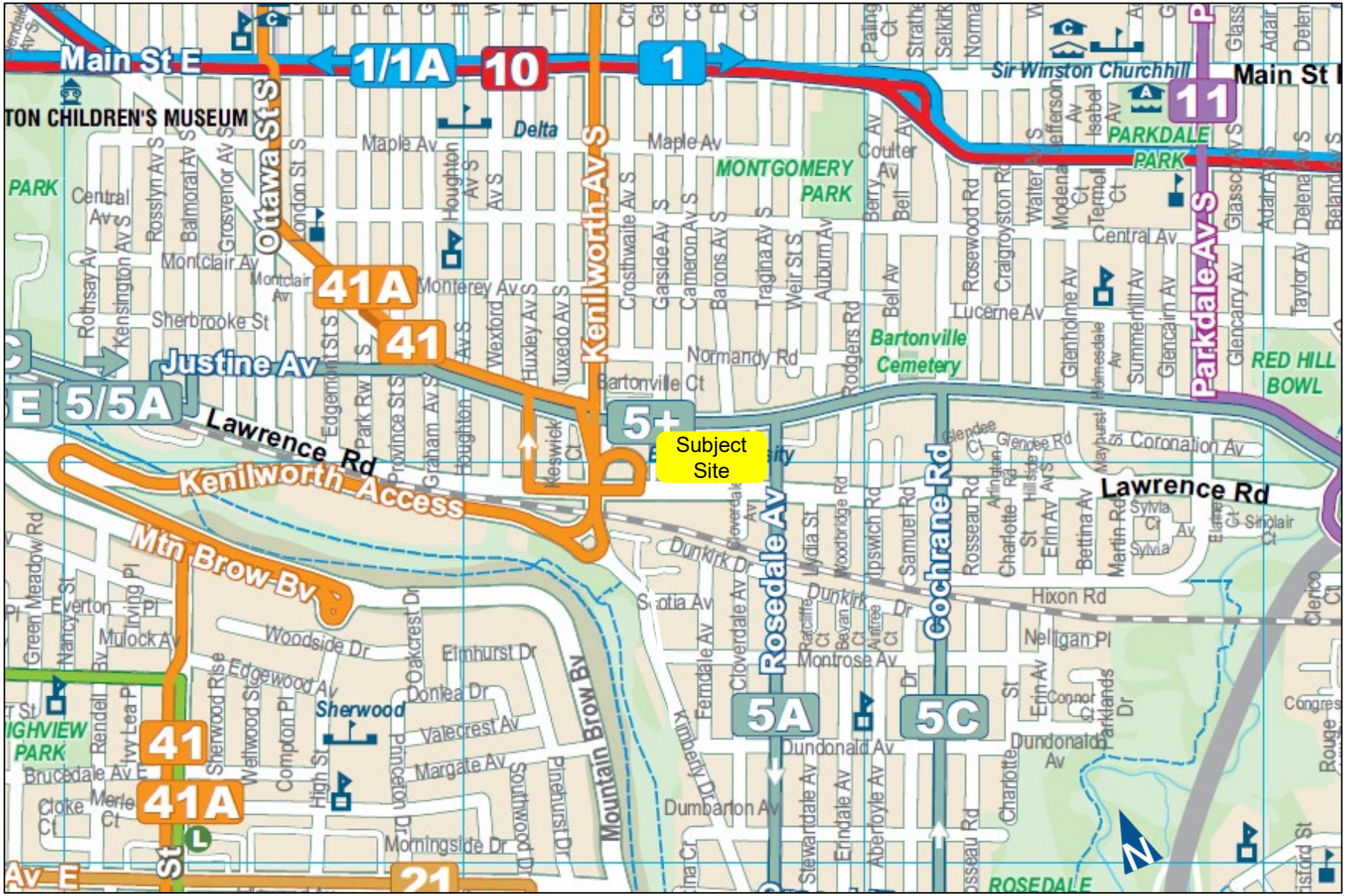
Connections to the larger HSR network are available along these routes as well as at the MacNab Street Bus Terminal (Route 5) located in downtown Hamilton ad at the Lime Ridge Mall Transit Terminal (Route 41). Additionally, Route 5 provides direct service to the GO Transit network (both bus and rail) at the Hunter Street GO station. All buses are equipped with bike racks on the front bumper.

Figure 2.2 illustrates the study area transit routes.

[3] https://www.walkscore.com/score/1842-king-st-e-hamilton-on-canada
[4] Hamilton Bikeways Map - Urban, City of Hamilton, March 2017.
[5] Shifting Gears: Hamilton's Cycling Master Plan, City of Hamilton, 2009

TABLE 2.1: EXISTING STUDY AREA TRANSIT SERVICE

Route	Description	Operating Hours
Route 5 Delaware	The Delaware is an east-west route that serves lower Hamilton, Dundas, Ancaster and Stoney Creek. Within the study area, service operates on King Street East and Rosedale Avenue. The closest eastbound bus stops are located on King Street East at the northeast corner of the site and on the northwest corner of Rosedale Avenue and Lawrence Road, about 115 metres from the site. The closest westbound stop is on the north side of King Street West opposite the northwest corner of the site.	Service runs 7 days a week from early morning until after midnight. Weekday service runs on seven to eight-minute headways during peak hours and on 10 to 20-minute headways during off-peak hours. Saturday service operates on mainly 12-minute headways, reducing to 15 to 20-minute headways during late-night service hours. Sunday/Holiday service operates on 12 to 15-minute headways.
Route 41 Mohawk	The Mohawk is a north-south route that services the Ancaster Meadowlands, Hamilton Mountain, lower Hamilton and the industrial sector. The closest eastbound bus stop is located on the northwest corner of Kenilworth Ramp and King Street East, about 250 metres west of the site. A westbound stop is not provided within convenient (400 metres) walking distance of the site.	Service runs 7 days a week from early morning until after midnight. Weekday service runs on 20-minute headways. Saturday service runs on 20-minute headways during peak hours and 30-minute headways during late-night service hours. Sunday/Holiday service operates on predominantly 30-minute headways, reducing to 60-minute headways at about 9:00 PM.



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Study Area Transit Routes

2.3.2 Ride-Hailing and Car Services

Ride-hailing and car services in the City of Hamilton include Hamilton Taxi, Blue Line Taxi, Wavetrans Para-transit and Uber/Lyft. These companies offer on-demand private car services.

2.4 Traffic Volumes

AM and PM peak period turning movement counts were provided by the City of Hamilton as follows:

- King Street East and Rosedale Avenue: Thursday, 21 November 2019;
- King Street East and Cameron Avenue south: Monday 09 September 2019;
- Lawrence Road and Rosedale Avenue: Friday 20 November 2009; and
- Kenilworth Avenue South and Lawrence Road: Friday 15 January 2016.

Am and PM peak period turning movement counts were conducted by Paradigm at the study area intersections as follows:

- King Street East and Rosedale Avenue: Wednesday, 10 February 2021; and
- King Street East and Barons Avenue South: Wednesday, 10 February 2021.

Due to the variation in traffic volumes and directional distribution caused by the COVID 19 pandemic, the 2019 King Street East traffic counts were used to establish the 2021 King Street volumes. It was assumed that growth would likely only occur between the 2019 and 2020 count years and little to no growth would occur between 2020 and 2021. Therefore, 2% growth was applied to the 2019 volumes to represent 2021 volumes. The 2% growth rate was approved by City staff during pre-study consultation. These volumes were not smoothed due to the presence of multiple midblock driveways on King Street East in the study area.

The Kenilworth Avenue and Lawrence Road traffic count was used to establish the 2021 Lawrence Road volumes. As above, a 2% growth rate, compounded for four years (total growth of 8.2%) was applied to the Lawrence Road volumes.

The Lawrence Road and Rosedale Avenue volumes were determined by retaining the 2009 turning percentages and proportionally increasing volumes to match the through traffic estimates.

Figure 2.3 illustrates the existing AM and PM peak hour traffic.

Appendix B contains the detailed traffic count data.

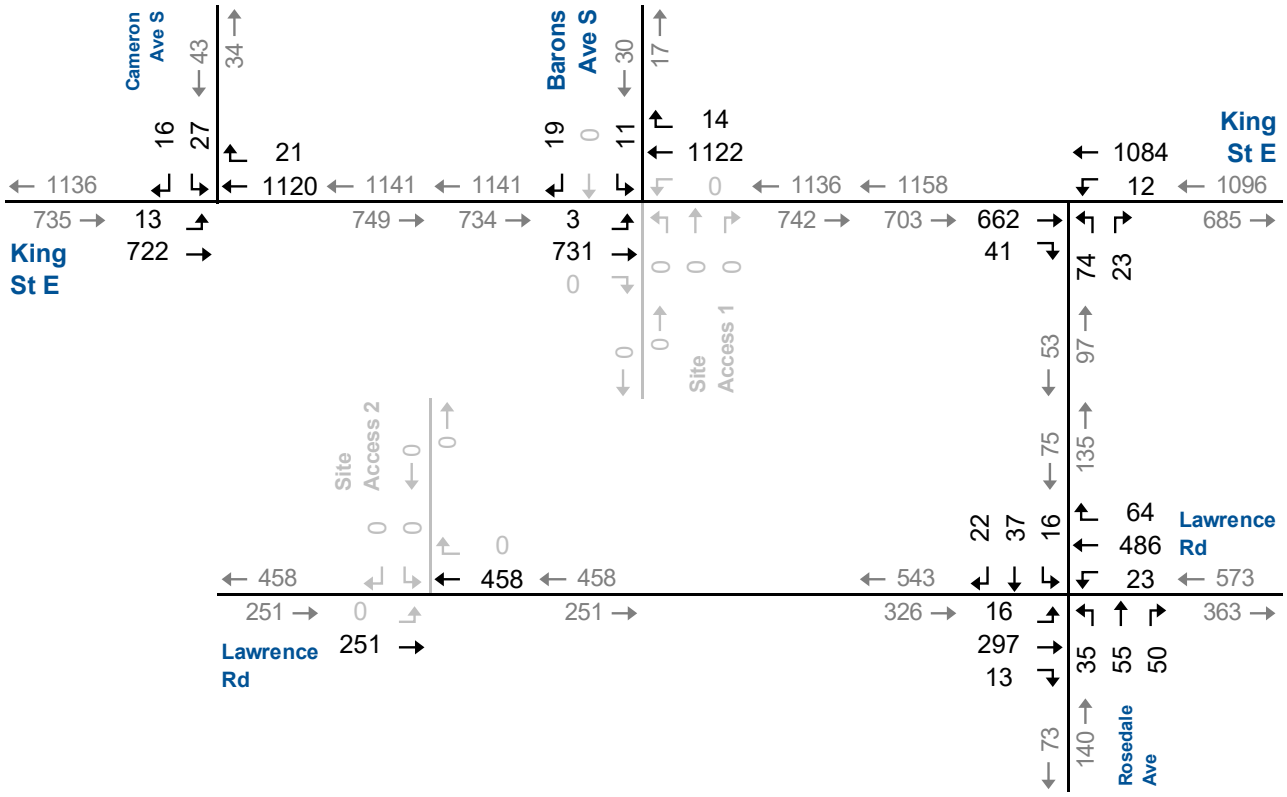
2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers 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 intending 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 and intersection geometry.

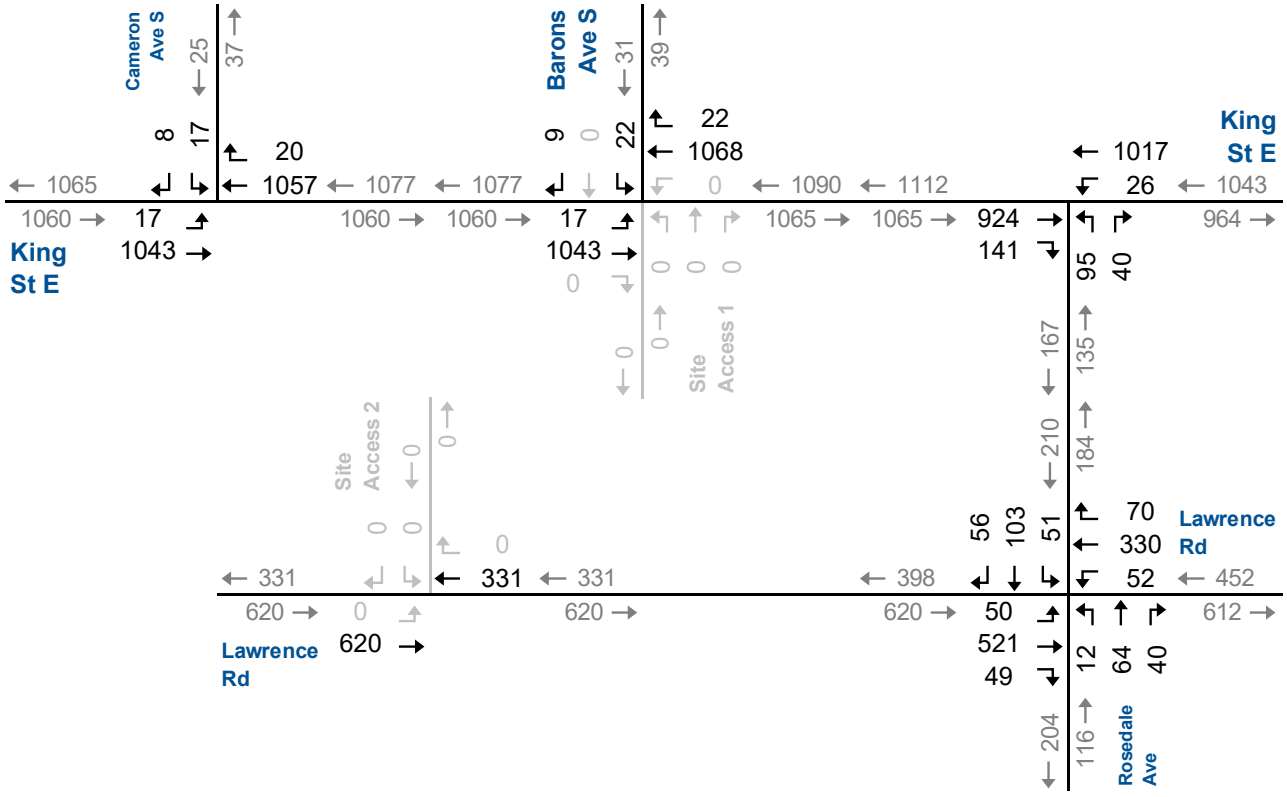
The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

The operations of intersections in the study area were evaluated with the existing turning movement volumes and signal timing plans using

AM Peak Hour



PM Peak Hour



Existing Peak Hour Traffic

Synchro 10 with HCM 2000 procedures to satisfy City capacity analyses requirements.

The intersection analysis considered two separate measures of performance:

- the volume to capacity ratio for each intersection; and
- the LOS for each turning movement (LOS is based on the average control delay per vehicle).

Based on the City's TIS guidelines, movements are considered critical under the following conditions:

- Signalized intersections:
  - Through or shared through/turning movements with v/c ratios of 0.85 or greater;
  - Exclusive left-turn movements with a v/c ratio of 0.90 or greater; and
  - The 95th percentile back of queue exceeds available storage for individual movements
- Unsignalized intersections:
  - Level of service based on average delay per vehicle on individual movements is LOS D or worse; and
  - The 95th percentile back of queue exceeds available storage for individual movements

Table 2.2 summarizes the existing intersection operations. The entries in the table indicate the AM and PM peak hour level of service (LOS), volume to capacity ratios (v/c), and 95th percentile queue length estimates. The 95th percentile queue lengths were determined using SimTraffic with 15 minutes seeding, 60 minutes recording and five iterations.

The analyses indicate that all study area intersections are operating with overall acceptable levels of service and within capacity during the peak hours. The following critical movements are noted:

- King Street East and Cameron Avenue South:
  - The southbound shared left-turn/right-turn movement is operating at LOS E with a v/c ratio of 0.28 during the AM peak hour and 0.23 during the PM peak hour
- King Street East and Barons Avenue South:

- The southbound shared left-turn/right-turn movement is operating at LOS F with a v/c ratio of 0.39 during the PM peak hour.

Appendix C contains the detailed Synchro 10 reports.

TABLE 2.2: EXISITING PEAK HOUR TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		A	>	A	<	B		B	C		>	C					B
			Delay		8	>	8	<	11		11	31		>	31					11
			V/C		0.33	>		<	0.55			0.21		>						0.46
			Q		40	>		<	77			23		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	A	>	A	A	B	>	B	<	C	>	C	<	C	>	C	B
			Delay	7	9	>	9	7	12	>	12	<	28	>	28	<	26	>	26	14
			V/C	0.05	0.30	>		0.04	0.54	>		<	0.30	>		<	0.16	>		0.46
			Q	10	39	>		16	70	>		<	44	>		<	28	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	5	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	A	<	A	>	A					D		>	D	A
			Delay	<	0	>	0	<	0	>	0					25		>	25	0
			V/C	<	0.23	>		<	0.37	>						0.16		>		
			Q	<	9	>		<	0	>						13		>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		A		A	>	A					E		>	E	A
			Delay	<	0.8		0		0	>	0					35		>	35	1
			V/C	<	0.31				0.48	>						0.28		>		
			Q	<	18				15	>						17		>		
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		A	>	A	<	B		B	C		>	C					B
			Delay		10	>	10	<	11		11	32		>	32					12
			V/C		0.50	>		<	0.55			0.30		>						0.48
			Q		61	>		<	75			27		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	B	>	B	A	A	>	A	<	C	>	C	<	C	>	C	B
			Delay	8	12	>	12	8	10	>	10	<	26	>	26	<	32	>	32	15
			V/C	0.10	0.54	>		0.15	0.38	>		<	0.23	>		<	0.50	>		0.53
			Q	16	76	>		19	59	>		<	34	>		<	48	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	-1	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	A	<	A	>	A					F		>	F	A
			Delay	<	0.7	>	0	<	0	>	0					71		>	71	1
			V/C	<	0.03	>		<	0.00	>						0.39		>		
			Q	<	15	>		<	0	>						17		>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		A		A	>	A					E		>	E	A
			Delay	<	0.9		0		0	>	0					45		>	45	1
			V/C	<	0.03				0.45	>						0.23		>		
			Q	<	27				9	>						14		>		

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

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

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

< - Shared Left-Turn Lane
> - Shared Right-Turn Lane

3 Development Concept

3.1 Development Description

The subject site is located at municipal address 1842 King Street East in the City of Hamilton. The site is currently occupied by the 6,000 m^2 (64,600 sq. ft.) Brock University Hamilton campus which focuses on teacher education. The site is supported by approximately 100 demarcated parking spaces and a large, unmarked parking area on the southwest corner of the site. The site is accessed via two all-turns driveway connections to King Street East and one all-turns driveway connection to Lawrence Road.

The existing building, parking areas and driveways will be removed to permit the development to proceed.

The applicant proposes to redevelop the site in two phases to include a total of 1,461 units: 1,381 condominium units in four 12-storey buildings and 80 stacked townhouse units:

- Phase 1:
  - 40 stacked townhouses; and
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  Buildout of Phase 1 is expected in 2022.
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  - 40 stacked townhouses; and
  - 716 high-rise apartment units.

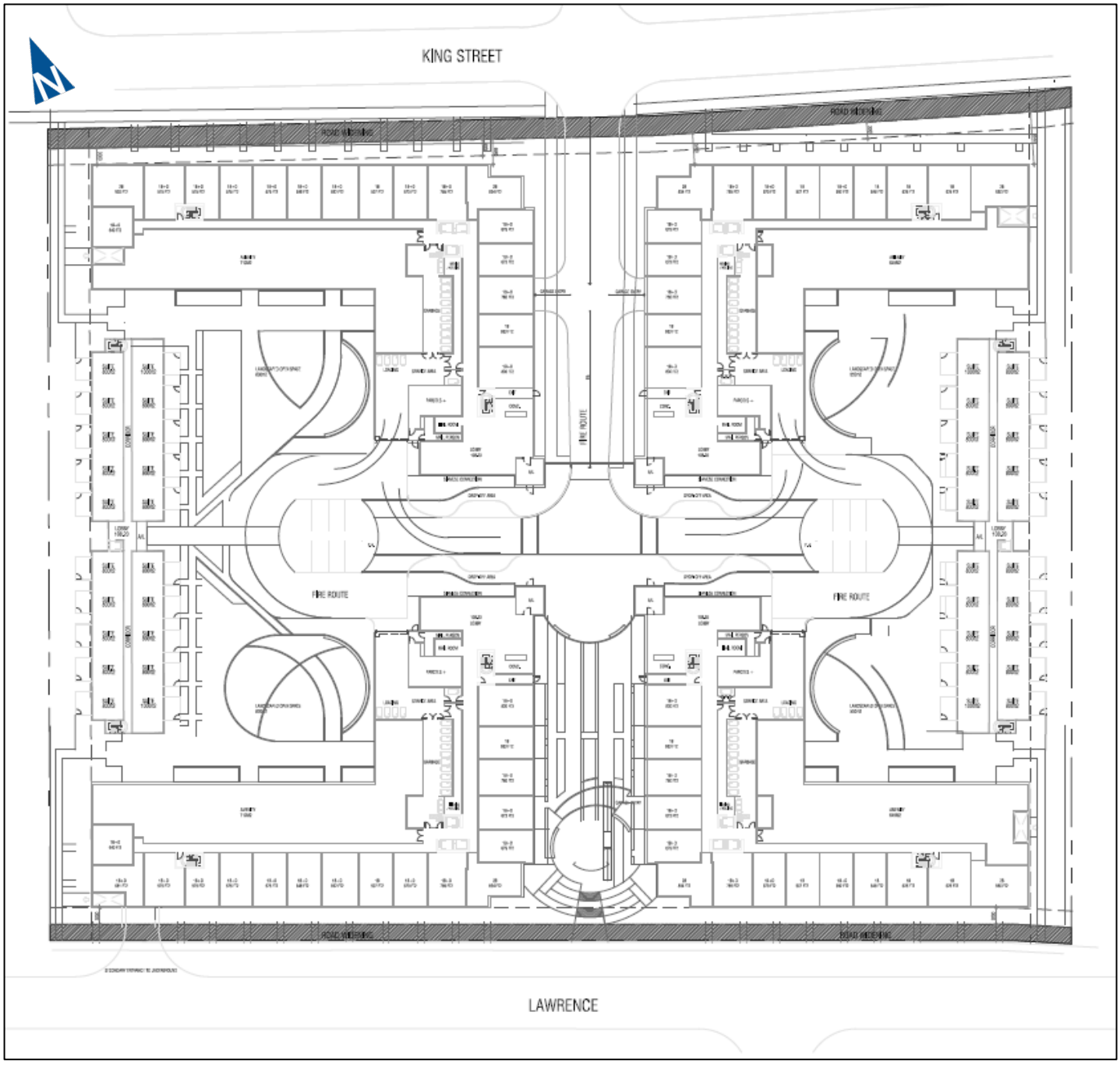
  Buildout of Phase 2 is expected in 2025

Access to the redeveloped site will be provided via one driveway connection to King Street East (Phases 1 and 2) and one driveway connection to Lawrence Road (Phase 2).

A total of 1,688 parking spaces are proposed to service the redeveloped site.

Note that the final unit count and parking provisions may be increased closer to construction to reflect current market conditions and demand.

Figure 3.1 illustrates the proposed site plan.



Proposed Site Plan

3.2 Development Trip Generation

3.2.1 Base Trip Generation

Two Institute of Transportation Engineers (ITE) Trip Generation Manual[6] land use codes (LUC) were used to estimate the site's trip generation: LUC 221 Multifamily Housing (Mid-Rise) (buildings between three and 10 storeys) and 222 Multifamily Housing (High-Rise) (buildings with more than 10 storeys). The equation rates were used to estimate the trips for both land uses since all criteria for their use were met.

Table 3.1 summarizes the estimated site trip generation The site is estimated a total of 449 AM peak hour trips and 533 PM peak hour trips as follows:

Phase 1

- LUC 221 – Multifamily Housing (Mid-Rise) (Stacked townhouses):
  - 14 AM peak hour trips; and
  - 18 PM peak hour trips
- LUC 222 – Multifamily Housing (High-Rise) (Condominium buildings):
  - 199 AM peak hour trips; and
  - 239 PM peak hour trips
- Total:
  - 213 AM peak hour trips; and
  - 257 PM peak hour trips

Phase 2

- LUC 221 – Multifamily Housing (Mid-Rise) (Stacked townhouses):
  - 14 AM peak hour trips; and
  - 18 PM peak hour trips
- LUC 222 – Multifamily Housing (High-Rise) (Condominium buildings):
  - 222 AM peak hour trips; and

[6] Trip Generation Tenth Edition, Institute of Transportation Engineers, 2017

- 258 PM peak hour trips

- Total:
  - 236 AM peak hour trips; and
  - 276 PM peak hour trips

Appendix D contains the ITE 10th Edition trip generation graphs for the respective land uses.

TABLE 3.1: SITE TRIP GENERATION

Land Use Code	Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
PHASE 1									
LUC 221 - Multifamily Housing (Mid-Rise)	40	FCE[1]	4	10	14	FCE[2]	11	7	18
LUC 222 - Multifamily Housing (High-Rise)	665	0.31	48	151	199	0.36	146	93	239
Phase 1 Trip Generation			**52**	**161**	**213**		**157**	**100**	**257**
PHASE 2									
LUC 221 - Multifamily Housing (Mid-Rise)	40	FCE[1]	4	10	14	FCE[2]	11	7	18
LUC 222 - Multifamily Housing (High-Rise)	716	0.31	53	169	222	0.36	157	101	258
Phase 2 Trip Generation			**57**	**179**	**236**		**168**	**108**	**276**
Total Site Trip Generation			**109**	**340**	**449**		**325**	**208**	**533**

[1]Ln(T) = 0.98 Ln(X) - 0.98 [2]Ln(T) = 0.96 Ln(X) - 0.63

3.2.2 Area Mode Share Rates

As directed by City staff, mode share reductions were not applied to the trip generation as they are inherent in the rates. However, a general estimate of the existing mode share for the study area was undertaken based on the information contained within the 2016 Transportation Tomorrow Survey (TTS) data. The TTS data is compiled from *"a time series telephone survey on travel behaviours in the greater Toronto and surrounding area. Data are categorized into household, person and trip tables".* The AM peak period (6:00 AM to 9:00) data for Ward 4 was taken from the TTS Summary By Ward document[7].

Table 3.2 outlines the mode share and indicates:

[7] TTS 2016 City of Hamilton Summary By Ward, Malatest, March 2018

- Auto drivers account for the majority of trips at 64%;
- Active transportation (walking and cycling) trips account for 13% of all trips;
- Transit accounts for 11% of all trips (excluding GO train); and
- Other modes (auto passenger, GO Train, and other) account for 13% of the total trips.

Appendix E contains the detailed TTS mode share data.

TABLE 3.2: AREA MODE SHARE

Driver	Active Trans	Transit	Other Modes	Total
64%	13%	11%	12%	100%

3.3 Development Trip Distribution and Assignment

The site generated trips were assigned to the road network based on the existing distribution of traffic at the study area intersections as determined from the existing peak hour traffic volumes. The existing distribution was used since it reflects the current trip making characteristics for the surrounding neighbourhood which is predominantly residential.

For assignment purposes, it was assumed that both site driveways would operate with all turns permitted. Phase 1 trips were assigned to King Street since this is only access open at this phase. For Phase 2,it was assumed that the existing percentage of trips on King Street East and Lawrence Road would be retained and these trips would use the respective access. This results in approximately 65% of trips assigned to the King Street East driveway and about 30% of the trips assigned to the Lawrence Road driveaway. The remaining trips will use either Barons Avenue South or Cameron Avenue South to access the site.

Table 3.3 summarizes the trip distribution.

TABLE 3.3: ESTIMATED PEAK HOUR TRIP DISTRIBUTION

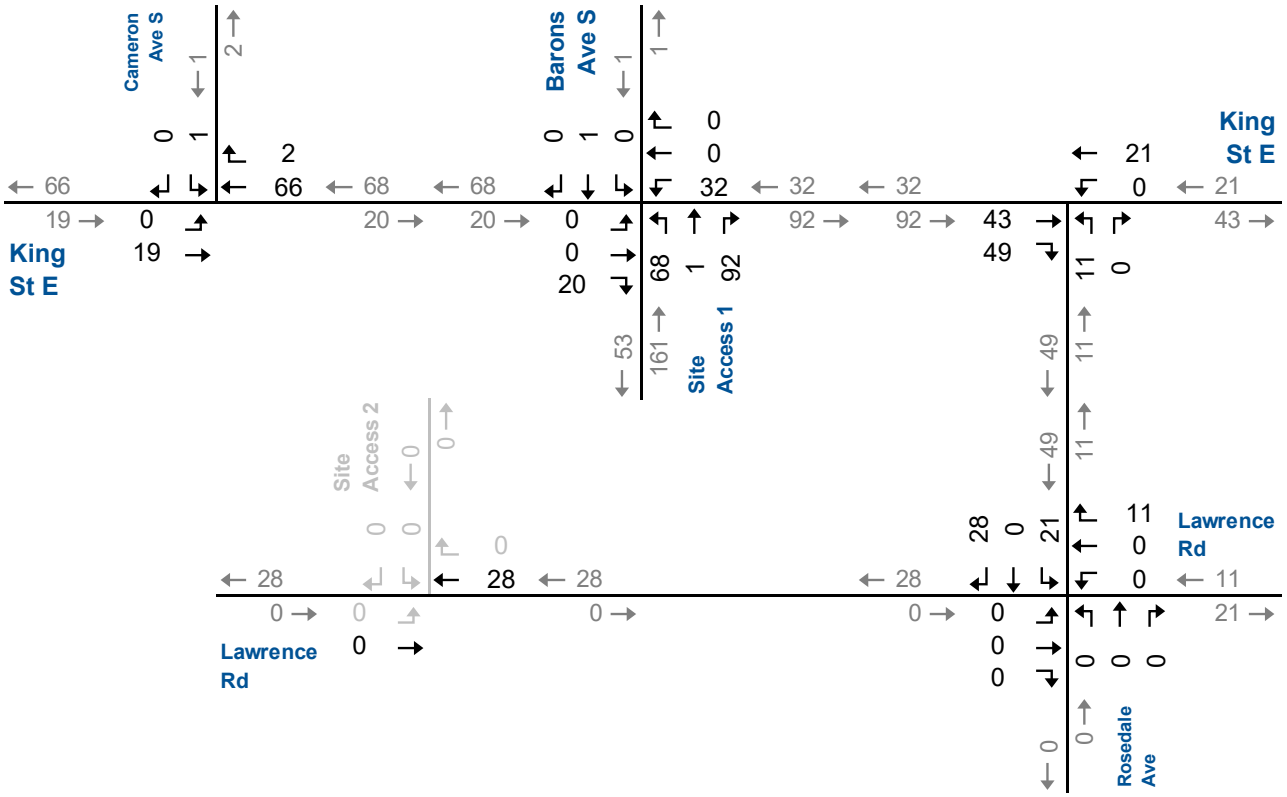
Origin / Destination	Direction	AM Peak Hour		PM Peak Hour	
		In	Out	In	Out
King St E	East	40%	25%	32%	32%
	West	27%	43%	33%	35%
Lawrence Rd	East	21%	13%	14%	20%
	West	9%	17%	18%	11%
Barons Ave S	North	1%	1%	1%	1%
Cameron Ave S	North	2%	1%	1%	1%
Total		**100%**	**100%**	**100%**	**100%**

Figure 3.2 illustrates the Phase 1 AM and PM peak hour site generated trip assignment.

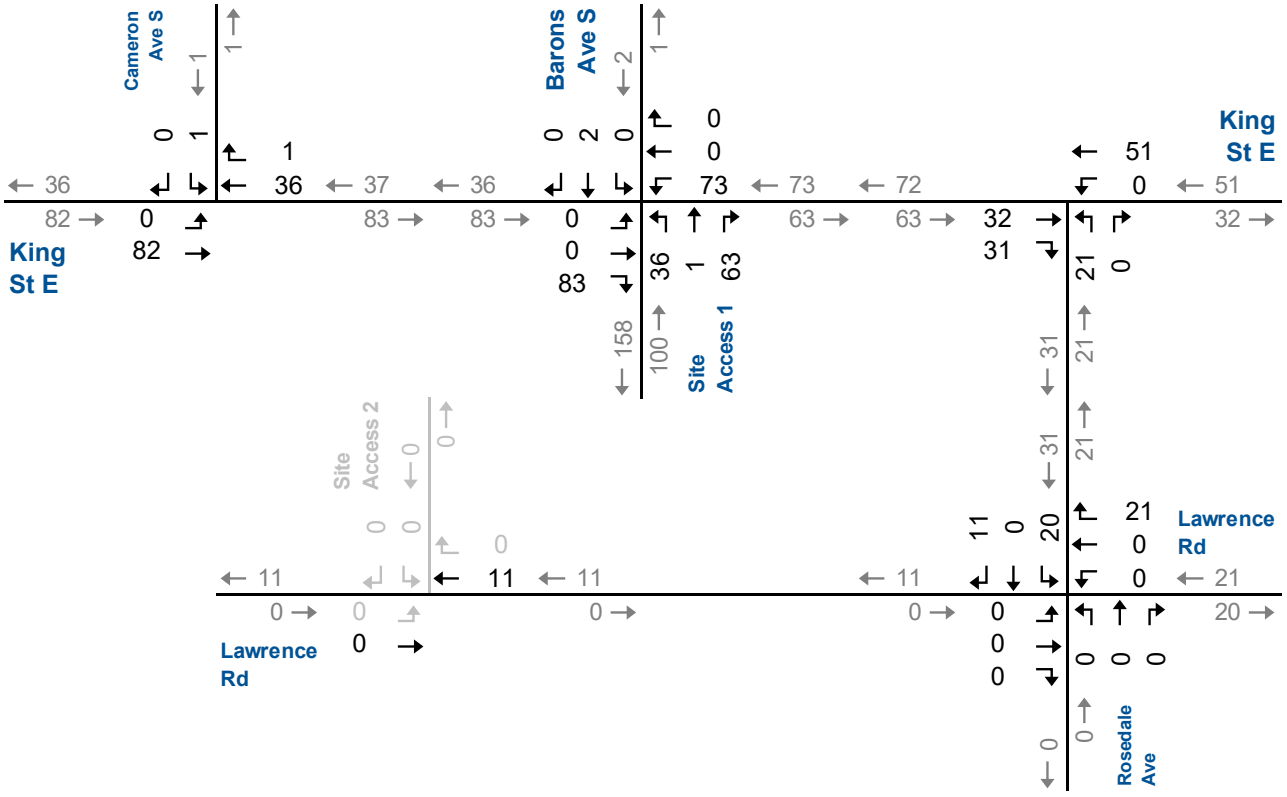
Figure 3.3 illustrates the Phase 2 AM and PM peak hour site generated trip assignment.

Appendix F contains the combined AM and PM peak hour site generated trip assignments.

AM Peak Hour

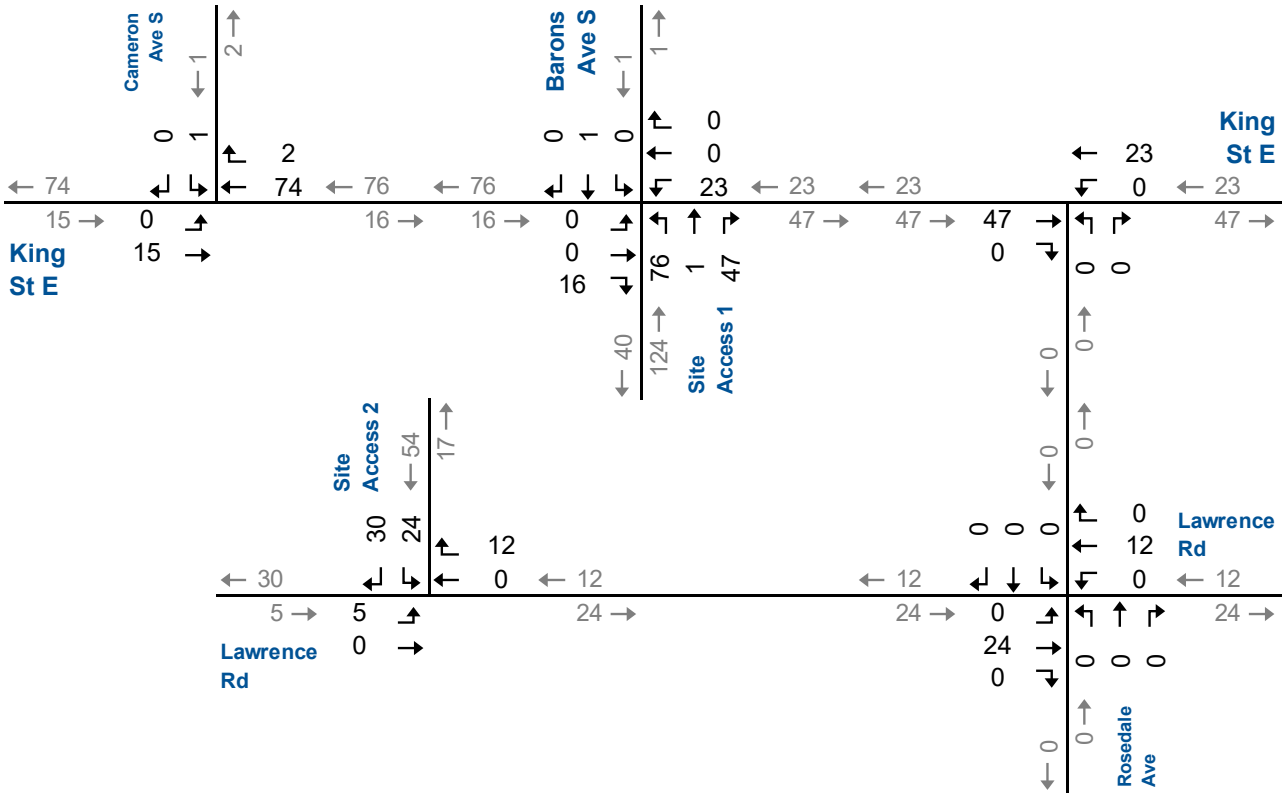


PM Peak Hour

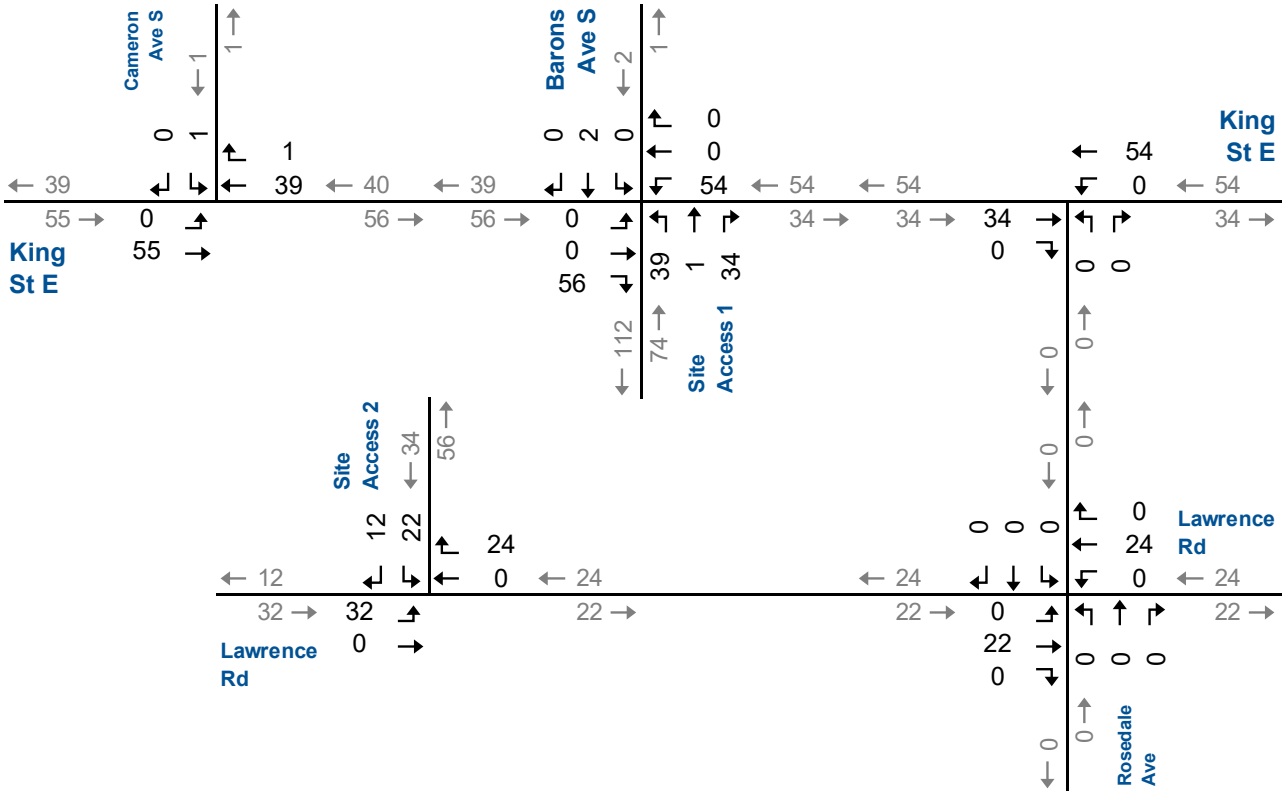


Phase 1 Site Generated Trip Assignment

AM Peak Hour



PM Peak Hour



Phase 2 Site Generated Trip Assignment

4 Evaluation of Future Total Traffic

The assessment of future traffic conditions contained in this section includes estimates and analyses of future background and total traffic volumes at the Phase 1 (2027) and Phase 2 (2030) horizons. The future traffic volumes in the vicinity of the development will consist of increased non-site traffic volumes (background traffic), traffic generated by other area developments and the site generated traffic.

4.1 2027 Background Traffic Volumes

A growth rate of 2% per annum compounded for six years (total growth of 12.6%) was applied to the existing traffic volumes to derive the 2027 background traffic volumes. This growth rate was approved by the City during pre-study consultation. As well, they did not identify any recently approved or in stream developments to be included over and above the general background traffic growth.

Figure 4.1 illustrates the 2027 AM and PM peak hour background traffic.

4.2 2027 Background Traffic Operations

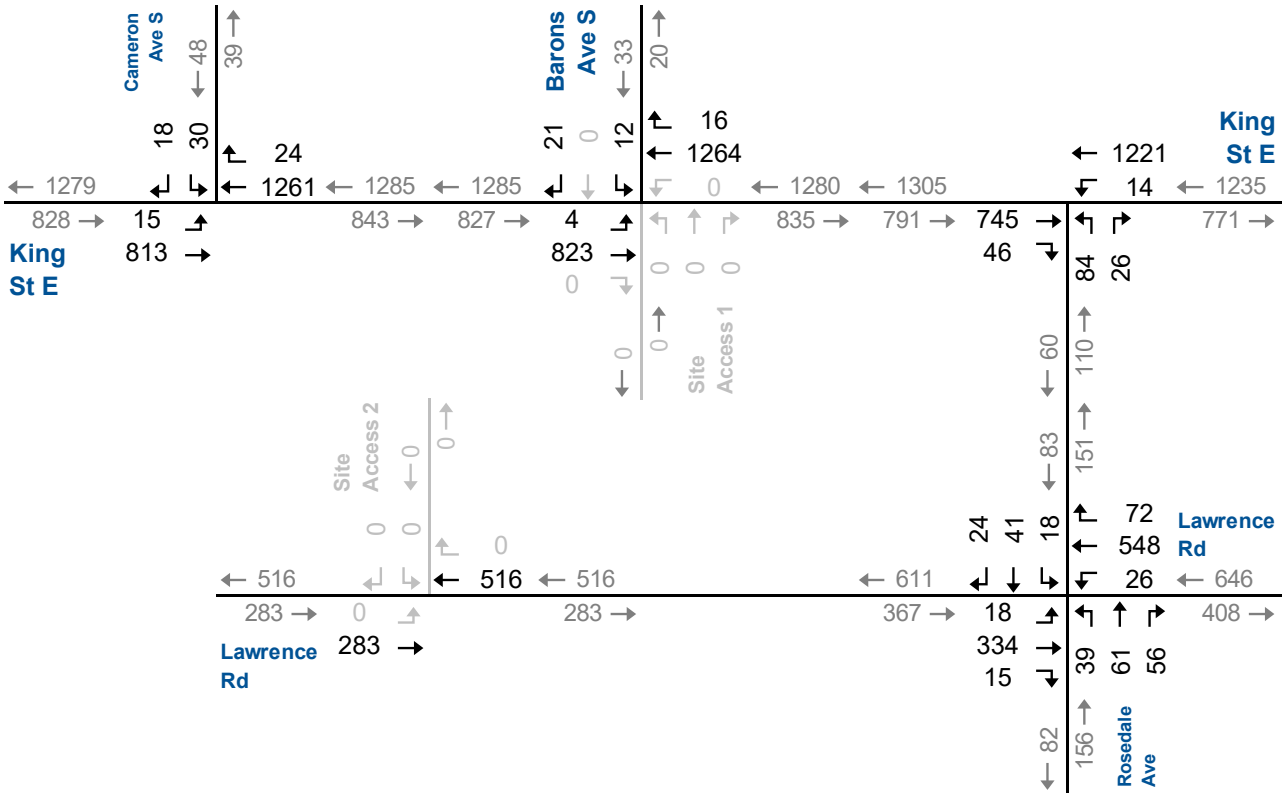
The operations of the study area intersections under 2027 background traffic volumes were evaluated using the same analytical approach as used for existing traffic operations and with the existing signal timing and phasing.

Table 4.1 summarizes the 2027 AM and PM peak hour background traffic operations. The entries in the table indicate the AM and PM peak hour level of service (LOS), volume to capacity ratios (v/c), and 95th percentile queue length estimates. The analyses indicate all intersections are forecast to operate with overall acceptable levels of service and within capacity. The following critical movements are noted:

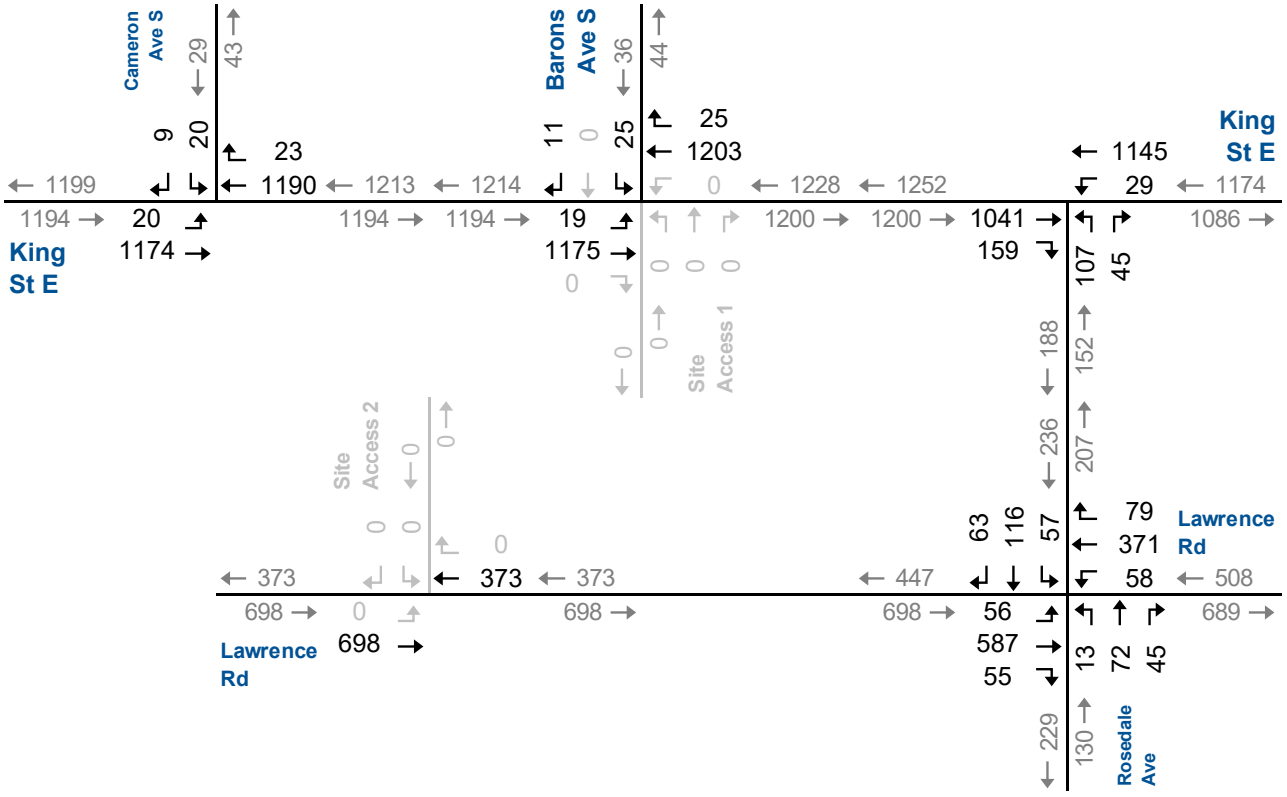
- King Street East and Barons Avenue South: southbound shared left-turn/right-turn movement:
  - AM peak hour – LOS D with a v/c ratio of 0.23; and
  - PM peak hour – LOS F with a v/c ratio of 0.66
- King Street East and Cameron Avenue South: southbound shared left-turn/right-turn movement:
  - AM peak hour – LOS F with a v/c ratio of 0.43; and
  - PM peak hour – LOS F with a v/c ratio of 0.41.

Appendix G contains the detailed Synchro 10 reports.

AM Peak Hour



PM Peak Hour



2027 Peak Hour Background Traffic

TABLE 4.1: 2027 BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		A	>	A	<	B		B	C		>	C					B
			Delay		9	>	9	<	12		12	32		>	32					12
			V/C		0.37	>		<	0.62			0.24		>						0.52
			Q		54	>		<	79			26		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	A	>	A	A	B	>	B	<	C	>	C	<	C	>	C	B
			Delay	8	10	>	9	7	13	>	13	<	28	>	28	<	26	>	26	15
			V/C	0.06	0.34	>		0.05	0.61	>		<	0.34	>		<	0.19	>		0.52
			Q	19	75	>		8	93	>		<	34	>		<	35	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	-4	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	A	<	A	>	A					D		>	D	A
			Delay	<	0	>	0	<	0	>	0					35		>	35	1
			V/C	<	0.26	>		<	0.41	>						0.23		>		
			Q	<	0	>		<	0	>						13		>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		A		A	>	A					F		>	F	A
			Delay	<	1		0		0	>	0					56		>	56	1
			V/C	<	0.35				0.54	>						0.43		>		
			Q	<	31				19	>						17		>		
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		B	>	B	<	B		B	C		>	C					B
			Delay		11	>	11	<	12		12	33		>	33					13
			V/C		0.56	>		<	0.63			0.34		>						0.55
			Q		76	>		<	66			65		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	B	>	B	A	B	>	B	<	C	>	C	<	C	>	C	B
			Delay	8	13	>	13	9	11	>	10	<	27	>	27	<	33	>	33	16
			V/C	0.13	0.61	>		0.20	0.43	>		<	0.26	>		<	0.56	>		0.60
			Q	20	137	>		19	62	>		<	27	>		<	34	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	-5	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	A	<	A	>	A					F		>	F	A
			Delay	<	1	>	1	<	0	>	0					146		>	146	2
			V/C	<	0.04	>		<	0.00	>						0.66		>		
			Q	<	52	>		<	0	>						16		>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		A		A	>	A					F		>	F	A
			Delay	<	1.1		0		0	>	0					81		>	81	1
			V/C	<	0.04				0.51	>						0.41		>		
			Q	<	41				0	>						29		>		

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

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

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

< - Shared Left-Turn Lane
> - Shared Right-Turn Lane

4.3 2027 Future Total Traffic Operations

The Phase 1 site generated traffic was added to the 2027 background traffic volumes to derive the future total traffic (2027).

Figure 4.2 illustrates the AM and PM peak future total traffic.

The operations of the study area intersections under 2027 future total traffic were evaluated using the same analytical approach as used for existing traffic operations with the existing signal timing and phasing plans.

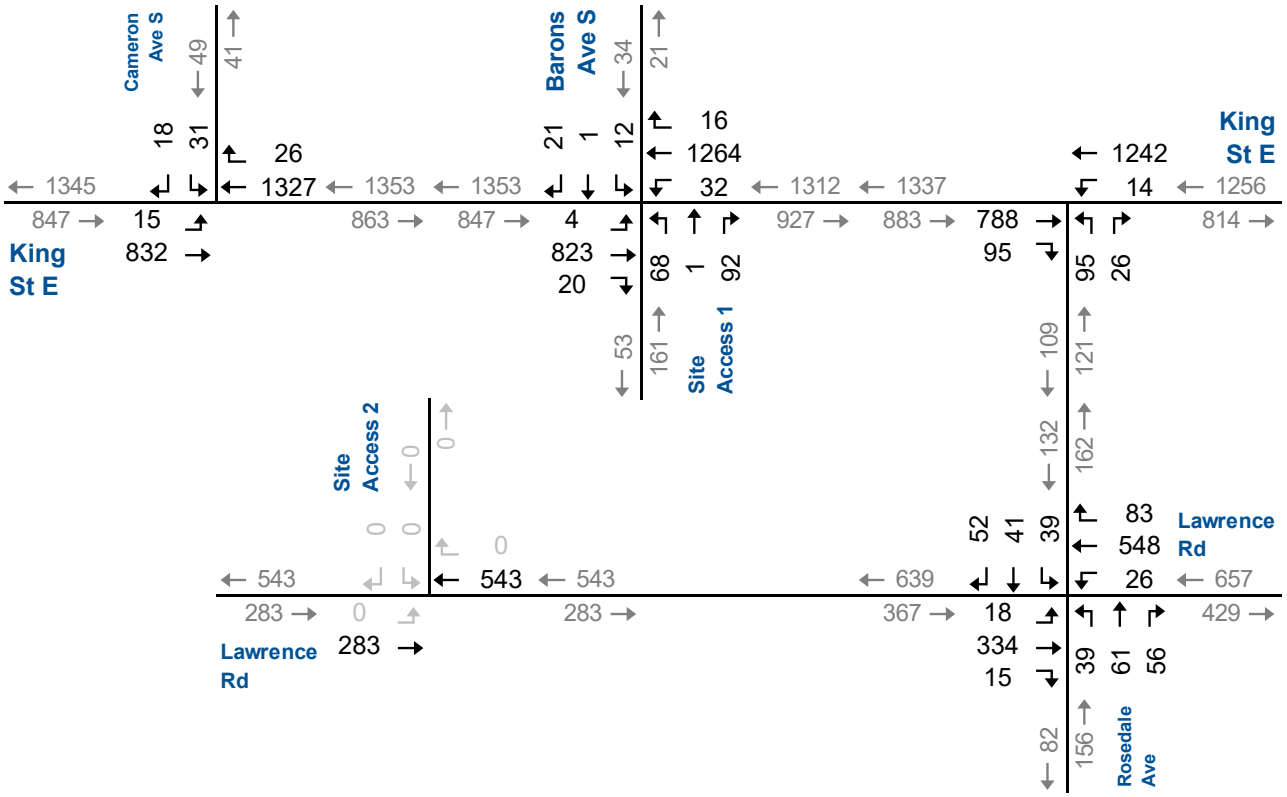
Table 4.2 summarizes the 2027 AM and PM peak hour future total traffic operations. The entries in the table indicate the AM and PM peak hour level of service (LOS), volume to capacity ratios (v/c), and 95th percentile queue length estimates. The analyses indicate all intersections are forecast to operate with overall acceptable levels of service and within capacity. The following critical movements are noted:

- King Street East and Barons Avenue South/Site Access 1:
  - Northbound left-turn movement:
    - AM peak hour – LOS F with a v/c ratio of 0.89; and
    - PM peak hour – LOS F with a v/c ratio of 1.83
  - Southbound shared left-turn/through/right-turn movement:
    - PM peak hour – LOS F with a v/c ratio of 1.74
- King Street East and Cameron Avenue South: southbound shared left-turn/right-turn movement:
  - AM peak hour – LOS F with a v/c ratio of 0.52; and
  - PM peak hour – LOS F with a v/c ratio of 0.50.

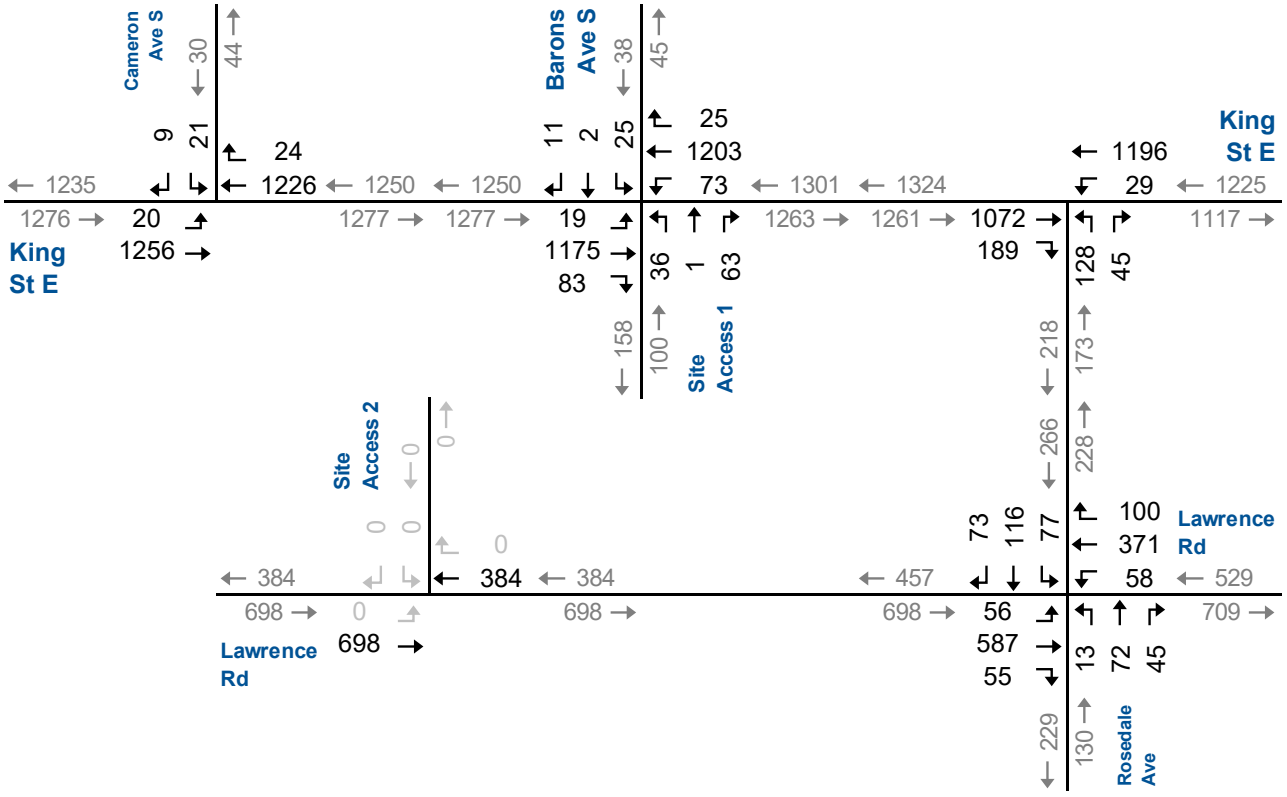
Inclusion of the site generated traffic increases delay at the study area intersections by 6 seconds or less during the AM peak hour and by 20 seconds or less during the PM peak hour. The largest increases in delay occur at King Street East and Barons Avenue South/Site Access 1 where all site traffic is assigned to the south approach.

Appendix H contains the detailed Synchro 10 reports.

AM Peak Hour



PM Peak Hour



2027 Peak Hour Future Total Traffic

TABLE 4.2: 2027 FUTURE TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		A	>	A	<	B		B	C		>	C					B
			Delay		9	>	9	<	12		12	32		>	32					12
			V/C		0.41	>		<	0.63			0.27		>						0.53
			Q		58	>		<	74			28		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	A	>	A	A	B	>	B	<	C	>	C	<	C	>	C	B
			Delay	8	10	>	9	7	14	>	13	<	28	>	28	<	28	>	28	16
			V/C	0.06	0.34	>		0.05	0.62	>		<	0.35	>		<	0.32	>		0.53
			Q	21	49	>		7	63	>		<	49	>		<	41	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	-6	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	A	<	A	>	A	F	B	>	F	<	B	>	F	A
			Delay	<	0	>	0	<	0	>	1	156.6	15	>	75	<	13	>	76	7
			V/C	<	0.28	>		<	0.41	>		0.89	0.21	>		<	0.21	>		
			Q	<	0	>		<	18	>		35	15	>		<	15	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		A		A	>	A					F		>	F	A
			Delay	<	1		0		0	>	0					73		>	73	2
			V/C	<	0.35				0.57	>						0.52		>		
			Q	<	13				31	>						16		>		
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		B	>	B	<	B		B	C		>	C					B
			Delay		11	>	11	<	12		12	34		>	34					13
			V/C		0.59	>		<	0.66			0.40		>						0.59
			Q		93	>		<	98			45		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	B	>	B	A	B	>	B	<	C	>	C	<	D	>	D	B
			Delay	8	13	>	13	9	11	>	11	<	27	>	27	<	37	>	37	17
			V/C	0.13	0.61	>		0.20	0.45	>		<	0.26	>		<	0.66	>		0.63
			Q	13	79	>		14	47	>		<	29	>		<	47	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	2	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	A	<	A	>	A	F	C	>	F	<	F	>	F	A
			Delay	<	1	>	1	<	5	>	2	780	23	>	297	<	707	>	707	22
			V/C	<	0.03	>		<	0.16	>		1.83	0.26	>		<	1.74	>		
			Q	<	70	>		<	60	>		25	28	>		<	20	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		A		A	>	A					F		>	F	A
			Delay	<	1.2		0		0	>	0					106		>	106	2
			V/C	<	0.04				0.52	>						0.50		>		
			Q	<	0				0	>						24		>		

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

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

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

< - Shared Left-Turn Lane
> - Shared Right-Turn Lane

4.4 2030 Background Traffic Volumes

The approved growth rate of 2% per annum was compounded for nine years (total growth of 19.5%) and applied to the existing traffic to derive the 2030 background traffic. The Phase 1 site traffic was included in the Phase 2 background traffic estimates. City staff did not identify any recently approved or in stream developments to be included over and above the general background traffic growth.

Figure 4.3 illustrates the AM and PM peak hour background traffic volumes.

4.5 2030 Background Traffic Operations

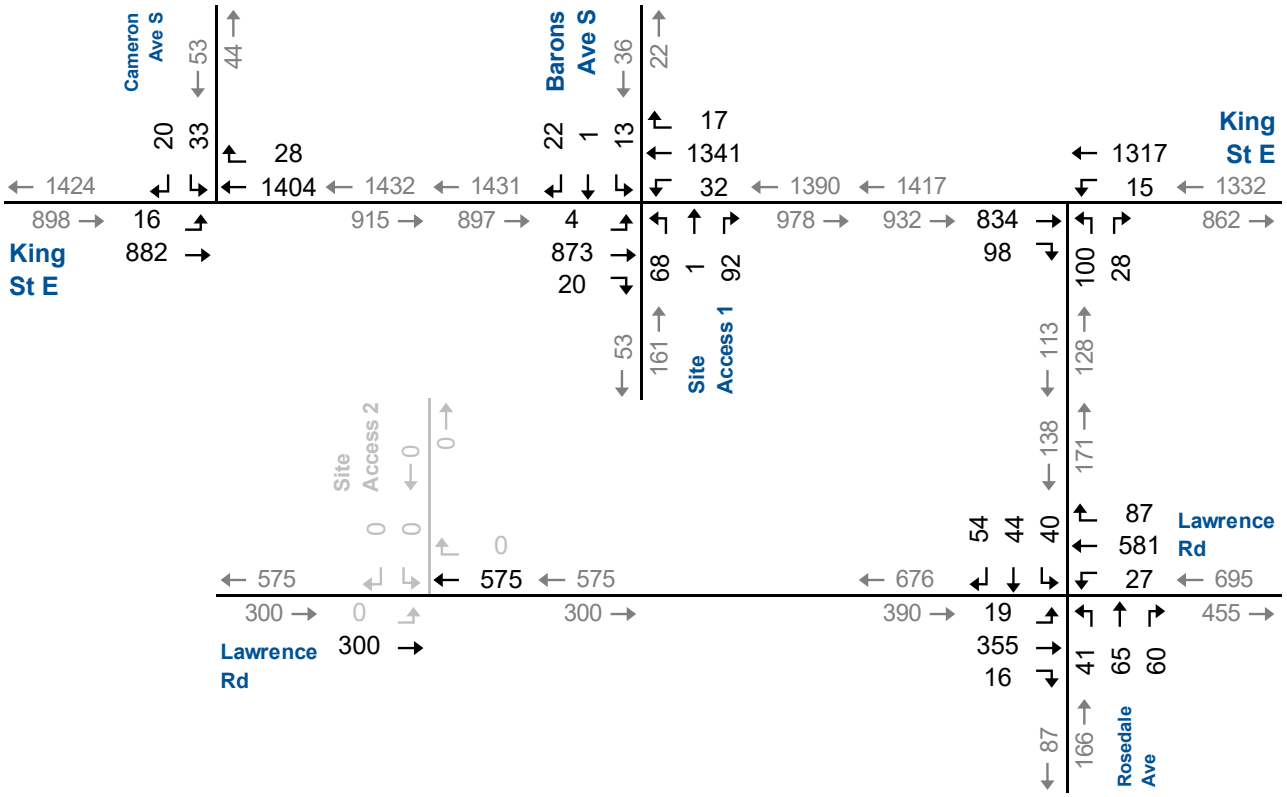
The operations of the study area intersections under 2030 background traffic were evaluated using the same analytical approach as used for existing traffic operations with the existing signal timing and phasing plans.

Table 4.3 summarizes the 2030 AM and PM peak hour background traffic operations. The entries in the table indicate the AM and PM peak hour level of service (LOS), volume to capacity ratios (v/c), and 95th percentile queue length estimates. The analyses indicate all intersections are forecast to operate with overall acceptable levels of service and within capacity. The following critical movements are noted:

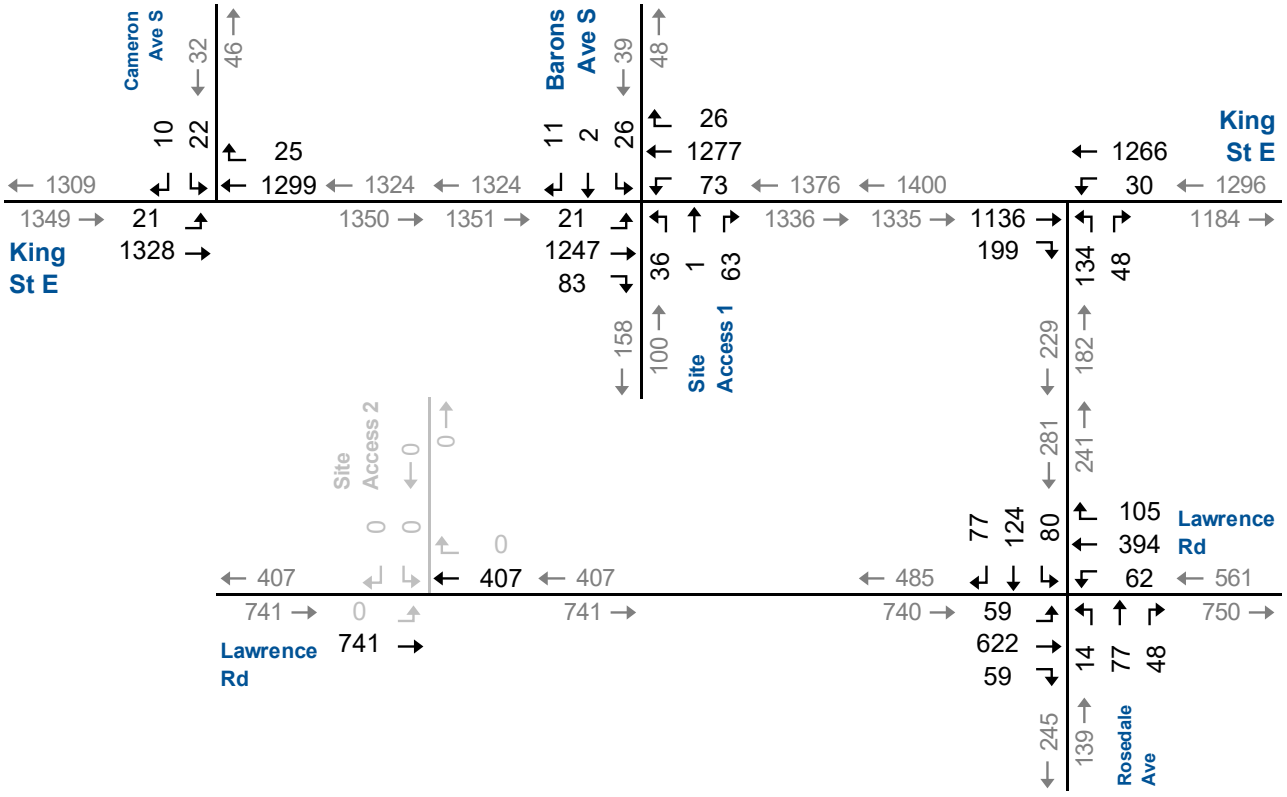
- King Street East and Barons Avenue South/Site Access 1:
  - Northbound left-turn movement:
    - AM peak hour – LOS F with a v/c ratio of 1.05; and
    - PM peak hour – LOS F with a v/c ratio of 2.59
  - Northbound shared through/right-turn movement:
    - PM peak hour – LOS D with a v/c ratio of 0.31
  - Southbound shared left-turn/through/right-turn movement:
    - PM peak hour – LOS F with a v/c ratio of 2.48
- King Street East and Cameron Avenue South: southbound shared left-turn/right-turn movement:
  - AM peak hour – LOS F with a v/c ratio of 0.67; and
  - PM peak hour – LOS F with a v/c ratio of 0.66.

Appendix I contains the detailed Synchro 10 reports.

AM Peak Hour



PM Peak Hour



2030 Peak Hour Background Traffic

TABLE 4.3: 2030 BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		A	>	**A**	<	B		**B**	C		>	**C**					**B**
			Delay		9	>	**9**	<	13		**13**	32		>	**32**					**12**
			V/C		0.44	>		<	0.67			0.29		>						**0.57**
			Q		47	>		<	74			29		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	A	>	**A**	A	B	>	**B**	<	C	>	**C**	<	C	>	**C**	**B**
			Delay	8	10	>	**10**	7	14	>	**14**	<	29	>	**29**	<	29	>	**29**	**16**
			V/C	0.08	0.36	>		0.05	0.65	>		<	0.37	>		<	0.33	>		**0.57**
			Q	19	36	>		7	72	>		<	37	>		<	43	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	-4	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	F	C	>	**F**	<	B	>	**F**	**A**
			Delay	<	0	>	**0**	<	0	>	**1**	223.1	15	>	**103**	<	13	>	**114**	**9**
			V/C	<	0.29	>		<	0.44	>		1.05	0.23	>		<	0.23	>		
			Q	<	0	>		<	0	>		31	18	>		<	18	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		**A**		A	>	**A**					F		>	**F**	**A**
			Delay	<	1.2		**0**		0	>	**0**					106		>	**106**	**3**
			V/C	<	0.38				0.60	>						0.67		>		
			Q	<	16				0	>						9		>		
	5 - Lawrence Rd & Site Access 2	TWSC	LOS		A		**A**		A	>	**A**									**A**
			Delay		0		**0**		0	>	**0**									**0**
			V/C		0.19				0.37	>										
			Q		0				0	>										
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		B	>	**B**	<	B		**B**	C		>	**C**					**B**
			Delay		12	>	**12**	<	13		**13**	35		>	**35**					**14**
			V/C		0.63	>		<	0.70			0.42		>						**0.62**
			Q		76	>		<	77			39		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	B	>	**B**	A	B	>	**B**	<	C	>	**C**	<	D	>	**D**	**B**
			Delay	8	14	>	**14**	10	11	>	**11**	<	27	>	**27**	<	39	>	**39**	**18**
			V/C	0.15	0.65	>		0.24	0.48	>		<	0.28	>		<	0.71	>		**0.67**
			Q	22	94	>		24	83	>		<	41	>		<	64	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	-7	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	F	D	>	**F**	<	F	>	**F**	**A**
			Delay	<	1.2	>	**1**	<	5	>	**3**	1239	28	>	**465**	<	1141	>	**1141**	**33**
			V/C	<	0.04	>		<	0.17	>		2.59	0.31	>		<	2.48	>		
			Q	<	14	>		<	62	>		16	15	>		<	19	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		**A**		A	>	**A**					F		>	**F**	**A**
			Delay	<	1.3		**1**		0	>	**0**					156		>	**156**	**2**
			V/C	<	0.05				0.55	>						0.66		>		
			Q	<	74				13	>						39		>		
	5 - Lawrence Rd & Site Access 2	TWSC	LOS	A	A		**A**		A	>	**A**									**A**
			Delay	0	0		**0**		0	>	**0**									**0**
			V/C	0.47	0.00				0.26	>										
			Q	0	0				0	>										

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

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

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

< - Shared Left-Turn Lane
> - Shared Right-Turn Lane

4.6 2030 Future Total Traffic Operations

The Phase 2 site generated traffic was added to the 2030 background traffic to derive the future total traffic (2030).

Figure 4.4 illustrates the AM and PM peak future total traffic.

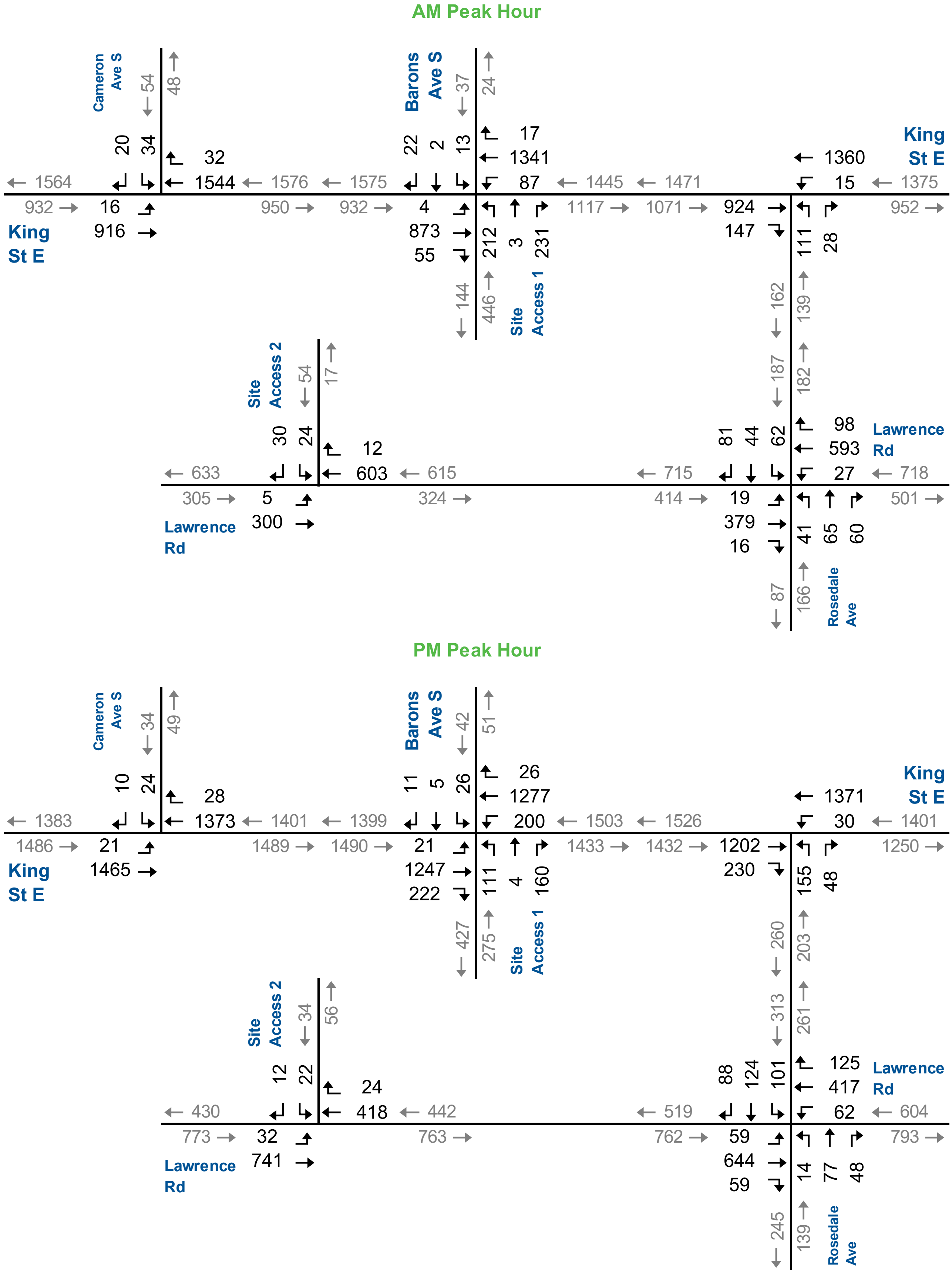
The operations of the study area intersections under 2030 future total traffic were evaluated using the same analytical approach as used for existing traffic operations with the existing signal timing and phasing plans.

Table 4.4 summarizes the 2030 AM and PM peak hour future total traffic operations. The entries in the table indicate the AM and PM peak hour level of service (LOS), volume to capacity ratios (v/c), and 95th percentile queue length estimates. The analyses indicate all intersections, with the exception of King Street East and Barons Avenue South/Site Access 1 are forecast to operate with overall acceptable levels of service and within capacity. The following critical movements are noted:

- King Street East and Barons Avenue South/Site Access 1:
  - Northbound left-turn movement:
    - AM peak hour – LOS F with a v/c ratio of 4.75; and
    - PM peak hour – LOS F with an undefined v/c ratio
  - Northbound shared through/right-turn movement:
    - AM peak hour – LOS D with a v/c ratios of 0.66; and
    - PM peak hour – LOS D with a v/c ratio of 2.47
  - Southbound shared left-turn/through/right-turn movement:
    - PM peak hour – LOS F with an undefined v/c ratio
- King Street East and Cameron Avenue South: southbound shared left-turn/right-turn movement:
  - AM peak hour – LOS F with a v/c ratio of 0.97; and
  - PM peak hour – LOS F with a v/c ratio of 0.97.

Inclusion of the site generated traffic generally increases delay at the study area intersections by 2 seconds or less during the AM and PM peak hours. Significant increases in delay (>700 seconds) are forecast at King Street East and Barons Avenue South/Site Access 1 where all site traffic is assigned to the south approach.

Appendix J contains the detailed Synchro 10 reports.



2030 Peak Hour Future Total Traffic

TABLE 4.4: 2030 FUTURE TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		A	>	A	<	B		B	C		>	C					B
			Delay		10	>	10	<	13		13	33		>	33					13
			V/C		0.50	>		<	0.69			0.32		>						0.59
			Q		74	>		<	96			32		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	A	>	A	A	B	>	B	<	C	>	C	<	C	>	C	B
			Delay	8	10	>	10	7	15	>	15	<	29	>	29	<	32	>	32	17
			V/C	0.08	0.38	>		0.06	0.68	>		<	0.38	>		<	0.49	>		0.62
			Q	15	43	>		21	98	>		<	47	>		<	70	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	0	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	A	<	A	>	A	F	D	>	F	<	C	>	F	A
			Delay	<	0	>	0	<	0	>	2	Err	30	>	4768	<	16	>	809	754
			V/C	<	0.31	>		<	0.44	>		4.75	0.66	>		<	0.66	>		
			Q	<	0	>		<	65	>		94	103	>		<	103	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		A		A	>	A					F		>	F	A
			Delay	<	1.4		1		0	>	0					219		>	219	5
			V/C	<	0.39				0.66	>						0.97		>		
			Q	<	19				0	>						29		>		
	5 - Lawrence Rd & Site Access 2	TWSC	LOS		A		A		A	>	A					B		>	B	A
			Delay		0		0		0	>	0					14		>	14	1
			V/C		0.01				0.39	>						0.12		>		
			Q		0				0	>						9		>		
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		B	>	B	<	B		B	D		>	D					B
			Delay		13	>	13	<	15		15	36		>	36					15
			V/C		0.68	>		<	0.77			0.48		>						0.69
			Q		103	>		<	109			60		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	B	>	B	B	B	>	B	<	C	>	C	<	D	>	D	C
			Delay	8	15	>	14	10	12	>	12	<	27	>	27	<	49	>	49	20
			V/C	0.16	0.67	>		0.25	0.52	>		<	0.28	>		<	0.83	>		0.72
			Q	14	84	>		19	31	>		<	37	>		<	73	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	1	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	A	<	C	>	B	F	F	>	F	<	F	>	F	A
			Delay	<	1.1	>	1	<	21	>	12	Err	793	>	Err	<	Err	>	Err	Err
			V/C	<	0.04	>		<	0.52	>		Err	2.47	>		<	Err	>		
			Q	<	45	>		<	91	>		95	110	>		<	16	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		A		A	>	A					F		>	F	A
			Delay	<	1.4		1		0	>	0					296		>	296	4
			V/C	<	0.05				0.59	>						0.97		>		
			Q	<	67				22	>						25		>		
	5 - Lawrence Rd & Site Access 2	TWSC	LOS		A		A		A	>	A					B		>	B	A
			Delay		0		1		0	>	0					14		>	14	1
			V/C		0.03				0.28	>						0.09		>		
			Q		0				0	>						13		>		

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

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

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

< - Shared Left-Turn Lane
> - Shared Right-Turn Lane

5 Remedial Measures

5.1 Auxiliary Turning Lanes

The need for auxiliary turning lanes was not assessed for the site due to the following:

- King Street East is a built-up urban roadway; therefore, provision of a dedicated westbound left-turn lane at Site Access 1 would require significant road widening. As well, the movement is forecast to operate with acceptable levels of service; and
- The existing two-way left-turn lane on Lawrence Road is expected to remain in place and serve the development.

5.2 Site Driveway Operations

The results of the analysis in **Chapter 4** indicate that the northbound left-turn movement exiting the site will operate at LOS F with a high v/c ratio during the peak hours at Phase 1 and Phase 2. Based on a sensitivity analysis, if any trips are assigned to this movement, the level of service and v/c ratios will be unacceptable. If all moves are retained at this location, driver frustration will increase as delay increases, leading drivers to accept smaller gaps on King Street, resulting in unsafe exiting movements.

Several mitigation options were considered to provide acceptable levels of service and safe environment for exiting traffic. The cursory review of each option determined that:

- Although installation of traffic control signals would provide acceptable levels of service for all intersection approaches, signals are not warranted for the intersection. As well, upon discussion with City staff, it was determined that traffic control signals are not desirable at this location due to the close proximity of the site driveway to the signalized intersection of King Street and Rosedale Avenue (about 120 metres).
- Turning restrictions, specifically limiting the exiting traffic at Site Access 1 to right-turn only outbound. This option will provide acceptable levels of service for the movement; however, traffic destined to points west will be required to circle back, either via Rosedale Avenue and Lawrence Road or through local roads east of Rosedale Avenue (and north of King Street). This option has the potential to increase in cut-through traffic on north-south roadways east and west of the study area; however, the need to provide site access via King Street East and the increase in

operations and safety at Site Access 1 help to offset any cut-through traffic impacts.

Overall, limiting the site driveway to right-turn out only was selected as the preferred alternative for further assessment.

5.3 Site Traffic Re-assignment

The site trips were re-assigned to the roadway network to reflect the turning restrictions at the King Street East site driveway.

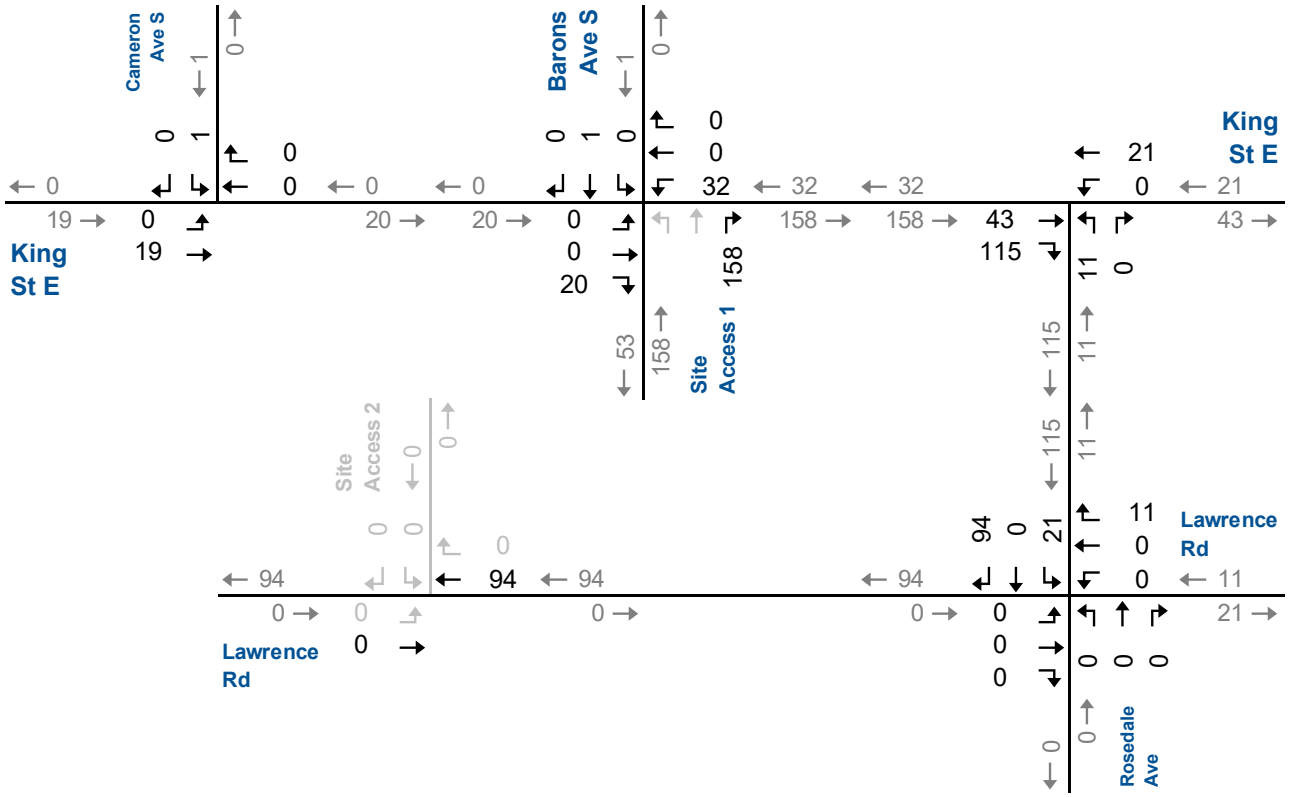
Figure 5.1 illustrates the Phase 1 site generated trip re-assignment.

Figure 5.2 illustrates the Phase 1 future total traffic with re-assignment.

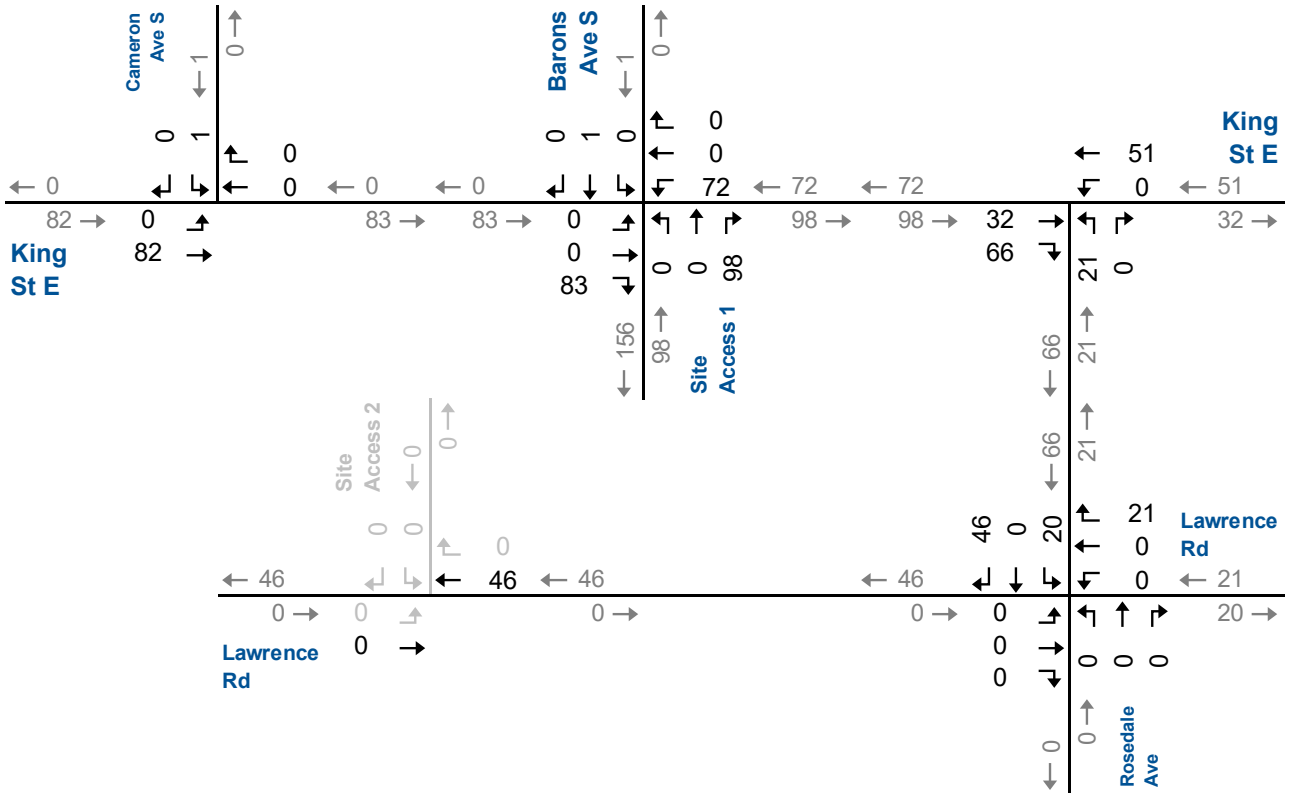
Figure 5.3 illustrates the combined Phase 1 and Phase 2 site generated trip re-assignment.

Figure 5.4 illustrates the Phase 2 future total traffic with re-assignment.

AM Peak Hour

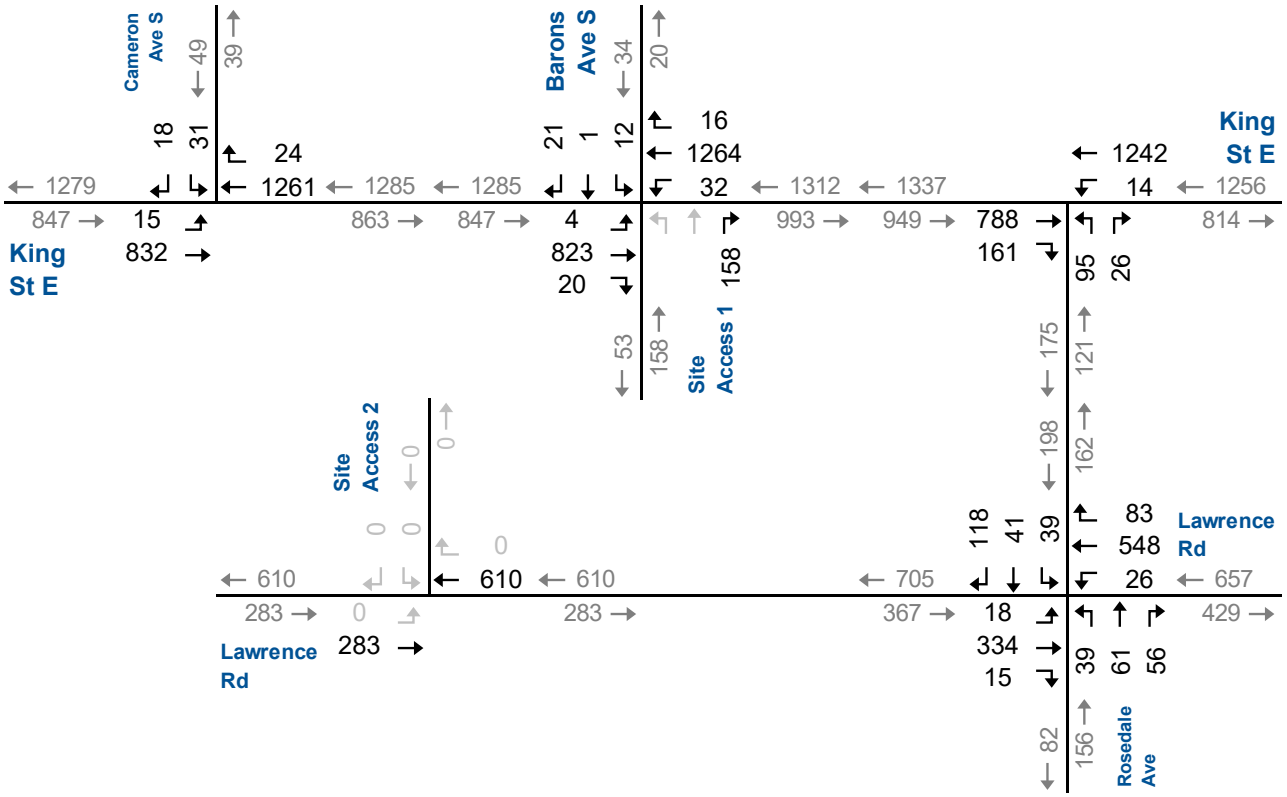


PM Peak Hour

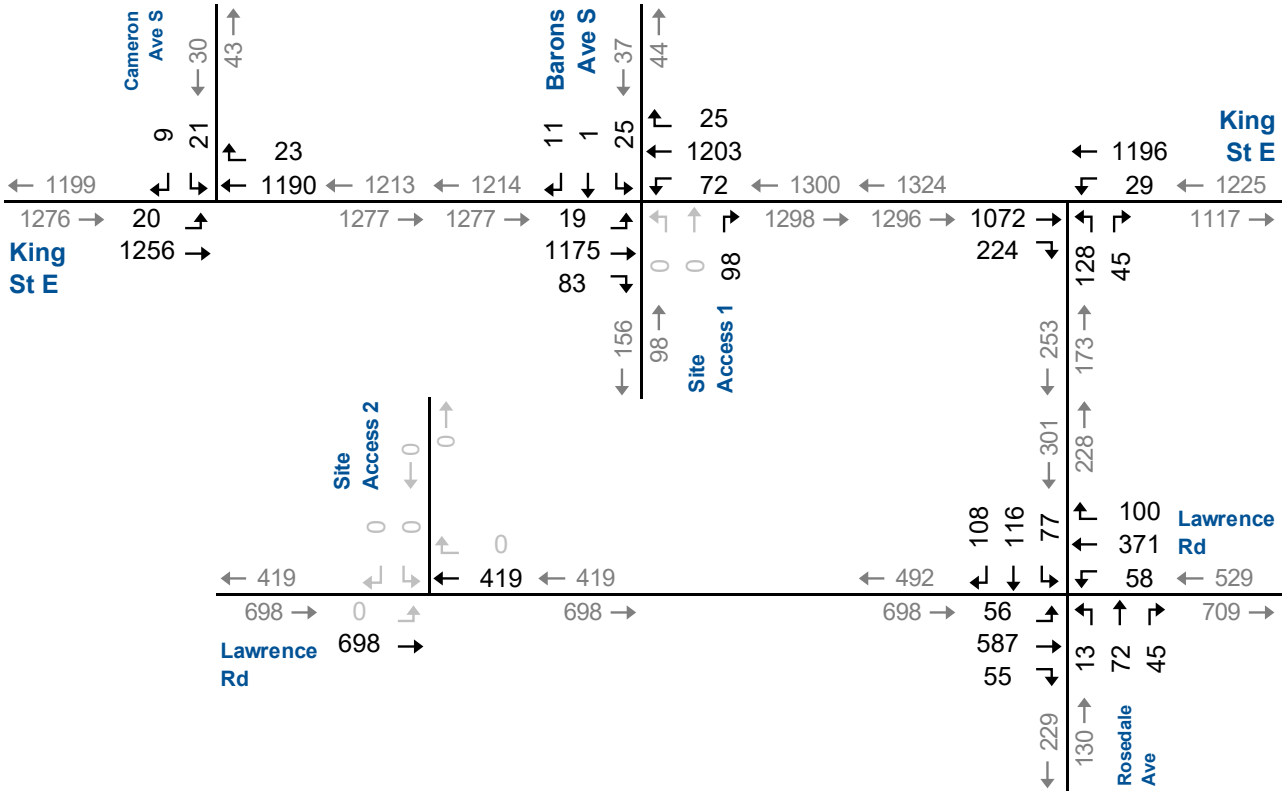


Phase 1 Site Generated Trip Re-assignment

AM Peak Hour

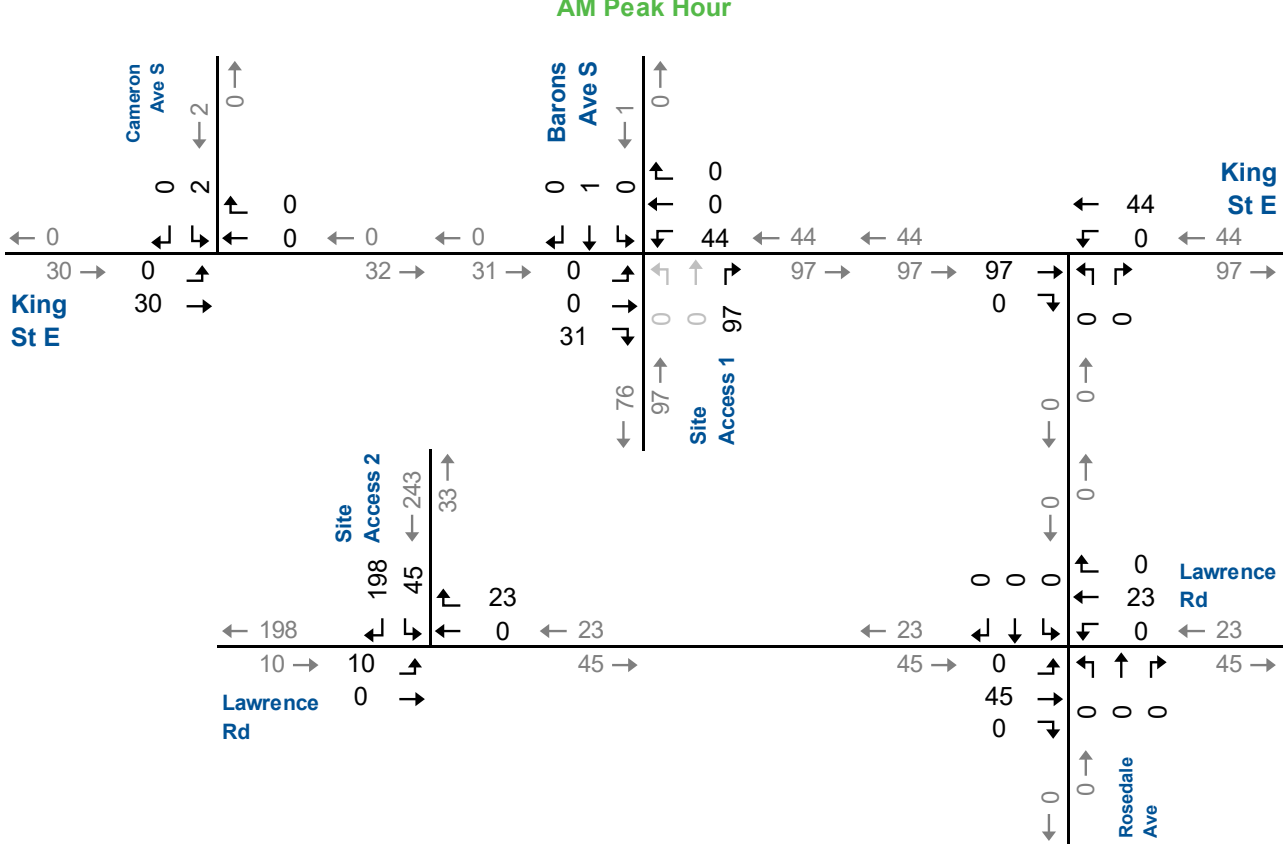


PM Peak Hour

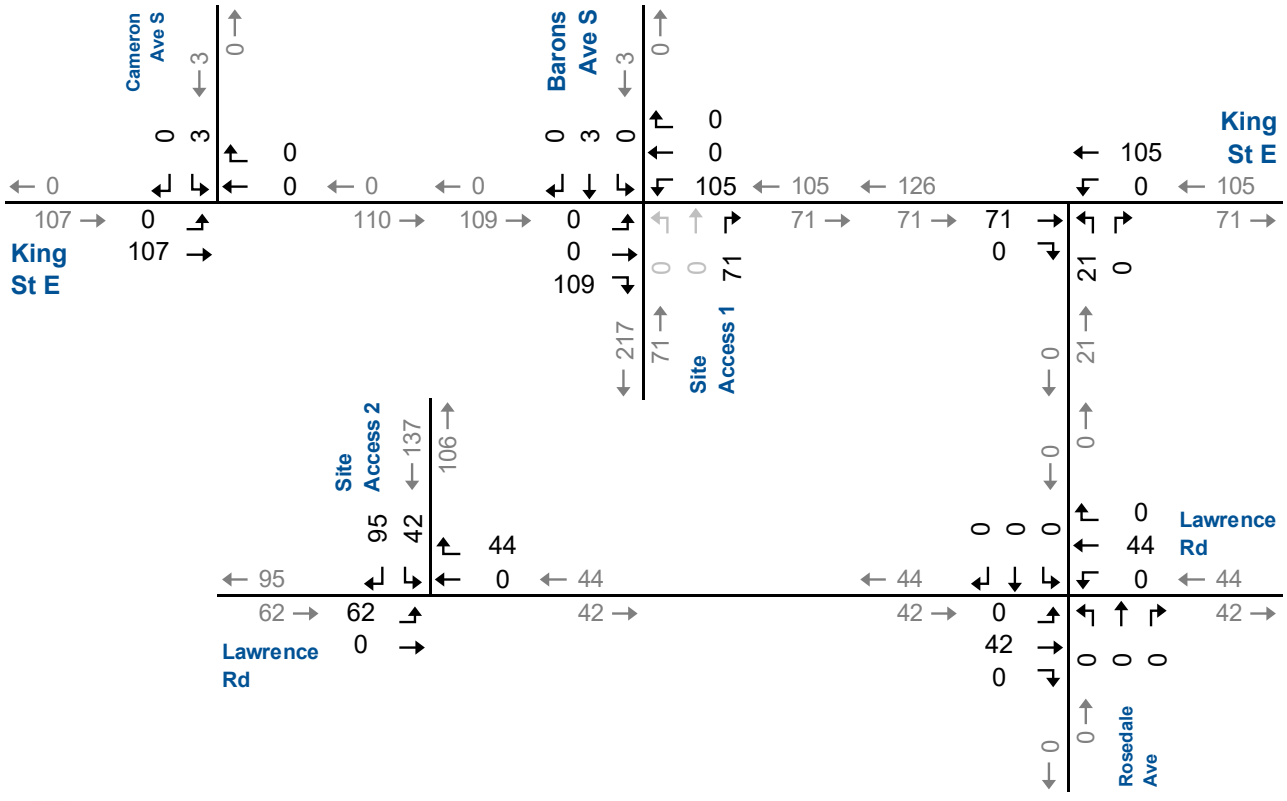


Phase 1 Future Total Traffic with Re-assignment

AM Peak Hour

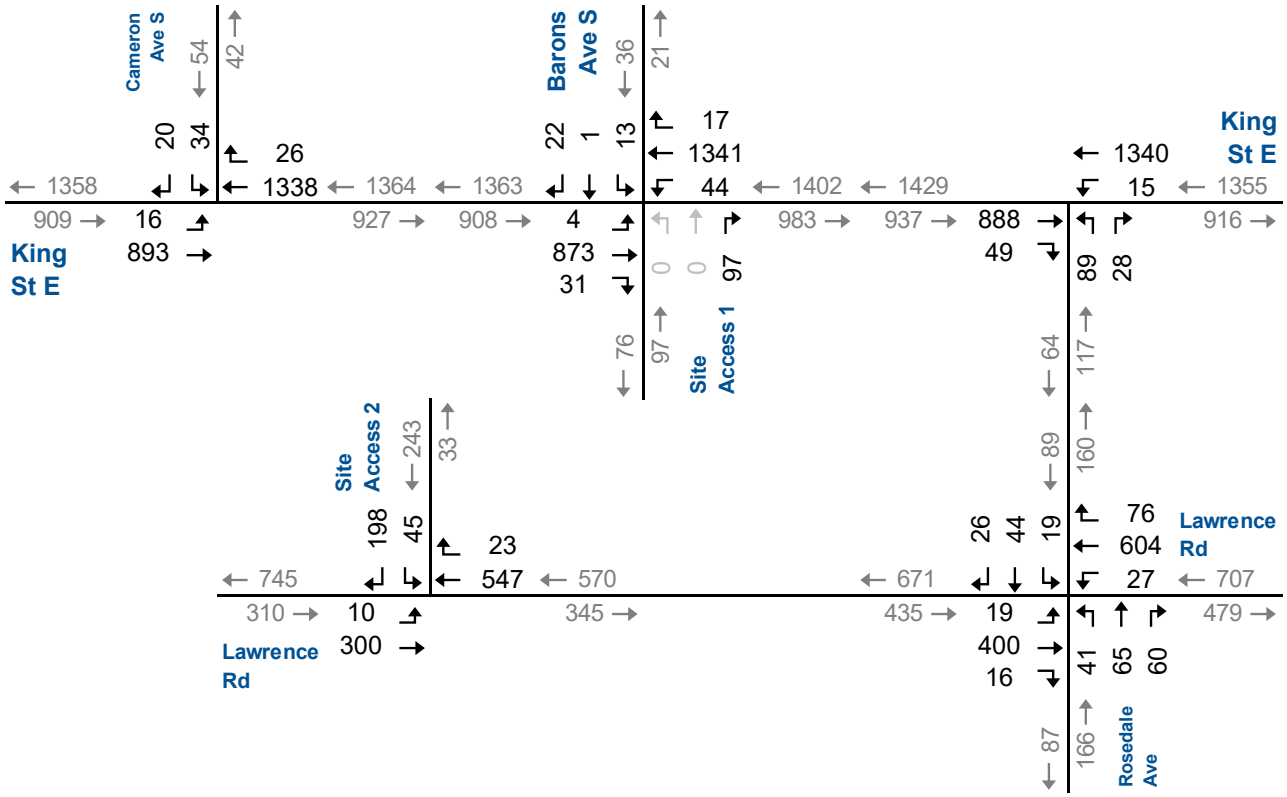


PM Peak Hour

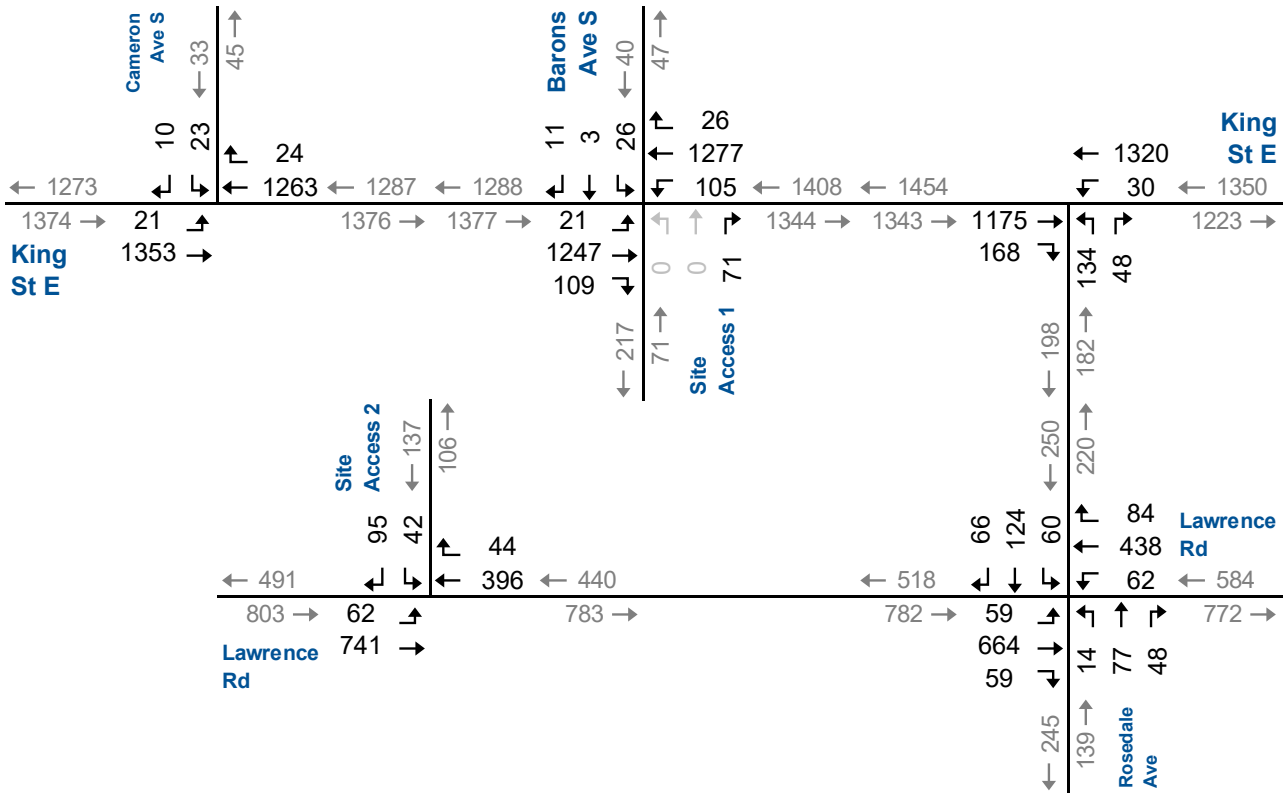


Buildout Site Generated Trip Re-assignment

AM Peak Hour



PM Peak Hour



Phase 2 Future Total Traffic with Re-assignment

5.4 2027 Future Total Traffic Operations with Re-assigned Volumes

The operations of the study area intersections under 2027 future total traffic with re-assignment were evaluated using the same analytical approach as used for existing traffic operations with the existing signal timing and phasing.

Table 5.1 summarizes the 2027 AM and PM peak hour future total traffic operations. The entries in the table indicate the AM and PM peak hour level of service (LOS), volume to capacity ratios (v/c), and 95th percentile queue length estimates. The analyses indicate all intersections are forecast to operate with overall acceptable levels of service and within capacity. The following critical movements are noted:

- King Street East and Barons Avenue South/Site Access 1:
  - Southbound shared left-turn/through/right-turn movement:
    - AM peak hour – LOS F with a v/c ratio of 0.57; and
    - PM peak hour – LOS F with a v/c ratio of 1.87
- King Street East and Cameron Avenue South: southbound shared left-turn/right-turn movement:
  - AM peak hour – LOS F with a v/c ratio of 0.45; and
  - PM peak hour – LOS F with a v/c ratio of 0.47.

Inclusion of the site generated traffic generally increases delay at the study area intersections by 2 seconds or less during the AM and PM peak hours. A more significant increase in delay (>100 seconds) is forecast at King Street East and Barons Avenue South/Site Access 1 during the PM peak hour; however the intersection will continue to operate at acceptable levels of service.

Appendix K contains the detailed Synchro 10 reports.

TABLE 5.1: 2027 FUTURE TOTAL TRAFFIC OPERATIONS WITH RE-ASSIGNMENT

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		A	>	**A**	<	B		**B**	C		>	**C**					**B**
			Delay		9	>	**9**	<	12		**12**	32		>	**32**					**12**
			V/C		0.45	>		<	0.63			0.27		>						**0.53**
			Q		52	>		<	82			40		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	A	>	**A**	A	B	>	**B**	<	C	>	**C**	<	C	>	**C**	**B**
			Delay	8	10	>	**9**	7	14	>	**13**	<	29	>	**29**	<	30	>	**30**	**16**
			V/C	0.06	0.34	>		0.05	0.62	>		<	0.35	>		<	0.43	>		**0.56**
			Q	14	66	>		14	62	>		<	42	>		<	49	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	1	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	**A**	<	A	>	**A**			B	**B**	<	F	>	**F**	**A**
			Delay	<	0	>	**0**	<	0	>	**1**			14	**14**	<	116	>	**116**	**3**
			V/C	<	0.28	>		<	0.41	>				0.31		<	0.57	>		
			Q	<	0	>		<	0	>				15		<	16	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		**A**		A	>	**A**					F		>	**F**	**A**
			Delay	<	1		**0**		0	>	**0**					58		>	**58**	**2**
			V/C	<	0.35				0.54	>						0.45		>		
			Q	<	11				0	>						14		>		
	5 - Lawrence Rd & Site Access 2	TWSC	LOS		A		**A**		A	>	**A**									**A**
			Delay		0		**0**		0	>	**0**									**0**
			V/C		0.18				0.39	>										
			Q		0				0	>										
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		B	>	**B**	<	B		**B**	C		>	**C**					**B**
			Delay		11	>	**11**	<	12		**12**	34		>	**34**					**13**
			V/C		0.61	>		<	0.66			0.40		>						**0.59**
			Q		69	>		<	85			40		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	B	>	**B**	A	B	>	**B**	<	C	>	**C**	<	D	>	**D**	**B**
			Delay	8	13	>	**13**	9	11	>	**11**	<	27	>	**27**	<	41	>	**41**	**18**
			V/C	0.13	0.61	>		0.20	0.45	>		<	0.26	>		<	0.74	>		**0.65**
			Q	13	92	>		17	49	>		<	42	>		<	97	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	2	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	**A**	<	A	>	**A**			C	**C**	<	F	>	**F**	**A**
			Delay	<	1	>	**1**	<	4	>	**2**			17	**17**	<	795	>	**795**	**13**
			V/C	<	0.03	>		<	0.15	>				0.27		<	1.87	>		
			Q	<	0	>		<	49	>				15		<	12	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		**A**		A	>	**A**					F		>	**F**	**A**
			Delay	<	1.1		**0**		0	>	**0**					94		>	**94**	**1**
			V/C	<	0.04				0.51	>						0.47		>		
			Q	<	23				8	>						12		>		
	5 - Lawrence Rd & Site Access 2	TWSC	LOS	A	A		**A**		A	>	**A**									**A**
			Delay	0	0		**0**		0	>	**0**									**0**
			V/C	0.45	0.00				0.27	>										
			Q	0	0				0	>										

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LOS - Level of Service
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Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage

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

< - Shared Left-Turn Lane
> - Shared Right-Turn Lane

5.5 2030 Future Total Traffic Operations with Re-assigned Volumes

The operations of the study area intersections under 2030 future total traffic with re-assignment were evaluated using the same analytical approach as used for existing traffic operations with existing signal timing and phasing plans.

Table 5.2 summarizes the 2030 AM and PM peak hour future total traffic operations. The entries in the table indicate the AM and PM peak hour level of service (LOS), volume to capacity ratios (v/c), and 95th percentile queue length estimates. The analyses indicate all intersections are forecast to operate with overall acceptable levels of service and within capacity. The following critical movements are noted:

- King Street East and Barons Avenue South/Site Access 1:
  - Southbound shared left-turn/through/right-turn movement:
    - AM peak hour – LOS F with a v/c ratio of 0.61; and
    - PM peak hour – LOS F with an undefined v/c ratio
- King Street East and Cameron Avenue South: southbound shared left-turn/right-turn movement:
  - AM peak hour – LOS F with a v/c ratio of 0.59; and
  - PM peak hour – LOS F with a v/c ratio of 0.72.

Inclusion of the site generated traffic generally increases delay at the study area intersections by 2 seconds or less during the AM and PM peak hours. A more significant increase in delay (about 16 seconds) is forecast at King Street East and Barons Avenue South/Site Access 1 during the PM peak hour.

Appendix M contains the detailed Synchro 10 reports.

Overall, restricting the King Street East Site Access to right-turn out only will provide adequate levels of service on the driveway as well as the study area intersections. The southbound movements at Cameron Avenue South and Barons Avenue South are forecast to have poor levels of service both without and with development of the site. Therefore, it is recommended the City permit the development to proceed the site access turning restriction.

TABLE 5.2: 2027 FUTURE TOTAL TRAFFIC OPERATIONS WITH RE-ASSIGNMENT

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		A	>	**A**	<	B		**B**	C		>	**C**					**B**
			Delay		9	>	**9**	<	13		**13**	32		>	**32**					**12**
			V/C		0.44	>		<	0.68			0.26		>						**0.57**
			Q		56	>		<	77			43		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	B	>	**B**	A	B	>	**B**	<	C	>	**C**	<	C	>	**C**	**B**
			Delay	8	10	>	**10**	7	15	>	**14**	<	29	>	**29**	<	26	>	**26**	**16**
			V/C	0.08	0.40	>		0.06	0.67	>		<	0.37	>		<	0.21	>		**0.57**
			Q	13	75	>		14	95	>		<	18	>		<	22	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	2	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	**A**	<	A	>	**A**			B	**B**	<	F	>	**F**	**A**
			Delay	<	0	>	**0**	<	0	>	**1**			14	**14**	<	126	>	**126**	**3**
			V/C	<	0.30	>		<	0.44	>				0.20		<	0.61	>		
			Q	<	0	>		<	22	>				15		<	10	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		**A**		A	>	**A**					F		>	**F**	**A**
			Delay	<	1		**0**		0	>	**0**					84		>	**84**	**2**
			V/C	<	0.38				0.57	>						0.59		>		
			Q	<	19				8	>						17		>		
	5 - Lawrence Rd & Site Access 2	TWSC	LOS		A		**A**		A	>	**A**					C		>	**C**	**A**
			Delay		0		**0**		0	>	**0**					18		>	**18**	**4**
			V/C		0.01				0.36	>						0.50		>		
			Q		0				0	>						28		>		
PM Peak Hour	1 - King Main St E & Rosedale Ave	TCS	LOS		B	>	**B**	<	B		**B**	C		>	**C**					**B**
			Delay		12	>	**12**	<	14		**14**	35		>	**35**					**14**
			V/C		0.63	>		<	0.73			0.42		>						**0.64**
			Q		79	>		<	109			22		>						
			Ex		-	>		<	-					>						
			Avail.		-	>		<	-					>						
	2 - Rosedale Ave & Lawrence Rd	TCS	LOS	A	B	>	**B**	B	B	>	**B**	<	C	>	**C**	<	C	>	**C**	**B**
			Delay	8	15	>	**15**	11	11	>	**11**	<	27	>	**27**	<	34	>	**34**	**17**
			V/C	0.15	0.69	>		0.27	0.50	>		<	0.28	>		<	0.60	>		**0.66**
			Q	17	104	>		15	49	>		<	38	>		<	47	>		
			Ex	15	-	>		15	-	>		<	-	>		<	-	>		
			Avail.	-2	-	>			-	>		<	-	>		<	-	>		
	3 - King St E & Barons Ave S / Site Access 1	TWSC	LOS	<	A	>	**A**	<	A	>	**A**			C	**C**	<	F	>	**F**	**A**
			Delay	<	1.1	>	**1**	<	9	>	**5**			19	**19**	<	Err	>	**Err**	**135**
			V/C	<	0.04	>		<	0.27	>				0.23		<	3.55	>		
			Q	<	60	>		<	66	>				18		<	36	>		
	4 - King Street E & Cameron Ave S	TWSC	LOS	<	A		**A**		A	>	**A**					F		>	**F**	**A**
			Delay	<	1.2		**0**		0	>	**0**					181		>	**181**	**2**
			V/C	<	0.04				0.54	>						0.72		>		
			Q	<	88				0	>						22		>		
	5 - Lawrence Rd & Site Access 2	TWSC	LOS		A		**A**		A	>	**A**					C		>	**C**	**A**
			Delay		0		**2**		0	>	**0**					15		>	**15**	**2**
			V/C		0.06				0.28	>						0.30		>		
			Q		0				0	>						9		>		

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

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

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

< - Shared Left-Turn Lane
> - Shared Right-Turn Lane

5.6 Increased Density Impacts

As mentioned in Chapter 3, the total unit count may be increased closer to construction due to market conditions and demand. This increases is anticipated to occur in the high-rise buildings. If this occurs, the network could support a 10% to 15% increase in units without the need for remedial measures with the limited outbound maneuver at King Street. This is supported by the low to moderate v/c ratios on the movements that would be impacted by the site trips.

The resulting trip generation for the potential unit increase is outlined in **Table 5.3** and indicates the site's trip generation would increase by 43 to 64 trips during the AM peak hour and 50 to 75 trips during the PM peak hour. This translates into about 0.72 to 1.25 additional site trips per minute.

TABLE 5.3:INCREASED DENSITY TRIP GENERATION ESTIMATES

Land Use Code	Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
10% Increase									
LUC 222 - Multifamily Housing (High-Rise)	138	0.31	10	33	**43**	0.36	30	20	**50**
Trips per Minute					**0.72**				**0.83**
15% Increase									
LUC 222 - Multifamily Housing (High-Rise)	207	0.31	15	49	**64**	0.36	45	30	**75**
Trips per Minute					**1.07**				**1.25**

6 Onsite TDM Measures

The goal of Transportation Demand Management (TDM) is to reduce the Project's overall traffic and parking impact through the implementation of strategies that are aimed at affecting the transportation demand rather than the transportation supply (ex. improving bus service rather than increasing the number of lanes on a road). By their very nature, TDM strategies attempt to change people's behavior, and to be successful, they must rely on incentives or disincentives to encourage the use of alternative modes of travel.

Strategies can also influence when trips are made. For example, alternative work hours (compressed work weeks, flex time, and telecommuting) can affect what time of day trips are made, or if trips occur at all on certain days. On an area-wide basis, the provision of park and ride facilities and transit services can also provide a competitive alternative to drive-alone commuting.

There are several reasons why incorporating TDM into a site is important:

- Reduces auto ownership levels; therefore, reducing private vehicle trips and congestion;
- Creates safe and attractive environments that encourage travel by walking, cycling and transit over auto; and
- Supports the development of healthy communities.

The following sections outline the TDM initiatives that are planned for the subject site to potentially reduce the residence reliance on auto travel. This report was prepared using Section 3.A Residential of the City's TDM guidelines[8].

6.1 Cycling

Bicycle parking is an important aspect to encourage the use of the surrounding cycling infrastructure. The City's TDM guidelines specify the recommended number of bicycle parking spaces for residential developments:

- Long-term spaces: 0.5 to 1.25 per dwelling unit (730 to 1,826 spaces based on the current site plan); and

[8] TDM for Development, Prepared for City of Hamilton by IBI Group, June 2015

- Short-term spaces: 0.05 to 0.2 per dwelling unit (73 to 292 spaces based on the current site plan).

The site will provide a minimum of 730 long-term bike parking spaces in the form of secure storage lockers located within the parking structure. A minimum of 73 short-term bicycle parking spaces will be provided via multi-unit bike racks located at-grade near the building entrances. Note that the ultimate number of spaces will be adjusted based on the final unit count and will meet the By-law recommended supply.

6.2 Walking

The site will provide direct connections to the municipal sidewalks surrounding the site. Where direct connections are not possible (rear or side of the building, etc.), onsite sidewalks will be provided to connect to King Street East and Lawrence Road. Other planned measures to help improve safety and the attractiveness of the pedestrian realm include:

- Provision of adequate exterior lighting and overhead weather protection (in the form over overhangs or awnings) near the building's entrances;
- A landscaping plan that will create an attractive, high-quality public realm that encourages travel by alternative modes; and
- Provision of benches near the building that will be sheltered by awnings or the building's overhang, where possible.

6.3 Transit Passes

As outlined in Section 2, the site is located on one HSR transit route. To support transit usage by residents, the applicant will provide a kiosk or display board within the buildings' lobbies where transit information such as a route map and individual schedules will be available. As well, an introductory Presto card loaded with a small amount ($10) to cover the cost of a few "starter" trips will be provided with each unit purchase.

6.4 Parking

Under the City of Hamilton Zoning By-law 6593, the site is required to provide parking at the following ratios:

Multi-Residential Dwellings:

- 1.25 total spaces per unit:

- 1.0 resident space per dwelling unit; and
- 0.25 visitor spaces per dwelling unit

Maisonettes:

- 1.50 total spaces per unit:
  - 1.20 residential spaces per dwelling unit; and
  - 0.30 visitor spaces per dwelling unit

Under the By-law, the site is required to provide a total of 2,216 spaces. The applicant is proposing to provide a total of 1,688 parking spaces, or 1.2 spaces per unit (1 resident space and 0.2 visitor spaces) for all land uses. The proposed supply of 1,688 spaces will be deficient by 528 spaces.

Although the proposed parking supply is lower than what is required under the By-law, the lower parking provision is supported by the site's:

- proximity to two major transit routes;
- proximity to amenities;
- location adjacent to two minor arterial roadways with sidewalks;
- offered parking management measures; and
- proposed TDM measures.

At present, the applicant does not intend to unbundle parking spaces from the units and only one net space per unit will be offered. As construction nears, the applicant may consider unbundling parking from the smaller units to increase affordability and permit two parking spaces to be offered to larger units up to the maximum residential parking provision while retaining the By-law required visitor parking supply.

6.5 Carshare

The applicant intends to provide at least one onsite carsharing space or vehicle in a location easily accessible to the development and the surrounding neighbourhood.

6.6 Wayfinding and Travel Planning

The applicant will be providing the following wayfinding and travel planning measures:

- Lobby signage directing residents to alternative and active transportation facilities such as transit;
- A lobby kiosk or display board will be provided where alternative and active transportation information will be readily available. This will include items such as cycling and transit route maps, transit schedules and carshare information; and
- Providing a “Welcome Package” to new residents containing information on the surrounding alternative and active transportation options as well as an introductory Presto card loaded with a small amount ($10) which is enough to cover the cost of a few “starter” trips.

6.7 Education/Promotion and Incentives

In addition to provision of a pre-loaded Presto pass, the applicant will highlight the TDM elements in the sales and marketing materials, specifically the proximity to transit and cycling facilities to encourage residents and visitors to use sustainable transportation modes.

7 Access and Circulation Review

An access and circulation review was conducted on the site plan to assess the ability of the following design vehicles to enter, navigate and exit the site:

- Medium single unit truck (TAC[9] MSU); and
- Heavy single unit truck / garbage truck (TAC[10]HSU); and
- Pumper fire truck (NCHRP Report 659)

The assessment was produced with AutoTURN swept path analysis software. As designed, all movements will be contained onsite and the MSU, HSU and pumper fire truck can enter, navigate and exit the site and loading bay without any conflicts.

Appendix M contains the detailed AutoTURN swept path analyses.

[9] Transportation Association of Canada. *Geometric Design Guide for Canadian Roads.* 2017.
[10] Transportation Association of Canada. *Geometric Design Guide for Canadian Roads.* 2017.

8 Conclusions and Recommendations

8.1 Conclusions

Based on the investigations carried out, it is concluded that:

- **Existing Traffic Operations:** The study area intersections are operating with overall acceptable levels of service and within capacity.

  The side street approaches on Cameron Avenue South are operating at LOS E during the peak hours with low v/c ratios. The southbound approach on Barons Avenue South is operating at LOS with a moderate v/c ratio during the PM peak hour.

- **Site Generated Traffic:** The site is forecast to generate at total of 449 AM peak hour trips and 533 PM peak hour trips including:

  - Phase 1: 213 AM peak hour trips and 257 PM peak hour trips; and
  - Phase 2: 236 AM peak hour trips and 276 PM peak hour trips

- **2027 Background Traffic Operations:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The side street approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS D or worse during the peak hours, with low to moderate v/c ratios during the peak hours.

- **2027 Future Total Traffic Operations:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The side street approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS F during the peak hours, with v/c ratios of 0.50 to 1.83 during the peak hours.

  Inclusion of the site generated traffic increases delay at the study area intersections by 6 seconds or less during the AM peak hour and by 20 seconds or less during the PM peak hour. The largest increases in delay occur at King Street East and Barons Avenue South/Site Access 1 where all site traffic is assigned to the south approach.

2030 Background Traffic Operations: The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

The side street approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS D or LOS F with v/c ratios of 0.31 to 2.29 during the peak hours.

- **2030 Future Total Traffic Operations:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The side street approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS D or LOS F with v/c ratios of 0.66 to 4.75 and greater during the peak hours.

  Inclusion of the site generated traffic generally increases delay at the study area intersections by 2 seconds or less during the AM and PM peak hours. Significant increases in delay (>700 seconds) are forecast at King Street East and Barons Avenue South/Site Access 1 where all site traffic is assigned to the south approach.

- **Remedial Measures:** No offsite remedial measures are required to support redevelopment of the site.

- **Site Driveway Operations:** Limiting the site driveway to right-turn out only was the preferred alternative selected for further assessment to improve operations of the King Street East Site Access.

- **2027 Future Total Traffic Operations – with Trip Re-assignment:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The southbound approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS F with v/c ratios of 0.45 to 1.87 during the peak hours.

- **2030 Future Total Traffic Operations – with Trip Re-assignment:** The study area intersections are forecast to continue operating at overall acceptable levels of service and within capacity.

  The southbound approaches on Cameron Avenue South and Barons Avenue South are forecast to operate at LOS F with v/c ratios of 0.59 to an undefined value (PM peak hour at Barons Avenue South).

Overall, restricting the King Street East Site Access to right-turn out only will provide adequate levels of service on the driveway as well as the study area intersections.

- **Transportation Demand Management Measures:** The applicant has developed a comprehensive transportation demand management (TDM) plan for the stie that will help increase travel by sustainable modes and decrease the need for residents to own a vehicles, thereby reducing the demand for onsite parking. Proposed TDM measures include:
  - Adequate onsite bike parking;
  - Exterior lighting and overhead weather protection;
  - Enhanced on site pedestrian amenities including benches, landscaping and lighting;
  - Transit incentives;
  - Carshare vehicle/parking; and
  - Onsite wayfinding and travel planning, including a Welcome Package.

8.2 Recommendations

Based on the findings of this study, it is recommended that:

- The City of Hamilton recognize the conclusions drawn above;
- The site be permitted to develop with the site access turning restriction; and
- The applicant implements the proposed TDM program.

Appendix A

Pre-Study Consultation Materials

From: Transportation Planning
To: Jill Juhlke
Subject: RE: FC-20-129 - 1842 King Street East (Ward 4) - Pre-Study Consultation (200384)
Date: February 18, 2021 11:39:38 AM
Attachments: image001.png

Hi Jill,

Transportation Planning approves of the scope of work provided with minor comments indicated in red below. Thank you for your submission,

Thank you,
Matthew Radaelli
Project Manager, Transportation Planning – Development Approvals
On Behalf of Transportation Planning
COVID-19 UPDATE: Flexibility and patience is asked of ourselves, clients, contractors and customers working with the City of Hamilton. Most staff are working remotely with limited access to voicemail, so please send emails. All in-person meetings that are required will be become conference calls or another form of virtual meetings. The City is making adjustments to ensure staff are connected to office tools and project files while we protect ourselves and our communities during this time. Please note that while we are trying to maintain time frames for comments on applications and dealing with responding information, we may not always achieve these goals.

From: Jill Juhlke <jjuhlke@ptsl.com>
Sent: February 9, 2021 8:11 AM
To: Transportation Planning <Transportation.Planning@hamilton.ca>
Subject: FC-20-129 - 1842 King Street East (Ward 4) - Pre-Study Consultation (200384)

Hello,

We have been retained to conduct a Transportation Impact Assessment and Transportation Demand Management (TDM) measures summary for the above noted redevelopment proposal. The site is located on the south side of King Street East west of Rosedale Avenue.

The owner is proposing to remove the existing building and construct a multi-building residential development (note that the type and number of units is yet to be finalized). Vehicular access is proposed via one all-turns driveway connection to King Street East opposite Barons Avenue South and one all-turns driveway connection to Lawrence Road near the westerly property limits. Buildout is expected to occur in 2025.

It is anticipated the total number of parking spaces will meet the By-law requirements. If there is a shortfall, we anticipate being able to resolve this shortfall without the need for a parking study.

The Transportation Impact Study will follow the City of Hamilton Traffic Impact Study Guidelines (2009). The following items supplement these guidelines:

1. The following study are intersections:
    - King Street East and Rosedale Avenue

- King Street East and Barons Avenue South
- King Street East and Cameron Avenue South
- Lawrence Road and Rosedale Avenue South
- The site connections to King Street East and Lawrence Road

The Transportation Planning Comments dated 19 January 2021 included the intersection of Lawrence Road and Cloverdale Avenue as part of the study area. However, since the site driveway connection was removed from this location, please confirm the need to analyze this intersection. Notwithstanding previous comments, the intersection of Lawrence Road & Cloverdale Avenue does not need to be included in the analysis if the proposed site driveway connection will be removed from this location.

2. We will utilize the City's 2019 count data for the intersections of King with Cameron and Rosedale. New traffic counts are being undertaken for the intersections of King & Lawrence and King & Barons. If needed, the 2019 data will be used to factor the 2021 count data to "typical" conditions.
3. Traffic forecasts will be completed from five (5) years from the data of the redevelopment completion (2030 horizon) and two analysis periods (AM and PM peak hours).
4. A review of TTS data for the area to determine the percentage of trips made by alternative modes of travel. This will be noted in the report but mode share reductions will not be applied to the trip generation.
5. Trip generation will be based on ITE 10th Edition rates using the appropriate land use codes (LUC). Tentatively those will include LUC 221 Multifamily Housing (Mid-Rise) and LUC 222 Multifamily Housing (High-Rise).
6. Trip distribution will be based on the existing travel patterns within the study area. The trips will be assigned based on the most logical routes to/from the site. Any assumptions regarding the distribution of trips to the site accesses will be outlined within the report.
7. General background growth will be accounted for at a 2% per annum, compounded over the study years.
8. Traffic growth from nearby developments will be accounted for. Based on a review of the City's Development Applications Mapping, we propose including the following developments, subject to confirmation from City staff:
    - DA-17-028: 235 Main Street West – 94 m^2 Tim Hortons. DA-17-028 is associated with address 652 Lawrence Road. Transportation does not require this background development to be included within background traffic assumptions as the application has not moved forward and the site is being envisioned for a different use at the moment. It is assumed that background traffic growth will accommodate growth as a result of nearby developments.
9. All traffic analyses will be undertaken using Synchro 9 with HCM 2000 procedures and SimTraffic. The existing signal timings will be retained for future analyses. Where timing

modifications are required, the analysis results will be presented separately.

10. All analyses results, assumptions and supporting documentation will be included within the report appendices

The TDM measures overview will outline:

- The number of short-term and long-term bicycle parking spaces proposed for the site, including the location (which will also be shown on the site plan)
- Confirmation of Sobi Bike Share or Presto passes for residents
- If parking will be unbundled from the units
- The total number of parking spaces proposed for the site
- If carshare spaces will be provided, including number and location

Transportation Planning notes that TDM measures recommended within the TIS shall be indicated and included on the future site plan accordingly.

We kindly request your review and comment on the proposed work plan. Feel free to contact me if you have any questions or require additional information.

Thank you,

Jill Juhlke, C.E.T.
Senior Project Manager

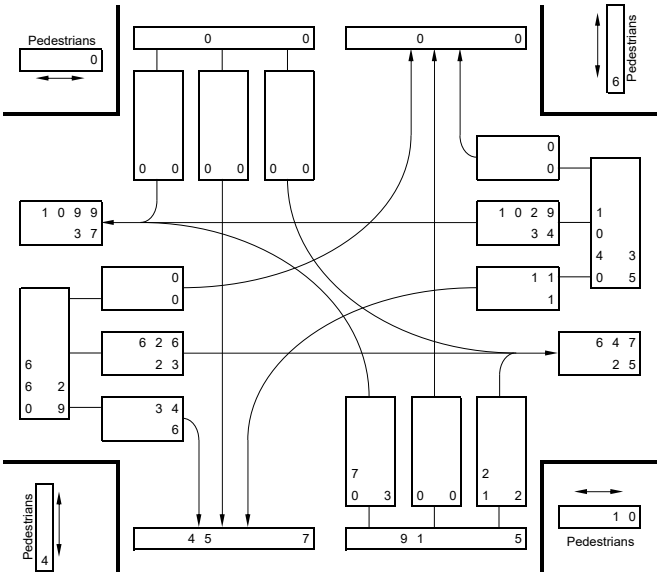
Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge ON N1R 8J8
p: 905.381.2229 x301
e: jjuhlke@ptsl.com
w: www.ptsl.com

Appendix B

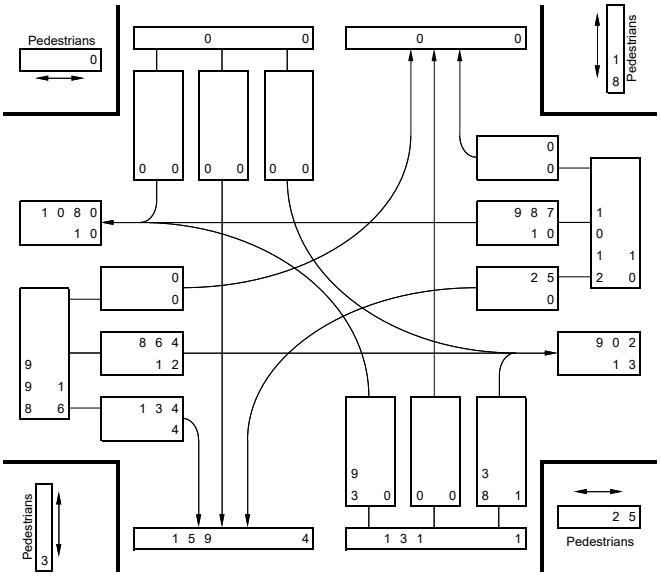
Detailed Traffic Count Data

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 4342

Intersection: **King St E** **at** **Rosedale Ave** Total Vehicles: 11,478 Date: Thursday
Direction: (East/West) (North/South) M.V.E./Year: 7.844 Nov 21, 2019
Road Condition: Dry Weather: Overcast AWDT Factor: 2.01 Period: 7 hours
Comments:

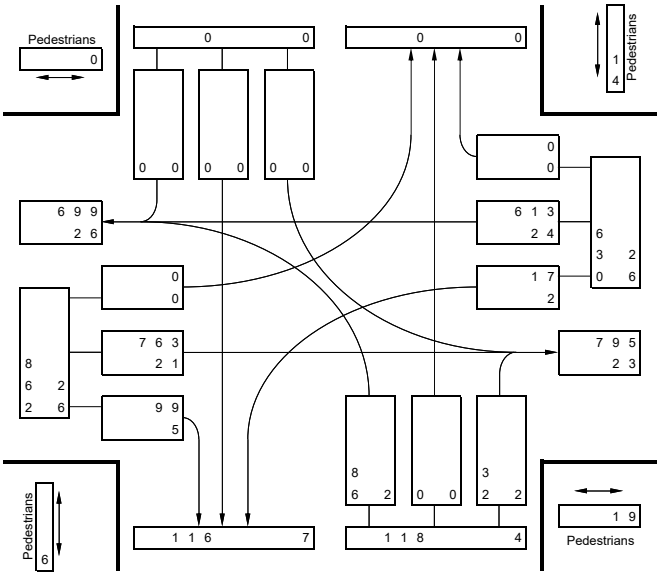


A.M. PEAK HOUR = 8:00 AM - 9:00 AM

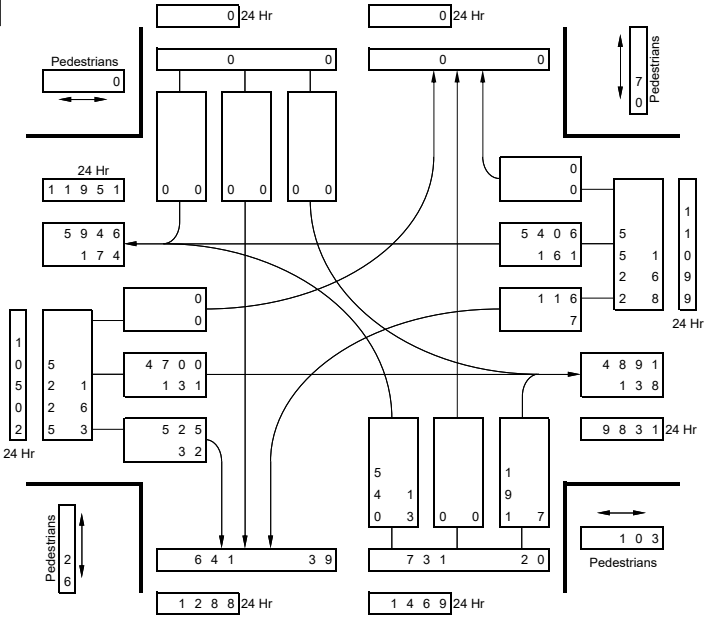


P.M. PEAK HOUR = 4:30 PM - 5:30 PM

N



NORMAL HOUR = 2:30 PM - 3:30 PM



7 Hr & 24 Hr TOTAL VOLUMES

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 4342

Intersection: **King St E** **at** **Rosedale Ave** Total Vehicles: 11,478 Date: Thursday
Direction: (East/West) (North/South) M.V.E./Year: 7.844 Nov 21, 2019
Road Condition: Dry Weather: Overcast AWDT Factor: 2.01 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	9	0	4	0	114	4	0	0	0	1	120	0	252	0	1	1	2
7:30	8	0	3	0	154	3	0	0	0	2	174	0	344	0	1	1	0
7:45	13	0	2	0	194	6	0	0	0	4	233	0	452	0	1	4	0
8:00	12	0	2	0	177	5	0	0	0	3	236	0	435	0	0	2	2
8:15 *	17	0	4	0	164	10	0	0	0	1	292	0	488	0	0	3	0
8:30 *	16	0	3	0	152	7	0	0	0	0	186	0	364	0	2	2	0
8:45 *	16	0	8	0	159	6	0	0	0	6	290	0	485	0	1	0	3
9:00 *	21	0	6	0	151	11	0	0	0	4	261	0	454	0	3	5	1
9:15	13	0	8	0	143	16	0	0	0	3	176	0	359	0	3	3	0
9:30	20	0	3	0	118	8	0	0	0	2	159	0	310	0	0	4	0
9:45	7	0	5	0	112	16	0	0	0	2	143	0	285	0	0	0	1
10:00	24	0	4	0	111	15	0	0	0	2	129	0	285	0	1	5	1
13:45	21	0	6	0	130	21	0	0	0	3	137	0	318	0	2	3	0
14:00	18	0	8	0	126	13	0	0	0	3	164	0	332	0	1	1	1
14:15	20	0	7	0	155	20	0	0	0	3	141	0	346	0	1	1	1
14:30	21	0	13	0	162	10	0	0	0	6	146	0	358	0	2	5	0
14:45 *	20	0	12	0	190	20	0	0	0	3	137	0	382	0	2	1	0
15:00 *	26	0	6	0	186	20	0	0	0	2	148	0	388	0	2	6	0
15:15 *	23	0	7	0	191	26	0	0	0	9	151	0	407	0	3	3	1
15:30 *	17	0	7	0	196	33	0	0	0	3	177	0	433	0	7	9	5
16:15	30	0	14	0	183	30	0	0	0	3	195	0	455	0	6	4	0
16:30	29	0	6	0	221	35	0	0	0	10	205	0	506	0	9	7	0
16:45 *	16	0	6	0	189	38	0	0	0	6	222	0	477	0	2	7	0
17:00 *	30	0	11	0	239	34	0	0	0	5	250	0	569	0	5	10	1
17:15 *	24	0	13	0	224	31	0	0	0	8	253	0	553	0	6	6	1
17:30 *	23	0	8	0	212	31	0	0	0	6	262	0	542	0	5	2	1
17:45	25	0	5	0	184	28	0	0	0	7	206	0	455	0	2	6	4
18:00	21	0	10	0	163	28	0	0	0	9	213	0	444	0	2	2	1
TOTAL	540	0	191	0	4,700	525	0	0	0	116	5,406	0		0	70	103	26
APPR.		731			5,225			0			5,522		11,478			199	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	1	1	0	0	0	0	1	0	3
7:30	1	0	0	0	6	1	0	0	0	0	8	0	16
7:45	0	0	0	0	7	1	0	0	0	0	10	0	18
8:00	0	0	0	0	5	2	0	0	0	1	5	0	13
8:15 *	1	0	0	0	4	1	0	0	0	1	12	0	19
8:30 *	2	0	0	0	9	2	0	0	0	0	8	0	21
8:45 *	0	0	0	0	5	2	0	0	0	0	6	0	13
9:00 *	0	0	2	0	5	1	0	0	0	0	8	0	16
9:15	0	0	0	0	7	1	0	0	0	1	9	0	18
9:30	0	0	0	0	9	1	0	0	0	0	10	0	20
9:45	0	0	0	0	3	2	0	0	0	0	5	0	10
10:00	1	0	0	0	4	1	0	0	0	0	6	0	12
13:45	1	0	1	0	8	1	0	0	0	1	6	0	18
14:00	2	0	0	0	5	0	0	0	0	0	4	0	11
14:15	2	0	0	0	3	0	0	0	0	1	6	0	12
14:30	0	0	0	0	7	1	0	0	0	0	5	0	13
14:45 *	0	0	1	0	1	1	0	0	0	1	8	0	12
15:00 *	1	0	0	0	8	1	0	0	0	0	3	0	13
15:15 *	0	0	1	0	5	1	0	0	0	1	4	0	12
15:30 *	1	0	0	0	7	2	0	0	0	0	9	0	19
16:15	0	0	0	0	3	1	0	0	0	0	8	0	12
16:30	0	0	0	0	3	2	0	0	0	0	5	0	10
16:45 *	0	0	0	0	1	0	0	0	0	0	3	0	4
17:00 *	0	0	0	0	6	1	0	0	0	0	4	0	11
17:15 *	0	0	0	0	2	1	0	0	0	0	2	0	5
17:30 *	0	0	1	0	3	2	0	0	0	0	1	0	7
17:45	1	0	0	0	2	2	0	0	0	0	4	0	9
18:00	0	0	1	0	2	0	0	0	0	0	1	0	4
TOTAL	13	0	7	0	131	32	0	0	0	7	161	0	
APPR.		20			163			0			168		351

TRUCKS

7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	1	0	0	0	3	0	0	0	0	0	2	0	6
7:45	0	0	0	0	6	0	0	0	0	0	6	0	12
8:00	0	0	0	0	2	1	0	0	0	0	3	0	6
8:15 *	1	0	0	0	0	0	0	0	0	0	4	0	5
8:30 *	0	0	0	0	7	0	0	0	0	0	4	0	11
8:45 *	0	0	0	0	3	0	0	0	0	0	3	0	6
9:00 *	0	0	1	0	1	0	0	0	0	0	3	0	5
9:15	0	0	0	0	3	0	0	0	0	1	7	0	11
9:30	0	0	0	0	2	0	0	0	0	0	5	0	7
9:45	0	0	0	0	0	1	0	0	0	0	3	0	4
10:00	1	0	0	0	2	0	0	0	0	0	3	0	6
13:45	1	0	1	0	6	0	0	0	0	0	4	0	12
14:00	2	0	0	0	3	0	0	0	0	0	1	0	6
14:15	0	0	0	0	2	0	0	0	0	0	4	0	6
14:30	0	0	0	0	3	0	0	0	0	0	3	0	6
14:45 *	0	0	1	0	0	0	0	0	0	0	5	0	6
15:00 *	0	0	0	0	4	0	0	0	0	0	1	0	5
15:15 *	0	0	1	0	3	1	0	0	0	1	1	0	7
15:30 *	0	0	0	0	1	0	0	0	0	0	2	0	3
16:15	0	0	0	0	1	0	0	0	0	0	5	0	6
16:30	0	0	0	0	2	0	0	0	0	0	2	0	4
16:45 *	0	0	0	0	0	0	0	0	0	0	1	0	1
17:00 *	0	0	0	0	5	0	0	0	0	0	2	0	7
17:15 *	0	0	0	0	1	0	0	0	0	0	0	0	1
17:30 *	0	0	1	0	1	0	0	0	0	0	0	0	2
17:45	1	0	0	0	1	1	0	0	0	0	1	0	4
18:00	0	0	1	0	1	0	0	0	0	0	0	0	2
TOTAL	7	0	6	0	63	4	0	0	0	2	75	0	
APPR.		13			67			0			77		157

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Rosedale Avenue
Site Code: 200384
Start Date: 02/10/2021

Turning Movement Data

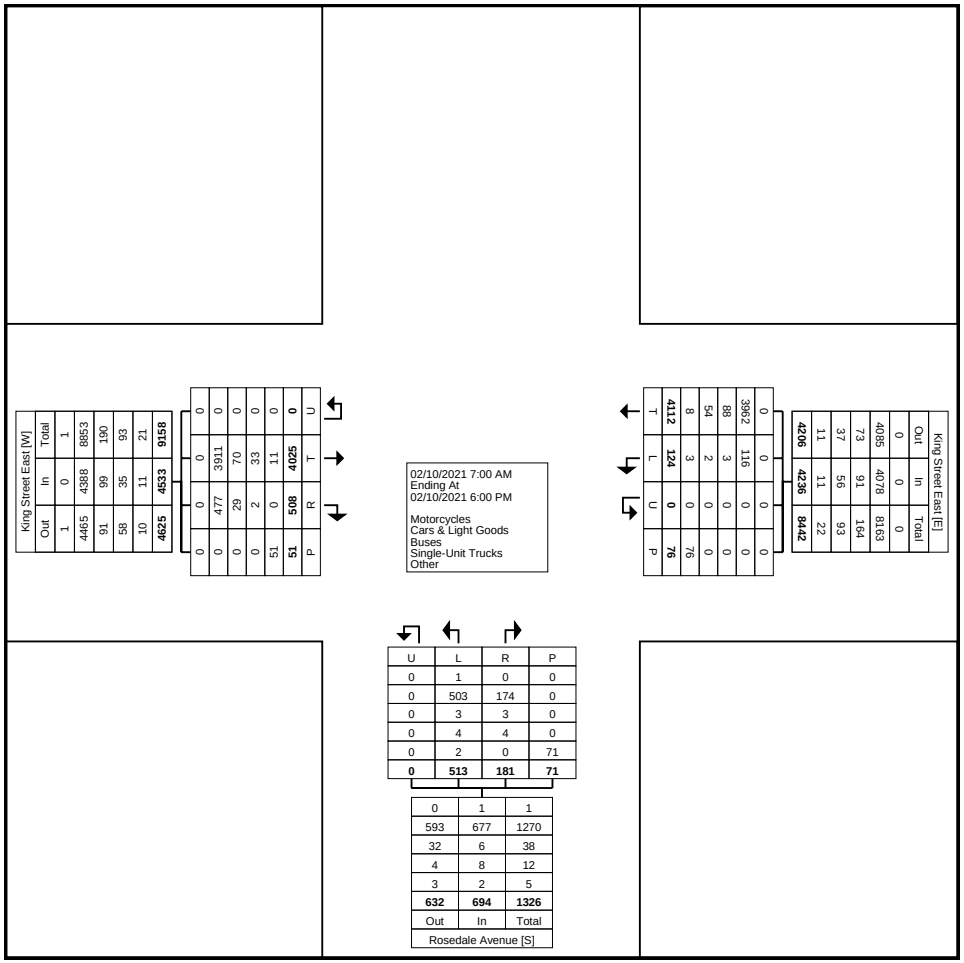
Start Time	King Street East Eastbound					King Street East Westbound					Rosedale Avenue Northbound					
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	112	7	0	2	119	3	98	0	0	101	7	2	0	1	9	229
7:15 AM	132	4	0	1	136	1	104	0	0	105	6	0	0	2	6	247
7:30 AM	138	3	0	1	141	0	133	0	0	133	8	0	0	1	8	282
7:45 AM	141	3	0	0	144	1	127	0	1	128	9	2	0	0	11	283
Hourly Total	523	17	0	4	540	5	462	0	1	467	30	4	0	4	34	1041
8:00 AM	124	6	0	1	130	1	170	0	1	171	13	5	0	0	18	319
8:15 AM	128	8	0	0	136	0	125	0	1	125	9	3	0	2	12	273
8:30 AM	110	8	0	0	118	2	165	0	1	167	5	6	0	1	11	296
8:45 AM	112	12	0	0	124	3	151	0	0	154	24	5	0	2	29	307
Hourly Total	474	34	0	1	508	6	611	0	3	617	51	19	0	5	70	1195
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	93	14	0	0	107	5	102	0	2	107	13	4	0	3	17	231
11:15 AM	91	14	0	3	105	3	107	0	5	110	12	2	0	2	14	229
11:30 AM	81	13	0	3	94	1	98	0	1	99	15	8	0	2	23	216
11:45 AM	114	15	0	0	129	5	88	0	3	93	16	8	0	0	24	246
Hourly Total	379	56	0	6	435	14	395	0	11	409	56	22	0	7	78	922
12:00 PM	113	18	0	0	131	1	121	0	2	122	12	11	0	3	23	276
12:15 PM	100	17	0	2	117	2	82	0	3	84	13	8	0	3	21	222
12:30 PM	110	17	0	0	127	5	104	0	5	109	20	3	0	3	23	259
12:45 PM	113	15	0	2	128	5	80	0	3	85	16	6	0	2	22	235
Hourly Total	436	67	0	4	503	13	387	0	13	400	61	28	0	11	89	992
1:00 PM	94	10	0	2	104	5	88	0	7	93	21	4	0	1	25	222
1:15 PM	94	13	0	0	107	3	117	0	1	120	13	11	0	5	24	251
1:30 PM	80	13	0	0	93	2	102	0	5	104	17	3	0	1	20	217
1:45 PM	117	18	0	4	135	3	119	0	2	122	20	4	0	1	24	281
Hourly Total	385	54	0	6	439	13	426	0	15	439	71	22	0	8	93	971
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	165	23	0	0	188	9	142	0	4	151	16	5	0	2	21	360
3:15 PM	160	14	0	2	174	7	154	0	8	161	28	8	0	1	36	371
3:30 PM	167	25	0	2	192	3	145	0	1	148	25	11	0	1	36	376
3:45 PM	154	17	0	3	171	7	175	0	0	182	14	6	0	3	20	373
Hourly Total	646	79	0	7	725	26	616	0	13	642	83	30	0	7	113	1480
4:00 PM	161	32	0	0	193	4	160	0	0	164	20	3	0	1	23	380
4:15 PM	188	28	0	2	216	2	162	0	2	164	20	7	0	1	27	407
4:30 PM	138	25	0	5	163	4	178	0	7	182	28	9	0	3	37	382
4:45 PM	162	24	0	3	186	4	154	0	0	158	20	6	0	4	26	370

Hourly Total	649	109	0	10	758	14	654	0	9	668	88	25	0	9	113	1539
5:00 PM	137	19	0	6	156	6	155	0	3	161	23	5	0	11	28	345
5:15 PM	162	29	0	4	191	12	141	0	1	153	17	12	0	3	29	373
5:30 PM	135	21	0	2	156	7	146	0	4	153	19	7	0	5	26	335
5:45 PM	99	23	0	1	122	8	119	0	3	127	14	7	0	1	21	270
Hourly Total	533	92	0	13	625	33	561	0	11	594	73	31	0	20	104	1323
Grand Total	4025	508	0	51	4533	124	4112	0	76	4236	513	181	0	71	694	9463
Approach %	88.8	11.2	0.0	-	-	2.9	97.1	0.0	-	-	73.9	26.1	0.0	-	-	-
Total %	42.5	5.4	0.0	-	47.9	1.3	43.5	0.0	-	44.8	5.4	1.9	0.0	-	7.3	-
Motorcycles	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.1	0.0
Cars & Light Goods	3911	477	0	-	4388	116	3962	0	-	4078	503	174	0	-	677	9143
% Cars & Light Goods	97.2	93.9	-	-	96.8	93.5	96.4	-	-	96.3	98.1	96.1	-	-	97.6	96.6
Buses	70	29	0	-	99	3	88	0	-	91	3	3	0	-	6	196
% Buses	1.7	5.7	-	-	2.2	2.4	2.1	-	-	2.1	0.6	1.7	-	-	0.9	2.1
Single-Unit Trucks	33	2	0	-	35	2	54	0	-	56	4	4	0	-	8	99
% Single-Unit Trucks	0.8	0.4	-	-	0.8	1.6	1.3	-	-	1.3	0.8	2.2	-	-	1.2	1.0
Articulated Trucks	9	0	0	-	9	2	6	0	-	8	1	0	0	-	1	18
% Articulated Trucks	0.2	0.0	-	-	0.2	1.6	0.1	-	-	0.2	0.2	0.0	-	-	0.1	0.2
Bicycles on Road	2	0	0	-	2	1	2	0	-	3	1	0	0	-	1	6
% Bicycles on Road	0.0	0.0	-	-	0.0	0.8	0.0	-	-	0.1	0.2	0.0	-	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	2	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	2.6	-	-	-	-	1.4	-	-
Pedestrians	-	-	-	51	-	-	-	-	74	-	-	-	-	70	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	97.4	-	-	-	-	98.6	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Rosedale Avenue
Site Code: 200384
Start Date: 02/10/2021



King Street East [W]	U	T	R	P
Total	1	8853	190	93	21	**9158**
In	0	4388	99	35	11	**4533**
Out	1	4465	91	58	10	**4625**
	0	0	477	29	2	0	**508**	**51**
	0	3911	70	33	11	**4025**	116	0
	0	0	0	0	0	**0**	3962	0

	T	L	U	P
	4112	**124**	**0**	**76**
	8	3	0	76
	54	2	0	0
	88	3	0	0
	116	0	0	0
	3962	0	0	0

	Out	In	Total	King Street East [E]
	0	0	0	0
	4085	4078	8163	164
	73	91	91	164
	37	56	93	22
	11	11	22	**8442**
	4206	**4236**	**8442**	

U	L	R	P
0	1	0	0
0	503	174	0
0	3	3	0
0	4	4	0
0	2	0	71
0	**513**	**181**	**71**

0	1	1
593	677	1270
32	6	38
4	8	12
3	2	5
632	**694**	**1326**
Out	In	Total
Rosedale Avenue [S]		

Turning Movement Data Plot

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Rosedale Avenue
Site Code: 200384
Start Date: 02/10/2021

Turning Movement Peak Hour Data (8:00 AM)

Start Time	King Street East Eastbound					King Street East Westbound					Rosedale Avenue Northbound					
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	124	6	0	1	130	1	170	0	1	171	13	5	0	0	18	319
8:15 AM	128	8	0	0	136	0	125	0	1	125	9	3	0	2	12	273
8:30 AM	110	8	0	0	118	2	165	0	1	167	5	6	0	1	11	296
8:45 AM	112	12	0	0	124	3	151	0	0	154	24	5	0	2	29	307
Total	474	34	0	1	508	6	611	0	3	617	51	19	0	5	70	1195
Approach %	93.3	6.7	0.0	-	-	1.0	99.0	0.0	-	-	72.9	27.1	0.0	-	-	-
Total %	39.7	2.8	0.0	-	42.5	0.5	51.1	0.0	-	51.6	4.3	1.6	0.0	-	5.9	-
PHF	0.926	0.708	0.000	-	0.934	0.500	0.899	0.000	-	0.902	0.531	0.792	0.000	-	0.603	0.937
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	455	29	0	-	484	5	574	0	-	579	51	18	0	-	69	1132
% Cars & Light Goods	96.0	85.3	-	-	95.3	83.3	93.9	-	-	93.8	100.0	94.7	-	-	98.6	94.7
Buses	14	5	0	-	19	1	20	0	-	21	0	1	0	-	1	41
% Buses	3.0	14.7	-	-	3.7	16.7	3.3	-	-	3.4	0.0	5.3	-	-	1.4	3.4
Single-Unit Trucks	4	0	0	-	4	0	12	0	-	12	0	0	0	-	0	16
% Single-Unit Trucks	0.8	0.0	-	-	0.8	0.0	2.0	-	-	1.9	0.0	0.0	-	-	0.0	1.3
Articulated Trucks	0	0	0	-	0	0	3	0	-	3	0	0	0	-	0	3
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.5	-	-	0.5	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	1	0	0	-	1	0	2	0	-	2	0	0	0	-	0	3
% Bicycles on Road	0.2	0.0	-	-	0.2	0.0	0.3	-	-	0.3	0.0	0.0	-	-	0.0	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	3	-	-	-	-	5	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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5A-150 Pinebush Rd

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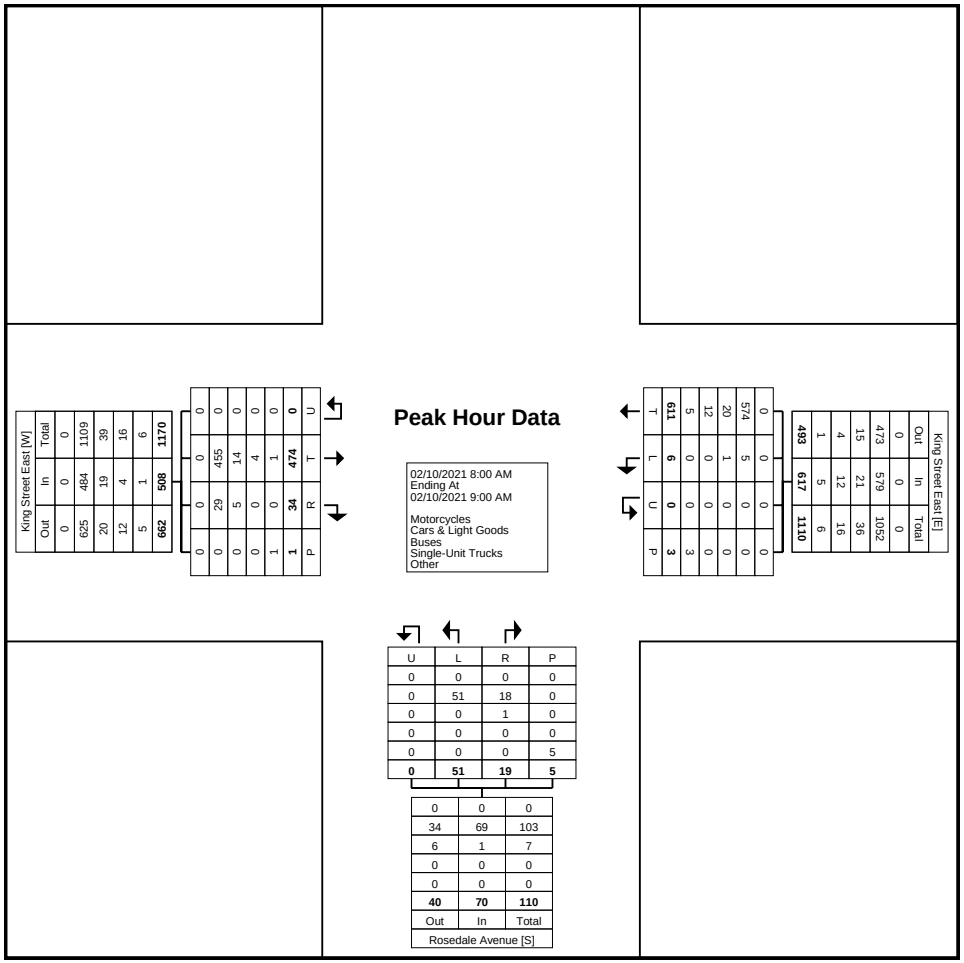
Count Name: King Street East & Rosedale Avenue
Site Code: 200384
Start Date: 02/10/2021



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

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Rosedale Avenue
Site Code: 200384
Start Date: 02/10/2021

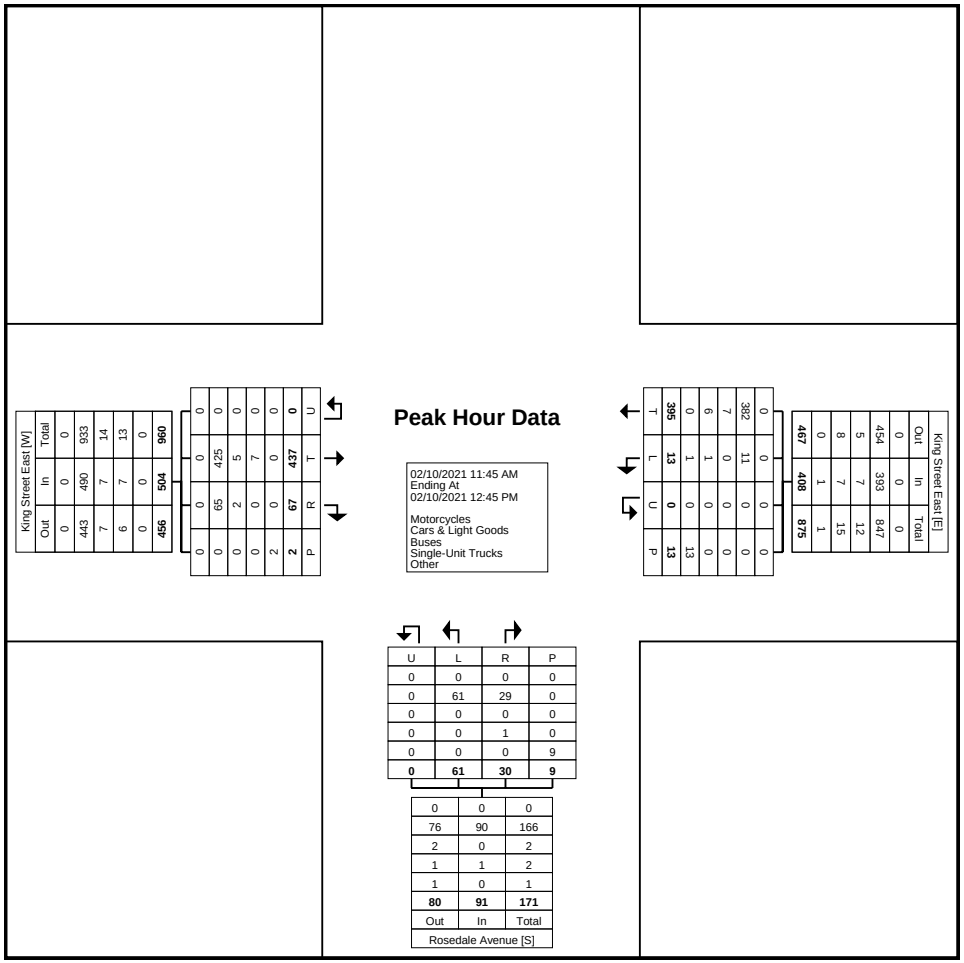
Turning Movement Peak Hour Data (11:45 AM)

Start Time	King Street East Eastbound					King Street East Westbound					Rosedale Avenue Northbound					
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
11:45 AM	114	15	0	0	129	5	88	0	3	93	16	8	0	0	24	246
12:00 PM	113	18	0	0	131	1	121	0	2	122	12	11	0	3	23	276
12:15 PM	100	17	0	2	117	2	82	0	3	84	13	8	0	3	21	222
12:30 PM	110	17	0	0	127	5	104	0	5	109	20	3	0	3	23	259
Total	437	67	0	2	504	13	395	0	13	408	61	30	0	9	91	1003
Approach %	86.7	13.3	0.0	-	-	3.2	96.8	0.0	-	-	67.0	33.0	0.0	-	-	-
Total %	43.6	6.7	0.0	-	50.2	1.3	39.4	0.0	-	40.7	6.1	3.0	0.0	-	9.1	-
PHF	0.958	0.931	0.000	-	0.962	0.650	0.816	0.000	-	0.836	0.763	0.682	0.000	-	0.948	0.909
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	425	65	0	-	490	11	382	0	-	393	61	29	0	-	90	973
% Cars & Light Goods	97.3	97.0	-	-	97.2	84.6	96.7	-	-	96.3	100.0	96.7	-	-	98.9	97.0
Buses	5	2	0	-	7	0	7	0	-	7	0	0	0	-	0	14
% Buses	1.1	3.0	-	-	1.4	0.0	1.8	-	-	1.7	0.0	0.0	-	-	0.0	1.4
Single-Unit Trucks	7	0	0	-	7	1	6	0	-	7	0	1	0	-	1	15
% Single-Unit Trucks	1.6	0.0	-	-	1.4	7.7	1.5	-	-	1.7	0.0	3.3	-	-	1.1	1.5
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	7.7	0.0	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	13	-	-	-	-	9	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Rosedale Avenue
Site Code: 200384
Start Date: 02/10/2021



Turning Movement Peak Hour Data Plot (11:45 AM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Rosedale Avenue
Site Code: 200384
Start Date: 02/10/2021

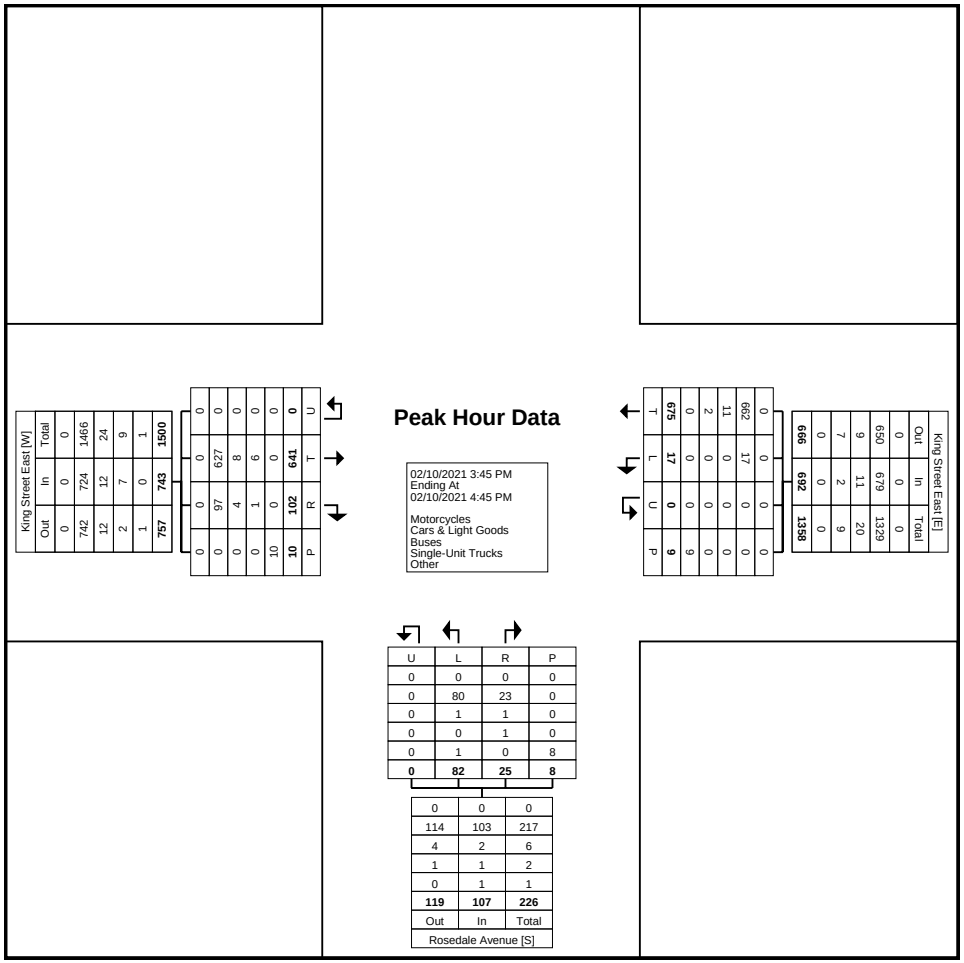
Turning Movement Peak Hour Data (3:45 PM)

Start Time	King Street East Eastbound					King Street East Westbound					Rosedale Avenue Northbound					
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
3:45 PM	154	17	0	3	171	7	175	0	0	182	14	6	0	3	20	373
4:00 PM	161	32	0	0	193	4	160	0	0	164	20	3	0	1	23	380
4:15 PM	188	28	0	2	216	2	162	0	2	164	20	7	0	1	27	407
4:30 PM	138	25	0	5	163	4	178	0	7	182	28	9	0	3	37	382
Total	641	102	0	10	743	17	675	0	9	692	82	25	0	8	107	1542
Approach %	86.3	13.7	0.0	-	-	2.5	97.5	0.0	-	-	76.6	23.4	0.0	-	-	-
Total %	41.6	6.6	0.0	-	48.2	1.1	43.8	0.0	-	44.9	5.3	1.6	0.0	-	6.9	-
PHF	0.852	0.797	0.000	-	0.860	0.607	0.948	0.000	-	0.951	0.732	0.694	0.000	-	0.723	0.947
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	627	97	0	-	724	17	662	0	-	679	80	23	0	-	103	1506
% Cars & Light Goods	97.8	95.1	-	-	97.4	100.0	98.1	-	-	98.1	97.6	92.0	-	-	96.3	97.7
Buses	8	4	0	-	12	0	11	0	-	11	1	1	0	-	2	25
% Buses	1.2	3.9	-	-	1.6	0.0	1.6	-	-	1.6	1.2	4.0	-	-	1.9	1.6
Single-Unit Trucks	6	1	0	-	7	0	2	0	-	2	0	1	0	-	1	10
% Single-Unit Trucks	0.9	1.0	-	-	0.9	0.0	0.3	-	-	0.3	0.0	4.0	-	-	0.9	0.6
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	1.2	0.0	-	-	0.9	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	2	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	22.2	-	-	-	-	12.5	-	-
Pedestrians	-	-	-	10	-	-	-	-	7	-	-	-	-	7	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	77.8	-	-	-	-	87.5	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

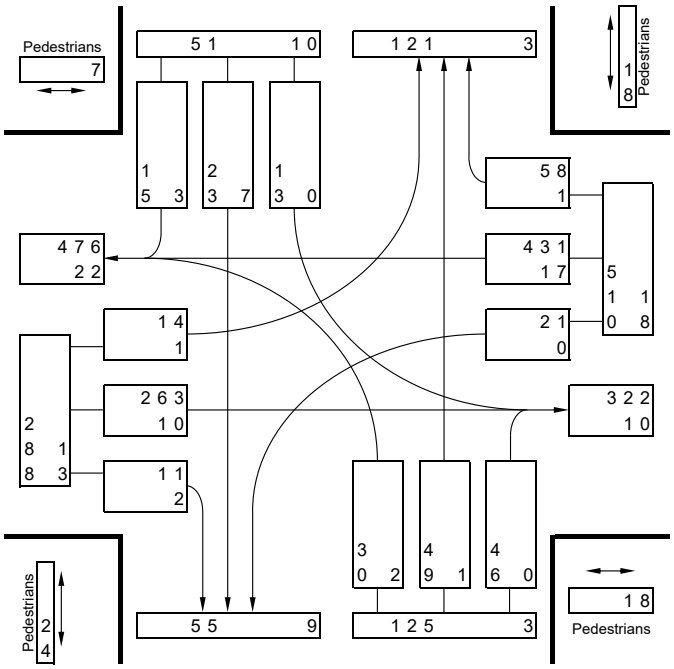
Count Name: King Street East & Rosedale Avenue
Site Code: 200384
Start Date: 02/10/2021



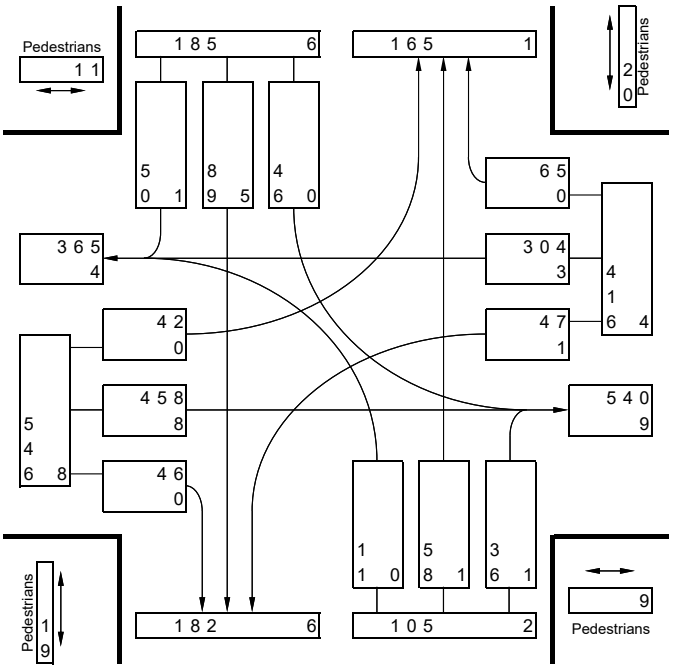
Turning Movement Peak Hour Data Plot (3:45 PM)

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 11

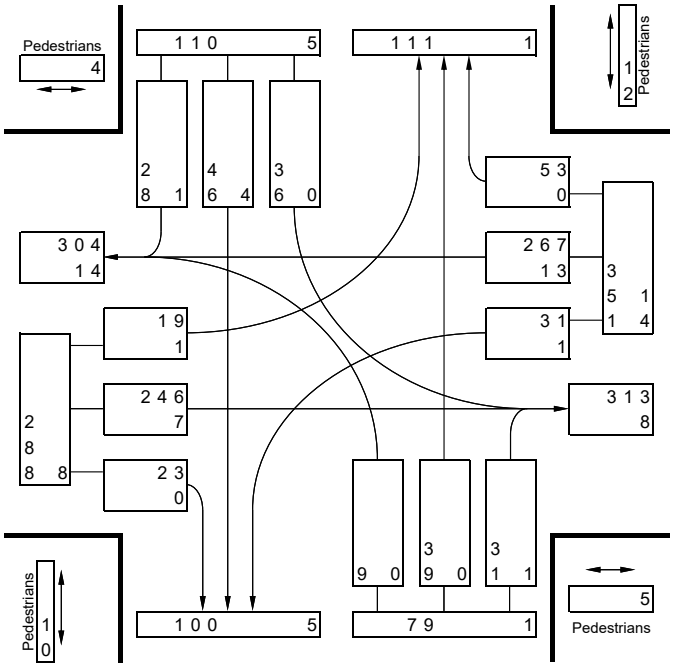
Intersection: **Lawrence Rd** **at** **Rosedale Ave** Total Vehicles: 6,606 Date: Friday
Direction: (East/West) (North/South) M.V.E./Year: 4.290 Nov 20, 2009
Road Condition: Dry Weather: Cloudy AWDT Factor: 1.91 Period: 7 hours
Comments:



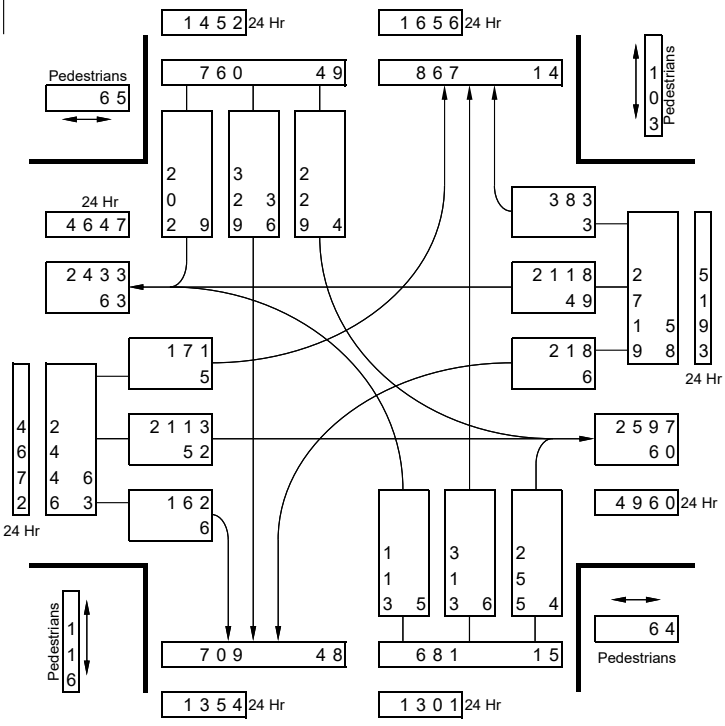
A.M. PEAK HOUR = 7:45 AM - 8:45 AM



P.M. PEAK HOUR = 4:30 PM - 5:30 PM



NORMAL HOUR = 2:00 PM - 3:00 PM



7 Hr & 24 Hr TOTAL VOLUMES

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 11

Intersection: **Lawrence Rd** **at** **Rosedale Ave** Total Vehicles: 6,606 Date: Friday
Direction: (East/West) (North/South) M.V.E./Year: 4.290 Nov 20, 2009
Road Condition: Dry Weather: Cloudy AWDT Factor: 1.91 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	2	10	7	4	30	3	0	7	3	3	28	7	104	1	0	0	1
7:30	5	8	6	0	45	1	4	5	1	0	56	6	137	0	1	1	1
7:45	6	6	6	2	39	3	1	6	1	1	98	9	178	1	0	2	1
8:00 *	8	7	8	3	74	2	0	6	5	5	106	19	243	0	6	2	5
8:15 *	5	20	16	5	65	1	5	4	3	2	124	15	265	2	5	7	10
8:30 *	5	10	9	3	68	2	4	5	6	8	93	13	226	4	4	5	5
8:45 *	12	12	13	3	56	6	4	8	1	6	108	11	240	1	3	4	4
9:00	10	13	12	4	61	3	5	2	3	8	102	17	240	2	1	1	1
9:15	3	9	6	5	56	5	4	10	5	5	69	10	187	0	4	2	4
9:30	4	12	7	5	43	3	6	9	3	9	43	10	154	1	3	2	4
9:45	8	8	8	1	70	0	3	12	6	3	48	13	180	0	3	1	2
10:00	1	11	13	4	45	0	5	9	3	3	46	14	154	4	3	1	6
14:15 *	1	7	8	5	55	7	16	10	4	9	65	15	202	2	2	2	1
14:30 *	4	8	9	8	61	3	9	15	12	8	71	15	223	1	2	1	1
14:45 *	2	7	5	4	61	6	7	11	8	4	52	12	179	0	5	0	5
15:00 *	2	17	9	2	69	7	4	10	4	10	79	11	224	1	3	2	3
15:15	5	17	5	7	101	11	8	16	9	5	80	13	277	4	4	1	2
15:30	4	9	15	6	104	6	15	15	13	16	86	18	307	8	6	4	7
15:45	0	9	7	13	85	10	13	13	2	8	70	26	256	7	7	10	10
16:00	2	11	10	7	112	8	19	14	19	12	73	14	301	1	7	3	5
16:15	7	13	8	10	116	9	12	11	5	11	93	11	306	3	4	0	6
16:30	1	11	7	17	109	10	10	13	13	13	70	13	287	7	3	2	5
16:45 *	3	13	9	8	108	11	15	23	12	14	75	20	311	1	5	1	7
17:00 *	3	17	11	10	120	11	11	26	13	16	82	20	340	2	8	3	4
17:15 *	2	9	7	12	115	12	13	17	12	8	73	10	290	5	2	0	2
17:30 *	3	19	9	12	115	12	7	23	13	9	74	15	311	3	5	5	6
17:45	4	8	11	8	73	5	18	20	13	10	84	10	264	4	3	2	6
18:00	1	12	14	3	57	5	11	9	10	12	70	16	220	0	4	0	2
TOTAL	113	313	255	171	2,113	162	229	329	202	218	2,118	383		65	103	64	116
APPR.		681			2,446			760			2,719		6,606			348	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	1	0	0	0	1	0	0	2	0	4
7:30	0	0	0	0	3	0	0	1	0	0	0	0	4
7:45	0	0	0	0	2	0	0	2	0	0	2	0	6
8:00 *	0	0	0	0	3	1	0	2	2	0	5	0	13
8:15 *	0	0	0	0	5	0	0	1	0	0	5	0	11
8:30 *	0	1	0	0	1	0	0	1	1	0	3	1	8
8:45 *	2	0	0	1	1	1	0	3	0	0	4	0	12
9:00	1	1	0	0	2	0	0	1	0	1	1	0	7
9:15	1	0	0	1	3	0	0	2	1	1	1	1	11
9:30	1	1	1	0	1	0	0	2	1	1	1	0	9
9:45	0	1	0	0	6	0	0	2	1	0	0	0	10
10:00	0	0	0	0	0	0	1	1	1	0	1	0	4
14:15 *	0	0	0	1	1	0	0	1	0	0	5	0	8
14:30 *	0	0	0	0	3	0	0	2	0	0	4	0	9
14:45 *	0	0	1	0	0	0	0	0	1	0	2	0	4
15:00 *	0	0	0	0	3	0	0	1	0	1	2	0	7
15:15	0	0	0	0	2	0	1	1	0	0	1	0	5
15:30	0	0	1	0	2	1	0	1	0	0	3	0	8
15:45	0	0	0	1	1	1	0	0	0	0	2	0	5
16:00	0	1	0	0	1	1	0	3	0	0	0	0	6
16:15	0	0	0	0	2	0	0	0	0	0	1	0	3
16:30	0	0	0	0	1	1	0	2	0	1	0	0	5
16:45 *	0	1	0	0	1	0	0	1	1	0	1	0	5
17:00 *	0	0	1	0	0	0	0	1	0	0	1	0	3
17:15 *	0	0	0	0	5	0	0	1	0	1	0	0	7
17:30 *	0	0	0	0	2	0	0	2	0	0	1	0	5
17:45	0	0	0	0	1	0	1	1	0	0	0	1	4
18:00	0	0	0	0	0	0	1	0	0	0	1	0	2
TOTAL	5	6	4	5	52	6	4	36	9	6	49	3	
APPR.		15			63			49			58		185

TRUCKS

7:15	0	0	0	0	0	0	0	0	0	0	1	0	1
7:30	0	0	0	0	3	0	0	0	0	0	0	0	3
7:45	0	0	0	0	1	0	0	1	0	0	1	0	3
8:00 *	0	0	0	0	3	0	0	0	2	0	3	0	8
8:15 *	0	0	0	0	3	0	0	0	0	0	4	0	7
8:30 *	0	1	0	0	1	0	0	0	1	0	2	0	5
8:45 *	0	0	0	0	0	1	0	2	0	0	2	0	5
9:00	1	0	0	0	1	0	0	0	0	1	1	0	4
9:15	1	0	0	0	2	0	0	1	1	1	1	1	8
9:30	1	0	1	0	1	0	0	1	1	1	1	0	7
9:45	0	1	0	0	5	0	0	1	1	0	0	0	8
10:00	0	0	0	0	0	0	1	0	1	0	1	0	3
14:15 *	0	0	0	1	0	0	0	0	0	0	1	0	2
14:30 *	0	0	0	0	2	0	0	1	0	0	1	0	4
14:45 *	0	0	1	0	0	0	0	0	1	0	0	0	2
15:00 *	0	0	0	0	1	0	0	0	0	0	1	0	2
15:15	0	0	0	0	1	0	0	0	0	0	1	0	2
15:30	0	0	1	0	1	0	0	0	0	0	0	0	2
15:45	0	0	0	0	0	1	0	0	0	0	1	0	2
16:00	0	1	0	0	1	0	0	0	0	0	0	0	2
16:15	0	0	0	0	2	0	0	0	0	0	0	0	2
16:30	0	0	0	0	0	1	0	0	0	1	0	0	2
16:45 *	0	1	0	0	1	0	0	0	0	0	0	0	2
17:00 *	0	0	1	0	0	0	0	0	0	0	1	0	2
17:15 *	0	0	0	0	2	0	0	1	0	1	0	0	4
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	1	0	0	0	0	1	2
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	4	4	1	31	3	2	8	8	5	23	2	
APPR.		11			35			18			30		94

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Barons Avenue South
Site Code: 200384
Start Date: 02/10/2021

Turning Movement Data

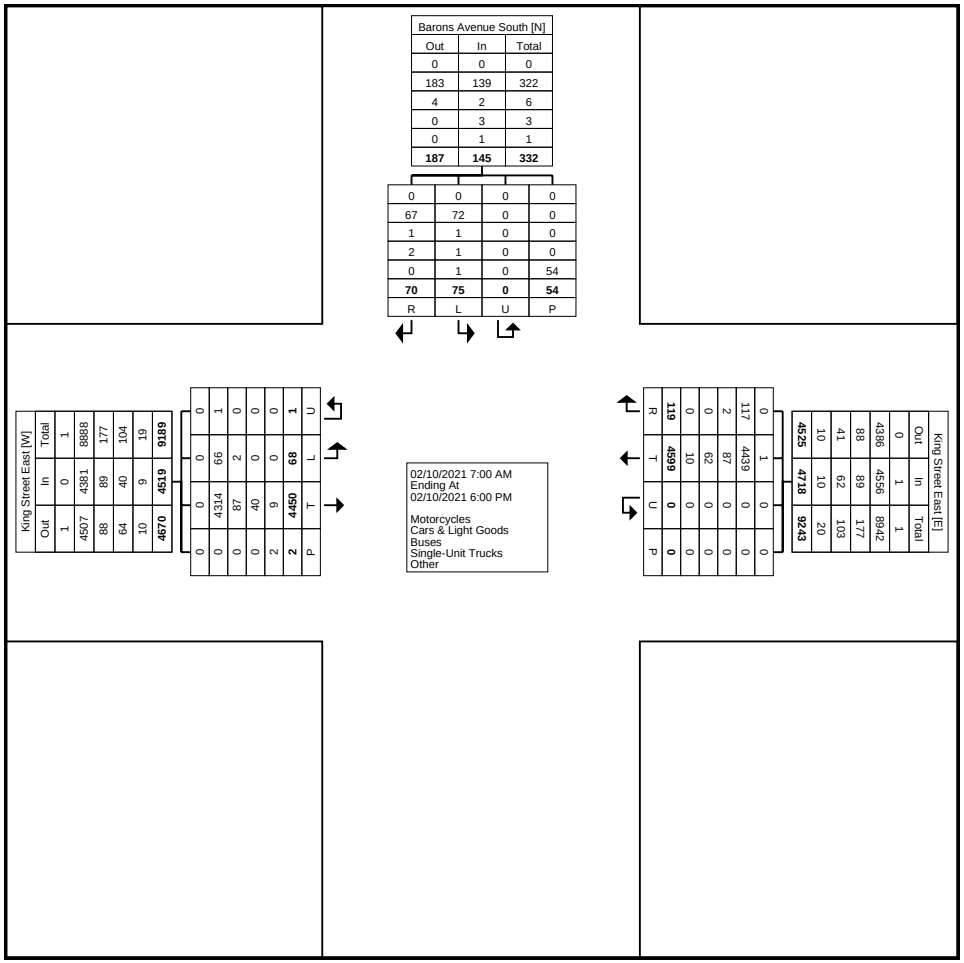
Start Time	King Street East Eastbound					King Street East Westbound					Barons Avenue South Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	0	117	0	0	117	108	2	0	0	110	2	1	0	0	3	230
7:15 AM	0	143	0	0	143	117	1	0	0	118	2	0	0	1	2	263
7:30 AM	1	158	0	0	159	156	0	0	0	156	2	5	0	1	7	322
7:45 AM	1	155	0	0	156	145	2	0	0	147	0	4	0	0	4	307
Hourly Total	2	573	0	0	575	526	5	0	0	531	6	10	0	2	16	1122
8:00 AM	0	133	0	0	133	186	2	0	0	188	1	2	0	0	3	324
8:15 AM	0	130	0	0	130	132	5	0	0	137	4	1	0	1	5	272
8:30 AM	0	110	0	0	110	171	2	0	0	173	4	5	0	2	9	292
8:45 AM	2	127	0	0	129	171	4	0	0	175	2	6	0	0	8	312
Hourly Total	2	500	0	0	502	660	13	0	0	673	11	14	0	3	25	1200
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	2	100	0	0	102	114	3	0	0	117	1	0	0	1	1	220
11:15 AM	1	99	0	0	100	119	5	0	0	124	1	2	0	3	3	227
11:30 AM	2	90	0	0	92	112	1	0	0	113	1	3	0	1	4	209
11:45 AM	2	127	0	0	129	102	2	0	0	104	4	3	0	1	7	240
Hourly Total	7	416	0	0	423	447	11	0	0	458	7	8	0	6	15	896
12:00 PM	2	122	1	0	125	130	5	0	0	135	4	2	0	2	6	266
12:15 PM	6	122	0	0	128	86	3	0	0	89	3	1	0	3	4	221
12:30 PM	1	123	0	0	124	123	3	0	0	126	2	2	0	3	4	254
12:45 PM	1	125	0	0	126	92	6	0	0	98	1	3	0	2	4	228
Hourly Total	10	492	1	0	503	431	17	0	0	448	10	8	0	10	18	969
1:00 PM	1	109	0	0	110	96	3	0	0	99	1	2	0	6	3	212
1:15 PM	1	102	0	0	103	125	9	0	0	134	2	1	0	2	3	240
1:30 PM	1	101	0	0	102	113	0	0	0	113	2	1	0	2	3	218
1:45 PM	1	125	0	0	126	137	3	0	0	140	4	0	0	0	4	270
Hourly Total	4	437	0	0	441	471	15	0	0	486	9	4	0	10	13	940
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	2	167	0	0	169	149	9	0	0	158	2	1	0	2	3	330
3:15 PM	6	175	0	0	181	177	7	0	0	184	3	6	0	3	9	374
3:30 PM	7	177	0	0	184	177	2	0	0	179	0	3	0	3	3	366
3:45 PM	2	165	0	0	167	179	6	0	0	185	5	3	0	0	8	360
Hourly Total	17	684	0	0	701	682	24	0	0	706	10	13	0	8	23	1430
4:00 PM	4	188	0	0	192	185	3	0	0	188	2	3	0	0	5	385
4:15 PM	2	208	0	0	210	188	3	0	0	191	5	2	0	4	7	408
4:30 PM	3	157	0	0	160	215	2	0	0	217	4	1	0	4	5	382
4:45 PM	2	178	0	1	180	178	6	0	0	184	3	0	0	0	3	367

Hourly Total	11	731	0	1	742	766	14	0	0	780	14	6	0	8	20	1542
5:00 PM	4	155	0	0	159	174	5	0	0	179	1	3	0	2	4	342
5:15 PM	3	182	0	0	185	155	3	0	0	158	1	1	0	4	2	345
5:30 PM	5	162	0	0	167	155	7	0	0	162	1	2	0	1	3	332
5:45 PM	3	118	0	1	121	132	5	0	0	137	5	1	0	0	6	264
Hourly Total	15	617	0	1	632	616	20	0	0	636	8	7	0	7	15	1283
Grand Total	68	4450	1	2	4519	4599	119	0	0	4718	75	70	0	54	145	9382
Approach %	1.5	98.5	0.0	-	-	97.5	2.5	0.0	-	-	51.7	48.3	0.0	-	-	-
Total %	0.7	47.4	0.0	-	48.2	49.0	1.3	0.0	-	50.3	0.8	0.7	0.0	-	1.5	-
Motorcycles	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	66	4314	1	-	4381	4439	117	0	-	4556	72	67	0	-	139	9076
% Cars & Light Goods	97.1	96.9	100.0	-	96.9	96.5	98.3	-	-	96.6	96.0	95.7	-	-	95.9	96.7
Buses	2	87	0	-	89	87	2	0	-	89	1	1	0	-	2	180
% Buses	2.9	2.0	0.0	-	2.0	1.9	1.7	-	-	1.9	1.3	1.4	-	-	1.4	1.9
Single-Unit Trucks	0	40	0	-	40	62	0	0	-	62	1	2	0	-	3	105
% Single-Unit Trucks	0.0	0.9	0.0	-	0.9	1.3	0.0	-	-	1.3	1.3	2.9	-	-	2.1	1.1
Articulated Trucks	0	8	0	-	8	8	0	0	-	8	0	0	0	-	0	16
% Articulated Trucks	0.0	0.2	0.0	-	0.2	0.2	0.0	-	-	0.2	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	1	0	-	1	2	0	0	-	2	1	0	0	-	1	4
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	1.3	0.0	-	-	0.7	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	1.9	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	53	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	98.1	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Barons Avenue South
Site Code: 200384
Start Date: 02/10/2021



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Barons Avenue South
Site Code: 200384
Start Date: 02/10/2021

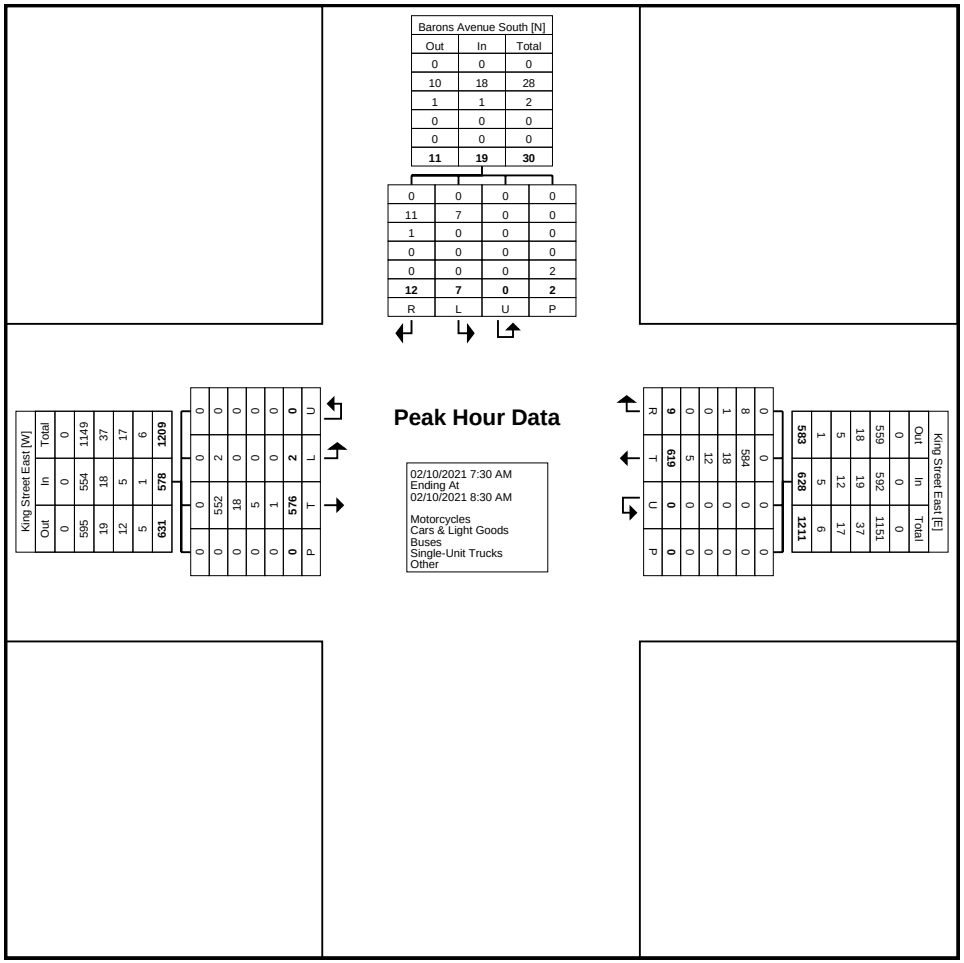
Turning Movement Peak Hour Data (7:30 AM)

Start Time	King Street East Eastbound					King Street East Westbound					Barons Avenue South Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
7:30 AM	1	158	0	0	159	156	0	0	0	156	2	5	0	1	7	322
7:45 AM	1	155	0	0	156	145	2	0	0	147	0	4	0	0	4	307
8:00 AM	0	133	0	0	133	186	2	0	0	188	1	2	0	0	3	324
8:15 AM	0	130	0	0	130	132	5	0	0	137	4	1	0	1	5	272
Total	2	576	0	0	578	619	9	0	0	628	7	12	0	2	19	1225
Approach %	0.3	99.7	0.0	-	-	98.6	1.4	0.0	-	-	36.8	63.2	0.0	-	-	-
Total %	0.2	47.0	0.0	-	47.2	50.5	0.7	0.0	-	51.3	0.6	1.0	0.0	-	1.6	-
PHF	0.500	0.911	0.000	-	0.909	0.832	0.450	0.000	-	0.835	0.438	0.600	0.000	-	0.679	0.945
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	2	552	0	-	554	584	8	0	-	592	7	11	0	-	18	1164
% Cars & Light Goods	100.0	95.8	-	-	95.8	94.3	88.9	-	-	94.3	100.0	91.7	-	-	94.7	95.0
Buses	0	18	0	-	18	18	1	0	-	19	0	1	0	-	1	38
% Buses	0.0	3.1	-	-	3.1	2.9	11.1	-	-	3.0	0.0	8.3	-	-	5.3	3.1
Single-Unit Trucks	0	5	0	-	5	12	0	0	-	12	0	0	0	-	0	17
% Single-Unit Trucks	0.0	0.9	-	-	0.9	1.9	0.0	-	-	1.9	0.0	0.0	-	-	0.0	1.4
Articulated Trucks	0	1	0	-	1	4	0	0	-	4	0	0	0	-	0	5
% Articulated Trucks	0.0	0.2	-	-	0.2	0.6	0.0	-	-	0.6	0.0	0.0	-	-	0.0	0.4
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Barons Avenue South
Site Code: 200384
Start Date: 02/10/2021



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

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Barons Avenue South
Site Code: 200384
Start Date: 02/10/2021

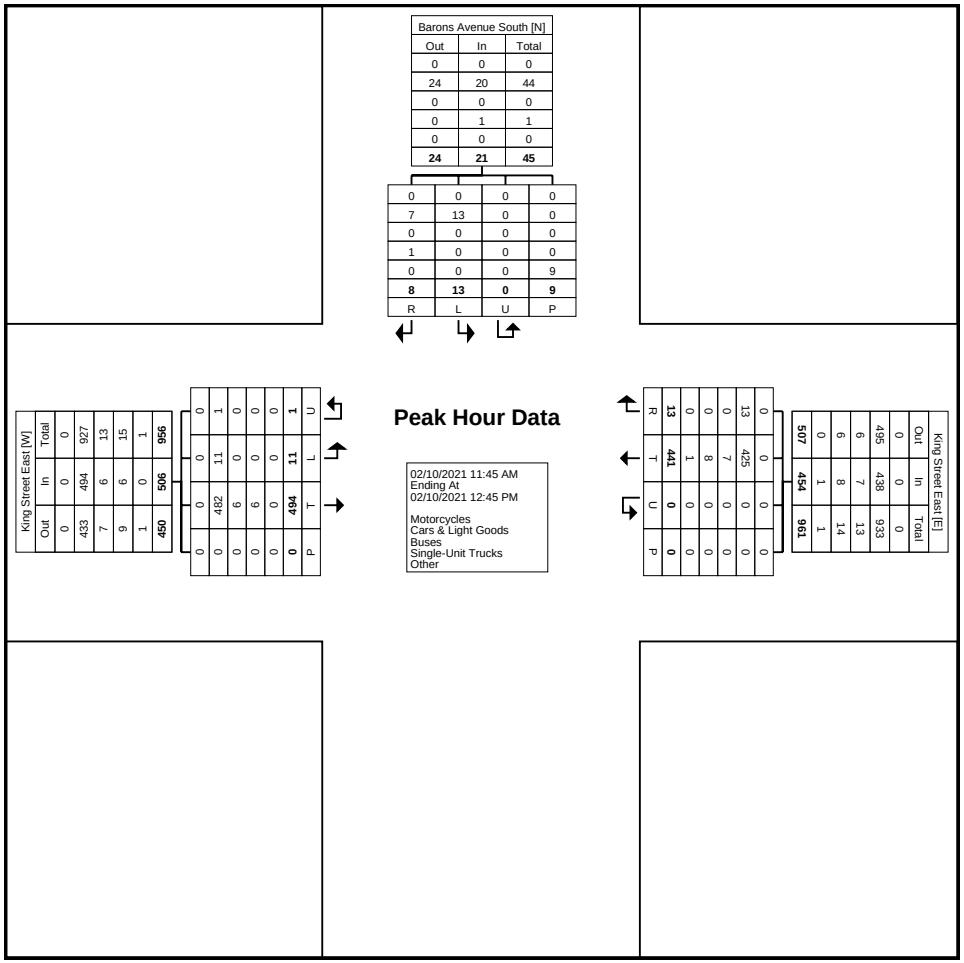
Turning Movement Peak Hour Data (11:45 AM)

Start Time	King Street East Eastbound					King Street East Westbound					Barons Avenue South Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
11:45 AM	2	127	0	0	129	102	2	0	0	104	4	3	0	1	7	240
12:00 PM	2	122	1	0	125	130	5	0	0	135	4	2	0	2	6	266
12:15 PM	6	122	0	0	128	86	3	0	0	89	3	1	0	3	4	221
12:30 PM	1	123	0	0	124	123	3	0	0	126	2	2	0	3	4	254
Total	11	494	1	0	506	441	13	0	0	454	13	8	0	9	21	981
Approach %	2.2	97.6	0.2	-	-	97.1	2.9	0.0	-	-	61.9	38.1	0.0	-	-	-
Total %	1.1	50.4	0.1	-	51.6	45.0	1.3	0.0	-	46.3	1.3	0.8	0.0	-	2.1	-
PHF	0.458	0.972	0.250	-	0.981	0.848	0.650	0.000	-	0.841	0.813	0.667	0.000	-	0.750	0.922
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	11	482	1	-	494	425	13	0	-	438	13	7	0	-	20	952
% Cars & Light Goods	100.0	97.6	100.0	-	97.6	96.4	100.0	-	-	96.5	100.0	87.5	-	-	95.2	97.0
Buses	0	6	0	-	6	7	0	0	-	7	0	0	0	-	0	13
% Buses	0.0	1.2	0.0	-	1.2	1.6	0.0	-	-	1.5	0.0	0.0	-	-	0.0	1.3
Single-Unit Trucks	0	6	0	-	6	8	0	0	-	8	0	1	0	-	1	15
% Single-Unit Trucks	0.0	1.2	0.0	-	1.2	1.8	0.0	-	-	1.8	0.0	12.5	-	-	4.8	1.5
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.2	0.0	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Barons Avenue South
Site Code: 200384
Start Date: 02/10/2021



Turning Movement Peak Hour Data Plot (11:45 AM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: King Street East & Barons Avenue South
Site Code: 200384
Start Date: 02/10/2021

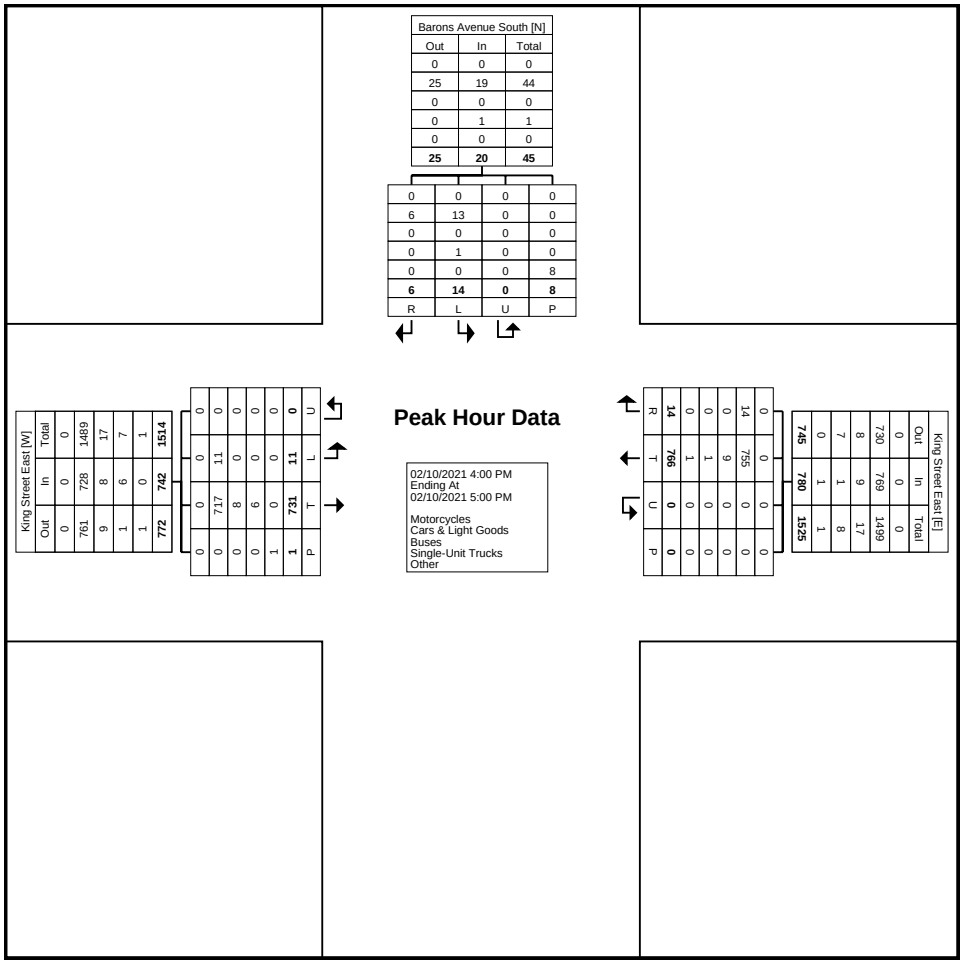
Turning Movement Peak Hour Data (4:00 PM)

Start Time	King Street East Eastbound					King Street East Westbound					Barons Avenue South Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
4:00 PM	4	188	0	0	192	185	3	0	0	188	2	3	0	0	5	385
4:15 PM	2	208	0	0	210	188	3	0	0	191	5	2	0	4	7	408
4:30 PM	3	157	0	0	160	215	2	0	0	217	4	1	0	4	5	382
4:45 PM	2	178	0	1	180	178	6	0	0	184	3	0	0	0	3	367
Total	11	731	0	1	742	766	14	0	0	780	14	6	0	8	20	1542
Approach %	1.5	98.5	0.0	-	-	98.2	1.8	0.0	-	-	70.0	30.0	0.0	-	-	-
Total %	0.7	47.4	0.0	-	48.1	49.7	0.9	0.0	-	50.6	0.9	0.4	0.0	-	1.3	-
PHF	0.688	0.879	0.000	-	0.883	0.891	0.583	0.000	-	0.899	0.700	0.500	0.000	-	0.714	0.945
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	11	717	0	-	728	755	14	0	-	769	13	6	0	-	19	1516
% Cars & Light Goods	100.0	98.1	-	-	98.1	98.6	100.0	-	-	98.6	92.9	100.0	-	-	95.0	98.3
Buses	0	8	0	-	8	9	0	0	-	9	0	0	0	-	0	17
% Buses	0.0	1.1	-	-	1.1	1.2	0.0	-	-	1.2	0.0	0.0	-	-	0.0	1.1
Single-Unit Trucks	0	6	0	-	6	1	0	0	-	1	1	0	0	-	1	8
% Single-Unit Trucks	0.0	0.8	-	-	0.8	0.1	0.0	-	-	0.1	7.1	0.0	-	-	5.0	0.5
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.1	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	8	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

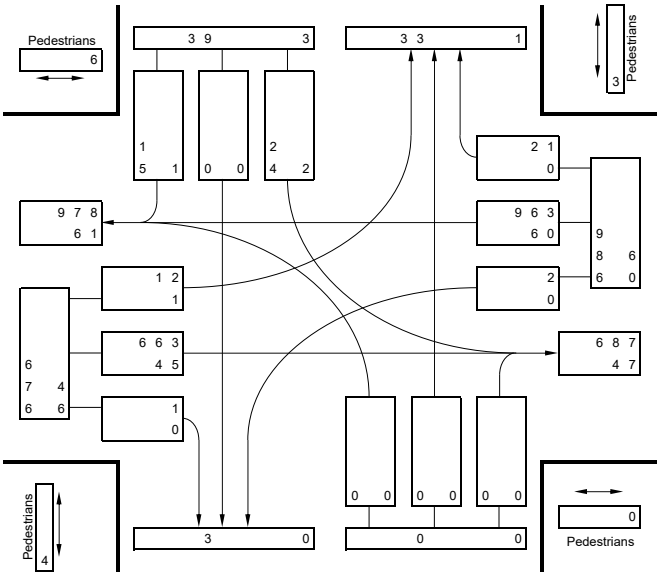
Count Name: King Street East & Barons Avenue South
Site Code: 200384
Start Date: 02/10/2021



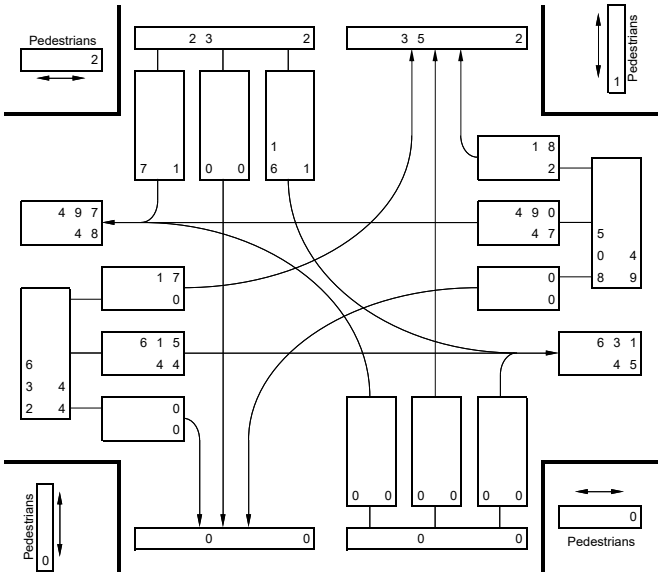
Turning Movement Peak Hour Data Plot (4:00 PM)

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 4270

Intersection: **King St E** **at** **Cameron Ave S** Total Vehicles: 7,685 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 5.435 Sep 9, 2019
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.08 Period: 7 hours
Comments:

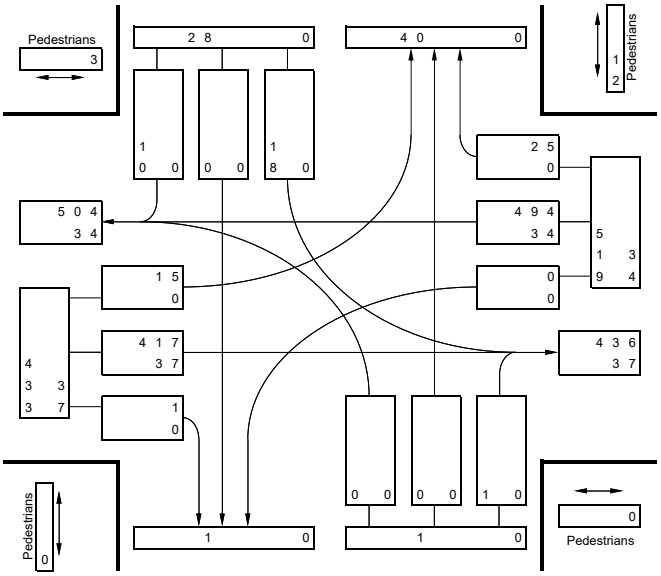


A.M. PEAK HOUR = 8:00 AM - 9:00 AM

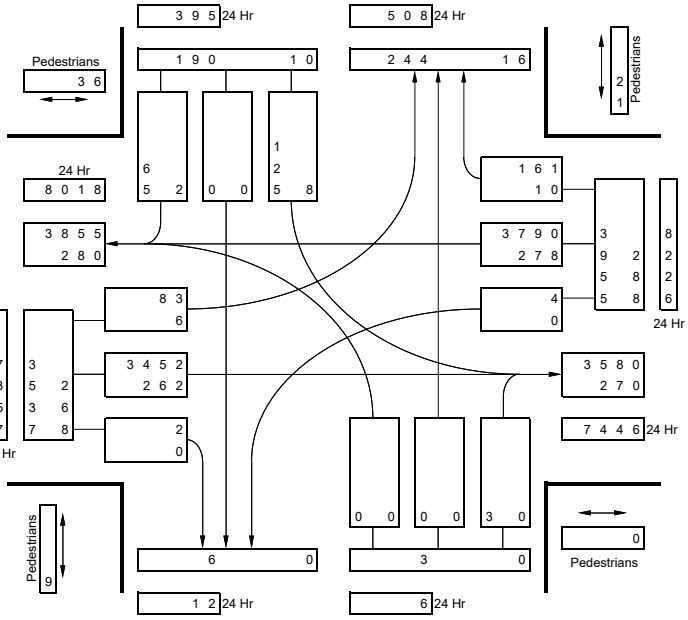


P.M. PEAK HOUR = 4:30 PM - 5:30 PM

N



NORMAL HOUR = 2:30 PM - 3:30 PM



7 Hr & 24 Hr TOTAL VOLUMES

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 4270

Intersection: **King St E** **at** **Cameron Ave S** Total Vehicles: 7,685 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 5.435 Sep 9, 2019
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.08 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	0	0	0	1	98	0	2	0	3	0	92	2	198	2	0	0	0
7:30	0	0	0	0	92	0	6	0	1	0	94	3	196	1	0	0	0
7:45	0	0	0	1	98	0	3	0	1	0	112	4	219	3	0	0	1
8:00	0	0	0	1	146	0	5	0	2	0	171	2	327	2	0	0	2
8:15 *	0	0	0	3	173	1	8	0	2	0	227	6	420	1	1	0	1
8:30 *	0	0	0	2	190	0	5	0	4	2	219	10	432	4	2	0	2
8:45 *	0	0	0	2	155	0	9	0	5	0	249	2	422	1	0	0	0
9:00 *	0	0	0	5	145	0	2	0	4	0	268	3	427	0	0	0	1
9:15	0	0	0	1	123	0	8	0	6	0	174	2	314	1	2	0	0
9:30	0	0	0	1	123	0	2	0	3	1	148	14	292	2	0	0	0
9:45	0	0	0	2	114	0	3	0	1	0	100	9	229	3	0	0	1
10:00	0	0	2	0	103	0	5	0	1	0	115	4	230	2	0	0	0
13:45	0	0	0	2	85	0	2	0	1	0	89	4	183	1	0	0	0
14:00	0	0	0	1	130	0	2	0	2	0	123	11	269	0	0	0	0
14:15	0	0	0	6	84	0	3	0	3	0	104	3	203	2	0	0	0
14:30	0	0	0	3	69	0	4	0	2	0	86	5	169	1	0	0	0
14:45 *	0	0	0	5	84	0	2	0	3	0	107	3	204	0	0	0	0
15:00 *	0	0	1	3	108	1	5	0	4	0	152	7	281	1	10	0	0
15:15 *	0	0	0	5	134	0	7	0	2	0	131	7	286	1	2	0	0
15:30 *	0	0	0	2	91	0	4	0	1	0	104	8	210	1	0	0	0
16:15	0	0	0	1	116	0	7	0	0	0	84	7	215	1	0	0	1
16:30	0	0	0	5	154	0	5	0	3	1	128	11	307	0	0	0	0
16:45 *	0	0	0	3	171	0	5	0	2	0	123	2	306	1	1	0	0
17:00 *	0	0	0	2	129	0	4	0	1	0	104	4	244	0	0	0	0
17:15 *	0	0	0	5	160	0	2	0	1	0	97	7	272	1	0	0	0
17:30 *	0	0	0	7	155	0	5	0	3	0	166	5	341	0	0	0	0
17:45	0	0	0	9	105	0	2	0	2	0	110	7	235	1	1	0	0
18:00	0	0	0	5	117	0	8	0	2	0	113	9	254	3	2	0	0
TOTAL	0	0	3	83	3,452	2	125	0	65	4	3,790	161		36	21	0	9
APPR.		3			3,537			190			3,955		7,685			66	

TRUCKS & BUSES

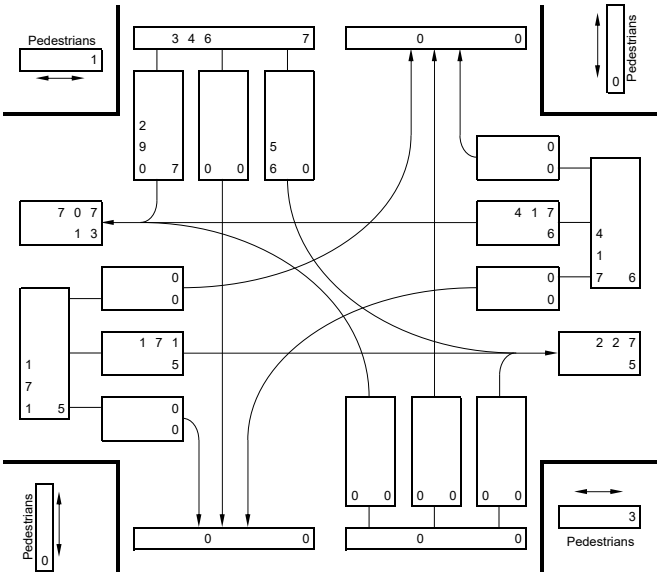
15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	5	0	0	0	0	0	4	0	9
7:30	0	0	0	0	5	0	2	0	0	0	9	2	18
7:45	0	0	0	0	5	0	0	0	0	0	8	0	13
8:00	0	0	0	0	11	0	1	0	0	0	9	0	21
8:15 *	0	0	0	0	9	0	1	0	1	0	10	0	21
8:30 *	0	0	0	0	10	0	0	0	0	0	11	0	21
8:45 *	0	0	0	1	15	0	1	0	0	0	19	0	36
9:00 *	0	0	0	0	11	0	0	0	0	0	20	0	31
9:15	0	0	0	0	9	0	1	0	0	0	12	1	23
9:30	0	0	0	0	8	0	0	0	0	0	10	1	19
9:45	0	0	0	1	15	0	0	0	0	0	13	0	29
10:00	0	0	0	0	13	0	0	0	0	0	8	0	21
13:45	0	0	0	1	9	0	0	0	0	0	8	1	19
14:00	0	0	0	0	8	0	0	0	0	0	9	1	18
14:15	0	0	0	0	2	0	0	0	0	0	6	0	8
14:30	0	0	0	0	6	0	0	0	0	0	3	1	10
14:45 *	0	0	0	0	14	0	0	0	0	0	8	0	22
15:00 *	0	0	0	0	6	0	0	0	0	0	3	0	9
15:15 *	0	0	0	0	7	0	0	0	0	0	11	0	18
15:30 *	0	0	0	0	10	0	0	0	0	0	12	0	22
16:15	0	0	0	0	8	0	1	0	0	0	10	0	19
16:30	0	0	0	2	10	0	0	0	0	0	7	1	20
16:45 *	0	0	0	0	8	0	0	0	1	0	14	1	24
17:00 *	0	0	0	0	6	0	0	0	0	0	9	0	15
17:15 *	0	0	0	0	17	0	1	0	0	0	7	1	26
17:30 *	0	0	0	0	13	0	0	0	0	0	17	0	30
17:45	0	0	0	1	7	0	0	0	0	0	8	0	16
18:00	0	0	0	0	15	0	0	0	0	0	13	0	28
TOTAL	0	0	0	6	262	0	8	0	2	0	278	10	
APPR.		0			268			10			288		566

TRUCKS

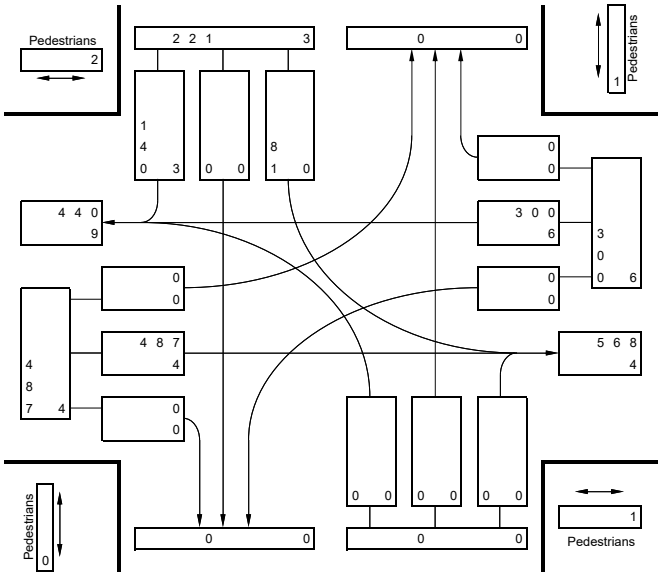
7:15	0	0	0	0	4	0	0	0	0	0	2	0	6
7:30	0	0	0	0	3	0	2	0	0	0	6	2	13
7:45	0	0	0	0	2	0	0	0	0	0	4	0	6
8:00	0	0	0	0	6	0	1	0	0	0	6	0	13
8:15 *	0	0	0	0	6	0	1	0	1	0	7	0	15
8:30 *	0	0	0	0	8	0	0	0	0	0	6	0	14
8:45 *	0	0	0	0	9	0	0	0	0	0	13	0	22
9:00 *	0	0	0	0	8	0	0	0	0	0	15	0	23
9:15	0	0	0	0	6	0	0	0	0	0	8	1	15
9:30	0	0	0	0	3	0	0	0	0	0	6	1	10
9:45	0	0	0	0	9	0	0	0	0	0	11	0	20
10:00	0	0	0	0	7	0	0	0	0	0	5	0	12
13:45	0	0	0	1	6	0	0	0	0	0	7	1	15
14:00	0	0	0	0	6	0	0	0	0	0	7	1	14
14:15	0	0	0	0	0	0	0	0	0	0	5	0	5
14:30	0	0	0	0	4	0	0	0	0	0	1	1	6
14:45 *	0	0	0	0	12	0	0	0	0	0	6	0	18
15:00 *	0	0	0	0	5	0	0	0	0	0	1	0	6
15:15 *	0	0	0	0	5	0	0	0	0	0	10	0	15
15:30 *	0	0	0	0	9	0	0	0	0	0	11	0	20
16:15	0	0	0	0	5	0	1	0	0	0	8	0	14
16:30	0	0	0	2	9	0	0	0	0	0	5	1	17
16:45 *	0	0	0	0	5	0	0	0	1	0	12	1	19
17:00 *	0	0	0	0	5	0	0	0	0	0	7	0	12
17:15 *	0	0	0	0	14	0	1	0	0	0	6	1	22
17:30 *	0	0	0	0	10	0	0	0	0	0	14	0	24
17:45	0	0	0	1	7	0	0	0	0	0	7	0	15
18:00	0	0	0	0	13	0	0	0	0	0	10	0	23
TOTAL	0	0	0	4	186	0	6	0	2	0	206	10	
APPR.		0			190			8			216		414

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 56

Intersection: **Lawrence Rd** **at** **Kenilworth Off Ramp** Total Vehicles: 4,843 Date: Friday
Direction: (East/West) (North/South) M.V.E./Year: 3.557 Jan 15, 2016
Road Condition: Wet Weather: Overcast AWDT Factor: 2.16 Period: 7 hours
Comments:

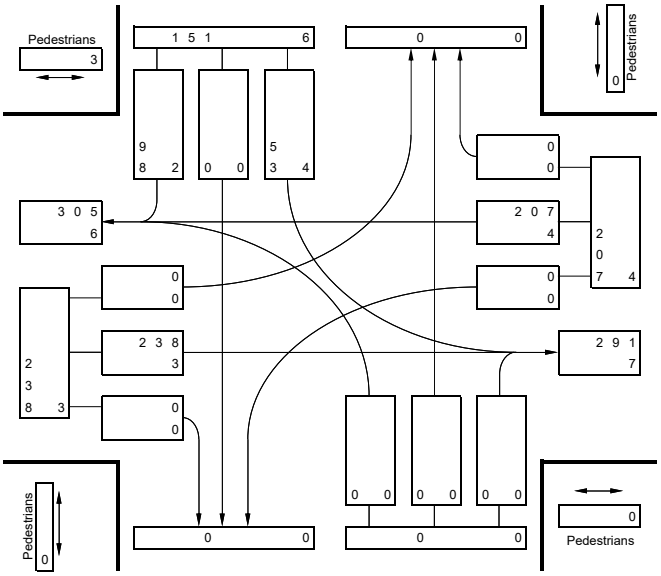


A.M. PEAK HOUR = 7:30 AM - 8:30 AM

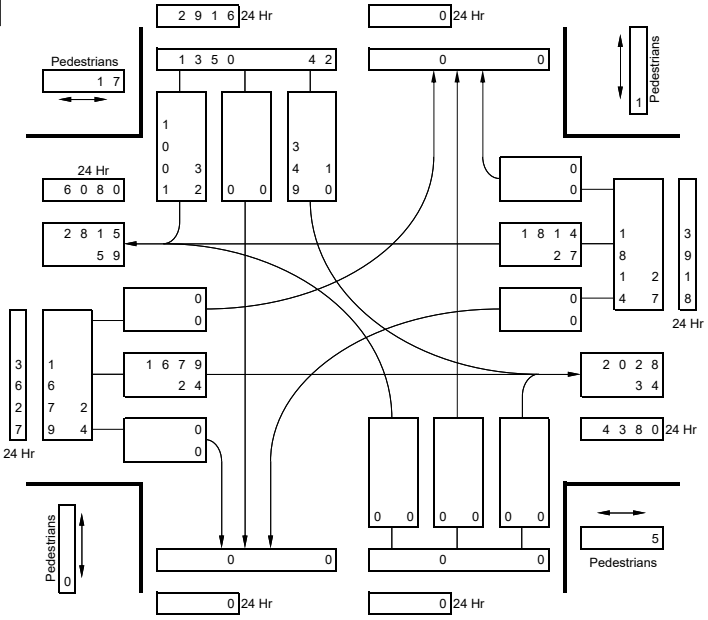


P.M. PEAK HOUR = 4:00 PM - 5:00 PM

N



NORMAL HOUR = 2:30 PM - 3:30 PM



7 Hr & 24 Hr TOTAL VOLUMES

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 56

Intersection: **Lawrence Rd** **at** **Kenilworth Off Ramp** Total Vehicles: 4,843 Date: Friday
Direction: (East/West) (North/South) M.V.E./Year: 3.557 Jan 15, 2016
Road Condition: Wet Weather: Overcast AWDT Factor: 2.16 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	0	0	0	0	21	0	6	0	43	0	48	0	118	0	0	0	0
7:30	0	0	0	0	34	0	6	0	51	0	70	0	161	0	0	0	0
7:45 *	0	0	0	0	38	0	12	0	75	0	80	0	205	0	0	0	0
8:00 *	0	0	0	0	43	0	13	0	63	0	106	0	225	0	0	0	0
8:15 *	0	0	0	0	46	0	15	0	74	0	132	0	267	1	0	0	0
8:30 *	0	0	0	0	44	0	16	0	78	0	99	0	237	0	0	3	0
8:45	0	0	0	0	30	0	20	0	65	0	70	0	185	0	0	0	0
9:00	0	0	0	0	23	0	2	0	34	0	60	0	119	0	0	0	0
9:15	0	0	0	0	51	0	17	0	41	0	81	0	190	1	0	1	0
9:30	0	0	0	0	33	0	8	0	24	0	52	0	117	0	0	0	0
9:45	0	0	0	0	28	0	7	0	8	0	39	0	82	0	0	0	0
10:00	0	0	0	0	35	0	7	0	17	0	57	0	116	2	0	0	0
13:45	0	0	0	0	60	0	11	0	16	0	60	0	147	1	0	0	0
14:00	0	0	0	0	9	0	3	0	7	0	19	0	38	0	0	0	0
14:15	0	0	0	0	20	0	11	0	4	0	30	0	65	3	0	0	0
14:30	0	0	0	0	54	0	17	0	26	0	56	0	153	0	0	0	0
14:45 *	0	0	0	0	47	0	13	0	15	0	65	0	140	1	0	0	0
15:00 *	0	0	0	0	66	0	11	0	26	0	59	0	162	0	0	0	0
15:15 *	0	0	0	0	38	0	10	0	23	0	33	0	104	1	0	0	0
15:30 *	0	0	0	0	87	0	19	0	34	0	50	0	190	1	0	0	0
16:15 *	0	0	0	0	113	0	15	0	32	0	66	0	226	0	0	0	0
16:30 *	0	0	0	0	129	0	17	0	39	0	94	0	279	0	0	1	0
16:45 *	0	0	0	0	118	0	24	0	33	0	75	0	250	2	1	0	0
17:00 *	0	0	0	0	127	0	25	0	36	0	65	0	253	0	0	0	0
17:15	0	0	0	0	91	0	8	0	27	0	61	0	187	2	0	0	0
17:30	0	0	0	0	117	0	18	0	55	0	69	0	259	0	0	0	0
17:45	0	0	0	0	99	0	14	0	26	0	59	0	198	2	0	0	0
18:00	0	0	0	0	78	0	4	0	29	0	59	0	170	0	0	0	0
TOTAL	0	0	0	0	1,679	0	349	0	1,001	0	1,814	0		17	1	5	0
APPR.		0			1,679			1,350			1,814		4,843			23	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	0	0	0	0	1	0	0	0	1
7:30	0	0	0	0	0	0	1	0	3	0	0	0	4
7:45 *	0	0	0	0	3	0	0	0	0	0	2	0	5
8:00 *	0	0	0	0	0	0	0	0	4	0	0	0	4
8:15 *	0	0	0	0	1	0	0	0	2	0	3	0	6
8:30 *	0	0	0	0	1	0	0	0	1	0	1	0	3
8:45	0	0	0	0	1	0	2	0	2	0	0	0	5
9:00	0	0	0	0	0	0	0	0	2	0	0	0	2
9:15	0	0	0	0	1	0	1	0	2	0	2	0	6
9:30	0	0	0	0	4	0	0	0	0	0	0	0	4
9:45	0	0	0	0	0	0	0	0	0	0	1	0	1
10:00	0	0	0	0	1	0	0	0	1	0	1	0	3
13:45	0	0	0	0	2	0	0	0	1	0	1	0	4
14:00	0	0	0	0	0	0	0	0	1	0	2	0	3
14:15	0	0	0	0	2	0	0	0	1	0	2	0	5
14:30	0	0	0	0	1	0	1	0	3	0	0	0	5
14:45 *	0	0	0	0	0	0	0	0	1	0	1	0	2
15:00 *	0	0	0	0	3	0	1	0	0	0	0	0	4
15:15 *	0	0	0	0	0	0	1	0	1	0	0	0	2
15:30 *	0	0	0	0	0	0	2	0	0	0	3	0	5
16:15 *	0	0	0	0	3	0	0	0	1	0	1	0	5
16:30 *	0	0	0	0	0	0	0	0	1	0	0	0	1
16:45 *	0	0	0	0	1	0	0	0	0	0	4	0	5
17:00 *	0	0	0	0	0	0	0	0	1	0	1	0	2
17:15	0	0	0	0	0	0	0	0	1	0	1	0	2
17:30	0	0	0	0	0	0	1	0	1	0	0	0	2
17:45	0	0	0	0	0	0	0	0	1	0	1	0	2
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	24	0	10	0	32	0	27	0	
APPR.		0			24			42			27		93

TRUCKS

7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 *	0	0	0	0	1	0	0	0	0	0	0	0	1
8:00 *	0	0	0	0	0	0	0	0	1	0	0	0	1
8:15 *	0	0	0	0	0	0	0	0	1	0	0	0	1
8:30 *	0	0	0	0	0	0	0	0	0	0	1	0	1
8:45	0	0	0	0	0	0	1	0	0	0	0	0	1
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15	0	0	0	0	1	0	1	0	0	0	1	0	3
9:30	0	0	0	0	3	0	0	0	0	0	0	0	3
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	1	0	0	0	0	0	1	0	2
13:45	0	0	0	0	1	0	0	0	0	0	1	0	2
14:00	0	0	0	0	0	0	0	0	1	0	1	0	2
14:15	0	0	0	0	0	0	0	0	0	0	2	0	2
14:30	0	0	0	0	1	0	0	0	2	0	0	0	3
14:45 *	0	0	0	0	0	0	0	0	0	0	1	0	1
15:00 *	0	0	0	0	1	0	0	0	0	0	0	0	1
15:15 *	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 *	0	0	0	0	0	0	1	0	0	0	1	0	2
16:15 *	0	0	0	0	2	0	0	0	0	0	0	0	2
16:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45 *	0	0	0	0	1	0	0	0	0	0	1	0	2
17:00 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	1	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	0	0	1	0	1
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	12	0	4	0	5	0	11	0	
APPR.		0			12			9			11		32

Appendix C

Existing Traffic Operations Reports

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	662	41	12	1084	74	23
Future Volume (vph)	662	41	12	1084	74	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00			1.00	0.99	
Frt	0.991				0.968	
Flt Protected				0.999	0.963	
Satd. Flow (prot)	3576	0	0	3541	1784	0
Flt Permitted				0.944	0.963	
Satd. Flow (perm)	3576	0	0	3346	1781	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	13				15	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		5	5		1	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	720	45	13	1178	80	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	765	0	0	1191	105	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.33			0.55	0.23	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	8.1			10.7	27.3	
Queue Delay	0.0			0.0	0.0	
Total Delay	8.1			10.7	27.3	
LOS	A			B	C	
Approach Delay	8.1			10.7	27.3	
Approach LOS	A			B	C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green		
Natural Cycle: 95		
Control Type: Pretimed		
Maximum v/c Ratio: 0.55		
Intersection Signal Delay: 10.6		Intersection LOS: B
Intersection Capacity Utilization 62.0%		ICU Level of Service B
Analysis Period (min) 15		

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	662	41	12	1084	74	23
Future Volume (vph)	662	41	12	1084	74	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.97	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3577			3543	1784	
Flt Permitted	1.00			0.94	0.96	
Satd. Flow (perm)	3577			3348	1784	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	720	45	13	1178	80	25
RTOR Reduction (vph)	5	0	0	0	11	0
Lane Group Flow (vph)	760	0	0	1191	94	0
Confl. Peds. (#/hr)		5	5		1	3
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2325			2176	440	
v/s Ratio Prot	0.21				c0.05	
v/s Ratio Perm				c0.36		
v/c Ratio	0.33			0.55	0.21	
Uniform Delay, d1	7.8			9.5	29.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.4			1.0	1.1	
Delay (s)	8.2			10.5	31.0	
Level of Service	A			B	C	
Approach Delay (s)	8.2			10.5	31.0	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	297	13	23	486	64	35	55	50	16	37	22
Future Volume (vph)	16	297	13	23	486	64	35	55	50	16	37	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	1.00	1.00		0.98	1.00			0.97			0.97	
Frt		0.994			0.982			0.952			0.960	
Flt Protected	0.950			0.950				0.988			0.990	
Satd. Flow (prot)	1706	1824	0	1825	1811	0	0	1726	0	0	1535	0
Flt Permitted	0.340			0.527				0.913			0.930	
Satd. Flow (perm)	608	1824	0	989	1811	0	0	1577	0	0	1432	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			14			30			23	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		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
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Adj. Flow (vph)	17	323	14	25	528	70	38	60	54	17	40	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	337	0	25	598	0	0	152	0	0	81	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.05	0.30		0.04	0.54			0.33			0.20	
Control Delay	7.5	9.2		7.3	12.2			23.2			20.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	7.5	9.2		7.3	12.2			23.2			20.2	
LOS	A	A		A	B			C			C	
Approach Delay		9.1			12.0			23.2			20.2	
Approach LOS		A			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 54.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	297	13	23	486	64	35	55	50	16	37	22
Future Volume (vph)	16	297	13	23	486	64	35	55	50	16	37	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.98	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			0.99			0.99	
Frt	1.00	0.99		1.00	0.98			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1698	1823		1782	1811			1705			1524	
Flt Permitted	0.34	1.00		0.53	1.00			0.91			0.93	
Satd. Flow (perm)	607	1823		990	1811			1577			1433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	323	14	25	528	70	38	60	54	17	40	24
RTOR Reduction (vph)	0	2	0	0	5	0	0	22	0	0	17	0
Lane Group Flow (vph)	17	335	0	25	593	0	0	130	0	0	64	0
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		24
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	370	1112		603	1104			432			393	
v/s Ratio Prot		0.18			c0.33							
v/s Ratio Perm	0.03			0.03				c0.08			0.04	
v/c Ratio	0.05	0.30		0.04	0.54			0.30			0.16	
Uniform Delay, d1	7.0	8.4		7.0	10.2			25.8			24.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.7		0.1	1.9			1.8			0.9	
Delay (s)	7.3	9.1		7.2	12.0			27.6			25.7	
Level of Service	A	A		A	B			C			C	
Approach Delay (s)		9.0			11.9			27.6			25.7	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.46				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		10.4	
Intersection Capacity Utilization	54.9%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

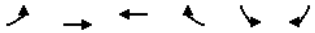
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	731	0	0	1122	14	0	0	0	11	0	19
Future Volume (vph)	3	731	0	0	1122	14	0	0	0	11	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.998						0.914	
Flt Protected											0.982	
Satd. Flow (prot)	0	3614	0	0	3538	0	0	1921	0	0	1724	0
Flt Permitted											0.982	
Satd. Flow (perm)	0	3614	0	0	3538	0	0	1921	0	0	1724	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	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%	1%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	3	795	0	0	1220	15	0	0	0	12	0	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	798	0	0	1235	0	0	0	0	0	33	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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	731	0	0	1122	14	0	0	0	11	0	19
Future Volume (Veh/h)	3	731	0	0	1122	14	0	0	0	11	0	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	3	795	0	0	1220	15	0	0	0	12	0	21
Pedestrians											2	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.82						0.82	0.82		0.82	0.82	0.82
vC, conflicting volume	1237			795			1432	2038	398	1633	2030	620
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	848			795			1086	1826	398	1331	1817	94
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	87	100	97
cM capacity (veh/h)	653			835			138	63	608	93	64	777

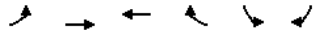
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	400	398	610	625	0	33
Volume Left	3	0	0	0	0	12
Volume Right	0	0	0	15	0	21
cSH	653	1700	835	1700	1700	212
Volume to Capacity	0.00	0.23	0.00	0.37	0.00	0.16
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	4.1
Control Delay (s)	0.1	0.0	0.0	0.0	0.0	25.1
Lane LOS	A				A	D
Approach Delay (s)	0.1		0.0		0.0	25.1
Approach LOS					A	D

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	41.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	13	722	1120	21	27	16
Future Volume (vph)	13	722	1120	21	27	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.950	
Flt Protected		0.999			0.969	
Satd. Flow (prot)	0	3381	3437	0	1768	0
Flt Permitted		0.999			0.969	
Satd. Flow (perm)	0	3381	3437	0	1768	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	6%	0%	0%	0%
Adj. Flow (vph)	14	785	1217	23	29	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	799	1240	0	46	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

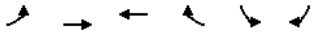
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	722	1120	21	27	16
Future Volume (Veh/h)	13	722	1120	21	27	16
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	785	1217	23	29	17
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.82				0.82	0.82
vC, conflicting volume	1246				1658	630
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	863				1365	112
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				74	98
cM capacity (veh/h)	643				112	753

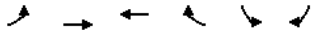
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	276	523	811	429	46
Volume Left	14	0	0	0	29
Volume Right	0	0	0	23	17
cSH	643	1700	1700	1700	164
Volume to Capacity	0.02	0.31	0.48	0.25	0.28
Queue Length 95th (m)	0.5	0.0	0.0	0.0	8.3
Control Delay (s)	0.8	0.0	0.0	0.0	35.3
Lane LOS	A				E
Approach Delay (s)	0.3		0.0		35.3
Approach LOS					E

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		42.9%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	251	458	0	0	0
Future Volume (vph)	0	251	458	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1847	1847	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1847	1847	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	4%	0%	0%	0%
Adj. Flow (vph)	0	273	498	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	273	498	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 27.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	251	458	0	0	0
Future Volume (Veh/h)	0	251	458	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	273	498	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.86				0.86	0.86
vC, conflicting volume	498				771	498
vC1, stage 1 conf vol					498	
vC2, stage 2 conf vol					273	
vCu, unblocked vol	328				648	328
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1063				565	614

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	273	498	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.16	0.29	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		27.4%	ICU Level of Service A
Analysis Period (min)		15	

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	41.0	42.8	99.3	79.0	22.1
Average Queue (m)	24.5	23.9	50.0	38.2	14.5
95th Queue (m)	37.9	40.3	76.5	68.0	22.9
Link Distance (m)	105.2	105.2	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	16.2	45.4	17.4	82.0	61.6	32.6
Average Queue (m)	2.1	21.1	5.6	42.3	24.1	15.1
95th Queue (m)	9.5	38.7	15.7	69.5	43.6	27.8
Link Distance (m)		189.5		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	1	14	0	23		
Queuing Penalty (veh)	3	2	3	5		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	EB	SB
Directions Served	LT	LTR
Maximum Queue (m)	21.1	9.1
Average Queue (m)	1.5	6.9
95th Queue (m)	9.2	12.7
Link Distance (m)	84.2	148.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: King St E & Cameron Ave S

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (m)	27.9	9.1	35.1	34.8	22.4
Average Queue (m)	5.0	0.3	1.2	2.5	7.6
95th Queue (m)	17.9	3.0	11.6	14.7	17.4
Link Distance (m)	220.0	220.0	84.2	84.2	117.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 13

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	924	141	26	1017	95	40
Future Volume (vph)	924	141	26	1017	95	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99			1.00	0.98	
Frt	0.980				0.960	
Flt Protected				0.999	0.966	
Satd. Flow (prot)	3527	0	0	3543	1768	0
Flt Permitted				0.898	0.966	
Satd. Flow (perm)	3527	0	0	3184	1747	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	35				20	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		8	8		10	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	1004	153	28	1105	103	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1157	0	0	1133	146	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.50			0.55	0.32	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	9.7			10.7	28.8	
Queue Delay	0.0			0.0	0.0	
Total Delay	9.7			10.7	28.8	
LOS	A			B	C	
Approach Delay	9.7			10.7	28.8	
Approach LOS	A			B	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 11.3		Intersection LOS: B	
Intersection Capacity Utilization 70.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	924	141	26	1017	95	40
Future Volume (vph)	924	141	26	1017	95	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.96	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	3527			3542	1768	
Flt Permitted	1.00			0.90	0.97	
Satd. Flow (perm)	3527			3183	1768	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1004	153	28	1105	103	43
RTOR Reduction (vph)	12	0	0	0	15	0
Lane Group Flow (vph)	1145	0	0	1133	131	0
Confl. Peds. (#/hr)		8	8		10	9
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2292			2068	436	
v/s Ratio Prot	0.32				c0.07	
v/s Ratio Perm				c0.36		
v/c Ratio	0.50			0.55	0.30	
Uniform Delay, d1	9.1			9.5	30.6	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.8			1.0	1.8	
Delay (s)	9.9			10.6	32.4	
Level of Service	A			B	C	
Approach Delay (s)	9.9			10.6	32.4	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	521	49	52	330	70	12	64	40	51	103	56
Future Volume (vph)	50	521	49	52	330	70	12	64	40	51	103	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	0.99	1.00		0.99	0.99			0.97			0.97	
Frt		0.987			0.974			0.954			0.964	
Flt Protected	0.950			0.950				0.995			0.988	
Satd. Flow (prot)	1825	1856	0	1789	1841	0	0	1743	0	0	1747	0
Flt Permitted	0.453			0.326				0.960			0.895	
Satd. Flow (perm)	860	1856	0	610	1841	0	0	1678	0	0	1568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			22			29			20	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
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%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Adj. Flow (vph)	54	566	53	57	359	76	13	70	43	55	112	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	619	0	57	435	0	0	126	0	0	228	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.10	0.54		0.15	0.38			0.26			0.51	
Control Delay	8.0	12.3		8.9	9.6			21.2			29.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.0	12.3		8.9	9.6			21.2			29.9	
LOS	A	B		A	A			C			C	
Approach Delay		12.0			9.6			21.2			29.9	
Approach LOS		B			A			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 14.6		Intersection LOS: B	
Intersection Capacity Utilization 70.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	521	49	52	330	70	12	64	40	51	103	56
Future Volume (vph)	50	521	49	52	330	70	12	64	40	51	103	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.98			0.98	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.97			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1804	1856		1779	1841			1739			1731	
Flt Permitted	0.45	1.00		0.33	1.00			0.96			0.90	
Satd. Flow (perm)	861	1856		610	1841			1677			1568	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	566	53	57	359	76	13	70	43	55	112	61
RTOR Reduction (vph)	0	4	0	0	9	0	0	21	0	0	15	0
Lane Group Flow (vph)	54	615	0	57	426	0	0	105	0	0	213	0
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	525	1132		372	1123			460			430	
v/s Ratio Prot		c0.33			0.23							
v/s Ratio Perm	0.06			0.09				0.06			c0.14	
v/c Ratio	0.10	0.54		0.15	0.38			0.23			0.50	
Uniform Delay, d1	7.3	10.2		7.6	8.9			25.3			27.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	1.9		0.9	1.0			1.2			4.1	
Delay (s)	7.7	12.1		8.4	9.9			26.4			31.5	
Level of Service	A	B		A	A			C			C	
Approach Delay (s)		11.8			9.7			26.4			31.5	
Approach LOS		B			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.4		
Intersection Capacity Utilization	70.7%	ICU Level of Service	C		
Analysis Period (min)	15				
c Critical Lane Group					

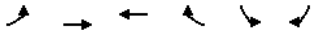
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1043	0	0	1068	22	0	0	0	22	0	9
Future Volume (vph)	17	1043	0	0	1068	22	0	0	0	22	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.997						0.960	
Flt Protected		0.999									0.966	
Satd. Flow (prot)	0	3611	0	0	3569	0	0	1921	0	0	1754	0
Flt Permitted		0.999									0.966	
Satd. Flow (perm)	0	3611	0	0	3569	0	0	1921	0	0	1754	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	8						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
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	1%	0%	3%
Adj. Flow (vph)	18	1134	0	0	1161	24	0	0	0	24	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1152	0	0	1185	0	0	0	0	0	34	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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	1043	0	0	1068	22	0	0	0	22	0	9
Future Volume (Veh/h)	17	1043	0	0	1068	22	0	0	0	22	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	18	1134	0	0	1161	24	0	0	0	24	0	10
Pedestrians		8									8	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.2									1.2	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.83						0.83	0.83		0.83	0.83	0.83
vC, conflicting volume	1193			1134			1768	2363	567	1784	2351	608
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	835			1134			1525	2237	567	1543	2222	135
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	100	100	62	100	99
cM capacity (veh/h)	669			623			66	35	472	64	35	729

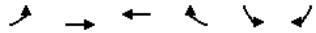
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	585	567	580	604	0	34
Volume Left	18	0	0	0	0	24
Volume Right	0	0	0	24	0	10
cSH	669	1700	623	1700	1700	87
Volume to Capacity	0.03	0.33	0.00	0.36	0.00	0.39
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0	11.8
Control Delay (s)	0.7	0.0	0.0	0.0	0.0	70.5
Lane LOS	A				A	F
Approach Delay (s)	0.4		0.0		0.0	70.5
Approach LOS					A	F

Intersection Summary					
Average Delay	1.2				
Intersection Capacity Utilization	51.2%	ICU Level of Service		A	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	17	1043	1057	20	17	8
Future Volume (vph)	17	1043	1057	20	17	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.955	
Flt Protected		0.999			0.968	
Satd. Flow (prot)	0	3439	3437	0	1655	0
Flt Permitted		0.999			0.968	
Satd. Flow (perm)	0	3439	3437	0	1655	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	6%	0%	8%	6%
Adj. Flow (vph)	18	1134	1149	22	18	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1152	1171	0	27	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

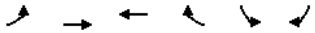
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	1043	1057	20	17	8
Future Volume (Veh/h)	17	1043	1057	20	17	8
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)	18	1134	1149	22	18	9
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	1177				1772	596
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	829				1537	136
tC, single (s)	4.3				7.0	7.0
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	97				78	99
cM capacity (veh/h)	636				81	728

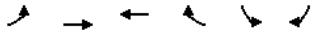
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	396	756	766	405	27
Volume Left	18	0	0	0	18
Volume Right	0	0	0	22	9
cSH	636	1700	1700	1700	116
Volume to Capacity	0.03	0.44	0.45	0.24	0.23
Queue Length 95th (m)	0.7	0.0	0.0	0.0	6.5
Control Delay (s)	0.9	0.0	0.0	0.0	45.4
Lane LOS	A				E
Approach Delay (s)	0.3		0.0		45.4
Approach LOS					E

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	0	620	331	0	0	0
Future Volume (vph)	0	620	331	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1902	1902	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1902	1902	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	0	674	360	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	674	360	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	0	620	331	0	0	0
Future Volume (Veh/h)	0	620	331	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	674	360	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.95				0.95	0.95
vC, conflicting volume	360				1034	360
vC1, stage 1 conf vol					360	
vC2, stage 2 conf vol					674	
vCu, unblocked vol	303				1011	303
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1209				457	706

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	674	360	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.40	0.21	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	63.0	60.9	85.1	82.7	33.7
Average Queue (m)	38.9	40.0	51.1	35.1	15.3
95th Queue (m)	60.1	61.1	75.4	66.9	26.6
Link Distance (m)	105.2	105.2	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	17.5	92.4	17.3	71.5	46.0	60.4
Average Queue (m)	5.8	48.1	7.9	29.0	16.1	27.3
95th Queue (m)	16.0	76.3	18.5	58.5	33.7	47.9
Link Distance (m)		189.5		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	2	25	7	16		
Queuing Penalty (veh)	9	12	27	8		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	EB	EB	WB	WB	SB
Directions Served	LT	TR	LT	TR	LTR
Maximum Queue (m)	38.4	14.2	15.2	20.0	20.9
Average Queue (m)	3.2	0.7	1.8	1.4	8.2
95th Queue (m)	15.4	5.5	8.7	8.7	16.8
Link Distance (m)	84.2	84.2	105.2	105.2	148.3
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: King St E & Cameron Ave S

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (m)	49.0	9.3	15.8	20.8	16.0
Average Queue (m)	7.1	0.3	1.1	1.5	5.5
95th Queue (m)	27.1	3.1	6.6	9.4	13.6
Link Distance (m)	220.0	220.0	84.2	84.2	117.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 56

Appendix D

ITE 10th Edition Trip Generation Graphs

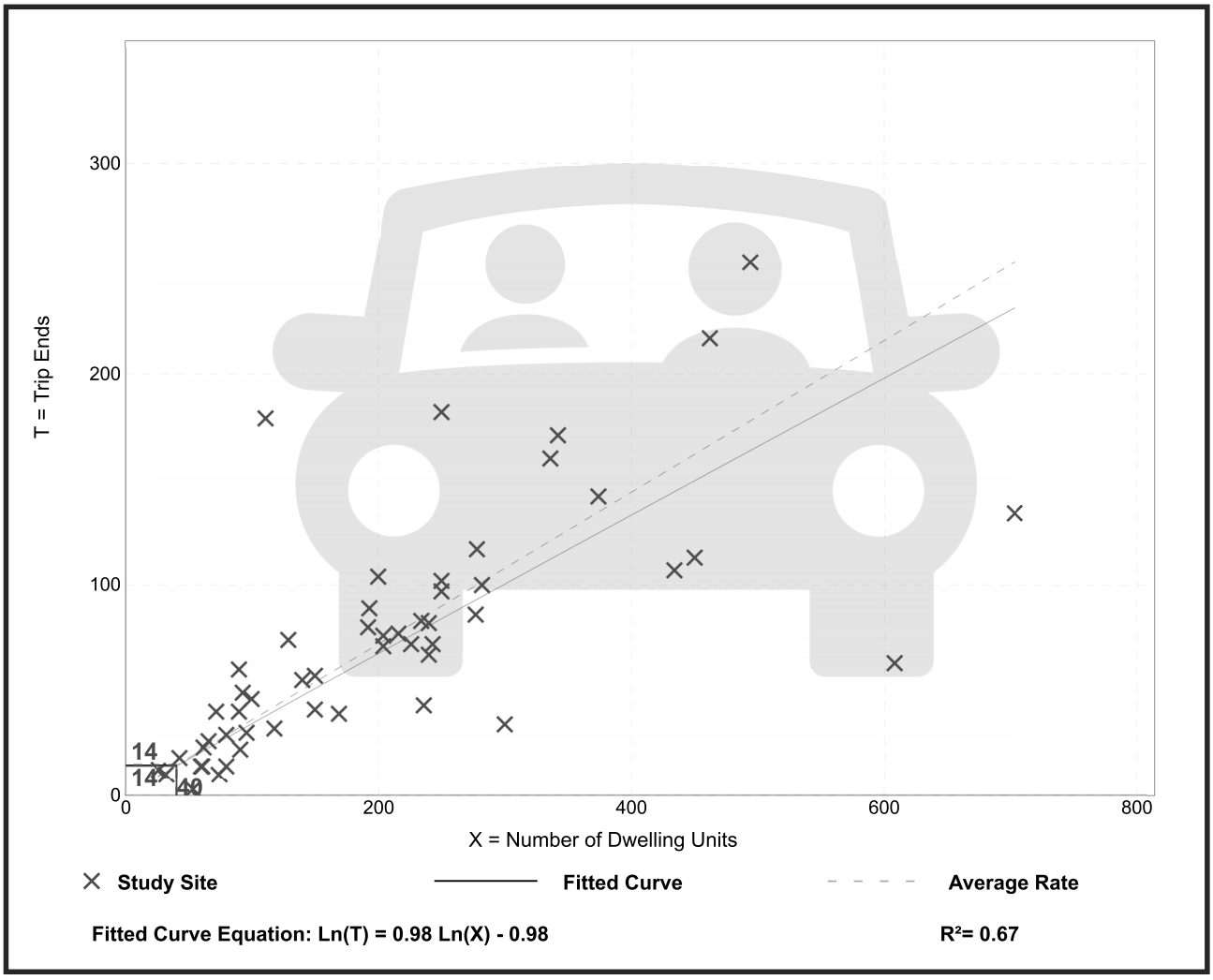
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 53
Avg. Num. of Dwelling Units: 207
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



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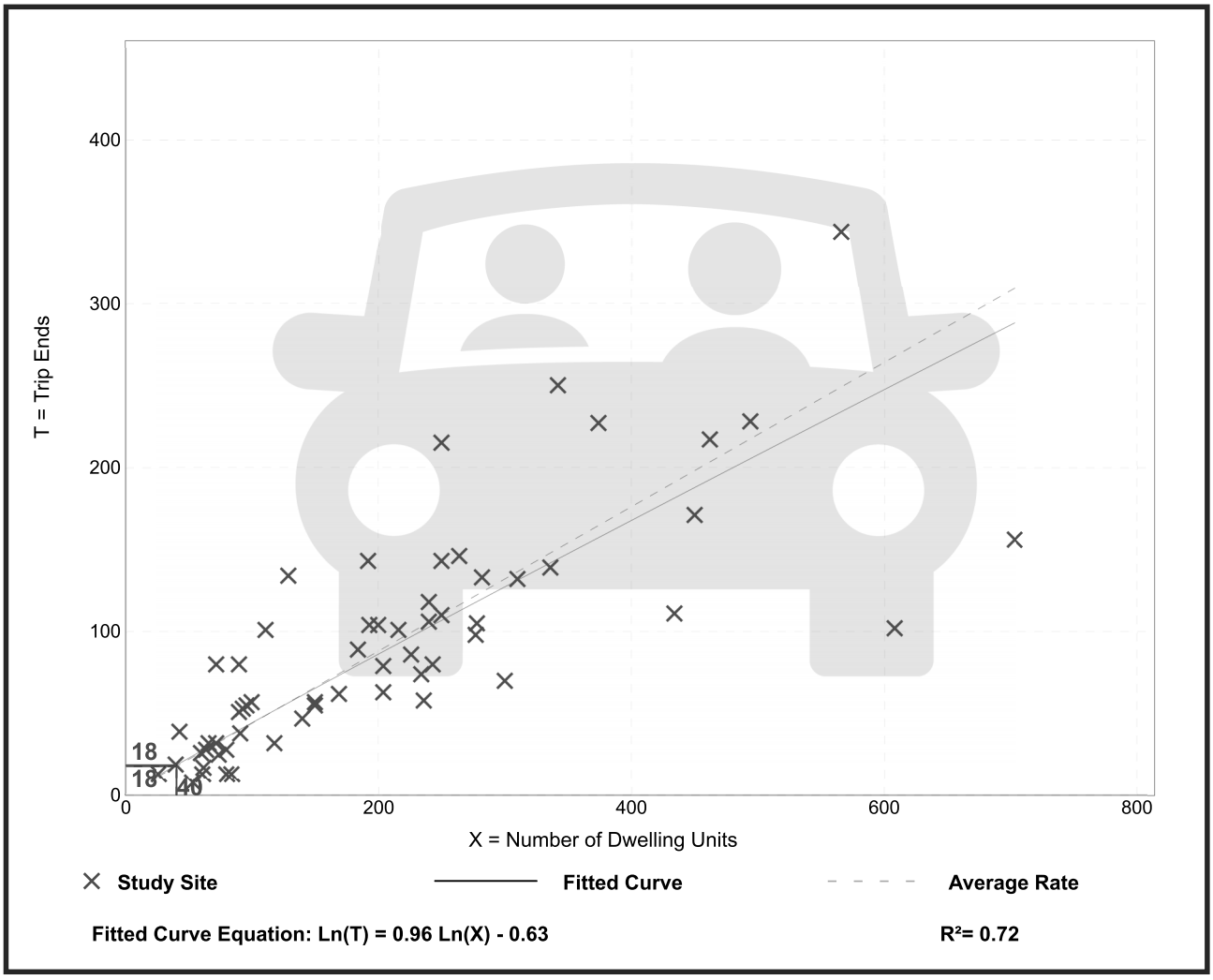
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 60
Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



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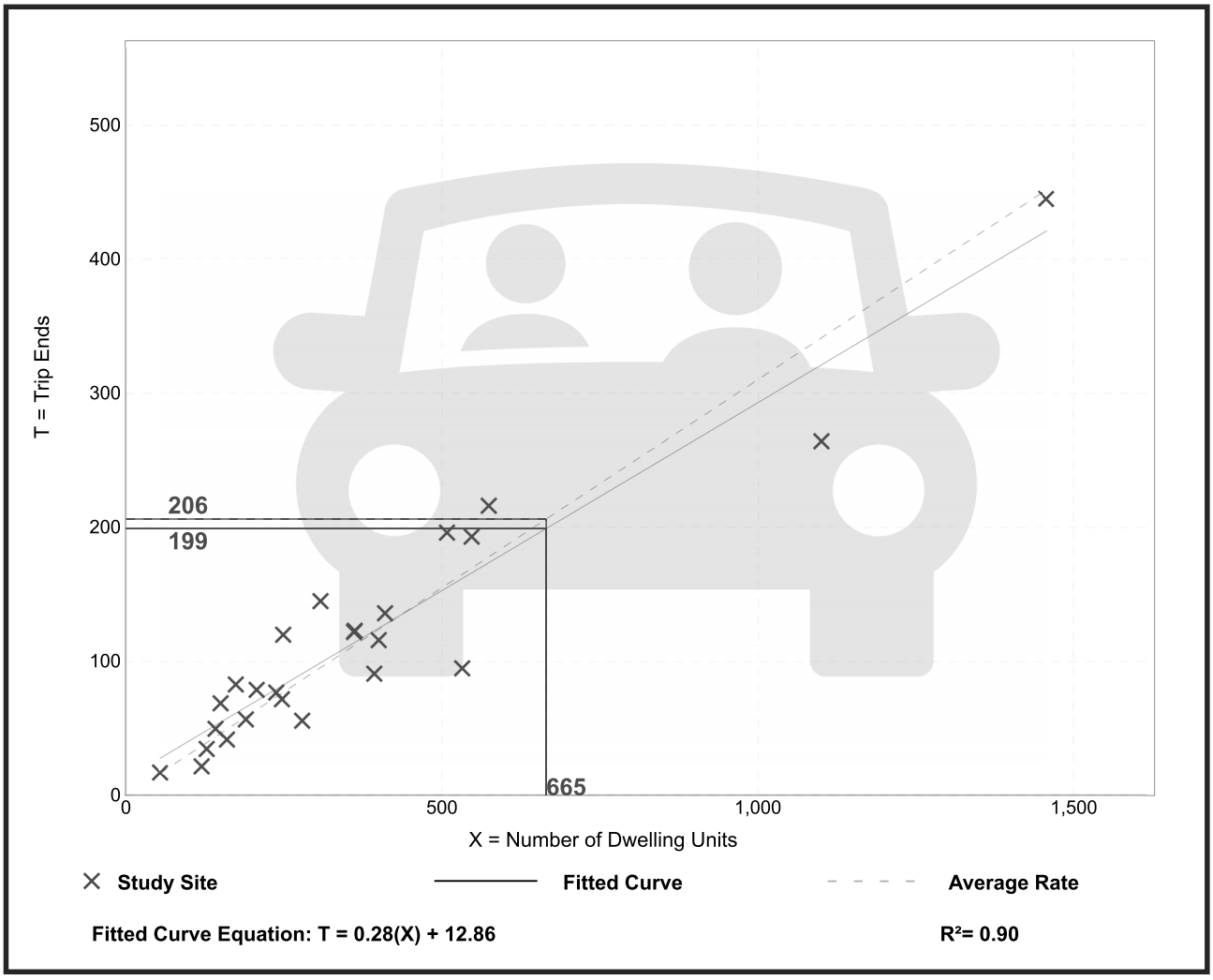
Multifamily Housing (High-Rise)
(222)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 25
Avg. Num. of Dwelling Units: 372
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.31	0.18 - 0.48	0.08

Data Plot and Equation



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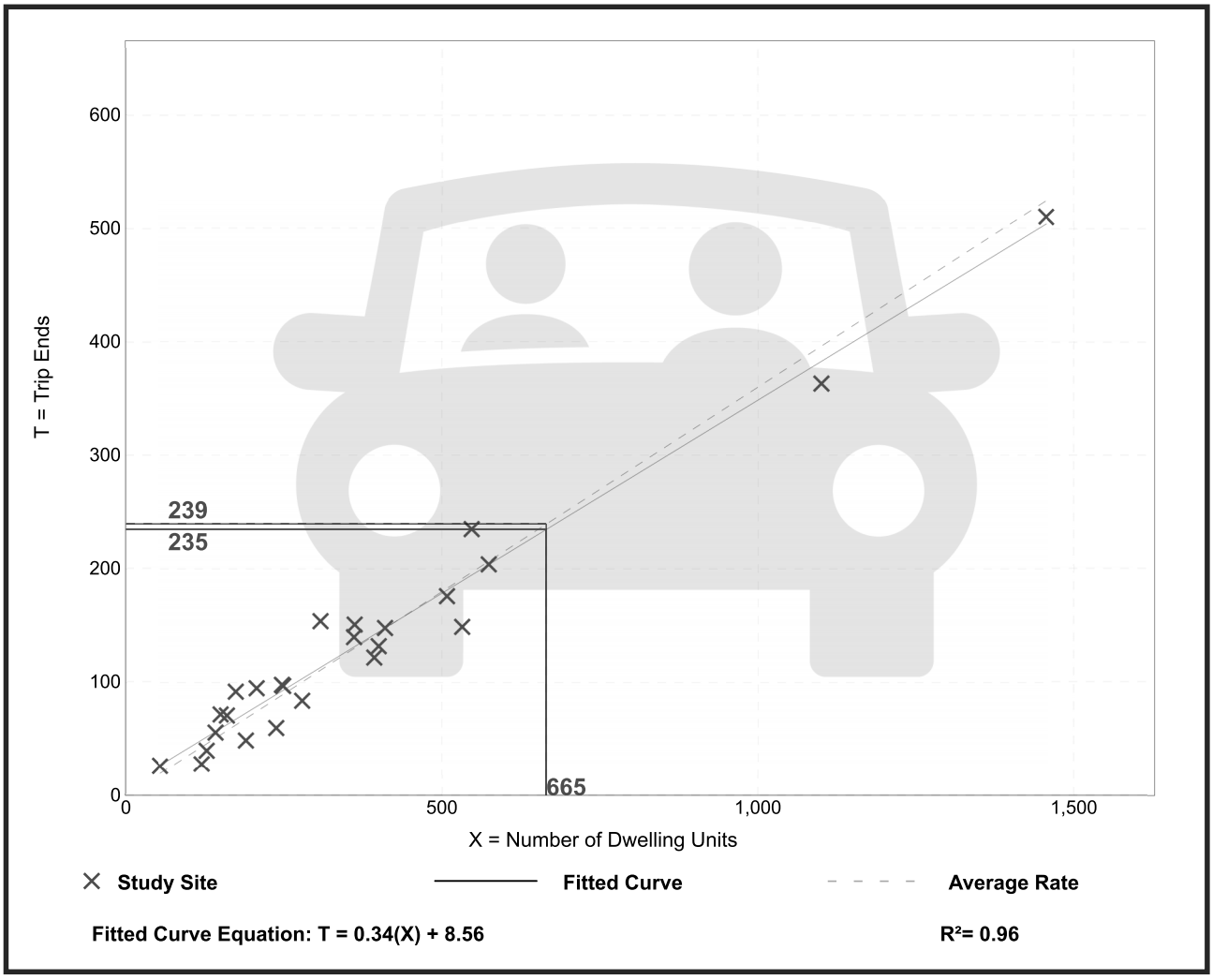
Multifamily Housing (High-Rise)
(222)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 25
Avg. Num. of Dwelling Units: 372
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.23 - 0.53	0.06

Data Plot and Equation



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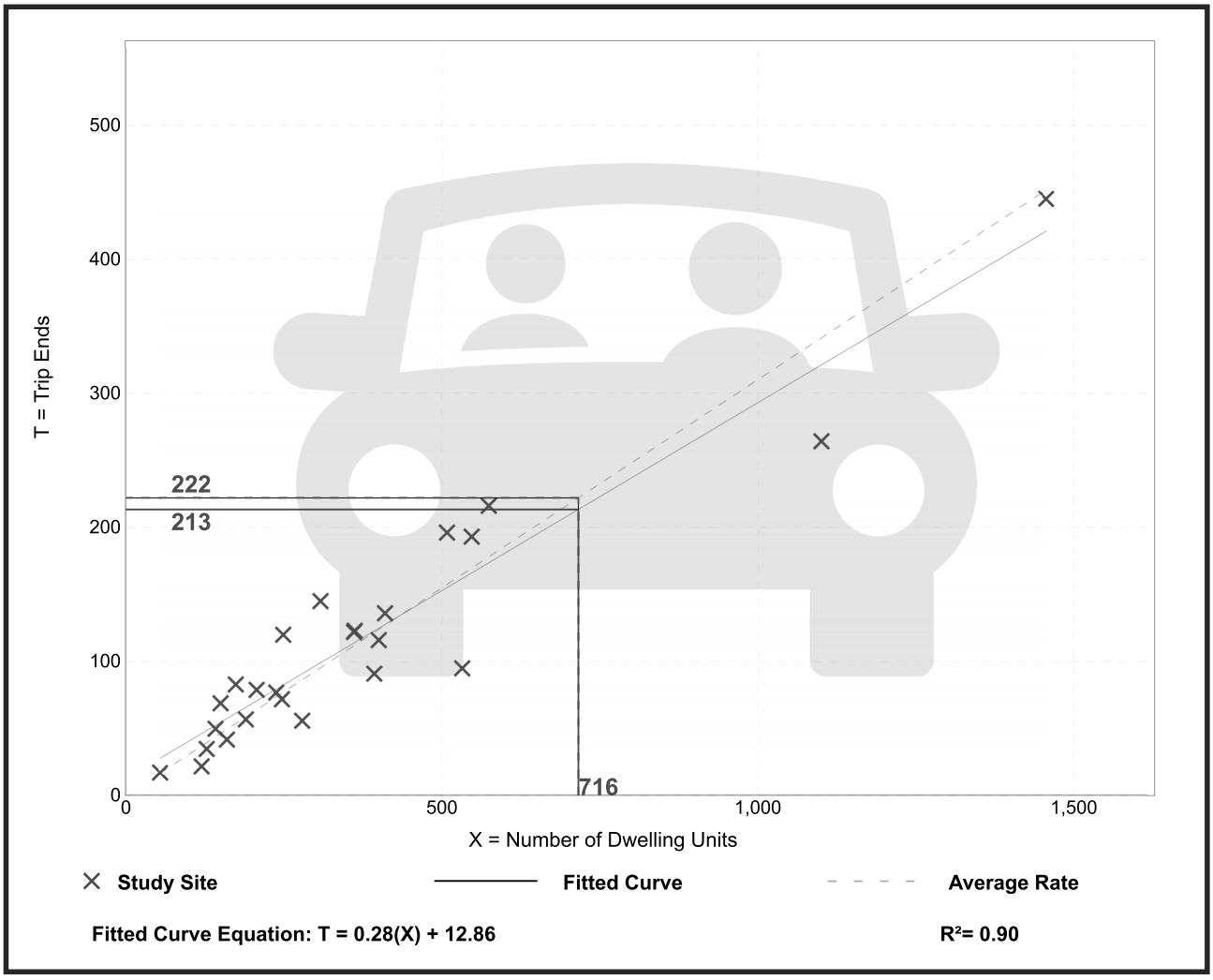
Multifamily Housing (High-Rise)
(222)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 25
Avg. Num. of Dwelling Units: 372
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.31	0.18 - 0.48	0.08

Data Plot and Equation



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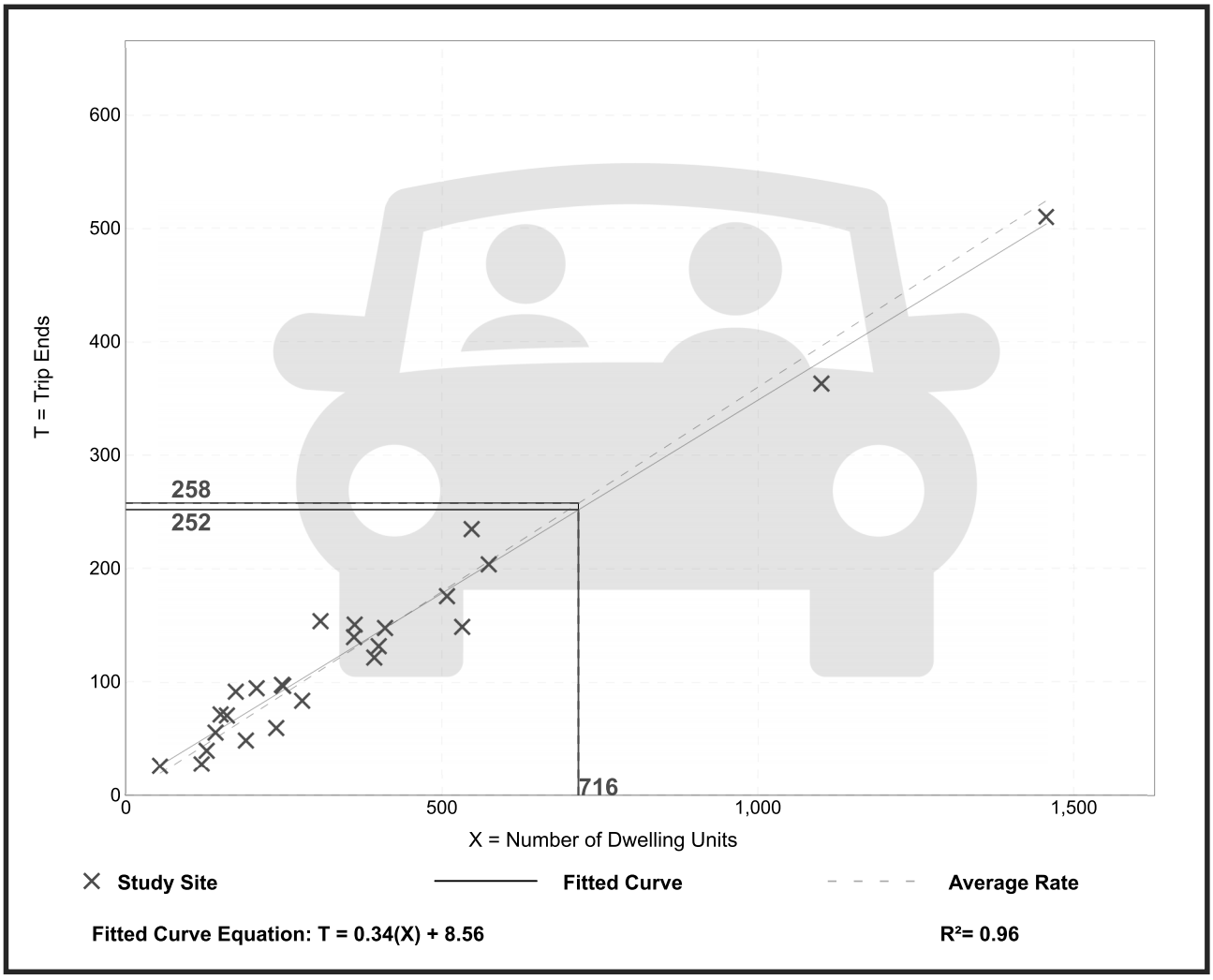
Multifamily Housing (High-Rise)
(222)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 25
Avg. Num. of Dwelling Units: 372
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.23 - 0.53	0.06

Data Plot and Equation



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Appendix E

Detailed TTS Mode Share Data

As taken from the TTS 2016 City of Hamilton Summary by Ward document

Trips made by Residents of City of Hamilton - Ward 4

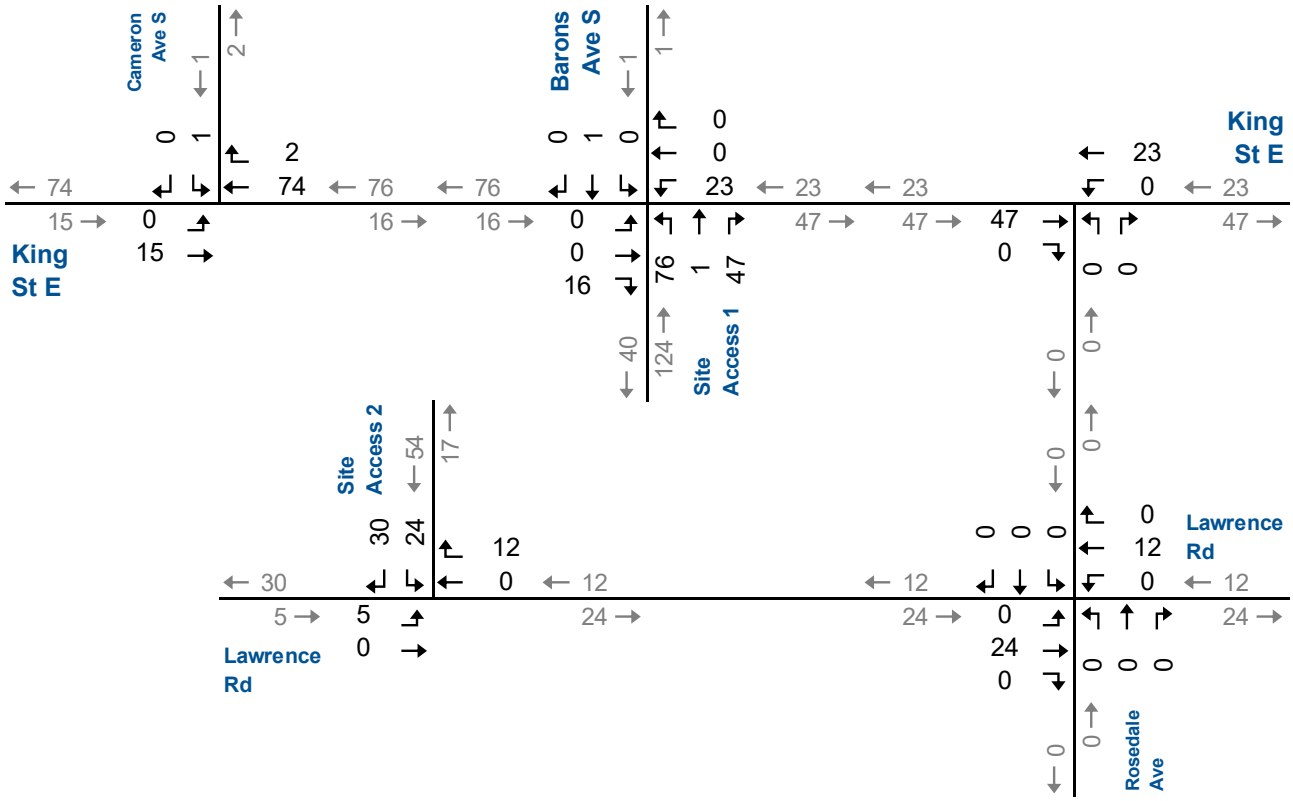
	Trips	Driver	Passenger	Transit	GO Train	Walk & Cycle	Other	Total
6a to 9 a	13100	63%	9%	11%	1%	13%	3%	100%

Driver	Active Trans	Transit	Other Modes	Total
63%	13%	11%	13%	100%

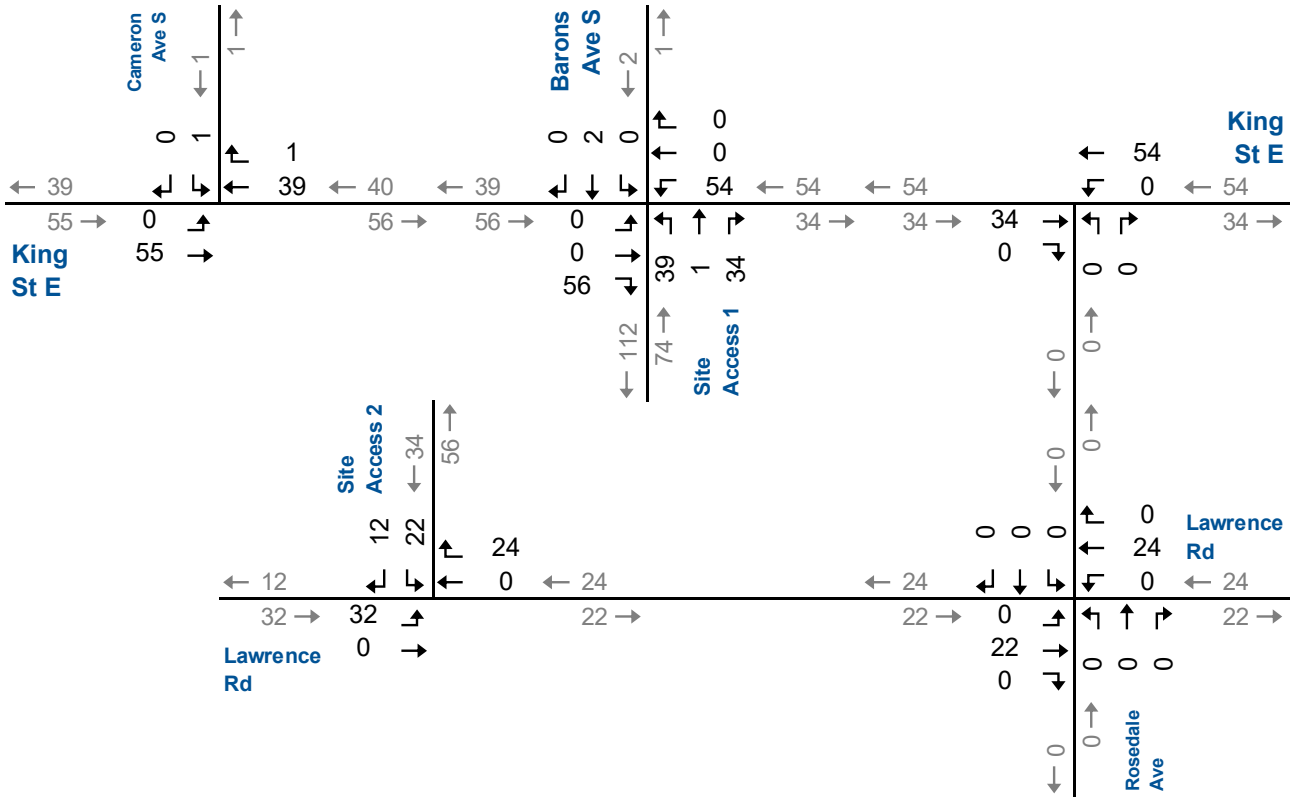
Appendix F

Combined Site Generated Trip Assignment

AM Peak Hour



PM Peak Hour



Combined Site Generated Trip Assignment

Appendix G

2027 Background Traffic Operations Reports

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	745	46	14	1221	84	26
Future Volume (vph)	745	46	14	1221	84	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00			1.00	0.99	
Frt	0.991				0.968	
Flt Protected				0.999	0.963	
Satd. Flow (prot)	3577	0	0	3541	1784	0
Flt Permitted				0.942	0.963	
Satd. Flow (perm)	3577	0	0	3339	1781	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	13				15	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		5	5		1	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	810	50	15	1327	91	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	860	0	0	1342	119	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.37			0.62	0.26	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	8.5			11.8	28.3	
Queue Delay	0.0			0.0	0.0	
Total Delay	8.5			11.8	28.3	
LOS	A			B	C	
Approach Delay	8.5			11.8	28.3	
Approach LOS	A			B	C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green		
Natural Cycle: 95		
Control Type: Pretimed		
Maximum v/c Ratio: 0.62		
Intersection Signal Delay: 11.4		Intersection LOS: B
Intersection Capacity Utilization 67.2%		ICU Level of Service C
Analysis Period (min) 15		

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	745	46	14	1221	84	26
Future Volume (vph)	745	46	14	1221	84	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.97	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3578			3543	1784	
Flt Permitted	1.00			0.94	0.96	
Satd. Flow (perm)	3578			3338	1784	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	810	50	15	1327	91	28
RTOR Reduction (vph)	5	0	0	0	11	0
Lane Group Flow (vph)	855	0	0	1342	108	0
Confl. Peds. (#/hr)		5	5		1	3
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2325			2169	440	
v/s Ratio Prot	0.24				c0.06	
v/s Ratio Perm				c0.40		
v/c Ratio	0.37			0.62	0.24	
Uniform Delay, d1	8.1			10.2	30.2	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.4			1.3	1.3	
Delay (s)	8.5			11.6	31.5	
Level of Service	A			B	C	
Approach Delay (s)	8.5			11.6	31.5	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	334	15	26	548	72	39	61	56	18	41	24
Future Volume (vph)	18	334	15	26	548	72	39	61	56	18	41	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	1.00	1.00		0.98	1.00			0.97			0.97	
Frt		0.994			0.983			0.951			0.961	
Flt Protected	0.950			0.950				0.988			0.989	
Satd. Flow (prot)	1706	1823	0	1825	1812	0	0	1724	0	0	1538	0
Flt Permitted	0.290			0.495				0.909			0.920	
Satd. Flow (perm)	519	1823	0	931	1812	0	0	1568	0	0	1421	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			13			31			22	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		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
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Adj. Flow (vph)	20	363	16	28	596	78	42	66	61	20	45	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	379	0	28	674	0	0	169	0	0	91	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.06	0.34		0.05	0.61			0.37			0.22	
Control Delay	7.8	9.6		7.4	13.5			24.2			21.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	7.8	9.6		7.4	13.5			24.2			21.2	
LOS	A	A		A	B			C			C	
Approach Delay		9.5			13.3			24.2			21.2	
Approach LOS		A			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 14.1		Intersection LOS: B	
Intersection Capacity Utilization 58.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	334	15	26	548	72	39	61	56	18	41	24
Future Volume (vph)	18	334	15	26	548	72	39	61	56	18	41	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.98	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			0.99			0.99	
Frt	1.00	0.99		1.00	0.98			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1699	1823		1786	1812			1704			1529	
Flt Permitted	0.29	1.00		0.50	1.00			0.91			0.92	
Satd. Flow (perm)	519	1823		931	1812			1568			1423	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	363	16	28	596	78	42	66	61	20	45	26
RTOR Reduction (vph)	0	2	0	0	5	0	0	22	0	0	16	0
Lane Group Flow (vph)	20	377	0	28	669	0	0	147	0	0	75	0
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		24
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	316	1112		567	1105			430			390	
v/s Ratio Prot		0.21			c0.37							
v/s Ratio Perm	0.04			0.03				c0.09			0.05	
v/c Ratio	0.06	0.34		0.05	0.61			0.34			0.19	
Uniform Delay, d1	7.1	8.6		7.1	10.9			26.1			25.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	0.8		0.2	2.5			2.1			1.1	
Delay (s)	7.5	9.5		7.2	13.3			28.3			26.1	
Level of Service	A	A		A	B			C			C	
Approach Delay (s)		9.4			13.1			28.3			26.1	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.52				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		10.4	
Intersection Capacity Utilization	58.6%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

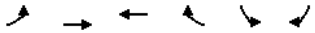
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	823	0	0	1264	16	0	0	0	12	0	21
Future Volume (vph)	4	823	0	0	1264	16	0	0	0	12	0	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.998						0.914	
Flt Protected											0.982	
Satd. Flow (prot)	0	3614	0	0	3538	0	0	1921	0	0	1724	0
Flt Permitted											0.982	
Satd. Flow (perm)	0	3614	0	0	3538	0	0	1921	0	0	1724	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	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%	1%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	895	0	0	1374	17	0	0	0	13	0	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	899	0	0	1391	0	0	0	0	0	36	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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	823	0	0	1264	16	0	0	0	12	0	21
Future Volume (Veh/h)	4	823	0	0	1264	16	0	0	0	12	0	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	4	895	0	0	1374	17	0	0	0	13	0	23
Pedestrians											2	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.78						0.78	0.78		0.78	0.78	0.78
vC, conflicting volume	1393			895			1613	2296	448	1840	2288	698
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	939			895			1221	2097	448	1512	2086	47
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	80	100	97
cM capacity (veh/h)	575			767			104	41	564	65	41	793

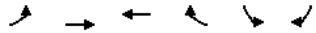
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	452	448	687	704	0	36
Volume Left	4	0	0	0	0	13
Volume Right	0	0	0	17	0	23
cSH	575	1700	767	1700	1700	157
Volume to Capacity	0.01	0.26	0.00	0.41	0.00	0.23
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	6.4
Control Delay (s)	0.2	0.0	0.0	0.0	0.0	34.6
Lane LOS	A				A	D
Approach Delay (s)	0.1		0.0		0.0	34.6
Approach LOS					A	D

Intersection Summary					
Average Delay	0.6				
Intersection Capacity Utilization	45.5%	ICU Level of Service		A	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	813	1261	24	30	18
Future Volume (vph)	15	813	1261	24	30	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.949	
Flt Protected		0.999			0.970	
Satd. Flow (prot)	0	3381	3437	0	1768	0
Flt Permitted		0.999			0.970	
Satd. Flow (perm)	0	3381	3437	0	1768	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	6%	0%	0%	0%
Adj. Flow (vph)	16	884	1371	26	33	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	900	1397	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

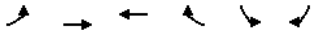
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	813	1261	24	30	18
Future Volume (Veh/h)	15	813	1261	24	30	18
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)	16	884	1371	26	33	20
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.78				0.78	0.78
vC, conflicting volume	1403				1867	708
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	948				1544	55
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				59	97
cM capacity (veh/h)	567				81	776

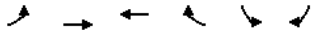
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	311	589	914	483	53
Volume Left	16	0	0	0	33
Volume Right	0	0	0	26	20
cSH	567	1700	1700	1700	122
Volume to Capacity	0.03	0.35	0.54	0.28	0.43
Queue Length 95th (m)	0.7	0.0	0.0	0.0	14.4
Control Delay (s)	1.0	0.0	0.0	0.0	55.5
Lane LOS	A				F
Approach Delay (s)	0.3		0.0		55.5
Approach LOS					F

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	0	283	516	0	0	0
Future Volume (vph)	0	283	516	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1847	1847	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1847	1847	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	4%	0%	0%	0%
Adj. Flow (vph)	0	308	561	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	308	561	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.5%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	0	283	516	0	0	0
Future Volume (Veh/h)	0	283	516	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	308	561	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.81				0.81	0.81
vC, conflicting volume	561				869	561
vC1, stage 1 conf vol					561	
vC2, stage 2 conf vol					308	
vCu, unblocked vol	344				723	344
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	996				523	571

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	308	561	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.18	0.33	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		30.5%	ICU Level of Service A
Analysis Period (min)		15	

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	45.4	48.6	84.2	56.9	20.7
Average Queue (m)	31.9	31.0	48.1	39.4	12.9
95th Queue (m)	47.7	54.2	79.0	61.3	25.9
Link Distance (m)	105.2	105.2	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	16.1	69.2	8.3	87.5	34.4	35.8
Average Queue (m)	6.3	34.9	2.5	61.8	28.0	16.7
95th Queue (m)	19.0	75.3	8.0	93.1	33.8	35.0
Link Distance (m)		189.5		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	2	13		31		
Queuing Penalty (veh)	6	2		8		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	SB
Directions Served	LTR
Maximum Queue (m)	9.0
Average Queue (m)	7.0
95th Queue (m)	12.7
Link Distance (m)	148.3
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: King St E & Cameron Ave S

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (m)	36.0	14.9	14.9	21.5	15.5
Average Queue (m)	7.2	3.0	3.0	4.3	8.5
95th Queue (m)	30.9	12.8	12.8	18.5	16.6
Link Distance (m)	220.0	220.0	84.2	84.2	117.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 16

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1041	159	29	1145	107	45
Future Volume (vph)	1041	159	29	1145	107	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99			1.00	0.98	
Frt	0.980				0.960	
Flt Protected				0.999	0.966	
Satd. Flow (prot)	3527	0	0	3543	1767	0
Flt Permitted				0.881	0.966	
Satd. Flow (perm)	3527	0	0	3124	1747	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	35				20	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		8	8		10	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	1132	173	32	1245	116	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1305	0	0	1277	165	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.57			0.63	0.37	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	10.6			12.1	30.0	
Queue Delay	0.0			0.0	0.0	
Total Delay	10.6			12.1	30.0	
LOS	B			B	C	
Approach Delay	10.6			12.1	30.0	
Approach LOS	B			B	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 76.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1041	159	29	1145	107	45
Future Volume (vph)	1041	159	29	1145	107	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.96	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	3527			3542	1767	
Flt Permitted	1.00			0.88	0.97	
Satd. Flow (perm)	3527			3125	1767	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1132	173	32	1245	116	49
RTOR Reduction (vph)	12	0	0	0	15	0
Lane Group Flow (vph)	1293	0	0	1277	150	0
Confl. Peds. (#/hr)		8	8		10	9
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2292			2031	436	
v/s Ratio Prot	0.37				c0.08	
v/s Ratio Perm				c0.41		
v/c Ratio	0.56			0.63	0.34	
Uniform Delay, d1	9.7			10.4	31.0	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.0			1.5	2.1	
Delay (s)	10.7			11.8	33.1	
Level of Service	B			B	C	
Approach Delay (s)	10.7			11.8	33.1	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	587	55	58	371	79	13	72	45	57	116	63
Future Volume (vph)	56	587	55	58	371	79	13	72	45	57	116	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	0.99	1.00		1.00	0.99			0.97			0.97	
Frt		0.987			0.974			0.953			0.964	
Flt Protected	0.950			0.950				0.995			0.988	
Satd. Flow (prot)	1825	1856	0	1789	1841	0	0	1741	0	0	1747	0
Flt Permitted	0.414			0.275				0.958			0.898	
Satd. Flow (perm)	787	1856	0	516	1841	0	0	1672	0	0	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			22			29			20	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
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%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Adj. Flow (vph)	61	638	60	63	403	86	14	78	49	62	126	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	698	0	63	489	0	0	141	0	0	256	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.13	0.61		0.20	0.43			0.29			0.57	
Control Delay	8.3	13.7		9.8	10.3			22.3			31.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.3	13.7		9.8	10.3			22.3			31.8	
LOS	A	B		A	B			C			C	
Approach Delay		13.3			10.2			22.3			31.8	
Approach LOS		B			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 15.8		Intersection LOS: B	
Intersection Capacity Utilization 77.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	587	55	58	371	79	13	72	45	57	116	63
Future Volume (vph)	56	587	55	58	371	79	13	72	45	57	116	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.98			0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.97			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1807	1856		1781	1841			1737			1732	
Flt Permitted	0.41	1.00		0.27	1.00			0.96			0.90	
Satd. Flow (perm)	788	1856		516	1841			1672			1575	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	638	60	63	403	86	14	78	49	62	126	68
RTOR Reduction (vph)	0	4	0	0	9	0	0	21	0	0	15	0
Lane Group Flow (vph)	61	694	0	63	480	0	0	120	0	0	241	0
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	480	1132		314	1123			458			432	
v/s Ratio Prot		c0.37			0.26							
v/s Ratio Perm	0.08			0.12				0.07			c0.15	
v/c Ratio	0.13	0.61		0.20	0.43			0.26			0.56	
Uniform Delay, d1	7.4	10.9		7.8	9.3			25.5			28.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	2.5		1.4	1.2			1.4			5.1	
Delay (s)	8.0	13.4		9.2	10.5			26.9			33.1	
Level of Service	A	B		A	B			C			C	
Approach Delay (s)		13.0			10.3			26.9			33.1	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.60				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.4		
Intersection Capacity Utilization	77.1%	ICU Level of Service	D		
Analysis Period (min)	15				
c Critical Lane Group					

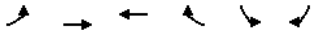
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1175	0	0	1203	25	0	0	0	25	0	11
Future Volume (vph)	19	1175	0	0	1203	25	0	0	0	25	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.997						0.958	
Flt Protected		0.999									0.967	
Satd. Flow (prot)	0	3611	0	0	3569	0	0	1921	0	0	1751	0
Flt Permitted		0.999									0.967	
Satd. Flow (perm)	0	3611	0	0	3569	0	0	1921	0	0	1751	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	8						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
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	1%	0%	3%
Adj. Flow (vph)	21	1277	0	0	1308	27	0	0	0	27	0	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1298	0	0	1335	0	0	0	0	0	39	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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	1175	0	0	1203	25	0	0	0	25	0	11
Future Volume (Veh/h)	19	1175	0	0	1203	25	0	0	0	25	0	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	21	1277	0	0	1308	27	0	0	0	27	0	12
Pedestrians		8									8	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.2									1.2	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.80						0.80	0.80		0.80	0.80	0.80
vC, conflicting volume	1343			1277			1993	2662	638	2010	2648	684
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	926			1277			1740	2577	638	1761	2560	101
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	100	100	35	100	98
cM capacity (veh/h)	592			550			43	20	424	42	20	734

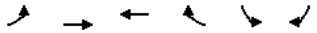
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	660	638	654	681	0	39
Volume Left	21	0	0	0	0	27
Volume Right	0	0	0	27	0	12
cSH	592	1700	550	1700	1700	59
Volume to Capacity	0.04	0.38	0.00	0.40	0.00	0.66
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	21.2
Control Delay (s)	1.0	0.0	0.0	0.0	0.0	146.0
Lane LOS	A				A	F
Approach Delay (s)	0.5		0.0		0.0	146.0
Approach LOS					A	F

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	1174	1190	23	20	9
Future Volume (vph)	20	1174	1190	23	20	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.958	
Flt Protected		0.999			0.967	
Satd. Flow (prot)	0	3439	3437	0	1657	0
Flt Permitted		0.999			0.967	
Satd. Flow (perm)	0	3439	3437	0	1657	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	6%	0%	8%	6%
Adj. Flow (vph)	22	1276	1293	25	22	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1298	1318	0	32	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

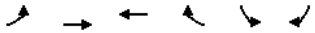
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.9%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1174	1190	23	20	9
Future Volume (Veh/h)	20	1174	1190	23	20	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)	22	1276	1293	25	22	10
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.80				0.80	0.80
vC, conflicting volume	1324				1996	669
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	910				1749	93
tC, single (s)	4.3				7.0	7.0
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	96				60	99
cM capacity (veh/h)	565				55	742

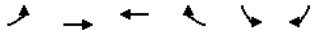
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	447	851	862	456	32
Volume Left	22	0	0	0	22
Volume Right	0	0	0	25	10
cSH	565	1700	1700	1700	78
Volume to Capacity	0.04	0.50	0.51	0.27	0.41
Queue Length 95th (m)	0.9	0.0	0.0	0.0	12.4
Control Delay (s)	1.1	0.0	0.0	0.0	80.6
Lane LOS	A				F
Approach Delay (s)	0.4		0.0		80.6
Approach LOS					F

Intersection Summary				
Average Delay		1.2		
Intersection Capacity Utilization		57.9%	ICU Level of Service	B
Analysis Period (min)		15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	0	698	373	0	0	0
Future Volume (vph)	0	698	373	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1902	1902	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1902	1902	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	0	759	405	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	759	405	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	0	698	373	0	0	0
Future Volume (Veh/h)	0	698	373	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	759	405	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	405				1164	405
vC1, stage 1 conf vol					405	
vC2, stage 2 conf vol					759	
vCu, unblocked vol	320				1138	320
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1161				415	673

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	759	405	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.45	0.24	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	72.4	72.6	66.2	61.7	58.9
Average Queue (m)	53.6	54.4	50.8	38.2	36.2
95th Queue (m)	75.6	75.2	66.1	63.2	64.5
Link Distance (m)	105.2	105.2	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	17.5	118.1	17.3	52.4	21.8	32.7
Average Queue (m)	12.8	74.0	12.6	42.9	15.0	28.2
95th Queue (m)	19.5	137.3	19.1	61.5	26.5	34.3
Link Distance (m)		189.5		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	1	26	4	31		
Queuing Penalty (veh)	6	15	20	18		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	EB	EB	SB
Directions Served	LT	TR	LTR
Maximum Queue (m)	52.9	60.2	15.4
Average Queue (m)	10.6	12.0	6.7
95th Queue (m)	45.5	51.8	16.4
Link Distance (m)	84.2	84.2	148.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: King St E & Cameron Ave S

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	35.6	23.5
Average Queue (m)	23.3	15.3
95th Queue (m)	40.4	28.9
Link Distance (m)	220.0	117.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 59

Appendix H

2027 Future Total Traffic Operations Reports

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	788	95	14	1242	95	26
Future Volume (vph)	788	95	14	1242	95	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00			1.00	1.00	
Frt	0.984				0.971	
Flt Protected				0.999	0.962	
Satd. Flow (prot)	3547	0	0	3541	1788	0
Flt Permitted				0.940	0.962	
Satd. Flow (perm)	3547	0	0	3332	1786	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	26				13	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		5	5		1	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	857	103	15	1350	103	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	960	0	0	1365	131	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.41			0.63	0.29	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	8.8			12.0	29.5	
Queue Delay	0.0			0.0	0.0	
Total Delay	8.8			12.0	29.5	
LOS	A			B	C	
Approach Delay	8.8			12.0	29.5	
Approach LOS	A			B	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 11.7		Intersection LOS: B	
Intersection Capacity Utilization 67.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	788	95	14	1242	95	26
Future Volume (vph)	788	95	14	1242	95	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.97	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3547			3543	1789	
Flt Permitted	1.00			0.94	0.96	
Satd. Flow (perm)	3547			3331	1789	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	857	103	15	1350	103	28
RTOR Reduction (vph)	9	0	0	0	10	0
Lane Group Flow (vph)	951	0	0	1365	121	0
Confl. Peds. (#/hr)		5	5		1	3
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2305			2165	441	
v/s Ratio Prot	0.27				c0.07	
v/s Ratio Perm				c0.41		
v/c Ratio	0.41			0.63	0.27	
Uniform Delay, d1	8.4			10.4	30.4	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.5			1.4	1.5	
Delay (s)	8.9			11.8	32.0	
Level of Service	A			B	C	
Approach Delay (s)	8.9			11.8	32.0	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	334	15	26	548	83	39	61	56	39	41	52
Future Volume (vph)	18	334	15	26	548	83	39	61	56	39	41	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	1.00	1.00		0.98	1.00			0.97			0.96	
Frt		0.994			0.980			0.951			0.947	
Flt Protected	0.950			0.950				0.988			0.986	
Satd. Flow (prot)	1706	1823	0	1825	1806	0	0	1724	0	0	1529	0
Flt Permitted	0.283			0.495				0.896			0.880	
Satd. Flow (perm)	506	1823	0	931	1806	0	0	1548	0	0	1353	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			15			31			36	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		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
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Adj. Flow (vph)	20	363	16	28	596	90	42	66	61	42	45	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	379	0	28	686	0	0	169	0	0	144	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.06	0.34		0.05	0.62			0.38			0.36	
Control Delay	7.8	9.6		7.4	13.8			24.3			22.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	7.8	9.6		7.4	13.8			24.3			22.6	
LOS	A	A		A	B			C			C	
Approach Delay		9.5			13.5			24.3			22.6	
Approach LOS		A			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 14.6		Intersection LOS: B	
Intersection Capacity Utilization 59.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	334	15	26	548	83	39	61	56	39	41	52
Future Volume (vph)	18	334	15	26	548	83	39	61	56	39	41	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.97	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			0.99			0.99	
Frt	1.00	0.99		1.00	0.98			0.95			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1700	1823		1786	1807			1707			1514	
Flt Permitted	0.28	1.00		0.50	1.00			0.90			0.88	
Satd. Flow (perm)	506	1823		931	1807			1548			1352	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	363	16	28	596	90	42	66	61	42	45	57
RTOR Reduction (vph)	0	2	0	0	6	0	0	22	0	0	26	0
Lane Group Flow (vph)	20	377	0	28	680	0	0	147	0	0	118	0
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		24
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	308	1112		567	1102			424			371	
v/s Ratio Prot		0.21			c0.38							
v/s Ratio Perm	0.04			0.03				c0.09			0.09	
v/c Ratio	0.06	0.34		0.05	0.62			0.35			0.32	
Uniform Delay, d1	7.1	8.6		7.1	11.0			26.2			26.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	0.8		0.2	2.6			2.2			2.2	
Delay (s)	7.5	9.5		7.2	13.6			28.4			28.2	
Level of Service	A	A		A	B			C			C	
Approach Delay (s)		9.4			13.3			28.4			28.2	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		10.4	
Intersection Capacity Utilization	59.3%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

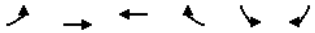
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	823	20	32	1264	16	68	1	92	12	1	21
Future Volume (vph)	4	823	20	32	1264	16	68	1	92	12	1	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.998			0.851			0.916	
Flt Protected					0.999		0.950				0.983	
Satd. Flow (prot)	0	3601	0	0	3537	0	1825	1635	0	0	1730	0
Flt Permitted					0.999		0.950				0.983	
Satd. Flow (perm)	0	3601	0	0	3537	0	1825	1635	0	0	1730	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	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%	1%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	895	22	35	1374	17	74	1	100	13	1	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	921	0	0	1426	0	74	101	0	0	37	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			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	823	20	32	1264	16	68	1	92	12	1	21
Future Volume (Veh/h)	4	823	20	32	1264	16	68	1	92	12	1	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	4	895	22	35	1374	17	74	1	100	13	1	23
Pedestrians											2	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.77						0.77	0.77		0.77	0.77	0.77
vC, conflicting volume	1393			917			1694	2377	458	2010	2380	698
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	921			917			1311	2194	458	1720	2197	21
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			95			11	97	82	63	97	97
cM capacity (veh/h)	578			752			83	33	555	35	33	816

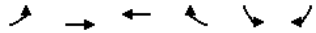
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	452	470	722	704	74	101	37
Volume Left	4	0	35	0	74	0	13
Volume Right	0	22	0	17	0	100	23
cSH	578	1700	752	1700	83	481	86
Volume to Capacity	0.01	0.28	0.05	0.41	0.89	0.21	0.43
Queue Length 95th (m)	0.2	0.0	1.1	0.0	35.8	6.0	13.4
Control Delay (s)	0.2	0.0	1.2	0.0	156.6	14.5	75.5
Lane LOS	A		A		F	B	F
Approach Delay (s)	0.1		0.6		74.6		75.5
Approach LOS					F		F

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	74.1%	ICU Level of Service	D	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	832	1327	26	31	18
Future Volume (vph)	15	832	1327	26	31	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.950	
Flt Protected		0.999			0.969	
Satd. Flow (prot)	0	3381	3437	0	1768	0
Flt Permitted		0.999			0.969	
Satd. Flow (perm)	0	3381	3437	0	1768	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	6%	0%	0%	0%
Adj. Flow (vph)	16	904	1442	28	34	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	920	1470	0	54	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

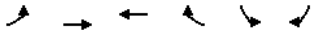
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	832	1327	26	31	18
Future Volume (Veh/h)	15	832	1327	26	31	18
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)	16	904	1442	28	34	20
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.78				0.78	0.78
vC, conflicting volume	1476				1949	745
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1037				1646	95
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				51	97
cM capacity (veh/h)	524				69	731

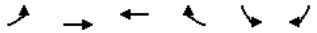
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	317	603	961	509	54
Volume Left	16	0	0	0	34
Volume Right	0	0	0	28	20
cSH	524	1700	1700	1700	103
Volume to Capacity	0.03	0.35	0.57	0.30	0.52
Queue Length 95th (m)	0.7	0.0	0.0	0.0	18.0
Control Delay (s)	1.0	0.0	0.0	0.0	72.7
Lane LOS	A				F
Approach Delay (s)	0.4		0.0		72.7
Approach LOS					F

Intersection Summary				
Average Delay		1.7		
Intersection Capacity Utilization		48.8%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	0	283	543	0	0	0
Future Volume (vph)	0	283	543	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1847	1847	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1847	1847	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	4%	0%	0%	0%
Adj. Flow (vph)	0	308	590	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	308	590	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.9%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	0	283	543	0	0	0
Future Volume (Veh/h)	0	283	543	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	308	590	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.81				0.81	0.81
vC, conflicting volume	590				898	590
vC1, stage 1 conf vol					590	
vC2, stage 2 conf vol					308	
vCu, unblocked vol	374				755	374
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	966				507	547

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	308	590	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.18	0.35	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	39.7	46.0	71.5	57.9	46.7
Average Queue (m)	27.7	33.1	58.1	40.4	24.3
95th Queue (m)	45.8	50.8	70.9	61.1	54.7
Link Distance (m)	103.1	103.1	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	TR	LTR	LTR
Maximum Queue (m)	16.0	34.6	69.8	28.5	42.5
Average Queue (m)	8.3	24.2	43.9	19.2	27.5
95th Queue (m)	17.5	38.6	66.2	28.0	47.4
Link Distance (m)		189.5	272.6	171.4	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	15.0				
Storage Blk Time (%)	3	11	31		
Queuing Penalty (veh)	11	2	8		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	TR	LTR
Maximum Queue (m)	13.5	21.3	32.9	15.9	14.1
Average Queue (m)	6.9	4.3	19.7	10.2	9.9
95th Queue (m)	16.8	18.4	34.8	14.9	13.4
Link Distance (m)	103.1	103.1	78.3	78.3	148.3
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: King St E & Cameron Ave S

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	41.5	16.6
Average Queue (m)	11.7	9.8
95th Queue (m)	37.1	19.5
Link Distance (m)	220.0	117.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 21

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1072	189	29	1196	128	45
Future Volume (vph)	1072	189	29	1196	128	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99				0.98	
Frt	0.978				0.965	
Flt Protected				0.999	0.964	
Satd. Flow (prot)	3518	0	0	3543	1775	0
Flt Permitted				0.879	0.964	
Satd. Flow (perm)	3518	0	0	3117	1753	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	41				17	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		8	8		10	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	1165	205	32	1300	139	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1370	0	0	1332	188	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.60			0.66	0.42	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	11.0			12.7	32.0	
Queue Delay	0.0			0.0	0.0	
Total Delay	11.0			12.7	32.0	
LOS	B			B	C	
Approach Delay	11.0			12.7	32.0	
Approach LOS	B			B	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 77.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1072	189	29	1196	128	45
Future Volume (vph)	1072	189	29	1196	128	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.96	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3516			3542	1775	
Flt Permitted	1.00			0.88	0.96	
Satd. Flow (perm)	3516			3116	1775	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1165	205	32	1300	139	49
RTOR Reduction (vph)	14	0	0	0	13	0
Lane Group Flow (vph)	1356	0	0	1332	175	0
Confl. Peds. (#/hr)		8	8		10	9
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2285			2025	438	
v/s Ratio Prot	0.39				c0.10	
v/s Ratio Perm				c0.43		
v/c Ratio	0.59			0.66	0.40	
Uniform Delay, d1	10.0			10.7	31.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.1			1.7	2.7	
Delay (s)	11.1			12.4	34.2	
Level of Service	B			B	C	
Approach Delay (s)	11.1			12.4	34.2	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	587	55	58	371	100	13	72	45	77	116	73
Future Volume (vph)	56	587	55	58	371	100	13	72	45	77	116	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	0.99	1.00		1.00	0.99			0.97			0.97	
Frt		0.987			0.968			0.953			0.963	
Flt Protected	0.950			0.950				0.995			0.986	
Satd. Flow (prot)	1825	1856	0	1789	1828	0	0	1741	0	0	1746	0
Flt Permitted	0.398			0.275				0.955			0.862	
Satd. Flow (perm)	757	1856	0	516	1828	0	0	1667	0	0	1510	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			28			29			21	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
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%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Adj. Flow (vph)	61	638	60	63	403	109	14	78	49	84	126	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	698	0	63	512	0	0	141	0	0	289	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.13	0.61		0.20	0.45			0.29			0.67	
Control Delay	8.4	13.7		9.8	10.5			22.3			35.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.4	13.7		9.8	10.5			22.3			35.9	
LOS	A	B		A	B			C			D	
Approach Delay		13.3			10.4			22.3			35.9	
Approach LOS		B			B			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 78.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	587	55	58	371	100	13	72	45	77	116	73
Future Volume (vph)	56	587	55	58	371	100	13	72	45	77	116	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.98			0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.97			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1808	1856		1781	1828			1737			1727	
Flt Permitted	0.40	1.00		0.27	1.00			0.96			0.86	
Satd. Flow (perm)	758	1856		516	1828			1667			1511	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	638	60	63	403	109	14	78	49	84	126	79
RTOR Reduction (vph)	0	4	0	0	11	0	0	21	0	0	15	0
Lane Group Flow (vph)	61	694	0	63	501	0	0	120	0	0	274	0
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	462	1132		314	1115			457			414	
v/s Ratio Prot		c0.37			0.27							
v/s Ratio Perm	0.08			0.12				0.07			c0.18	
v/c Ratio	0.13	0.61		0.20	0.45			0.26			0.66	
Uniform Delay, d1	7.4	10.9		7.8	9.4			25.5			28.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	2.5		1.4	1.3			1.4			8.1	
Delay (s)	8.0	13.4		9.2	10.7			26.9			37.0	
Level of Service	A	B		A	B			C			D	
Approach Delay (s)		13.0			10.6			26.9			37.0	
Approach LOS		B			B			C			D	

Intersection Summary					
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.63				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.4		
Intersection Capacity Utilization	78.9%	ICU Level of Service	D		
Analysis Period (min)	15				
c Critical Lane Group					

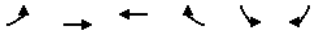
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1175	83	73	1203	25	36	1	63	25	2	11
Future Volume (vph)	19	1175	83	73	1203	25	36	1	63	25	2	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.997			0.852			0.960	
Flt Protected		0.999			0.997		0.950				0.968	
Satd. Flow (prot)	0	3577	0	0	3562	0	1825	1637	0	0	1758	0
Flt Permitted		0.999			0.997		0.950				0.968	
Satd. Flow (perm)	0	3577	0	0	3562	0	1825	1637	0	0	1758	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	8						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
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	1%	0%	3%
Adj. Flow (vph)	21	1277	90	79	1308	27	39	1	68	27	2	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1388	0	0	1414	0	39	69	0	0	41	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			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	1175	83	73	1203	25	36	1	63	25	2	11
Future Volume (Veh/h)	19	1175	83	73	1203	25	36	1	63	25	2	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	21	1277	90	79	1308	27	39	1	68	27	2	12
Pedestrians		8									8	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.2									1.2	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.78						0.78	0.78		0.78	0.78	0.78
vC, conflicting volume	1343			1367			2197	2865	684	2236	2896	684
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	886			1367			1976	2828	684	2026	2868	45
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			84			0	91	83	0	81	98
cM capacity (veh/h)	601			509			21	11	396	18	11	782

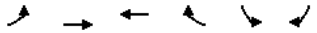
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	660	728	733	681	39	69	41
Volume Left	21	0	79	0	39	0	27
Volume Right	0	90	0	27	0	68	12
cSH	601	1700	509	1700	21	266	24
Volume to Capacity	0.03	0.43	0.16	0.40	1.83	0.26	1.74
Queue Length 95th (m)	0.8	0.0	4.1	0.0	38.7	7.7	39.2
Control Delay (s)	1.0	0.0	4.5	0.0	780.0	23.2	707.0
Lane LOS	A		A		F	C	F
Approach Delay (s)	0.5		2.3		296.5		707.0
Approach LOS					F		F

Intersection Summary					
Average Delay	22.0				
Intersection Capacity Utilization	90.8%	ICU Level of Service		E	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	1256	1226	24	21	9
Future Volume (vph)	20	1256	1226	24	21	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.959	
Flt Protected		0.999			0.966	
Satd. Flow (prot)	0	3439	3437	0	1657	0
Flt Permitted		0.999			0.966	
Satd. Flow (perm)	0	3439	3437	0	1657	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	6%	0%	8%	6%
Adj. Flow (vph)	22	1365	1333	26	23	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1387	1359	0	33	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

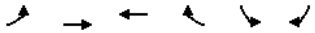
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 60.1%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1256	1226	24	21	9
Future Volume (Veh/h)	20	1256	1226	24	21	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)	22	1365	1333	26	23	10
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.80				0.80	0.80
vC, conflicting volume	1365				2082	690
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	947				1847	99
tC, single (s)	4.3				7.0	7.0
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	96				51	99
cM capacity (veh/h)	542				47	730

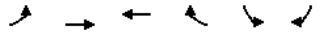
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	477	910	889	470	33
Volume Left	22	0	0	0	23
Volume Right	0	0	0	26	10
cSH	542	1700	1700	1700	65
Volume to Capacity	0.04	0.54	0.52	0.28	0.50
Queue Length 95th (m)	1.0	0.0	0.0	0.0	15.4
Control Delay (s)	1.2	0.0	0.0	0.0	106.4
Lane LOS	A				F
Approach Delay (s)	0.4		0.0		106.4
Approach LOS					F

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	0	698	384	0	0	0
Future Volume (vph)	0	698	384	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1902	1902	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1902	1902	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	0	759	417	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	759	417	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	0	698	384	0	0	0
Future Volume (Veh/h)	0	698	384	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	759	417	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	417				1176	417
vC1, stage 1 conf vol					417	
vC2, stage 2 conf vol					759	
vCu, unblocked vol	336				1152	336
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1149				413	661

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	759	417	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.45	0.25	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	70.2	66.5	84.2	81.5	46.7
Average Queue (m)	53.4	57.8	71.4	60.0	24.6
95th Queue (m)	73.5	69.4	94.1	84.6	51.4
Link Distance (m)	103.1	103.1	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	17.4	71.1	17.4	94.8	28.4	59.6
Average Queue (m)	6.6	63.8	13.0	62.0	18.0	47.7
95th Queue (m)	20.0	72.4	19.2	100.1	29.0	69.6
Link Distance (m)		189.5		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	10	28	14	22		
Queuing Penalty (veh)	62	15	64	13		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	LT	TR	L	TR	LTR
Maximum Queue (m)	71.0	48.3	59.8	58.1	27.1	27.6	15.6
Average Queue (m)	22.3	15.5	28.8	16.3	8.8	15.0	12.5
95th Queue (m)	70.1	48.4	59.8	53.9	25.1	28.4	19.5
Link Distance (m)	82.5	82.5	103.1	103.1	78.3	78.3	148.3
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 4: King St E & Cameron Ave S

Movement	EB	WB	WB	SB
Directions Served	LT	T	TR	LR
Maximum Queue (m)	9.2	9.3	9.3	14.7
Average Queue (m)	3.7	1.9	1.9	8.6
95th Queue (m)	11.1	8.0	8.0	17.8
Link Distance (m)	220.0	82.5	82.5	117.8
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 154

Appendix I

2030 Background Traffic Operations Reports

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	834	98	15	1317	100	28
Future Volume (vph)	834	98	15	1317	100	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00			1.00	1.00	
Frt	0.984				0.971	
Flt Protected				0.999	0.962	
Satd. Flow (prot)	3547	0	0	3541	1788	0
Flt Permitted				0.938	0.962	
Satd. Flow (perm)	3547	0	0	3325	1786	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	26				13	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		5	5		1	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	907	107	16	1432	109	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1014	0	0	1448	139	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.44			0.67	0.31	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	9.0			12.8	30.0	
Queue Delay	0.0			0.0	0.0	
Total Delay	9.0			12.8	30.0	
LOS	A			B	C	
Approach Delay	9.0			12.8	30.0	
Approach LOS	A			B	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 12.2		Intersection LOS: B	
Intersection Capacity Utilization 70.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	834	98	15	1317	100	28
Future Volume (vph)	834	98	15	1317	100	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.97	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3548			3543	1788	
Flt Permitted	1.00			0.94	0.96	
Satd. Flow (perm)	3548			3325	1788	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	907	107	16	1432	109	30
RTOR Reduction (vph)	9	0	0	0	10	0
Lane Group Flow (vph)	1005	0	0	1448	129	0
Confl. Peds. (#/hr)		5	5		1	3
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2306			2161	441	
v/s Ratio Prot	0.28				c0.07	
v/s Ratio Perm				c0.44		
v/c Ratio	0.44			0.67	0.29	
Uniform Delay, d1	8.5			10.9	30.6	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.6			1.7	1.7	
Delay (s)	9.1			12.5	32.2	
Level of Service	A			B	C	
Approach Delay (s)	9.1			12.5	32.2	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	355	16	27	581	87	41	65	60	40	44	54
Future Volume (vph)	19	355	16	27	581	87	41	65	60	40	44	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	1.00	1.00		0.98	1.00			0.97			0.96	
Frt		0.994			0.980			0.952			0.947	
Flt Protected	0.950			0.950				0.988			0.986	
Satd. Flow (prot)	1706	1823	0	1825	1806	0	0	1726	0	0	1528	0
Flt Permitted	0.257			0.477				0.892			0.884	
Satd. Flow (perm)	460	1823	0	898	1806	0	0	1543	0	0	1358	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			15			31			36	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		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
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Adj. Flow (vph)	21	386	17	29	632	95	45	71	65	43	48	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	403	0	29	727	0	0	181	0	0	150	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.07	0.36		0.05	0.66			0.41			0.38	
Control Delay	8.1	9.8		7.4	14.7			25.2			23.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.1	9.8		7.4	14.7			25.2			23.1	
LOS	A	A		A	B			C			C	
Approach Delay		9.7			14.4			25.2			23.1	
Approach LOS		A			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 61.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	355	16	27	581	87	41	65	60	40	44	54
Future Volume (vph)	19	355	16	27	581	87	41	65	60	40	44	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.97	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			0.99			0.99	
Frt	1.00	0.99		1.00	0.98			0.95			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1700	1823		1788	1807			1708			1515	
Flt Permitted	0.26	1.00		0.48	1.00			0.89			0.88	
Satd. Flow (perm)	459	1823		898	1807			1542			1357	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	386	17	29	632	95	45	71	65	43	48	59
RTOR Reduction (vph)	0	2	0	0	6	0	0	22	0	0	26	0
Lane Group Flow (vph)	21	401	0	29	721	0	0	159	0	0	124	0
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		24
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	279	1112		547	1102			423			372	
v/s Ratio Prot		0.22			c0.40							
v/s Ratio Perm	0.05			0.03				c0.10			0.09	
v/c Ratio	0.08	0.36		0.05	0.65			0.37			0.33	
Uniform Delay, d1	7.2	8.8		7.1	11.4			26.4			26.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	0.9		0.2	3.0			2.5			2.4	
Delay (s)	7.7	9.7		7.3	14.4			28.9			28.5	
Level of Service	A	A		A	B			C			C	
Approach Delay (s)		9.6			14.2			28.9			28.5	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.57				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		10.4	
Intersection Capacity Utilization	61.3%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

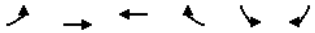
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	873	20	32	1341	17	68	1	92	13	1	22
Future Volume (vph)	4	873	20	32	1341	17	68	1	92	13	1	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.998			0.851			0.917	
Flt Protected					0.999		0.950				0.982	
Satd. Flow (prot)	0	3604	0	0	3537	0	1825	1635	0	0	1730	0
Flt Permitted					0.999		0.950				0.982	
Satd. Flow (perm)	0	3604	0	0	3537	0	1825	1635	0	0	1730	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	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%	1%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	949	22	35	1458	18	74	1	100	14	1	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	975	0	0	1511	0	74	101	0	0	39	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			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	873	20	32	1341	17	68	1	92	13	1	22
Future Volume (Veh/h)	4	873	20	32	1341	17	68	1	92	13	1	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	4	949	22	35	1458	18	74	1	100	14	1	24
Pedestrians											2	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.75						0.75	0.75		0.75	0.75	0.75
vC, conflicting volume	1478			971			1792	2516	486	2122	2518	740
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	965			971			1384	2353	486	1826	2356	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			95			0	96	81	49	96	97
cM capacity (veh/h)	539			718			70	26	533	28	25	815

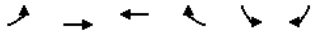
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	478	496	764	747	74	101	39
Volume Left	4	0	35	0	74	0	14
Volume Right	0	22	0	18	0	100	24
cSH	539	1700	718	1700	70	445	68
Volume to Capacity	0.01	0.29	0.05	0.44	1.05	0.23	0.58
Queue Length 95th (m)	0.2	0.0	1.2	0.0	41.7	6.6	18.5
Control Delay (s)	0.2	0.0	1.3	0.0	223.1	15.4	114.3
Lane LOS	A		A		F	C	F
Approach Delay (s)	0.1		0.7		103.3		114.3
Approach LOS					F		F

Intersection Summary					
Average Delay	8.8				
Intersection Capacity Utilization	76.0%	ICU Level of Service		D	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	882	1404	28	33	20
Future Volume (vph)	16	882	1404	28	33	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.949	
Flt Protected		0.999			0.970	
Satd. Flow (prot)	0	3381	3437	0	1768	0
Flt Permitted		0.999			0.970	
Satd. Flow (perm)	0	3381	3437	0	1768	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	6%	0%	0%	0%
Adj. Flow (vph)	17	959	1526	30	36	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	976	1556	0	58	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

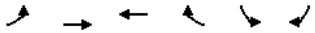
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	882	1404	28	33	20
Future Volume (Veh/h)	16	882	1404	28	33	20
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)	17	959	1526	30	36	22
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.75				0.75	0.75
vC, conflicting volume	1562				2064	788
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1082				1751	49
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				36	97
cM capacity (veh/h)	487				56	755

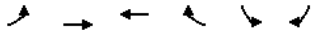
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	337	639	1017	539	58
Volume Left	17	0	0	0	36
Volume Right	0	0	0	30	22
cSH	487	1700	1700	1700	87
Volume to Capacity	0.03	0.38	0.60	0.32	0.67
Queue Length 95th (m)	0.8	0.0	0.0	0.0	24.3
Control Delay (s)	1.2	0.0	0.0	0.0	106.3
Lane LOS	A				F
Approach Delay (s)	0.4		0.0		106.3
Approach LOS					F

Intersection Summary				
Average Delay		2.5		
Intersection Capacity Utilization		51.0%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	0	300	575	0	0	0
Future Volume (vph)	0	300	575	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1847	1847	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1847	1847	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	4%	0%	0%	0%
Adj. Flow (vph)	0	326	625	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	326	625	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.6%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	0	300	575	0	0	0
Future Volume (Veh/h)	0	300	575	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	326	625	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.78				0.78	0.78
vC, conflicting volume	625				951	625
vC1, stage 1 conf vol					625	
vC2, stage 2 conf vol					326	
vCu, unblocked vol	382				798	382
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	929				486	524

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	326	625	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.19	0.37	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	52.7	58.8	73.1	61.3	27.2
Average Queue (m)	32.9	36.5	63.7	49.3	15.5
95th Queue (m)	51.6	65.1	72.5	61.0	25.6
Link Distance (m)	103.1	103.1	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	9.1	57.1	8.5	89.3	36.5	57.0
Average Queue (m)	3.5	39.2	4.1	57.4	23.0	36.3
95th Queue (m)	10.7	61.9	10.2	99.5	41.3	57.1
Link Distance (m)		189.5		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	0	11		31		
Queuing Penalty (veh)	0	2		8		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	WB	NB	NB	SB
Directions Served	LT	L	TR	LTR
Maximum Queue (m)	13.5	32.6	16.8	9.2
Average Queue (m)	4.1	12.8	11.9	7.2
95th Queue (m)	13.0	30.8	18.0	13.2
Link Distance (m)	103.1	78.3	78.3	148.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: King St E & Cameron Ave S

Movement	WB	WB	SB
Directions Served	T	TR	LR
Maximum Queue (m)	9.1	9.1	28.5
Average Queue (m)	1.8	1.8	14.8
95th Queue (m)	7.8	7.9	31.1
Link Distance (m)	82.5	82.5	117.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 11

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1136	199	30	1266	134	48
Future Volume (vph)	1136	199	30	1266	134	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99				0.98	
Frt	0.978				0.965	
Flt Protected				0.999	0.964	
Satd. Flow (prot)	3518	0	0	3543	1775	0
Flt Permitted				0.872	0.964	
Satd. Flow (perm)	3518	0	0	3092	1753	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	41				17	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		8	8		10	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	1235	216	33	1376	146	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1451	0	0	1409	198	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.63			0.70	0.44	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	11.6			13.7	32.6	
Queue Delay	0.0			0.0	0.0	
Total Delay	11.6			13.7	32.6	
LOS	B			B	C	
Approach Delay	11.6			13.7	32.6	
Approach LOS	B			B	C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green		
Natural Cycle: 95		
Control Type: Pretimed		
Maximum v/c Ratio: 0.70		
Intersection Signal Delay: 13.9		Intersection LOS: B
Intersection Capacity Utilization 80.1%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1136	199	30	1266	134	48
Future Volume (vph)	1136	199	30	1266	134	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.96	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3516			3542	1775	
Flt Permitted	1.00			0.87	0.96	
Satd. Flow (perm)	3516			3093	1775	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1235	216	33	1376	146	52
RTOR Reduction (vph)	14	0	0	0	13	0
Lane Group Flow (vph)	1437	0	0	1409	185	0
Confl. Peds. (#/hr)		8	8		10	9
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2285			2010	438	
v/s Ratio Prot	0.41				c0.10	
v/s Ratio Perm				c0.46		
v/c Ratio	0.63			0.70	0.42	
Uniform Delay, d1	10.4			11.3	31.7	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.3			2.1	3.0	
Delay (s)	11.7			13.3	34.6	
Level of Service	B			B	C	
Approach Delay (s)	11.7			13.3	34.6	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	622	59	62	394	105	14	77	48	80	124	77
Future Volume (vph)	59	622	59	62	394	105	14	77	48	80	124	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	0.99	1.00		1.00	0.99			0.97			0.97	
Frt		0.987			0.968			0.954			0.963	
Flt Protected	0.950			0.950				0.995			0.986	
Satd. Flow (prot)	1825	1856	0	1789	1828	0	0	1743	0	0	1745	0
Flt Permitted	0.378			0.248				0.958			0.853	
Satd. Flow (perm)	720	1856	0	465	1828	0	0	1675	0	0	1494	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			27			29			21	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
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%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Adj. Flow (vph)	64	676	64	67	428	114	15	84	52	87	135	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	740	0	67	542	0	0	151	0	0	306	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.15	0.65		0.24	0.48			0.31			0.72	
Control Delay	8.6	14.6		10.7	10.9			22.9			38.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.6	14.6		10.7	10.9			22.9			38.6	
LOS	A	B		B	B			C			D	
Approach Delay		14.1			10.9			22.9			38.6	
Approach LOS		B			B			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 17.8		Intersection LOS: B	
Intersection Capacity Utilization 93.7%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	622	59	62	394	105	14	77	48	80	124	77
Future Volume (vph)	59	622	59	62	394	105	14	77	48	80	124	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.98			0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.97			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1809	1856		1783	1829			1739			1727	
Flt Permitted	0.38	1.00		0.25	1.00			0.96			0.85	
Satd. Flow (perm)	719	1856		466	1829			1673			1494	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	676	64	67	428	114	15	84	52	87	135	84
RTOR Reduction (vph)	0	4	0	0	11	0	0	21	0	0	15	0
Lane Group Flow (vph)	64	736	0	67	531	0	0	130	0	0	291	0
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	438	1132		284	1115			459			410	
v/s Ratio Prot		c0.40			0.29							
v/s Ratio Perm	0.09			0.14				0.08			c0.19	
v/c Ratio	0.15	0.65		0.24	0.48			0.28			0.71	
Uniform Delay, d1	7.5	11.3		8.0	9.7			25.7			29.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.7	2.9		1.9	1.5			1.5			9.9	
Delay (s)	8.2	14.2		9.9	11.1			27.2			39.4	
Level of Service	A	B		A	B			C			D	
Approach Delay (s)		13.8			11.0			27.2			39.4	
Approach LOS		B			B			C			D	

Intersection Summary					
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.67				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.4		
Intersection Capacity Utilization	93.7%	ICU Level of Service	F		
Analysis Period (min)	15				
c Critical Lane Group					

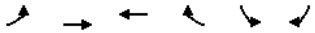
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1247	83	73	1277	26	36	1	63	26	2	11
Future Volume (vph)	21	1247	83	73	1277	26	36	1	63	26	2	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.997			0.852			0.961	
Flt Protected		0.999			0.997		0.950				0.968	
Satd. Flow (prot)	0	3581	0	0	3562	0	1825	1637	0	0	1760	0
Flt Permitted		0.999			0.997		0.950				0.968	
Satd. Flow (perm)	0	3581	0	0	3562	0	1825	1637	0	0	1760	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	8						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
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	1%	0%	3%
Adj. Flow (vph)	23	1355	90	79	1388	28	39	1	68	28	2	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1468	0	0	1495	0	39	69	0	0	42	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			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	1247	83	73	1277	26	36	1	63	26	2	11
Future Volume (Veh/h)	21	1247	83	73	1277	26	36	1	63	26	2	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	23	1355	90	79	1388	28	39	1	68	28	2	12
Pedestrians		8									8	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.2									1.2	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.76						0.76	0.76		0.76	0.76	0.76
vC, conflicting volume	1424			1445			2319	3028	722	2360	3059	724
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	931			1445			2106	3037	722	2160	3077	11
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			83			0	87	82	0	73	98
cM capacity (veh/h)	562			475			15	8	373	13	7	798

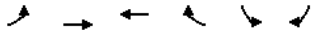
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	700	768	773	722	39	69	42
Volume Left	23	0	79	0	39	0	28
Volume Right	0	90	0	28	0	68	12
cSH	562	1700	475	1700	15	224	17
Volume to Capacity	0.04	0.45	0.17	0.42	2.59	0.31	2.48
Queue Length 95th (m)	1.0	0.0	4.5	0.0	42.6	9.6	44.3
Control Delay (s)	1.2	0.0	5.0	0.0	1239.1	28.1	1140.9
Lane LOS	A		A		F	D	F
Approach Delay (s)	0.5		2.6		465.4		1140.9
Approach LOS					F		F

Intersection Summary					
Average Delay	33.0				
Intersection Capacity Utilization	95.0%	ICU Level of Service		F	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	1328	1299	25	22	10
Future Volume (vph)	21	1328	1299	25	22	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.958	
Flt Protected		0.999			0.967	
Satd. Flow (prot)	0	3439	3437	0	1658	0
Flt Permitted		0.999			0.967	
Satd. Flow (perm)	0	3439	3437	0	1658	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	6%	0%	8%	6%
Adj. Flow (vph)	23	1443	1412	27	24	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1466	1439	0	35	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

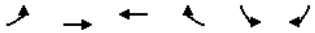
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	1328	1299	25	22	10
Future Volume (Veh/h)	21	1328	1299	25	22	10
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)	23	1443	1412	27	24	11
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.77				0.77	0.77
vC, conflicting volume	1445				2202	730
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	988				1967	62
tC, single (s)	4.3				7.0	7.0
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	95				36	99
cM capacity (veh/h)	507				37	749

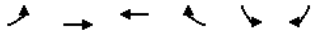
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	504	962	941	498	35
Volume Left	23	0	0	0	24
Volume Right	0	0	0	27	11
cSH	507	1700	1700	1700	53
Volume to Capacity	0.05	0.57	0.55	0.29	0.66
Queue Length 95th (m)	1.1	0.0	0.0	0.0	20.2
Control Delay (s)	1.3	0.0	0.0	0.0	156.2
Lane LOS	A				F
Approach Delay (s)	0.5		0.0		156.2
Approach LOS					F

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	0	741	407	0	0	0
Future Volume (vph)	0	741	407	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1902	1902	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1902	1902	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	0	805	442	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	805	442	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	0	741	407	0	0	0
Future Volume (Veh/h)	0	741	407	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	805	442	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.92				0.92	0.92
vC, conflicting volume	442				1247	442
vC1, stage 1 conf vol					442	
vC2, stage 2 conf vol					805	
vCu, unblocked vol	345				1224	345
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1122				392	643

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	805	442	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.47	0.26	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	78.1	76.1	104.4	79.5	33.7
Average Queue (m)	58.9	59.5	79.5	57.9	27.0
95th Queue (m)	87.5	82.9	103.1	97.1	39.0
Link Distance (m)	103.1	103.1	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	8.8	82.2	17.2	68.4	27.8	66.0
Average Queue (m)	5.2	58.2	11.9	54.5	21.0	33.4
95th Queue (m)	12.1	88.3	17.4	68.2	27.8	66.8
Link Distance (m)		189.5		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)		31	9	28		
Queuing Penalty (veh)		18	44	17		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LT	LT	TR	L	TR	LTR
Maximum Queue (m)	14.1	54.9	54.2	14.6	15.4	15.5
Average Queue (m)	4.5	27.9	20.1	6.4	8.9	10.0
95th Queue (m)	14.0	62.3	60.8	15.8	15.0	19.4
Link Distance (m)	82.5	103.1	103.1	78.3	78.3	148.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: King St E & Cameron Ave S

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	38.0	11.8	9.1
Average Queue (m)	14.2	2.4	5.4
95th Queue (m)	38.5	10.1	10.8
Link Distance (m)	220.0	82.5	117.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 80

Appendix J

2030 Future Total Traffic Operations Reports

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	924	147	15	1360	111	28
Future Volume (vph)	924	147	15	1360	111	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00			1.00	1.00	
Frt	0.979				0.973	
Flt Protected				0.999	0.961	
Satd. Flow (prot)	3527	0	0	3541	1790	0
Flt Permitted				0.935	0.961	
Satd. Flow (perm)	3527	0	0	3314	1788	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	36				12	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		5	5		1	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	1004	160	16	1478	121	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1164	0	0	1494	151	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.50			0.69	0.33	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	9.7			13.3	30.9	
Queue Delay	0.0			0.0	0.0	
Total Delay	9.7			13.3	30.9	
LOS	A			B	C	
Approach Delay	9.7			13.3	30.9	
Approach LOS	A			B	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 12.8		Intersection LOS: B	
Intersection Capacity Utilization 71.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	924	147	15	1360	111	28
Future Volume (vph)	924	147	15	1360	111	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.97	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3528			3543	1792	
Flt Permitted	1.00			0.93	0.96	
Satd. Flow (perm)	3528			3314	1792	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1004	160	16	1478	121	30
RTOR Reduction (vph)	13	0	0	0	9	0
Lane Group Flow (vph)	1151	0	0	1494	142	0
Confl. Peds. (#/hr)		5	5		1	3
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2293			2154	442	
v/s Ratio Prot	0.33				c0.08	
v/s Ratio Perm				c0.45		
v/c Ratio	0.50			0.69	0.32	
Uniform Delay, d1	9.1			11.2	30.8	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.8			1.9	1.9	
Delay (s)	9.9			13.0	32.7	
Level of Service	A			B	C	
Approach Delay (s)	9.9			13.0	32.7	
Approach LOS	A			B	C	

Intersection Summary				
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3	
Intersection Capacity Utilization	71.7%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	379	16	27	593	98	41	65	60	62	44	81
Future Volume (vph)	19	379	16	27	593	98	41	65	60	62	44	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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		1.00		0.98	0.99			0.97			0.96	
Frt		0.994			0.979			0.952			0.941	
Flt Protected	0.950			0.950				0.988			0.984	
Satd. Flow (prot)	1706	1824	0	1825	1804	0	0	1726	0	0	1527	0
Flt Permitted	0.241			0.458				0.889			0.838	
Satd. Flow (perm)	433	1824	0	863	1804	0	0	1540	0	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			17			31			42	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		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
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Adj. Flow (vph)	21	412	17	29	645	107	45	71	65	67	48	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	429	0	29	752	0	0	181	0	0	203	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.08	0.39		0.06	0.68			0.41			0.53	
Control Delay	8.2	10.1		7.5	15.3			25.2			27.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.2	10.1		7.5	15.3			25.2			27.6	
LOS	A	B		A	B			C			C	
Approach Delay		10.0			15.0			25.2			27.6	
Approach LOS		B			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 16.4		Intersection LOS: B	
Intersection Capacity Utilization 63.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	379	16	27	593	98	41	65	60	62	44	81
Future Volume (vph)	19	379	16	27	593	98	41	65	60	62	44	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.98			0.97	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			0.99			0.99	
Frt	1.00	0.99		1.00	0.98			0.95			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1706	1824		1790	1804			1710			1513	
Flt Permitted	0.24	1.00		0.46	1.00			0.89			0.84	
Satd. Flow (perm)	433	1824		863	1804			1540			1288	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	412	17	29	645	107	45	71	65	67	48	88
RTOR Reduction (vph)	0	2	0	0	7	0	0	22	0	0	30	0
Lane Group Flow (vph)	21	427	0	29	745	0	0	159	0	0	173	0
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		24
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	264	1112		526	1100			422			353	
v/s Ratio Prot		0.23			c0.41							
v/s Ratio Perm	0.05			0.03				0.10			c0.13	
v/c Ratio	0.08	0.38		0.06	0.68			0.38			0.49	
Uniform Delay, d1	7.2	8.9		7.1	11.7			26.4			27.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	1.0		0.2	3.4			2.5			4.8	
Delay (s)	7.8	9.9		7.3	15.0			29.0			32.1	
Level of Service	A	A		A	B			C			C	
Approach Delay (s)		9.8			14.7			29.0			32.1	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.62				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.4		
Intersection Capacity Utilization	63.0%	ICU Level of Service	B		
Analysis Period (min)	15				
c Critical Lane Group					

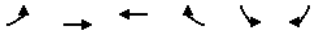
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	873	55	87	1341	17	212	3	231	13	1	22
Future Volume (vph)	4	873	55	87	1341	17	212	3	231	13	1	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.998			0.852			0.917	
Flt Protected					0.997		0.950				0.982	
Satd. Flow (prot)	0	3584	0	0	3534	0	1825	1637	0	0	1730	0
Flt Permitted					0.997		0.950				0.982	
Satd. Flow (perm)	0	3584	0	0	3534	0	1825	1637	0	0	1730	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	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%	1%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	949	60	95	1458	18	230	3	251	14	1	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1013	0	0	1571	0	230	254	0	0	39	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			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	873	55	87	1341	17	212	3	231	13	1	22
Future Volume (Veh/h)	4	873	55	87	1341	17	212	3	231	13	1	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	4	949	60	95	1458	18	230	3	251	14	1	24
Pedestrians											2	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.73						0.73	0.73		0.73	0.73	0.73
vC, conflicting volume	1478			1009			1930	2655	504	2394	2676	740
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	923			1009			1541	2529	504	2173	2558	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			86			0	83	52	0	94	97
cM capacity (veh/h)	547			695			48	18	518	8	17	798

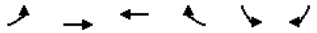
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	478	534	824	747	230	254	39
Volume Left	4	0	95	0	230	0	14
Volume Right	0	60	0	18	0	251	24
cSH	547	1700	695	1700	48	387	21
Volume to Capacity	0.01	0.31	0.14	0.44	4.75	0.66	1.88
Queue Length 95th (m)	0.2	0.0	3.6	0.0	Err	34.2	39.0
Control Delay (s)	0.2	0.0	3.6	0.0	Err	30.3	809.0
Lane LOS	A		A		F	D	F
Approach Delay (s)	0.1		1.9		4767.5		809.0
Approach LOS					F		F

Intersection Summary					
Average Delay	753.8				
Intersection Capacity Utilization	94.5%	ICU Level of Service		F	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	916	1544	32	34	20
Future Volume (vph)	16	916	1544	32	34	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.950	
Flt Protected		0.999			0.970	
Satd. Flow (prot)	0	3381	3437	0	1770	0
Flt Permitted		0.999			0.970	
Satd. Flow (perm)	0	3381	3437	0	1770	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	6%	0%	0%	0%
Adj. Flow (vph)	17	996	1678	35	37	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1013	1713	0	59	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

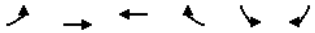
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	916	1544	32	34	20
Future Volume (Veh/h)	16	916	1544	32	34	20
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)	17	996	1678	35	37	22
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.74				0.74	0.74
vC, conflicting volume	1719				2236	866
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1274				1971	126
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				6	97
cM capacity (veh/h)	408				39	668

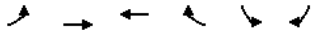
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	349	664	1119	594	59
Volume Left	17	0	0	0	37
Volume Right	0	0	0	35	22
cSH	408	1700	1700	1700	61
Volume to Capacity	0.04	0.39	0.66	0.35	0.97
Queue Length 95th (m)	1.0	0.0	0.0	0.0	35.0
Control Delay (s)	1.4	0.0	0.0	0.0	219.3
Lane LOS	A				F
Approach Delay (s)	0.5		0.0		219.3
Approach LOS					F

Intersection Summary				
Average Delay		4.8		
Intersection Capacity Utilization		55.0%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	5	300	603	12	24	30
Future Volume (vph)	5	300	603	12	24	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997		0.924	
Flt Protected		0.999			0.978	
Satd. Flow (prot)	0	1846	1843	0	1736	0
Flt Permitted		0.999			0.978	
Satd. Flow (perm)	0	1846	1843	0	1736	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	4%	0%	0%	0%
Adj. Flow (vph)	5	326	655	13	26	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	331	668	0	59	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	5	300	603	12	24	30
Future Volume (Veh/h)	5	300	603	12	24	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	326	655	13	26	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.77				0.77	0.77
vC, conflicting volume	668				998	662
vC1, stage 1 conf vol					662	
vC2, stage 2 conf vol					336	
vCu, unblocked vol	414				844	406
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				94	93
cM capacity (veh/h)	885				464	498

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	331	668	59
Volume Left	5	0	26
Volume Right	0	13	33
cSH	885	1700	482
Volume to Capacity	0.01	0.39	0.12
Queue Length 95th (m)	0.1	0.0	3.2
Control Delay (s)	0.2	0.0	13.5
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	13.5
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	40.3	35.0	66.5	58.5	33.7
Average Queue (m)	29.2	25.8	47.8	41.9	26.3
95th Queue (m)	43.1	39.9	66.0	61.5	33.5
Link Distance (m)	103.1	103.1	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	WB	WB	NB	SB
Directions Served	TR	L	TR	LTR	LTR
Maximum Queue (m)	47.3	17.1	77.0	52.4	73.8
Average Queue (m)	30.7	5.9	49.7	32.6	42.3
95th Queue (m)	46.6	16.4	75.2	60.5	80.7
Link Distance (m)	185.8		272.6	171.4	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		15.0			
Storage Blk Time (%)	21	0	32		
Queuing Penalty (veh)	4	0	9		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	TR	LTR
Maximum Queue (m)	55.2	39.3	82.9	82.9	14.8
Average Queue (m)	33.6	15.7	77.9	65.8	8.3
95th Queue (m)	65.2	47.4	94.2	103.0	16.1
Link Distance (m)	103.1	103.1	78.3	78.3	148.3
Upstream Blk Time (%)			65	27	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: King St E & Cameron Ave S

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	62.2	22.0
Average Queue (m)	26.1	13.2
95th Queue (m)	67.1	21.6
Link Distance (m)	220.0	117.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Lawrence Rd & Site Access 2

Movement	SB
Directions Served	LR
Maximum Queue (m)	9.0
Average Queue (m)	7.0
95th Queue (m)	12.8
Link Distance (m)	77.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 13

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1202	230	30	1371	155	48
Future Volume (vph)	1202	230	30	1371	155	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99				0.98	
Frt	0.976				0.968	
Flt Protected				0.999	0.963	
Satd. Flow (prot)	3509	0	0	3542	1780	0
Flt Permitted				0.863	0.963	
Satd. Flow (perm)	3509	0	0	3060	1757	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	45				15	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		8	8		10	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	1307	250	33	1490	168	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1557	0	0	1523	220	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.68			0.77	0.49	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	12.5			15.5	34.3	
Queue Delay	0.0			0.0	0.0	
Total Delay	12.5			15.5	34.3	
LOS	B			B	C	
Approach Delay	12.5			15.5	34.3	
Approach LOS	B			B	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 82.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1202	230	30	1371	155	48
Future Volume (vph)	1202	230	30	1371	155	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.97	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3509			3542	1780	
Flt Permitted	1.00			0.86	0.96	
Satd. Flow (perm)	3509			3062	1780	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1307	250	33	1490	168	52
RTOR Reduction (vph)	16	0	0	0	11	0
Lane Group Flow (vph)	1541	0	0	1523	209	0
Confl. Peds. (#/hr)		8	8		10	9
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2280			1990	439	
v/s Ratio Prot	0.44				c0.12	
v/s Ratio Perm				c0.50		
v/c Ratio	0.68			0.77	0.48	
Uniform Delay, d1	10.9			12.2	32.1	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.6			2.9	3.7	
Delay (s)	12.6			15.1	35.8	
Level of Service	B			B	D	
Approach Delay (s)	12.6			15.1	35.8	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	644	59	62	417	125	14	77	48	101	124	88
Future Volume (vph)	59	644	59	62	417	125	14	77	48	101	124	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	0.99	1.00			0.99			0.97			0.97	
Frt		0.987			0.965			0.954			0.962	
Flt Protected	0.950			0.950				0.995			0.984	
Satd. Flow (prot)	1825	1856	0	1789	1821	0	0	1743	0	0	1743	0
Flt Permitted	0.346			0.234				0.956			0.819	
Satd. Flow (perm)	660	1856	0	441	1821	0	0	1672	0	0	1434	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			31			29			22	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
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%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Adj. Flow (vph)	64	700	64	67	453	136	15	84	52	110	135	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	764	0	67	589	0	0	151	0	0	341	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.16	0.67		0.25	0.52			0.32			0.83	
Control Delay	8.8	15.2		11.1	11.5			22.9			48.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.8	15.2		11.1	11.5			22.9			48.1	
LOS	A	B		B	B			C			D	
Approach Delay		14.7			11.5			22.9			48.1	
Approach LOS		B			B			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 20.0		Intersection LOS: C	
Intersection Capacity Utilization 97.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	644	59	62	417	125	14	77	48	101	124	88
Future Volume (vph)	59	644	59	62	417	125	14	77	48	101	124	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.98			0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.97			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1811	1857		1789	1822			1739			1723	
Flt Permitted	0.35	1.00		0.23	1.00			0.96			0.82	
Satd. Flow (perm)	659	1857		440	1822			1670			1433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	700	64	67	453	136	15	84	52	110	135	96
RTOR Reduction (vph)	0	4	0	0	12	0	0	21	0	0	16	0
Lane Group Flow (vph)	64	760	0	67	577	0	0	130	0	0	325	0
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	401	1132		268	1111			458			393	
v/s Ratio Prot		c0.41			0.32							
v/s Ratio Perm	0.10			0.15				0.08			c0.23	
v/c Ratio	0.16	0.67		0.25	0.52			0.28			0.83	
Uniform Delay, d1	7.6	11.6		8.1	10.0			25.7			30.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	3.2		2.2	1.7			1.5			17.8	
Delay (s)	8.4	14.8		10.3	11.8			27.2			48.5	
Level of Service	A	B		B	B			C			D	
Approach Delay (s)		14.3			11.6			27.2			48.5	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

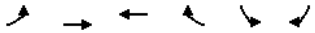
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1247	222	200	1277	26	111	4	160	26	5	11
Future Volume (vph)	21	1247	222	200	1277	26	111	4	160	26	5	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.978			0.997			0.853			0.964	
Flt Protected		0.999			0.993		0.950				0.970	
Satd. Flow (prot)	0	3537	0	0	3553	0	1825	1639	0	0	1771	0
Flt Permitted		0.999			0.993		0.950				0.970	
Satd. Flow (perm)	0	3537	0	0	3553	0	1825	1639	0	0	1771	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	8						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
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	1%	0%	3%
Adj. Flow (vph)	23	1355	241	217	1388	28	121	4	174	28	5	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1619	0	0	1633	0	121	178	0	0	45	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			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	111.2%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	1247	222	200	1277	26	111	4	160	26	5	11
Future Volume (Veh/h)	21	1247	222	200	1277	26	111	4	160	26	5	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	23	1355	241	217	1388	28	121	4	174	28	5	12
Pedestrians		8									8	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.2									1.2	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.72						0.72	0.72		0.72	0.72	0.72
vC, conflicting volume	1424			1596			2672	3380	798	2744	3486	724
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	824			1596			2547	3524	798	2646	3671	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			48			0	0	48	0	0	98
cM capacity (veh/h)	586			416			0	2	333	0	2	772

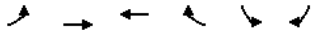
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	700	918	911	722	121	178	45
Volume Left	23	0	217	0	121	0	28
Volume Right	0	241	0	28	0	174	12
cSH	586	1700	416	1700	0	72	0
Volume to Capacity	0.04	0.54	0.52	0.42	Err	2.47	Err
Queue Length 95th (m)	0.9	0.0	22.2	0.0	Err	130.3	Err
Control Delay (s)	1.1	0.0	20.6	0.0	Err	792.9	Err
Lane LOS	A		C		F	F	F
Approach Delay (s)	0.5		11.5		Err		Err
Approach LOS					F		F

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	111.2%	ICU Level of Service	H	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	1465	1373	28	24	10
Future Volume (vph)	21	1465	1373	28	24	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.960	
Flt Protected		0.999			0.966	
Satd. Flow (prot)	0	3439	3437	0	1659	0
Flt Permitted		0.999			0.966	
Satd. Flow (perm)	0	3439	3437	0	1659	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	6%	0%	8%	6%
Adj. Flow (vph)	23	1592	1492	30	26	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1615	1522	0	37	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

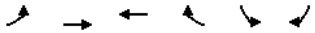
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	1465	1373	28	24	10
Future Volume (Veh/h)	21	1465	1373	28	24	10
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)	23	1592	1492	30	26	11
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.75				0.75	0.75
vC, conflicting volume	1528				2358	771
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1049				2149	45
tC, single (s)	4.3				7.0	7.0
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	95				4	99
cM capacity (veh/h)	469				27	750

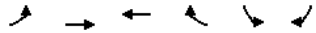
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	554	1061	995	527	37
Volume Left	23	0	0	0	26
Volume Right	0	0	0	30	11
cSH	469	1700	1700	1700	38
Volume to Capacity	0.05	0.62	0.59	0.31	0.97
Queue Length 95th (m)	1.2	0.0	0.0	0.0	27.8
Control Delay (s)	1.4	0.0	0.0	0.0	295.7
Lane LOS	A				F
Approach Delay (s)	0.5		0.0		295.7
Approach LOS					F

Intersection Summary				
Average Delay		3.7		
Intersection Capacity Utilization		66.6%	ICU Level of Service	C
Analysis Period (min)		15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	32	741	418	24	22	12
Future Volume (vph)	32	741	418	24	22	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.993		0.953	
Flt Protected		0.998			0.969	
Satd. Flow (prot)	0	1899	1890	0	1774	0
Flt Permitted		0.998			0.969	
Satd. Flow (perm)	0	1899	1890	0	1774	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	35	805	454	26	24	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	840	480	0	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	741	418	24	22	12
Future Volume (Veh/h)	32	741	418	24	22	12
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)	35	805	454	26	24	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.90				0.90	0.90
vC, conflicting volume	480				1342	467
vC1, stage 1 conf vol					467	
vC2, stage 2 conf vol					875	
vCu, unblocked vol	364				1324	349
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				93	98
cM capacity (veh/h)	1083				354	627

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	840	480	37
Volume Left	35	0	24
Volume Right	0	26	13
cSH	1083	1700	418
Volume to Capacity	0.03	0.28	0.09
Queue Length 95th (m)	0.8	0.0	2.2
Control Delay (s)	0.8	0.0	14.4
Lane LOS	A		B
Approach Delay (s)	0.8	0.0	14.4
Approach LOS			B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	72.8	62.3	74.0	63.3	53.1
Average Queue (m)	48.2	50.2	61.1	50.0	35.7
95th Queue (m)	79.7	72.5	84.4	65.8	59.2
Link Distance (m)	103.1	103.1	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	14.4	79.4	16.8	53.2	28.0	58.7
Average Queue (m)	9.1	61.7	11.5	42.2	15.6	40.2
95th Queue (m)	17.4	82.0	17.9	54.8	29.5	60.0
Link Distance (m)		185.8		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	4	28	8	21		
Queuing Penalty (veh)	26	17	42	13		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	LT	TR	L	TR	LTR
Maximum Queue (m)	44.3	28.2	84.1	80.8	82.8	82.8	14.9
Average Queue (m)	14.4	10.7	61.2	57.7	72.3	53.9	6.6
95th Queue (m)	44.7	32.3	91.2	86.6	95.1	110.3	16.1
Link Distance (m)	82.5	82.5	103.1	103.1	78.3	78.3	148.3
Upstream Blk Time (%)					54	43	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (m)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 4: King St E & Cameron Ave S

Movement	EB	EB	SB
Directions Served	LT	T	LR
Maximum Queue (m)	15.2	9.3	15.4
Average Queue (m)	3.0	1.9	11.9
95th Queue (m)	13.0	8.0	16.4
Link Distance (m)	220.0	220.0	117.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Lawrence Rd & Site Access 2

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	22.4	21.8
Average Queue (m)	6.3	9.6
95th Queue (m)	20.8	21.1
Link Distance (m)	202.5	77.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 97

Appendix K

2027 Future Total Traffic Operations Reports - with Turning Restrictions

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	788	161	14	1242	95	26
Future Volume (vph)	788	161	14	1242	95	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99			1.00	1.00	
Frt	0.975				0.971	
Flt Protected				0.999	0.962	
Satd. Flow (prot)	3509	0	0	3541	1788	0
Flt Permitted				0.938	0.962	
Satd. Flow (perm)	3509	0	0	3325	1786	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	49				13	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		5	5		1	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	857	175	15	1350	103	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1032	0	0	1365	131	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.45			0.63	0.29	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	8.9			12.1	29.5	
Queue Delay	0.0			0.0	0.0	
Total Delay	8.9			12.1	29.5	
LOS	A			B	C	
Approach Delay	8.9			12.1	29.5	
Approach LOS	A			B	C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green		
Natural Cycle: 95		
Control Type: Pretimed		
Maximum v/c Ratio: 0.63		
Intersection Signal Delay: 11.7		Intersection LOS: B
Intersection Capacity Utilization 67.8%		ICU Level of Service C
Analysis Period (min) 15		

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	788	161	14	1242	95	26
Future Volume (vph)	788	161	14	1242	95	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.99			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.97			1.00	0.97	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3508			3543	1789	
Flt Permitted	1.00			0.94	0.96	
Satd. Flow (perm)	3508			3326	1789	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	857	175	15	1350	103	28
RTOR Reduction (vph)	17	0	0	0	10	0
Lane Group Flow (vph)	1015	0	0	1365	121	0
Confl. Peds. (#/hr)		5	5		1	3
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2280			2161	441	
v/s Ratio Prot	0.29				c0.07	
v/s Ratio Perm				c0.41		
v/c Ratio	0.45			0.63	0.27	
Uniform Delay, d1	8.6			10.4	30.4	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.6			1.4	1.5	
Delay (s)	9.3			11.8	32.0	
Level of Service	A			B	C	
Approach Delay (s)	9.3			11.8	32.0	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	334	15	26	548	83	39	61	56	39	41	118
Future Volume (vph)	18	334	15	26	548	83	39	61	56	39	41	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	1.00	1.00		0.98	1.00			0.97			0.95	
Frt		0.994			0.980			0.951			0.920	
Flt Protected	0.950			0.950				0.988			0.990	
Satd. Flow (prot)	1706	1823	0	1825	1806	0	0	1724	0	0	1456	0
Flt Permitted	0.283			0.495				0.888			0.915	
Satd. Flow (perm)	506	1823	0	931	1806	0	0	1534	0	0	1338	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			15			31			81	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		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
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Adj. Flow (vph)	20	363	16	28	596	90	42	66	61	42	45	128
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	379	0	28	686	0	0	169	0	0	215	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

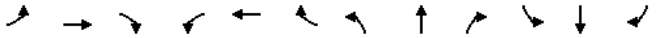
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.06	0.34		0.05	0.62			0.38			0.51	
Control Delay	7.8	9.6		7.4	13.8			24.4			21.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	7.8	9.6		7.4	13.8			24.4			21.6	
LOS	A	A		A	B			C			C	
Approach Delay		9.5			13.5			24.4			21.6	
Approach LOS		A			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 14.8		Intersection LOS: B	
Intersection Capacity Utilization 59.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

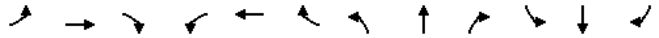
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	334	15	26	548	83	39	61	56	39	41	118
Future Volume (vph)	18	334	15	26	548	83	39	61	56	39	41	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.96	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			0.99			0.99	
Frt	1.00	0.99		1.00	0.98			0.95			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1700	1823		1786	1807			1710			1448	
Flt Permitted	0.28	1.00		0.50	1.00			0.89			0.91	
Satd. Flow (perm)	506	1823		931	1807			1537			1337	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	363	16	28	596	90	42	66	61	42	45	128
RTOR Reduction (vph)	0	2	0	0	6	0	0	22	0	0	59	0
Lane Group Flow (vph)	20	377	0	28	680	0	0	147	0	0	156	0
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		24
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	308	1112		567	1102			421			366	
v/s Ratio Prot		0.21			c0.38							
v/s Ratio Perm	0.04			0.03				0.10			c0.12	
v/c Ratio	0.06	0.34		0.05	0.62			0.35			0.43	
Uniform Delay, d1	7.1	8.6		7.1	11.0			26.2			26.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	0.8		0.2	2.6			2.3			3.6	
Delay (s)	7.5	9.5		7.2	13.6			28.5			30.4	
Level of Service	A	A		A	B			C			C	
Approach Delay (s)		9.4			13.3			28.5			30.4	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.56				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		10.4	
Intersection Capacity Utilization	59.3%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	823	20	32	1264	16	0	0	158	12	1	21
Future Volume (vph)	4	823	20	32	1264	16	0	0	158	12	1	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.998			0.865			0.916	
Flt Protected					0.999						0.983	
Satd. Flow (prot)	0	3601	0	0	3537	0	0	1662	0	0	1730	0
Flt Permitted					0.999						0.983	
Satd. Flow (perm)	0	3601	0	0	3537	0	0	1662	0	0	1730	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	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%	1%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	895	22	35	1374	17	0	0	172	13	1	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	921	0	0	1426	0	0	172	0	0	37	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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

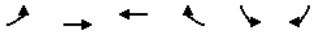
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	823	20	32	1264	16	0	0	158	12	1	21
Future Volume (Veh/h)	4	823	20	32	1264	16	0	0	158	12	1	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	4	895	22	35	1374	17	0	0	172	13	1	23
Pedestrians											2	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.77						0.77	0.77		0.77	0.77	0.77
vC, conflicting volume	1393			917			1694	2377	458	2082	2380	698
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	921			917			1311	2194	458	1812	2197	21
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			95			100	100	69	49	97	97
cM capacity (veh/h)	578			752			83	33	555	26	33	816

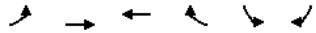
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	452	470	722	704	172	37
Volume Left	4	0	35	0	0	13
Volume Right	0	22	0	17	172	23
cSH	578	1700	752	1700	555	65
Volume to Capacity	0.01	0.28	0.05	0.41	0.31	0.57
Queue Length 95th (m)	0.2	0.0	1.1	0.0	10.0	17.9
Control Delay (s)	0.2	0.0	1.2	0.0	14.4	116.0
Lane LOS	A		A		B	F
Approach Delay (s)	0.1		0.6		14.4	116.0
Approach LOS					B	F

Intersection Summary					
Average Delay	3.0				
Intersection Capacity Utilization	78.1%	ICU Level of Service		D	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	832	1261	24	31	18
Future Volume (vph)	15	832	1261	24	31	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.950	
Flt Protected		0.999			0.969	
Satd. Flow (prot)	0	3381	3437	0	1768	0
Flt Permitted		0.999			0.969	
Satd. Flow (perm)	0	3381	3437	0	1768	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	8%	6%	0%	0%	0%
Adj. Flow (vph)	16	904	1371	26	34	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	920	1397	0	54	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

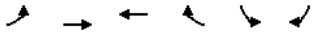
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	832	1261	24	31	18
Future Volume (Veh/h)	15	832	1261	24	31	18
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)	16	904	1371	26	34	20
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.78				0.78	0.78
vC, conflicting volume	1403				1877	708
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	942				1553	47
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				57	97
cM capacity (veh/h)	568				79	783

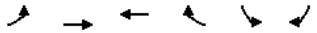
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	317	603	914	483	54
Volume Left	16	0	0	0	34
Volume Right	0	0	0	26	20
cSH	568	1700	1700	1700	119
Volume to Capacity	0.03	0.35	0.54	0.28	0.45
Queue Length 95th (m)	0.7	0.0	0.0	0.0	15.2
Control Delay (s)	1.0	0.0	0.0	0.0	58.2
Lane LOS	A				F
Approach Delay (s)	0.3		0.0		58.2
Approach LOS					F

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	0	283	610	0	0	0
Future Volume (vph)	0	283	610	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1847	1847	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1847	1847	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	4%	0%	0%	0%
Adj. Flow (vph)	0	308	663	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	308	663	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	0	283	610	0	0	0
Future Volume (Veh/h)	0	283	610	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	308	663	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.80				0.80	0.80
vC, conflicting volume	663				971	663
vC1, stage 1 conf vol					663	
vC2, stage 2 conf vol					308	
vCu, unblocked vol	458				841	458
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	894				468	488

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	308	663	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.18	0.39	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	41.2	49.2	77.5	79.6	33.6
Average Queue (m)	30.3	36.1	53.3	43.1	20.7
95th Queue (m)	39.4	51.8	82.2	77.7	40.0
Link Distance (m)	105.2	105.2	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	15.8	67.4	12.9	58.7	35.8	40.8
Average Queue (m)	3.2	39.5	5.8	38.2	29.8	20.5
95th Queue (m)	13.6	66.1	14.2	62.2	42.2	42.9
Link Distance (m)		189.5		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	6	25	1	20		
Queuing Penalty (veh)	22	5	6	5		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	EB	WB	NB	SB
Directions Served	LT	LT	LTR	LTR
Maximum Queue (m)	53.0	15.2	16.3	15.3
Average Queue (m)	12.3	4.6	10.4	8.1
95th Queue (m)	46.3	14.8	15.3	16.1
Link Distance (m)	84.2	105.2	78.8	148.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: King St E & Cameron Ave S

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	9.2	14.7
Average Queue (m)	3.7	10.1
95th Queue (m)	11.1	13.9
Link Distance (m)	220.0	117.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

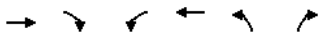
Network wide Queuing Penalty: 38

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1072	224	29	1196	128	45
Future Volume (vph)	1072	224	29	1196	128	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99				0.98	
Frt	0.974				0.965	
Flt Protected				0.999	0.964	
Satd. Flow (prot)	3501	0	0	3543	1775	0
Flt Permitted				0.876	0.964	
Satd. Flow (perm)	3501	0	0	3107	1753	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	50				17	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		8	8		10	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	1165	243	32	1300	139	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1408	0	0	1332	188	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.61			0.66	0.42	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	11.2			12.7	32.0	
Queue Delay	0.0			0.0	0.0	
Total Delay	11.2			12.7	32.0	
LOS	B			B	C	
Approach Delay	11.2			12.7	32.0	
Approach LOS	B			B	C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green		
Natural Cycle: 95		
Control Type: Pretimed		
Maximum v/c Ratio: 0.66		
Intersection Signal Delay: 13.2		Intersection LOS: B
Intersection Capacity Utilization 77.4%		ICU Level of Service D
Analysis Period (min) 15		

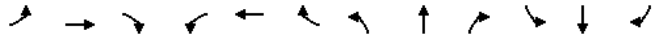
Splits and Phases: 1: Rosedale Ave & King St E



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1072	224	29	1196	128	45
Future Volume (vph)	1072	224	29	1196	128	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.97			1.00	0.96	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3501			3542	1775	
Flt Permitted	1.00			0.88	0.96	
Satd. Flow (perm)	3501			3105	1775	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1165	243	32	1300	139	49
RTOR Reduction (vph)	18	0	0	0	13	0
Lane Group Flow (vph)	1391	0	0	1332	175	0
Confl. Peds. (#/hr)		8	8		10	9
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2275			2018	438	
v/s Ratio Prot	0.40				c0.10	
v/s Ratio Perm				c0.43		
v/c Ratio	0.61			0.66	0.40	
Uniform Delay, d1	10.2			10.7	31.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.2			1.7	2.7	
Delay (s)	11.4			12.4	34.2	
Level of Service	B			B	C	
Approach Delay (s)	11.4			12.4	34.2	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	587	55	58	371	100	13	72	45	77	116	108
Future Volume (vph)	56	587	55	58	371	100	13	72	45	77	116	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	0.99	1.00		1.00	0.99			0.97			0.97	
Frt		0.987			0.968			0.953			0.952	
Flt Protected	0.950			0.950				0.995			0.987	
Satd. Flow (prot)	1825	1856	0	1789	1828	0	0	1741	0	0	1720	0
Flt Permitted	0.398			0.275				0.958			0.876	
Satd. Flow (perm)	757	1856	0	516	1828	0	0	1672	0	0	1512	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			28			29			31	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
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%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Adj. Flow (vph)	61	638	60	63	403	109	14	78	49	84	126	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	698	0	63	512	0	0	141	0	0	327	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.13	0.61		0.20	0.45			0.29			0.75	
Control Delay	8.4	13.7		9.8	10.5			22.3			39.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.4	13.7		9.8	10.5			22.3			39.2	
LOS	A	B		A	B			C			D	
Approach Delay		13.3			10.4			22.3			39.2	
Approach LOS		B			B			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 17.8		Intersection LOS: B	
Intersection Capacity Utilization 81.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	587	55	58	371	100	13	72	45	77	116	108
Future Volume (vph)	56	587	55	58	371	100	13	72	45	77	116	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.98			0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.97			0.95			0.95	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1808	1856		1781	1828			1738			1704	
Flt Permitted	0.40	1.00		0.27	1.00			0.96			0.88	
Satd. Flow (perm)	758	1856		516	1828			1673			1512	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	638	60	63	403	109	14	78	49	84	126	117
RTOR Reduction (vph)	0	4	0	0	11	0	0	21	0	0	22	0
Lane Group Flow (vph)	61	694	0	63	501	0	0	120	0	0	305	0
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	462	1132		314	1115			459			414	
v/s Ratio Prot		c0.37			0.27							
v/s Ratio Perm	0.08			0.12				0.07			c0.20	
v/c Ratio	0.13	0.61		0.20	0.45			0.26			0.74	
Uniform Delay, d1	7.4	10.9		7.8	9.4			25.5			29.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	2.5		1.4	1.3			1.4			11.1	
Delay (s)	8.0	13.4		9.2	10.7			26.9			40.7	
Level of Service	A	B		A	B			C			D	
Approach Delay (s)		13.0			10.6			26.9			40.7	
Approach LOS		B			B			C			D	

Intersection Summary					
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.65				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		10.4	
Intersection Capacity Utilization	81.2%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

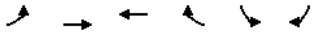
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1175	83	72	1203	25	0	0	98	25	1	11
Future Volume (vph)	19	1175	83	72	1203	25	0	0	98	25	1	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.997			0.865			0.959	
Flt Protected		0.999			0.997						0.967	
Satd. Flow (prot)	0	3577	0	0	3562	0	0	1662	0	0	1754	0
Flt Permitted		0.999			0.997						0.967	
Satd. Flow (perm)	0	3577	0	0	3562	0	0	1662	0	0	1754	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	8						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
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	1%	0%	3%
Adj. Flow (vph)	21	1277	90	78	1308	27	0	0	107	27	1	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1388	0	0	1413	0	0	107	0	0	40	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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	1175	83	72	1203	25	0	0	98	25	1	11
Future Volume (Veh/h)	19	1175	83	72	1203	25	0	0	98	25	1	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	21	1277	90	78	1308	27	0	0	107	27	1	12
Pedestrians		8									8	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.2									1.2	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.78						0.78	0.78		0.78	0.78	0.78
vC, conflicting volume	1343			1367			2194	2863	684	2273	2894	684
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	886			1367			1973	2825	684	2073	2865	45
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			85			100	100	73	0	91	98
cM capacity (veh/h)	601			509			23	11	396	15	11	782

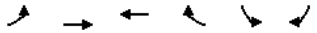
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	660	728	732	681	107	40
Volume Left	21	0	78	0	0	27
Volume Right	0	90	0	27	107	12
cSH	601	1700	509	1700	396	21
Volume to Capacity	0.03	0.43	0.15	0.40	0.27	1.87
Queue Length 95th (m)	0.8	0.0	4.1	0.0	8.2	39.6
Control Delay (s)	1.0	0.0	4.4	0.0	17.4	795.3
Lane LOS	A		A		C	F
Approach Delay (s)	0.5		2.3		17.4	795.3
Approach LOS					C	F

Intersection Summary					
Average Delay	12.7				
Intersection Capacity Utilization	90.8%	ICU Level of Service		E	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	1256	1190	23	21	9
Future Volume (vph)	20	1256	1190	23	21	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.959	
Flt Protected		0.999			0.966	
Satd. Flow (prot)	0	3439	3437	0	1657	0
Flt Permitted		0.999			0.966	
Satd. Flow (perm)	0	3439	3437	0	1657	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	6%	0%	8%	6%
Adj. Flow (vph)	22	1365	1293	25	23	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1387	1318	0	33	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

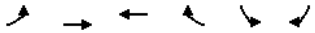
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1256	1190	23	21	9
Future Volume (Veh/h)	20	1256	1190	23	21	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)	22	1365	1293	25	23	10
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.80				0.80	0.80
vC, conflicting volume	1324				2041	669
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	897				1796	74
tC, single (s)	4.3				7.0	7.0
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	96				55	99
cM capacity (veh/h)	568				51	758

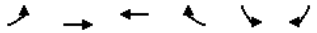
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	477	910	862	456	33
Volume Left	22	0	0	0	23
Volume Right	0	0	0	25	10
cSH	568	1700	1700	1700	71
Volume to Capacity	0.04	0.54	0.51	0.27	0.47
Queue Length 95th (m)	0.9	0.0	0.0	0.0	14.2
Control Delay (s)	1.1	0.0	0.0	0.0	93.9
Lane LOS	A				F
Approach Delay (s)	0.4		0.0		93.9
Approach LOS					F

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	0	698	419	0	0	0
Future Volume (vph)	0	698	419	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1902	1902	0	1921	0
Flt Permitted						
Satd. Flow (perm)	0	1902	1902	0	1921	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	0	759	455	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	759	455	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	0	698	419	0	0	0
Future Volume (Veh/h)	0	698	419	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	759	455	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	455				1214	455
vC1, stage 1 conf vol					455	
vC2, stage 2 conf vol					759	
vCu, unblocked vol	372				1191	372
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1109				406	629

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	759	455	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.45	0.27	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	59.4	61.3	78.7	69.4	40.9
Average Queue (m)	46.8	46.2	53.0	41.7	25.2
95th Queue (m)	65.5	68.7	85.0	80.0	39.8
Link Distance (m)	105.2	105.2	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	9.2	87.5	14.0	47.0	40.8	85.5
Average Queue (m)	5.4	56.4	8.8	33.8	22.3	50.9
95th Queue (m)	12.6	91.5	17.0	49.2	41.7	96.5
Link Distance (m)		189.5		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	0	31	2	24		
Queuing Penalty (veh)	0	18	12	14		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	WB	WB	NB	SB
Directions Served	LT	TR	LTR	LTR
Maximum Queue (m)	47.3	44.5	14.8	9.1
Average Queue (m)	24.4	16.1	10.9	5.2
95th Queue (m)	46.6	49.0	14.8	12.2
Link Distance (m)	105.2	105.2	78.8	148.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: King St E & Cameron Ave S

Movement	EB	WB	SB
Directions Served	LT	T	LR
Maximum Queue (m)	22.2	9.3	9.1
Average Queue (m)	7.6	1.9	6.3
95th Queue (m)	23.4	8.0	12.0
Link Distance (m)	220.0	84.2	117.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Lawrence Rd & Site Access 2

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 43

Appendix L

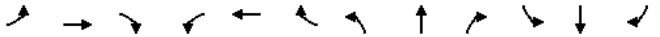
2030 Future Total Traffic Operations Reports - with Turning Restrictions

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	888	49	15	1340	89	28
Future Volume (vph)	888	49	15	1340	89	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.97	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3581			3543	1784	
Flt Permitted	1.00			0.94	0.96	
Satd. Flow (perm)	3581			3326	1784	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	965	53	16	1457	97	30
RTOR Reduction (vph)	4	0	0	0	11	0
Lane Group Flow (vph)	1014	0	0	1473	116	0
Confl. Peds. (#/hr)		5	5		1	3
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2327			2161	440	
v/s Ratio Prot	0.28				c0.06	
v/s Ratio Perm				c0.44		
v/c Ratio	0.44			0.68	0.26	
Uniform Delay, d1	8.5			11.0	30.3	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.6			1.8	1.5	
Delay (s)	9.1			12.8	31.8	
Level of Service	A			B	C	
Approach Delay (s)	9.1			12.8	31.8	
Approach LOS	A			B	C	

Intersection Summary				
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3	
Intersection Capacity Utilization	71.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	400	16	27	604	76	41	65	60	19	44	26
Future Volume (vph)	19	400	16	27	604	76	41	65	60	19	44	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.98	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			0.99			0.99	
Frt	1.00	0.99		1.00	0.98			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1701	1825		1792	1813			1705			1528	
Flt Permitted	0.25	1.00		0.44	1.00			0.91			0.92	
Satd. Flow (perm)	445	1825		832	1813			1563			1418	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	435	17	29	657	83	45	71	65	21	48	28
RTOR Reduction (vph)	0	2	0	0	5	0	0	22	0	0	16	0
Lane Group Flow (vph)	21	450	0	29	735	0	0	159	0	0	81	0
Confl. Peds. (#/hr)	7		18	18		7	24		18	18		24
Heavy Vehicles (%)	7%	4%	15%	0%	4%	2%	6%	2%	0%	0%	23%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	271	1113		507	1105			428			389	
v/s Ratio Prot		0.25			c0.41							
v/s Ratio Perm	0.05			0.03				c0.10			0.06	
v/c Ratio	0.08	0.40		0.06	0.67			0.37			0.21	
Uniform Delay, d1	7.2	9.1		7.1	11.5			26.4			25.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	1.1		0.2	3.2			2.5			1.2	
Delay (s)	7.7	10.2		7.3	14.7			28.8			26.3	
Level of Service	A	B		A	B			C			C	
Approach Delay (s)		10.1			14.4			28.8			26.3	
Approach LOS		B			B			C			C	

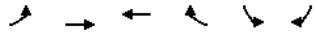
Intersection Summary				
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.4	
Intersection Capacity Utilization	61.8%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	873	31	44	1341	17	0	0	97	13	1	22
Future Volume (Veh/h)	4	873	31	44	1341	17	0	0	97	13	1	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	4	949	34	48	1458	18	0	0	105	14	1	24
Pedestrians											2	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	1478			983			1824	2548	492	2152	2556	740
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	943			983			1410	2389	492	1855	2400	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			93			100	100	80	46	96	97
cM capacity (veh/h)	543			711			66	24	528	26	23	806

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	478	508	777	747	105	39
Volume Left	4	0	48	0	0	14
Volume Right	0	34	0	18	105	24
cSH	543	1700	711	1700	528	64
Volume to Capacity	0.01	0.30	0.07	0.44	0.20	0.61
Queue Length 95th (m)	0.2	0.0	1.6	0.0	5.6	19.6
Control Delay (s)	0.2	0.0	1.8	0.0	13.5	126.4
Lane LOS	A		A		B	F
Approach Delay (s)	0.1		0.9		13.5	126.4
Approach LOS					B	F

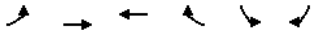
Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	82.9%	ICU Level of Service	E	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	893	1338	26	34	20
Future Volume (Veh/h)	16	893	1338	26	34	20
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)	17	971	1454	28	37	22
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.74				0.74	0.74
vC, conflicting volume	1488				1996	751
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	965				1649	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				43	97
cM capacity (veh/h)	533				65	804

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	341	647	969	513	59
Volume Left	17	0	0	0	37
Volume Right	0	0	0	28	22
cSH	533	1700	1700	1700	99
Volume to Capacity	0.03	0.38	0.57	0.30	0.59
Queue Length 95th (m)	0.7	0.0	0.0	0.0	21.4
Control Delay (s)	1.0	0.0	0.0	0.0	84.0
Lane LOS	A				F
Approach Delay (s)	0.4		0.0		84.0
Approach LOS					F

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	49.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Traffic Volume (veh/h)	10	300	547	23	45	198
Future Volume (Veh/h)	10	300	547	23	45	198
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)	11	326	595	25	49	215
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.77				0.77	0.77
vC, conflicting volume	620				956	608
vC1, stage 1 conf vol					608	
vC2, stage 2 conf vol					348	
vCu, unblocked vol	356				792	339
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				90	60
cM capacity (veh/h)	934				488	544

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	337	620	264
Volume Left	11	0	49
Volume Right	0	25	215
cSH	934	1700	533
Volume to Capacity	0.01	0.36	0.50
Queue Length 95th (m)	0.3	0.0	20.7
Control Delay (s)	0.4	0.0	18.2
Lane LOS	A		C
Approach Delay (s)	0.4	0.0	18.2
Approach LOS			C

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	50.7	52.2	77.1	46.4	41.8
Average Queue (m)	35.8	34.2	52.1	33.4	22.2
95th Queue (m)	55.6	54.8	76.7	54.1	43.1
Link Distance (m)	105.2	105.2	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	13.6	70.2	14.5	96.9	15.5	22.8
Average Queue (m)	3.8	47.3	4.6	57.4	13.2	13.7
95th Queue (m)	12.6	74.8	14.4	95.3	17.6	22.3
Link Distance (m)		185.8		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	1	30	0	24		
Queuing Penalty (veh)	3	6	0	7		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	WB	WB	NB	SB
Directions Served	LT	TR	LTR	LTR
Maximum Queue (m)	21.2	26.0	15.9	8.6
Average Queue (m)	7.3	5.2	10.1	7.6
95th Queue (m)	20.1	22.4	14.9	10.0
Link Distance (m)	105.2	105.2	78.8	148.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: King St E & Cameron Ave S

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	16.7	9.0	15.4
Average Queue (m)	6.2	1.8	8.4
95th Queue (m)	18.9	7.7	16.5
Link Distance (m)	220.0	84.2	117.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Lawrence Rd & Site Access 2

Movement	SB
Directions Served	LR
Maximum Queue (m)	28.6
Average Queue (m)	20.6
95th Queue (m)	28.2
Link Distance (m)	77.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 16

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1175	168	30	1320	134	48
Future Volume (vph)	1175	168	30	1320	134	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99				0.98	
Frt	0.981				0.965	
Flt Protected				0.999	0.964	
Satd. Flow (prot)	3531	0	0	3543	1775	0
Flt Permitted				0.874	0.964	
Satd. Flow (perm)	3531	0	0	3099	1753	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	32				17	
Link Speed (k/h)	48			48	48	
Link Distance (m)	120.1			248.4	183.2	
Travel Time (s)	9.0			18.6	13.7	
Confl. Peds. (#/hr)		8	8		10	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Adj. Flow (vph)	1277	183	33	1435	146	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1460	0	0	1468	198	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	3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Minimum Split (s)	70.0		70.0	70.0	23.3	
Total Split (s)	70.0		70.0	70.0	30.0	
Total Split (%)	70.0%		70.0%	70.0%	30.0%	
Maximum Green (s)	65.0		65.0	65.0	24.7	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	1.7		1.7	1.7	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.3	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		12.0	12.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
v/c Ratio	0.63			0.73	0.44	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Control Delay	11.7			14.4	32.6	
Queue Delay	0.0			0.0	0.0	
Total Delay	11.7			14.4	32.6	
LOS	B			B	C	
Approach Delay	11.7			14.4	32.6	
Approach LOS	B			B	C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 100		
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green		
Natural Cycle: 95		
Control Type: Pretimed		
Maximum v/c Ratio: 0.73		
Intersection Signal Delay: 14.3		Intersection LOS: B
Intersection Capacity Utilization 81.5%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 1: Rosedale Ave & King St E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1175	168	30	1320	134	48
Future Volume (vph)	1175	168	30	1320	134	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.3	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.96	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3532			3542	1775	
Flt Permitted	1.00			0.87	0.96	
Satd. Flow (perm)	3532			3099	1775	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1277	183	33	1435	146	52
RTOR Reduction (vph)	11	0	0	0	13	0
Lane Group Flow (vph)	1449	0	0	1468	185	0
Confl. Peds. (#/hr)		8	8		10	9
Heavy Vehicles (%)	1%	0%	0%	3%	0%	0%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	65.0			65.0	24.7	
Effective Green, g (s)	65.0			65.0	24.7	
Actuated g/C Ratio	0.65			0.65	0.25	
Clearance Time (s)	5.0			5.0	5.3	
Lane Grp Cap (vph)	2295			2014	438	
v/s Ratio Prot	0.41				c0.10	
v/s Ratio Perm				c0.47		
v/c Ratio	0.63			0.73	0.42	
Uniform Delay, d1	10.4			11.6	31.7	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.3			2.4	3.0	
Delay (s)	11.7			14.0	34.6	
Level of Service	B			B	C	
Approach Delay (s)	11.7			14.0	34.6	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	664	59	62	438	84	14	77	48	60	124	66
Future Volume (vph)	59	664	59	62	438	84	14	77	48	60	124	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		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	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	0.99	1.00			0.99			0.97			0.98	
Frt		0.988			0.976			0.954			0.964	
Flt Protected	0.950			0.950				0.995			0.988	
Satd. Flow (prot)	1825	1858	0	1789	1846	0	0	1743	0	0	1747	0
Flt Permitted	0.361			0.220				0.955			0.895	
Satd. Flow (perm)	688	1858	0	414	1846	0	0	1669	0	0	1569	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			20			29			20	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		198.8			278.8			179.3			183.2	
Travel Time (s)		14.9			20.9			13.4			13.7	
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
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%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Adj. Flow (vph)	64	722	64	67	476	91	15	84	52	65	135	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	786	0	67	567	0	0	151	0	0	272	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)		3.7			3.7			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		Yes										
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.1	26.1		26.1	26.1		26.3	26.3		26.3	26.3	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.9	54.9		54.9	54.9		24.7	24.7		24.7	24.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		8.0	8.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.15	0.69		0.27	0.50			0.32			0.61	
Control Delay	8.7	15.7		11.6	11.3			23.0			33.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.7	15.7		11.6	11.3			23.0			33.1	
LOS	A	B		B	B			C			C	
Approach Delay		15.2			11.4			23.0			33.1	
Approach LOS		B			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 17.1		Intersection LOS: B	
Intersection Capacity Utilization 87.0%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Rosedale Ave & Lawrence Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	664	59	62	438	84	14	77	48	60	124	66
Future Volume (vph)	59	664	59	62	438	84	14	77	48	60	124	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.98			0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.98			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1810	1857		1789	1846			1738			1733	
Flt Permitted	0.36	1.00		0.22	1.00			0.96			0.89	
Satd. Flow (perm)	687	1857		414	1846			1669			1569	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	722	64	67	476	91	15	84	52	65	135	72
RTOR Reduction (vph)	0	4	0	0	8	0	0	21	0	0	15	0
Lane Group Flow (vph)	64	782	0	67	559	0	0	130	0	0	257	0
Confl. Peds. (#/hr)	11		9	9		11	19		20	20		19
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	3%	0%	5%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Effective Green, g (s)	54.9	54.9		54.9	54.9			24.7			24.7	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
Clearance Time (s)	5.1	5.1		5.1	5.1			5.3			5.3	
Lane Grp Cap (vph)	419	1132		252	1126			458			430	
v/s Ratio Prot		c0.42			0.30							
v/s Ratio Perm	0.09			0.16				0.08			c0.16	
v/c Ratio	0.15	0.69		0.27	0.50			0.28			0.60	
Uniform Delay, d1	7.5	11.8		8.2	9.8			25.7			28.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.8	3.5		2.6	1.6			1.5			6.0	
Delay (s)	8.3	15.3		10.7	11.4			27.2			34.4	
Level of Service	A	B		B	B			C			C	
Approach Delay (s)		14.8			11.3			27.2			34.4	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.66				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.4		
Intersection Capacity Utilization	87.0%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					

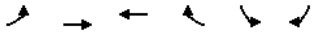
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1247	222	105	1277	26	0	0	71	26	3	11
Future Volume (vph)	21	1247	222	105	1277	26	0	0	71	26	3	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.978			0.997			0.865			0.962	
Flt Protected		0.999			0.996						0.968	
Satd. Flow (prot)	0	3537	0	0	3560	0	0	1662	0	0	1763	0
Flt Permitted		0.999			0.996						0.968	
Satd. Flow (perm)	0	3537	0	0	3560	0	0	1662	0	0	1763	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		97.3			120.1			88.7			158.0	
Travel Time (s)		7.3			9.0			6.7			11.9	
Confl. Peds. (#/hr)	8						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
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	1%	0%	3%
Adj. Flow (vph)	23	1355	241	114	1388	28	0	0	77	28	3	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1619	0	0	1530	0	0	77	0	0	43	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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	1247	222	105	1277	26	0	0	71	26	3	11
Future Volume (Veh/h)	21	1247	222	105	1277	26	0	0	71	26	3	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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)	23	1355	241	114	1388	28	0	0	77	28	3	12
Pedestrians		8									8	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.2									1.2	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					120							
pX, platoon unblocked	0.75						0.75	0.75		0.75	0.75	0.75
vC, conflicting volume	1424			1596			2465	3174	798	2438	3280	724
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	885			1596			2282	3233	798	2246	3376	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			73			100	100	77	0	25	98
cM capacity (veh/h)	572			416			5	5	333	10	4	795

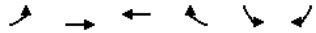
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	700	918	808	722	77	43
Volume Left	23	0	114	0	0	28
Volume Right	0	241	0	28	77	12
cSH	572	1700	416	1700	333	12
Volume to Capacity	0.04	0.54	0.27	0.42	0.23	3.55
Queue Length 95th (m)	1.0	0.0	8.4	0.0	6.7	Err
Control Delay (s)	1.1	0.0	9.1	0.0	19.0	Err
Lane LOS	A		A		C	F
Approach Delay (s)	0.5		4.8		19.0	Err
Approach LOS					C	F

Intersection Summary					
Average Delay	134.5				
Intersection Capacity Utilization	100.4%	ICU Level of Service		G	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	1465	1263	24	23	10
Future Volume (vph)	21	1465	1263	24	23	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.959	
Flt Protected		0.999			0.966	
Satd. Flow (prot)	0	3439	3437	0	1657	0
Flt Permitted		0.999			0.966	
Satd. Flow (perm)	0	3439	3437	0	1657	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		224.3	97.3		127.3	
Travel Time (s)		16.8	7.3		9.5	
Confl. Peds. (#/hr)	6			6	3	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	6%	0%	8%	6%
Adj. Flow (vph)	23	1592	1373	26	25	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1615	1399	0	36	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		3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

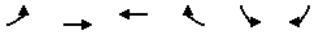
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 66.6%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	1465	1263	24	23	10
Future Volume (Veh/h)	21	1465	1263	24	23	10
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)	23	1592	1373	26	25	11
Pedestrians		4	3		6	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			217			
pX, platoon unblocked	0.76				0.76	0.76
vC, conflicting volume	1405				2237	710
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	907				1999	0
tC, single (s)	4.3				7.0	7.0
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	96				29	99
cM capacity (veh/h)	538				35	810

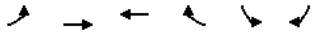
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	554	1061	915	484	36
Volume Left	23	0	0	0	25
Volume Right	0	0	0	26	11
cSH	538	1700	1700	1700	50
Volume to Capacity	0.04	0.62	0.54	0.28	0.72
Queue Length 95th (m)	1.0	0.0	0.0	0.0	22.2
Control Delay (s)	1.2	0.0	0.0	0.0	181.2
Lane LOS	A				F
Approach Delay (s)	0.4		0.0		181.2
Approach LOS					F

Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		66.6%	ICU Level of Service	C
Analysis Period (min)		15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (vph)	62	741	396	44	42	95
Future Volume (vph)	62	741	396	44	42	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.986		0.907	
Flt Protected		0.996			0.985	
Satd. Flow (prot)	0	1896	1877	0	1716	0
Flt Permitted		0.996			0.985	
Satd. Flow (perm)	0	1896	1877	0	1716	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		205.8	198.8		84.4	
Travel Time (s)		15.4	14.9		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	67	805	430	48	46	103
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	872	478	0	149	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 84.1%		ICU Level of Service E	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Traffic Volume (veh/h)	62	741	396	44	42	95
Future Volume (Veh/h)	62	741	396	44	42	95
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)	67	805	430	48	46	103
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			199			
pX, platoon unblocked	0.88				0.88	0.88
vC, conflicting volume	478				1393	454
vC1, stage 1 conf vol					454	
vC2, stage 2 conf vol					939	
vCu, unblocked vol	342				1379	315
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	94				86	84
cM capacity (veh/h)	1084				326	644

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	872	478	149
Volume Left	67	0	46
Volume Right	0	48	103
cSH	1084	1700	495
Volume to Capacity	0.06	0.28	0.30
Queue Length 95th (m)	1.5	0.0	9.5
Control Delay (s)	1.6	0.0	15.4
Lane LOS	A		C
Approach Delay (s)	1.6	0.0	15.4
Approach LOS			C

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

Intersection: 1: Rosedale Ave & King St E

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	65.1	65.8	96.2	102.4	21.4
Average Queue (m)	46.0	47.5	85.1	80.8	16.7
95th Queue (m)	67.7	79.3	97.8	108.5	21.2
Link Distance (m)	105.2	105.2	246.1	246.1	165.8
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Rosedale Ave & Lawrence Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	17.4	111.8	14.3	43.4	34.8	49.4
Average Queue (m)	7.9	51.5	7.9	31.4	24.1	26.9
95th Queue (m)	17.3	104.4	15.4	48.5	38.4	46.5
Link Distance (m)		185.8		272.6	171.4	165.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	15.0		15.0			
Storage Blk Time (%)	0	30	0	19		
Queuing Penalty (veh)	3	18	0	12		

Intersection: 3: Site Access 1/Barons Ave S & King St E

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (m)	50.8	49.4	31.9	38.9	16.1	34.7
Average Queue (m)	30.2	15.6	20.3	7.8	12.7	24.0
95th Queue (m)	60.4	46.7	32.8	33.5	18.0	35.5
Link Distance (m)	84.2	84.2	105.2	105.2	78.8	148.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: King St E & Cameron Ave S

Movement	EB	EB	SB
Directions Served	LT	T	LR
Maximum Queue (m)	80.7	64.1	20.0
Average Queue (m)	37.8	22.6	9.0
95th Queue (m)	88.8	64.5	22.4
Link Distance (m)	220.0	220.0	117.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Lawrence Rd & Site Access 2

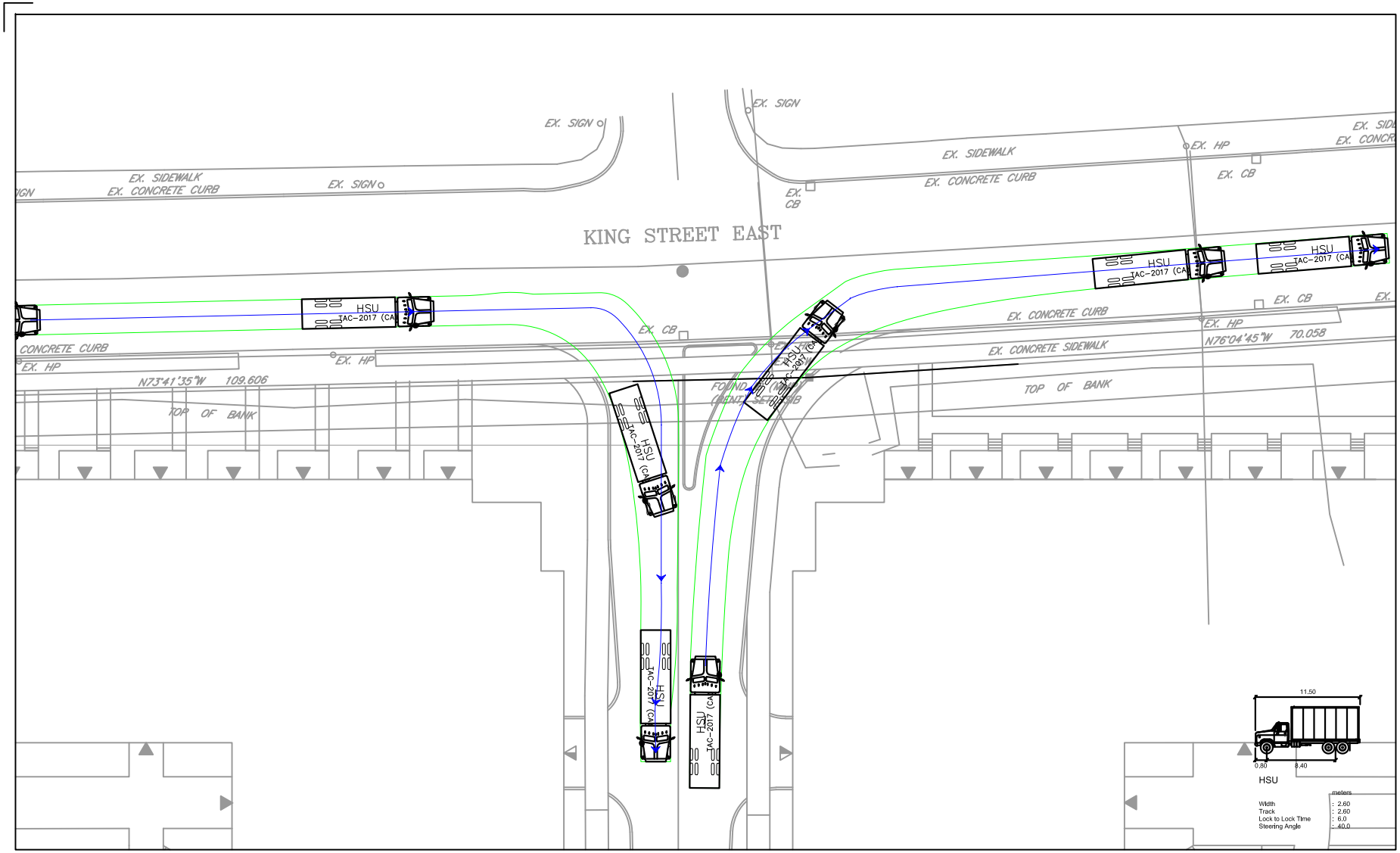
Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	28.2	9.1
Average Queue (m)	16.9	8.8
95th Queue (m)	29.1	9.2
Link Distance (m)	202.5	77.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

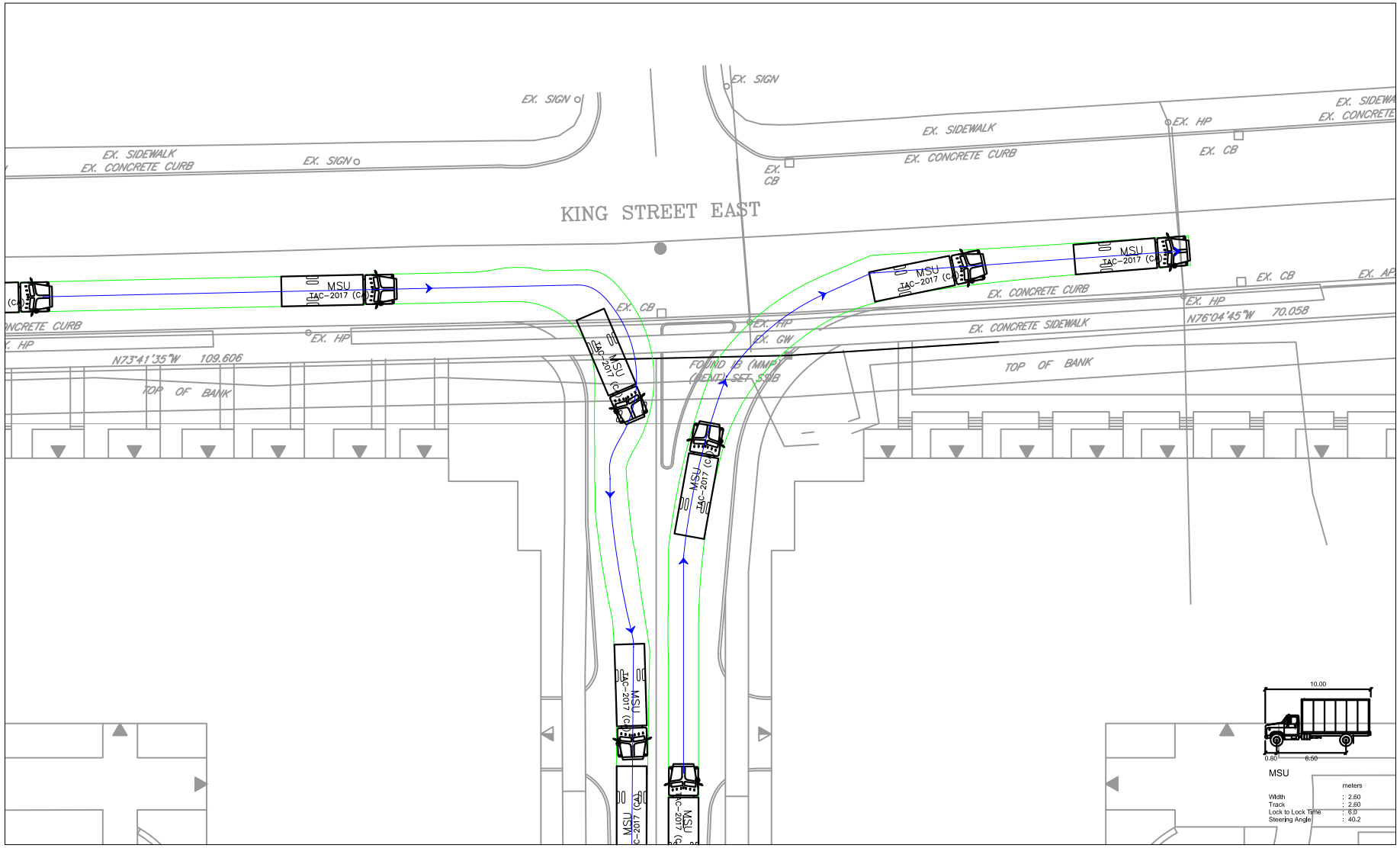
Network Summary

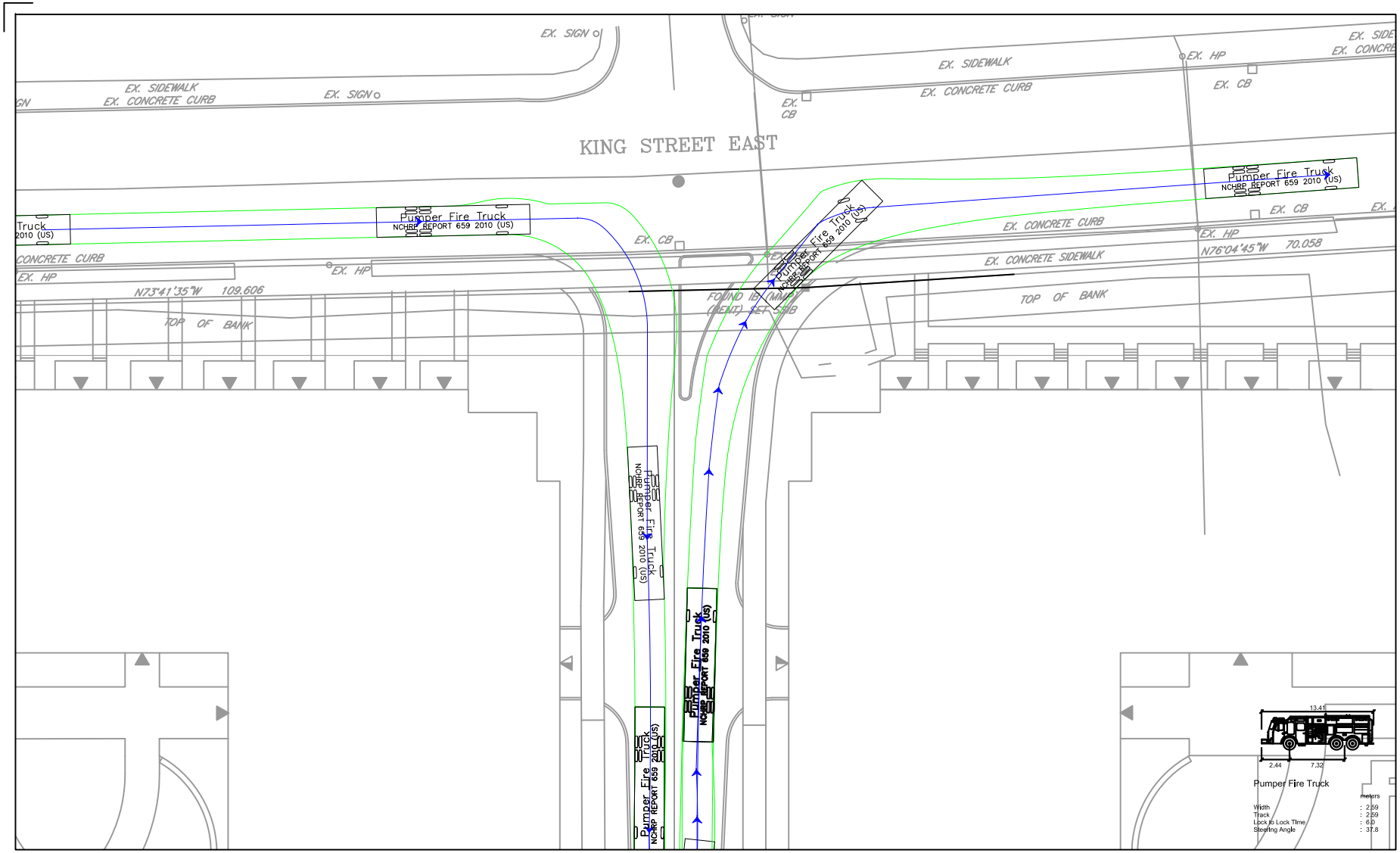
Network wide Queuing Penalty: 32

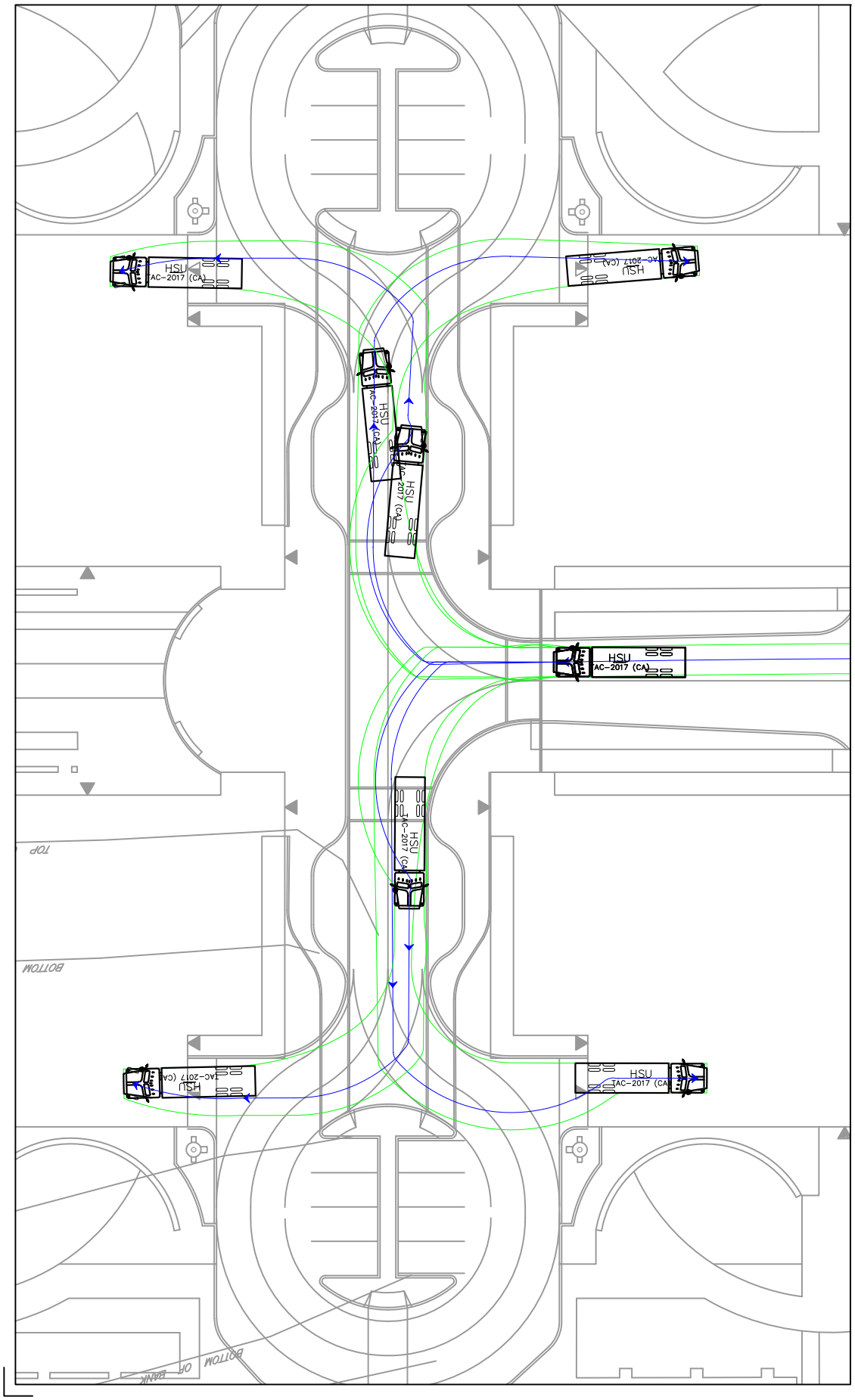
Appendix M

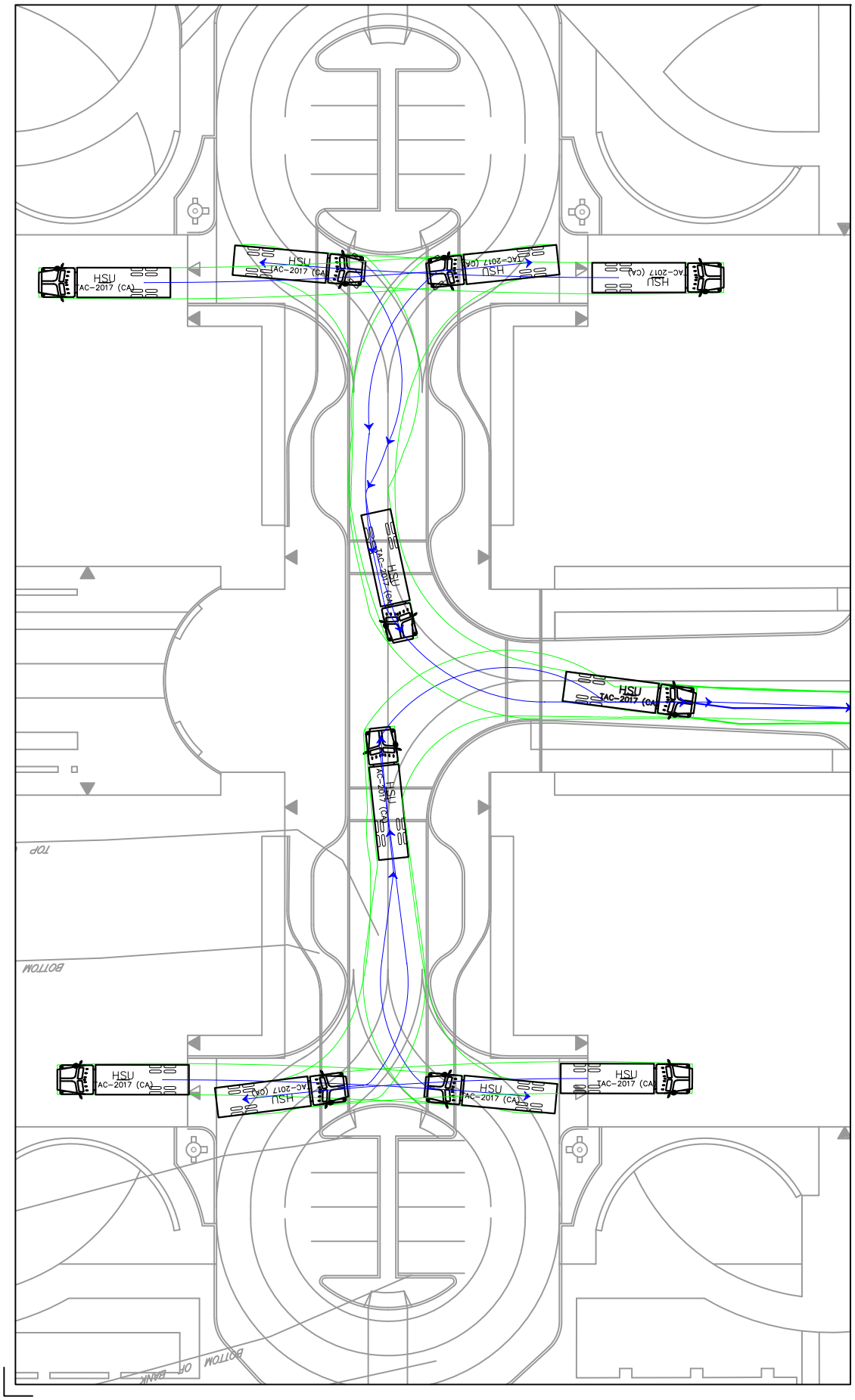
AutoTURN Swept Path Analyses Results

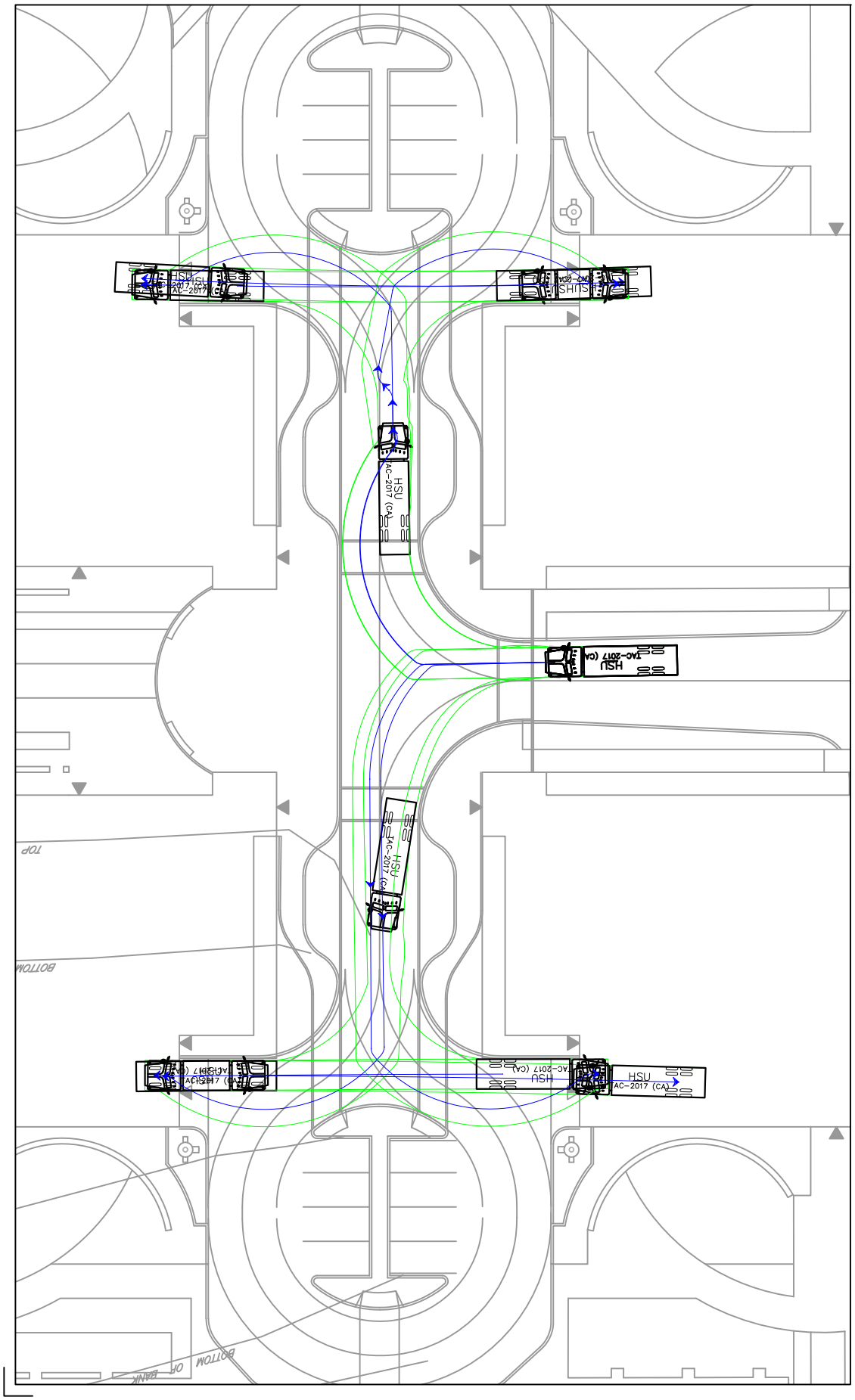

KING STREET EAST
EX. SIGN
EX. SIDEWALK
EX. CONCRETE CURB
EX. CB
EX. HP
EX. CONCRETE SIDEWALK
TOP OF BANK
N73°41'35"W 109.606
N76°04'45"W 70.058
HSU
TAC-2017 (CA
11.50
0.80
8.40
meters
Width : 2.60
Track : 2.60
Lock to Lock Time : 6.0
Steering Angle : 40.0

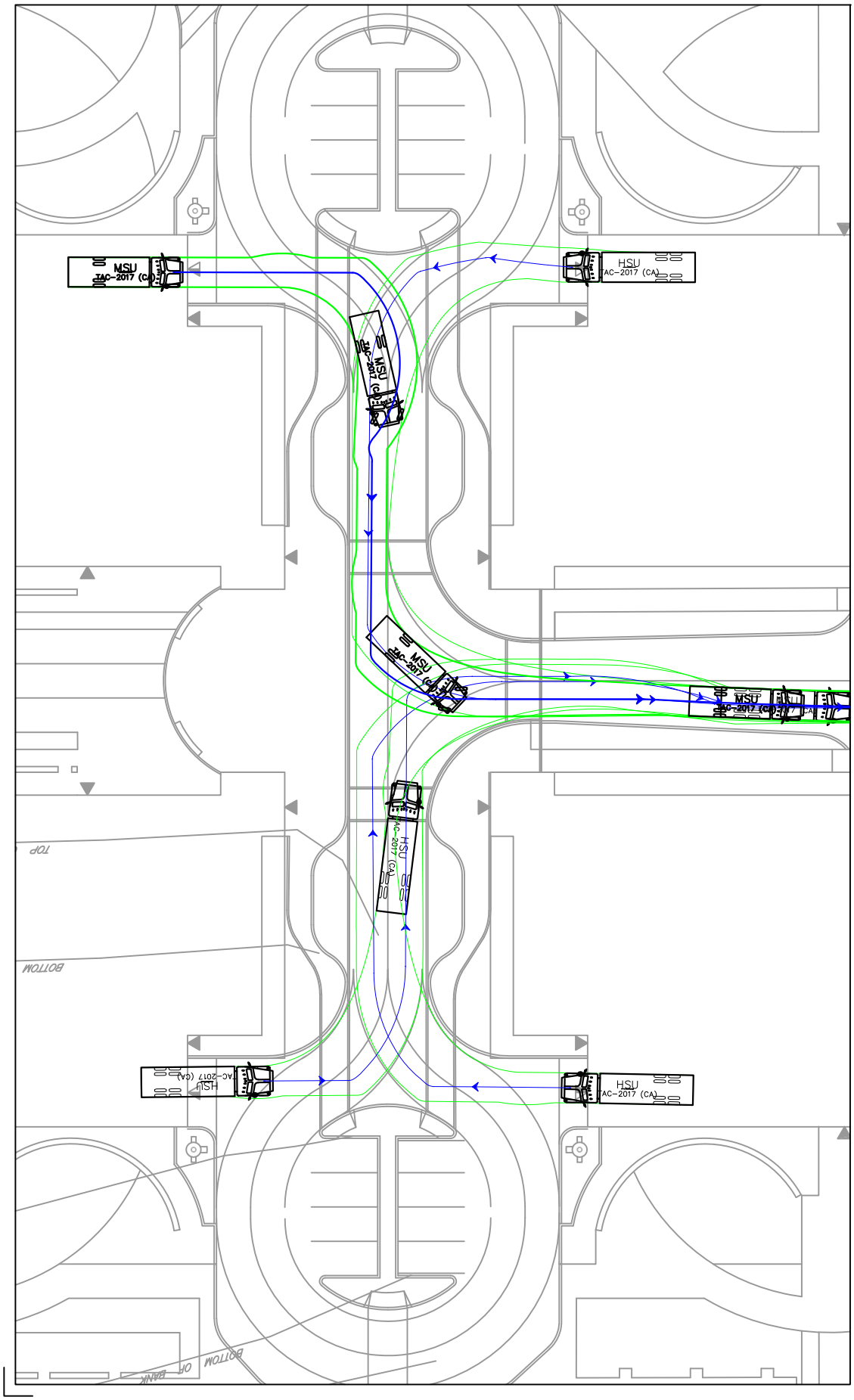

KING STREET EAST
EX. SIGN
EX. SIDEWALK
EX. CONCRETE CURB
EX. HP
EX. CB
EX. GW
EX. CONCRETE SIDEWALK
TOP OF BANK
N73°41'35"W 109.606
N76°04'45"W 70.058
FOUND IB (MMS)
(BENT) SET IBB
MSU
TAC-2017 (C)
10.00
0.80
6.50
meters
Width : 2.60
Track : 2.60
Lock to Lock Time : 6.0
Steering Angle : 40.2

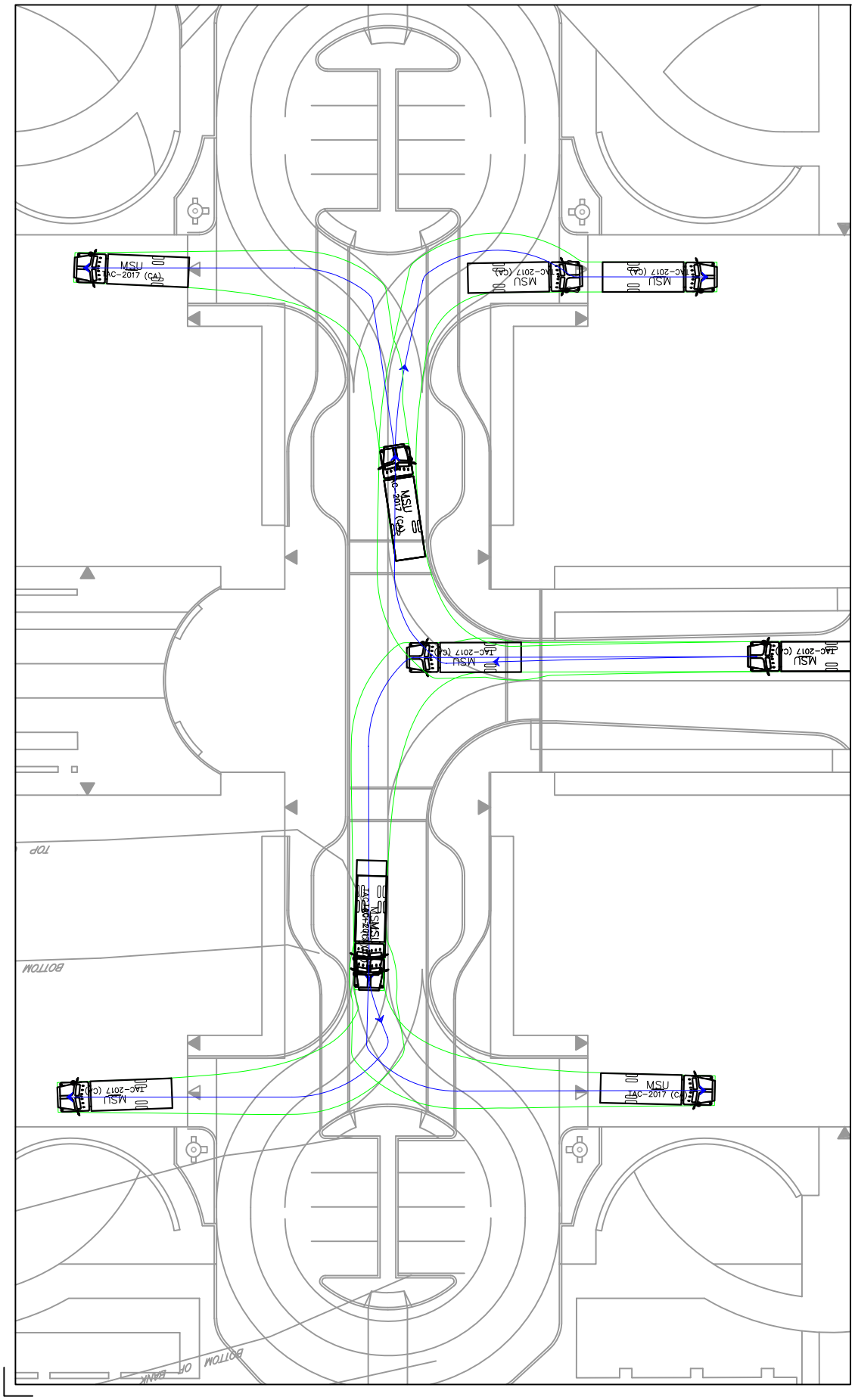

KING STREET EAST
EX. SIGN
EX. SIDEWALK
EX. CONCRETE CURB
EX. CB
EX. HP
EX. CONCRETE SIDEWALK
TOP OF BANK
N73°41'35"W 109.606
N76°04'45"W 70.058
Pumper Fire Truck
NCHRP REPORT 659 2010 (US)
Truck
2010 (US)
13.41
2.44
7.32
Pumper Fire Truck
meters
Width : 2.59
Track : 2.59
Lock to Lock Time : 6.0
Steering Angle : 37.8

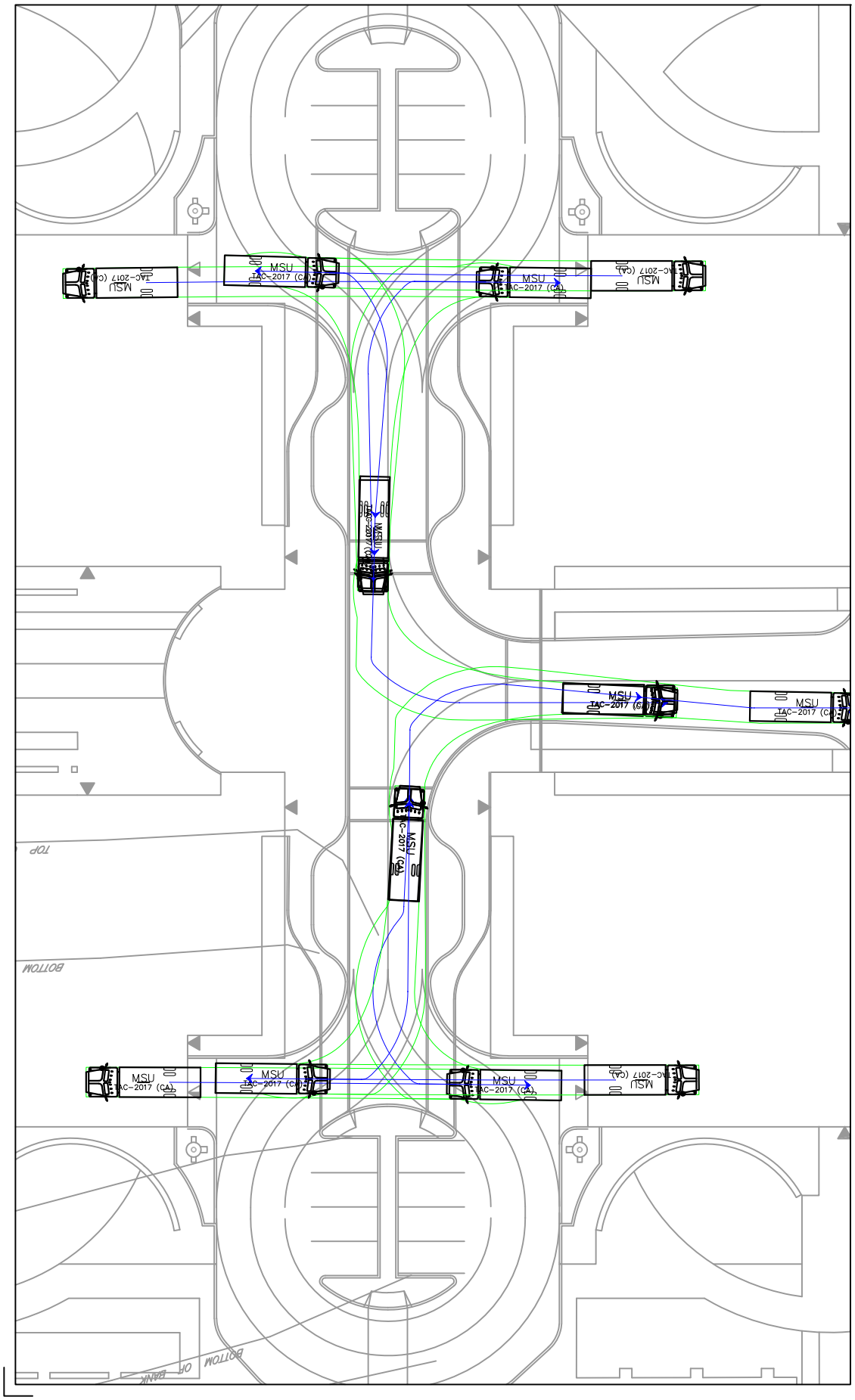

HSU
AC-2017 (CA)
TOP
BOTTOM
BOTTOM OF BANK

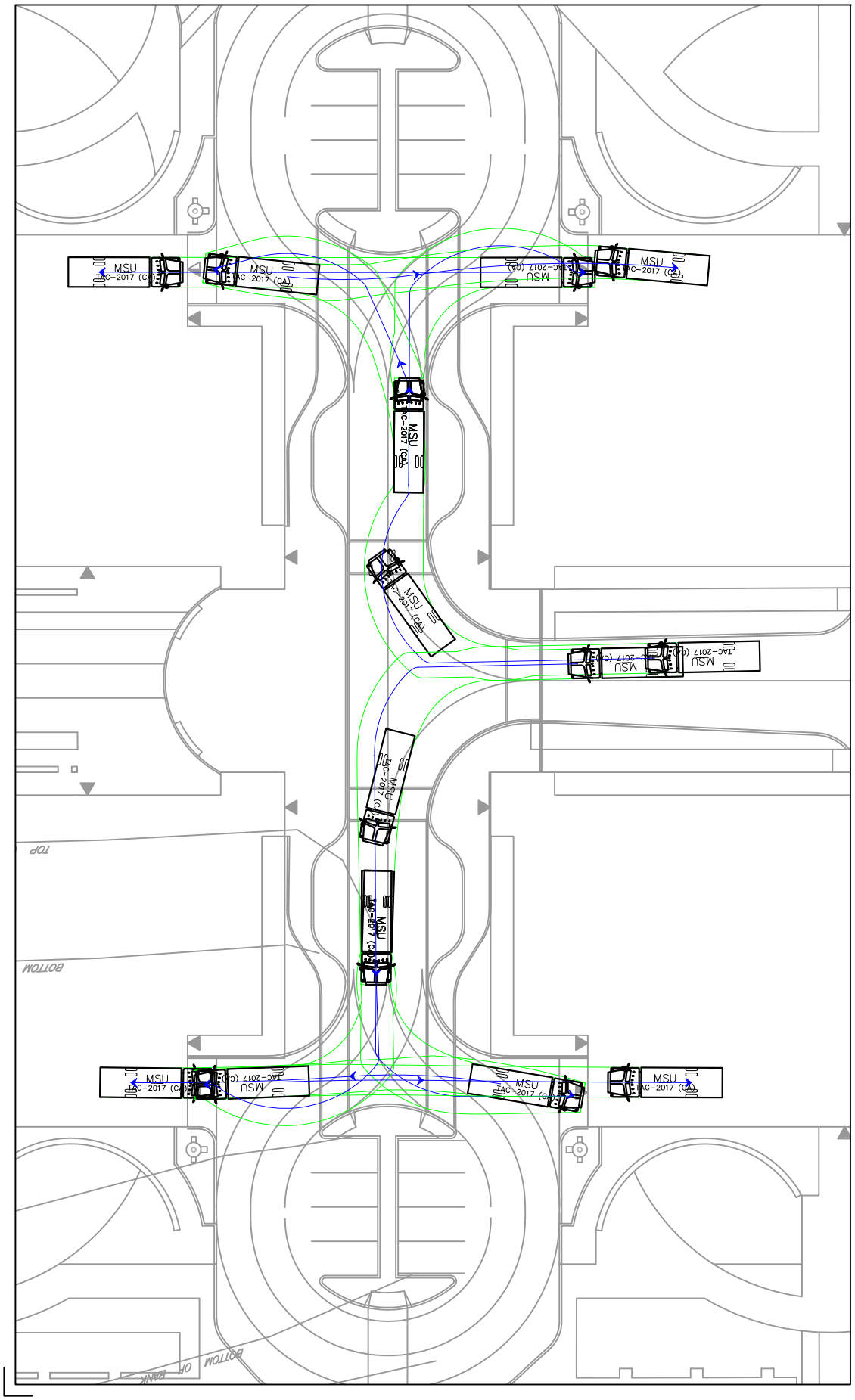

HSU
AC-2017 (CA)
TOP
BOTTOM
BOTTOM OF BANK

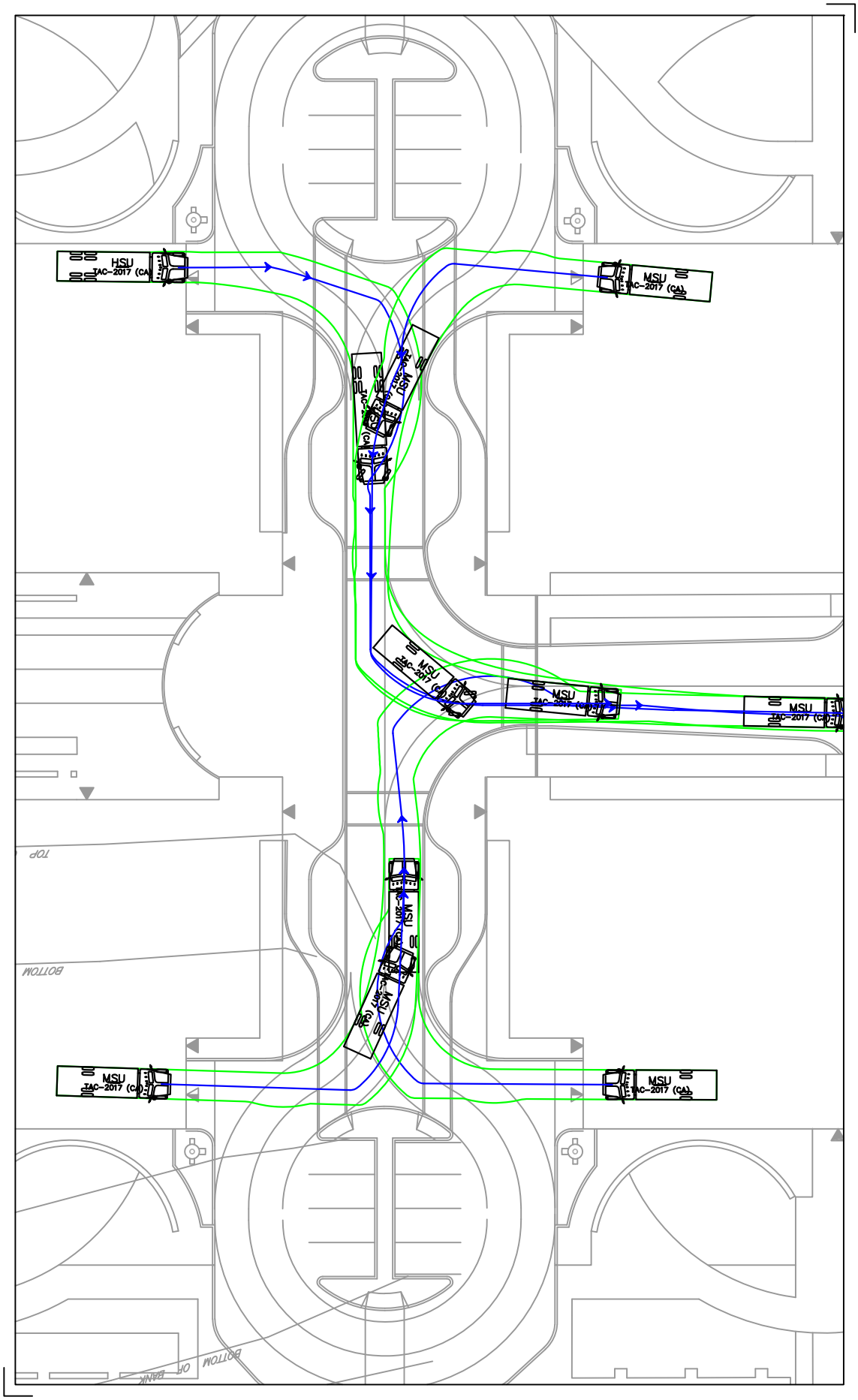

HSU
TAC-2017 (CA)
TOP
BOTTOM
BOTTOM OF BANK

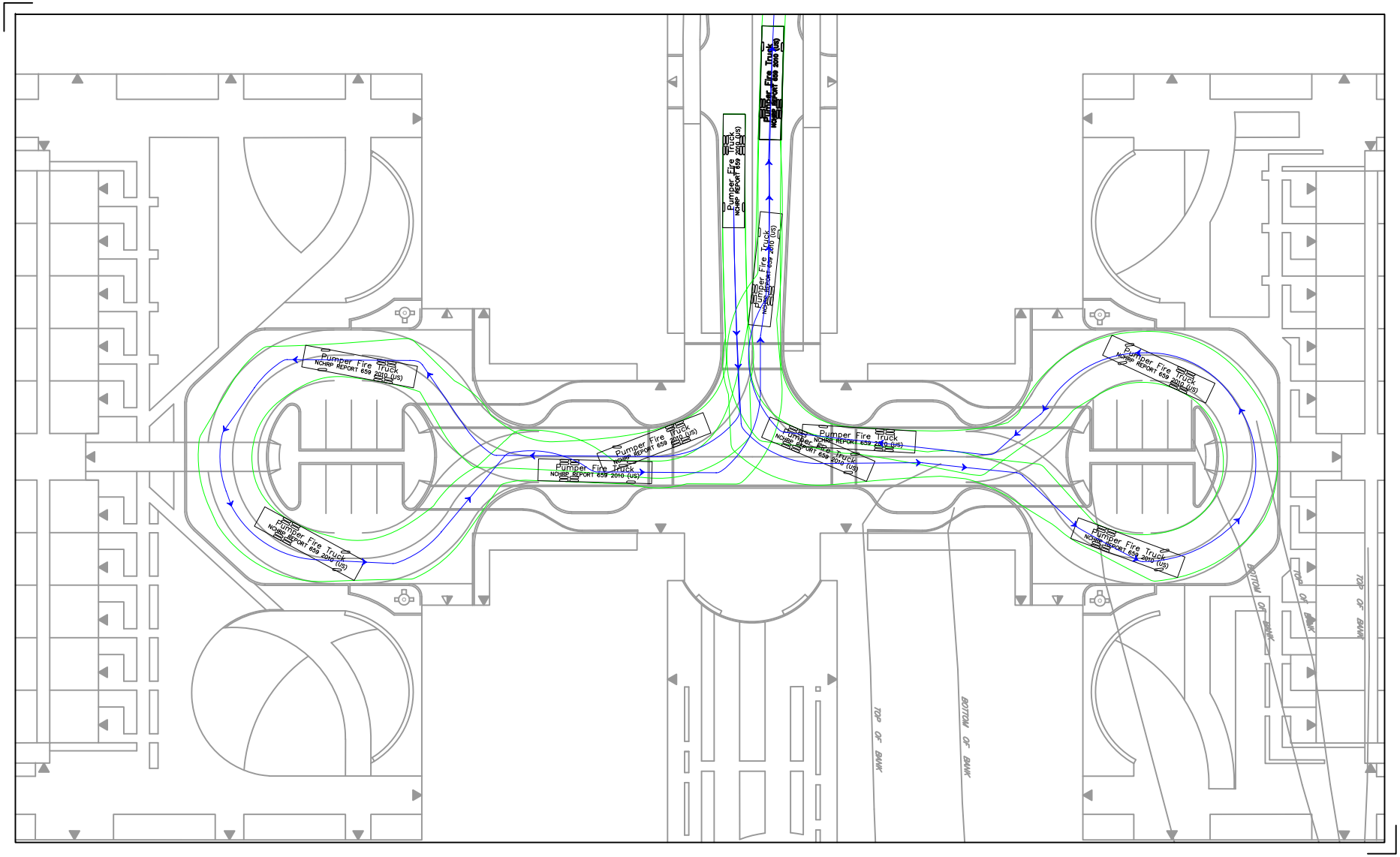

MSU
TAC-2017 (CA)
HSU
TAC-2017 (CA)
TOP
BOTTOM
BOTTOM OF BANK


MSU
TAC-2017 (CA)
TOP
BOTTOM
BOTTOM OF BANK


MSU
TAC-2017 (CA)
TOP
BOTTOM
BOTTOM OF BANK


MSU
TAC-2017 (CA)
TOP
BOTTOM
BOTTOM OF BANK


MSU
TAC-2017 (CA)
MSU
TAC-2017 (CA)
MSU
TAC-2017 (CA)
MSU
TAC-2017 (CA)
MSU
TAC-2017 (CA)
MSU
TAC-2017 (CA)
MSU
TAC-2017 (CA)
MSU
TAC-2017 (CA)
MSU
TAC-2017 (CA)
TOP
BOTTOM
BOTTOM OF BANK


Pumper Fire Truck
NCHRP REPORT 659 2010 (US)
TOP OF BANK
BOTTOM OF BANK