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409 Brant Street Transportation Impact Study, Parking Study and TDM Options Report

Paradigm Transportation Solutions Limited

January 2018

Project Summary

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409 Brant Street
Transportation Impact Study, Parking Study and TDM Options Report

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Signatures and Seals



Signature

Engineer's Seal

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Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study (TIS), Parking Study (PS) and TDM Options Report for the proposed redevelopment of the lands known municipally as 409 Brant Street in the City of Burlington, Ontario.

Development of the property includes consolidating 401 – 413 Brant Street, 444 - 450 John Street and 2002 – 2012 James Street into a single development parcel. For the purposes of this report, the development's address will be referenced as 409 Brant Street.

The study includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts, parking demand analysis, and outlines recommendations to improve future traffic conditions and strategies to reduce dependency on single occupancy vehicle travel.

Conclusions

This study evaluated existing conditions, the impacts of background traffic growth and projected the impacts of the development with the construction of 227 condominium units and 6,425± sf of ground floor retail uses.

Access to the site is proposed via one all-direction driveway connection to John Street. Full-build out of the development is projected to generate approximately 66 new vehicle trips during the weekday AM peak hour and 89 new vehicle trips during the weekday PM peak hour.

The traffic analysis conducted as part of this assessment indicates that development volumes will only result in minor increases to the surrounding study area intersections under peak conditions. This analysis indicates that the transportation infrastructure currently provided is still adequate for accommodating traffic associated with the proposed development.

It is acknowledged that deficiencies at the Brant Street and Elgin Street intersection are projected to occur in the future with anticipated growth in traffic, independent of the development. To address these deficiencies the following mitigation measures should be considered to be implemented by the City:

- **Brant Street and Elgin Street** – The City consider restricting the eastbound approach to right turns only during the weekday PM peak hours from Monday to Friday. This improvement is recommended to address projected capacity deficiencies and potential delay, independent of the proposed development.

The results of the methodologies utilized in the parking analysis provide a general understanding of parking behavior. The parking analysis conducted

indicates that the proposed supply of 0.93 parking space per unit (212 parking spaces) will meet and exceed the parking demand for the following reasons:

- The development is located within a Mixed-Use Activity Area under the Burlington Official Plan which encourages greater reliance on non-automotive forms of transportation;
- The development will be marketed towards individuals and families who prefer living in the Downtown with a strong support for using non-automotive travel modes;
- There is an established sidewalk network through the neighbourhood which provides good connectivity to surrounding communities and the site is within walking distance of several services, shops and other employment opportunities that generally reduce the demand for private car ownership;
- The development will promote the use of active transportation through the provision of 160 bicycle parking spaces for residents, three bicycle parking spaces for the retail land uses and a reduced parking standard that will meet the needs of the development while minimizing potential oversupply; and
- A review of other municipalities, rates found within the ITE Parking Generation 4th Edition and the City of Burlington's City-Wide Parking Standards Review has shown a trend towards lower parking standards within major urban and intensification areas. Parking supply variances are also granted on a case-by-case basis for developments that meet certain criteria such as proximity to higher order transit, provision of quality bike facilities and/or car share programs. This approach is setting a precedent for becoming a best practice in certain parking management strategies. The proposed development generally satisfies many of these criteria and the proposed parking rate of 0.93 is noted to be acceptable.
- To better understand the actual parking demand that can be expected for a development of this type, a parking utilization survey was undertaken at two different sites with similar land uses to the proposed development.
    - Parking demand at the Strata Condominium (551 Maple Avenue) was calculated at 0.80 parking spaces per unit. Applying these rates to the proposed development indicates a total of 182 parking spaces is required. The development exceeds this requirement.
    - Parking demand at 360 on Pearl Condominium (360 Pearl Street) was calculated at 0.76 parking spaces per unit. Applying these rates to the proposed development indicates a total of 173 parking spaces is required. The development exceeds this requirement.



- The site provides significant opportunity with respect to transit availability. Bus service is available within the immediate location and is within 150 metres walk of the John Street Transit Terminal. This is an important terminal that provides significant access to all local transit and higher order transit routes.
- Alternative transportation options provide significant encouragement to residents given the fact that parking will be at a premium in terms of cost and provided on a limited basis.
- The proposed parking supply would accommodate parking for 93% of the units in the building (assuming one space is provided to any specific unit) which exceeds the base proportion of building unit occupants who need to drive on a recurring basis, approximately 70 to 72 percent during the peak periods based on the 2011 TTS data.
- There will be some visitor vehicle parking demand that will impact adjacent public parking facilities and on-street supply. This however will be managed within the context of the overall transportation system. No residential spillover is projected.
- There are 860 existing parking spaces available within a 400-metre radius of the development. Capacity within the Brant Street and Elizabeth Street lots peaked during the evening hours whereas the remaining lots within the Downtown noted to experience limited use in the evening. Visitors of the site who may have difficulties in locating a parking space adjacent to the development can access available parking in other facilities within less than a 100-metre walking distance.
- To manage any future risk to on-street parking supply, the City does have pricing techniques available to affect the demands on the on-street parking supply.
- The proposed reduced parking supply on site is considered appropriate and will meet the base parking needs of the future residents who need to own a car for the purposes of day-to-day travel.
- The most important aspect to the proposed parking supply is that if residents are unwilling to change their travel behaviour, they will not purchase a unit.
- The development is considered an innovative, adaptive redevelopment, which successfully balances intensification and promotion of non-automotive use which are both compatible and respectful of the existing character of the area.

Within the context of being in a future Mobility Hub area, the land use lends itself to being less reliant on auto use where residents and visitors can take advantage of the additional transportation choices such as walking, cycling and transit. It is expected that the land use will generate reduced parking demands due to the locale in combination with the proposed overall design and marketing strategy of the project.



To further promote the site as a sustainable development a variety of transportation demand management measures (TDM) to reduce parking demand is recommended to be incorporated. The TDM plan will focus on making the site a model of sustainable transportation by promoting alternative modes of transportation over the use of private automobiles.

The TDM plan and the developments transportation context will provide residents with a range of mobility choices other than using privately-owned vehicles and supports the provision of an appropriate parking supply in the building.

Recommendations

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

- The City of Burlington recognize the conclusions drawn above;
- Driveway A operate with a single inbound and outbound travel lane with stop control provided for the west leg;
- Optimizing select traffic control signals at study area intersections, if necessary, after build-out to better support the future traffic volumes and travel patterns;
- The intersection of Brant Street and Elgin Street be monitored by the City of Burlington when build-out of in-stream developments within the area occurs to determine if time of day turning restrictions may be required during the weekday peak hours;
- The City of Burlington support the proposed Zoning By-law parking rate to allow the provision of 212 parking spaces for the development (0.93 parking spaces per unit); and
- To promote alternative modes and further reduce the risk attached to reduced parking ratios, the owner develops and implements a TDM plan with the following measures:
  - TDM Coordinator;
  - Unbundled parking;
  - Car-share vehicle within walking distance of the site; and
  - Information packages to residents outlining sustainable travel information.

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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study, Parking Study and TDM Options Report for the proposed redevelopment of the lands known municipally as 409 Brant Street in the City of Burlington.

The subject site is proposed to be redeveloped to include a 23-storey building that will include 597 square metres (6,425 square feet) of ground floor retail space and 227 residential units.

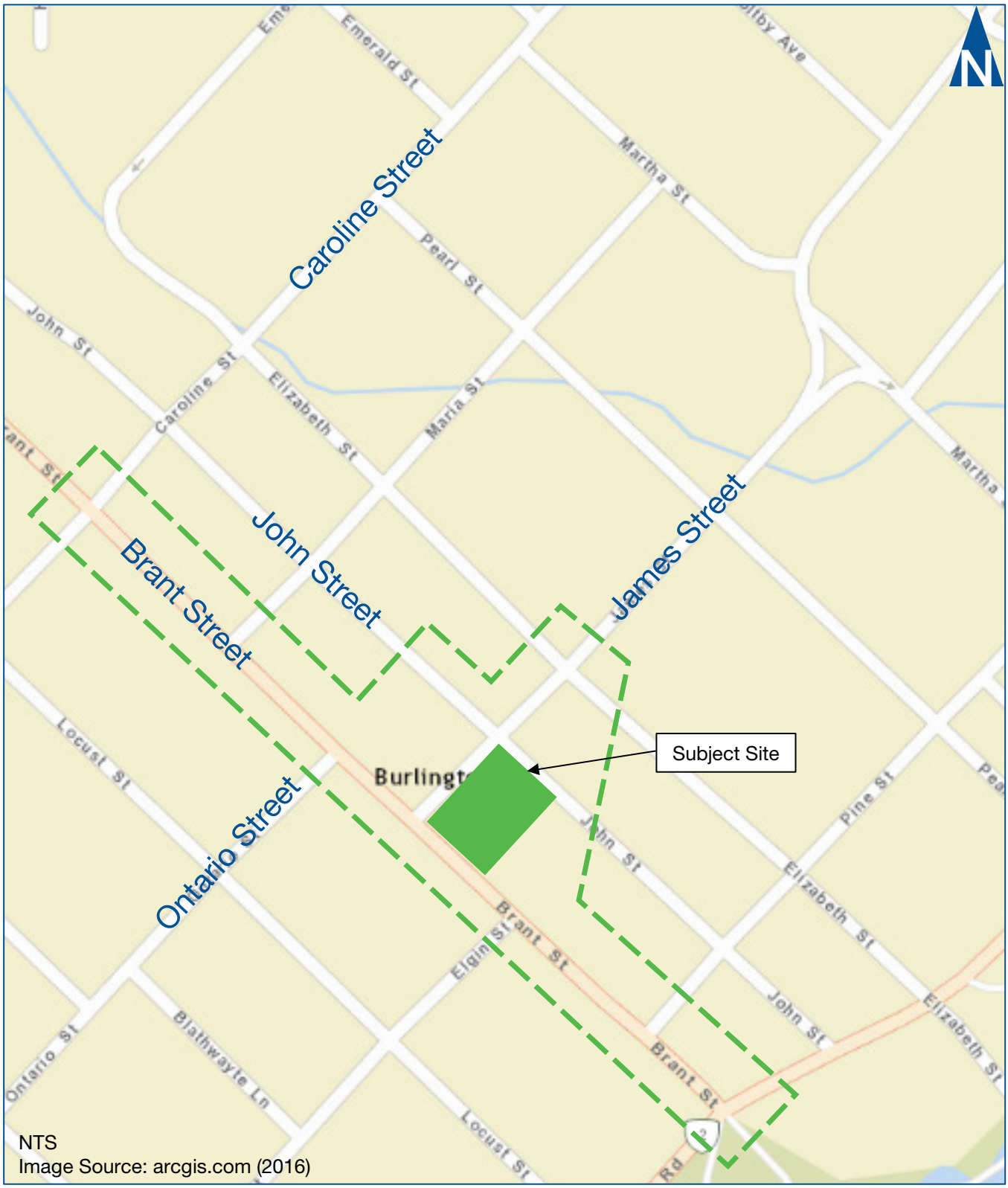
Vehicular access to the site is proposed via one all movements driveway connection to John Street.

The site's parking demand is proposed to be accommodated by an underground parking structure containing 212 parking stalls among five floors.

Pre-study consultation was undertaken via e-mail, with the City of Burlington in December 2017. **Appendix A** contains the pre-study correspondence and comments received from City staff.

Figure 1.1 illustrates the location of the development.





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Location of Subject Site & Study Area

1.2 Purpose and Scope

The purpose of this study is to determine the impacts of the development traffic on the surrounding road network and identify any improvements necessary to accommodate the increase in traffic generated by this development.

The scope of this study is to:

- Document current traffic and site conditions in the vicinity of the development;
- Estimate the background traffic growth in the area;
- Estimate the additional traffic forecast to be generated by the redevelopment of the subject site;
- Assign the forecast traffic to the surrounding road network based on the existing traffic patterns in the study area;
- Assess future total traffic within the study area for a horizon year five (5) years from built-out of the site;
- Identify any operational or safety concerns and any mitigation measures that may be required to improve operations;
- Review the City of Burlington's Zoning By-Law requirements;
- Provide a technical analysis using secondary source and local parking survey information to estimate the potential parking demand;
- Review the adequacy of the proposed parking supply; and
- Review and identify potential Transportation Demand Management (TDM) measures that can be implemented for the proposed development.

1.3 Study Area

The intersections evaluated within this study that are most likely to be impacted by the development, as identified by the City are:

- Brant Street and James Street;
- Brant Street and Lakeshore Road;
- Brant Street and Elgin Street;
- Brant Street and Ontario Street;
- Brant Street and Caroline Street;
- James Street and Elizabeth Street; and
- James Street and John Street.

2 Existing Conditions

This section of the report provides an overview of the existing conditions on the roadways in the study area.

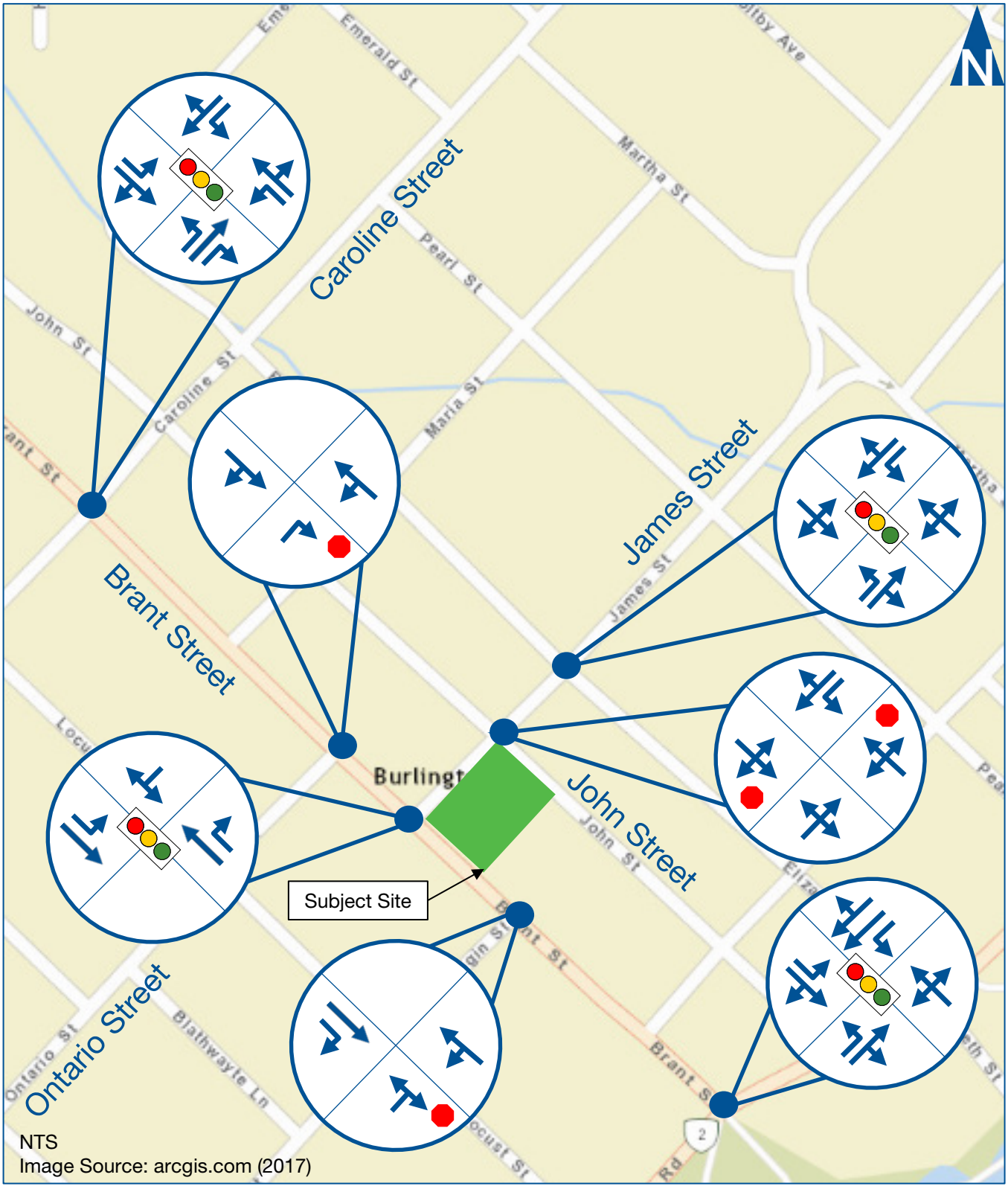
2.1 Existing Roadways

The main roadways in the vicinity of the subject site that have been assessed include Brant Street, James Street, Lakeshore Road, Elgin Street, Caroline Street, Elizabeth Street, John Street and Ontario Street. The characteristics of these roadways are as follows:

- Brant Street is a north-south two-lane minor arterial roadway that operates under the jurisdiction of the City of Burlington. Within the study area, it has an urban cross-section, on-street parking and sidewalks on both sides. The maximum speed limit is unposted and assumed to be 50 kilometres per hour.
- James Street is an east-west two-lane minor arterial roadway that operates under the jurisdiction of the City of Burlington. Within the study area, it has an urban cross-section, on-street parking provided on the south side, and sidewalks provided on both sides of the roadway. The maximum speed limit is unposted and assumed to be 50 kilometres per hour.
- Lakeshore Road is an east-west two-lane minor arterial roadway that operates under the jurisdiction of the City of Burlington. Within the study area, it has an urban cross-section, sidewalks and no stopping restrictions on both sides of the roadway. The maximum posted speed limit is 50 kilometres per hour.
- Elgin Street is an east-west two-lane collector roadway that operates under the jurisdiction of the City of Burlington. Within the study area, it has an urban cross-section with sidewalks on both sides of the roadway, and a no stopping restriction on the north side. The maximum posted speed limit is 40 kilometres per hour.
- Caroline Street is an east-west two-lane collector roadway that operates under the jurisdiction of the City of Burlington. Within the study area, it has an urban cross-section, sidewalks on both sides, and on-street parking on the south side. The maximum posted speed limit is 40 kilometres per hour.
- Elizabeth Street is a north-south two-lane collector roadway that operates under the jurisdiction of the City of Burlington. Within the study area, it has an urban cross-section, sidewalks on both sides, on-street parking on the west side, and no stopping restrictions on the east side. The maximum posted speed limit is unposted and assumed to be 50 kilometres per hour.

- John Street is a north-south two-lane collector roadway that operates under the jurisdiction of the City of Burlington. Within the study area, it has an urban cross-section, sidewalks and on-street parking on both sides. The maximum speed limit is unposted and assumed to be 50 kilometres per hour.
- Ontario Street is an east-west two-lane local roadway that operates under the jurisdiction of the City of Burlington. Within the study area, it has an urban cross-section, with sidewalks on both sides, on-street parking on the north side, and no stopping restrictions on the south side. The maximum posted speed limit is 40 kilometres per hour.

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



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Existing Lane Configurations & Traffic Control

2.2 Existing Transit Service

2.2.1 City of Burlington Transit Service

Burlington Transit (BT) is the public transit operator for the City of Burlington and operates several routes within the study area. The main bus terminal in Downtown Burlington is located on John Street, a walk of approximately 100 metres from the subject site. Currently, BT operates six routes within the study area:

- Route 3,3A (Guelph-Downtown) operates between the Burlington GO Station and the Highway 407 Carpool Lot via Downtown Burlington. Service is provided seven days a week with approximately 30-minute headways during weekday peak hours, and 60-minute headways during all other times.
- Route 4 (Central) runs between Downtown Burlington and the Appleby GO Station. Service is provided seven days a week with approximately 45-minute headways during the weekday afternoon peak hour, and 30-minute headways during all other weekday service hours. One-hour headways occur during weekend service hours.
- Route 5 (Francis-Downtown) operates between King/Townsend and the Burlington GO Station via Downtown Burlington. The route runs with 30-minute headways during all weekday service hours.
- Route 10 (New-Maple) runs between Burlington GO Station and Appleby GO Station via Downtown Burlington. The route operates with approximately 30-minute headways during all weekday service hours and 30-minute to 60-minute headways during all weekend service hours.
- Route 50 (Burlington South) provides late night service around the southern portion of the City emanating and terminating at the Burlington GO Station. Buses operate with one-hour headways and provide a connection at the John Street Transit Terminal. The service runs between 10:55 PM and 1:16 AM, Monday to Saturday.
- Route 52 (Burlington Northwest) provides late night service around the northwest portion of the City emanating and terminating at the Burlington GO Station. Buses operate with one-hour headways and stop in Downtown Burlington. The service runs between 10:55 PM and 1:22 AM, Monday to Saturday.

2.2.2 GO Transit Service

The Burlington GO station is located about 2.8 kilometres north of the subject site and is easily accessible via Burlington Transit. Since this GO line provides train service to Mississauga and Downtown Toronto, it is expected that the subject development will attract residents that will utilize both City transit and inter-regional transit for commuting purposes.

Figure 2.2 illustrates the existing transit network**.**



NTS
Image Source: burlingtontransit.com

Existing Transit Services

409 Brant Street TRIS, PS & TDM Options Report
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Figure 2.2

2.3 Active Transportation

2.3.1 Walkability

Pedestrian sidewalks are provided along both sides of the roadways throughout the majority of the study area. Crosswalks, pedestrian pushbuttons, and indicators are provided for all approaches at the signalized intersections within the study area.

The subject site is located within walking distance of numerous significant employment, retail, cultural and recreational opportunities providing for a range of destinations for prospective residents of the proposed building that can be readily accessed without the use of a car. The proximity of the site to such a range of amenities and destinations within walking distance serves to reduce the need for residents of the building to travel on a regular basis using a car.

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 subject site is noted to have a Walk Score of 91 and is considered a “Very Walkable” location which means most daily errands can be accomplished on foot without the need of a personal vehicle[1].

2.3.2 Cycling

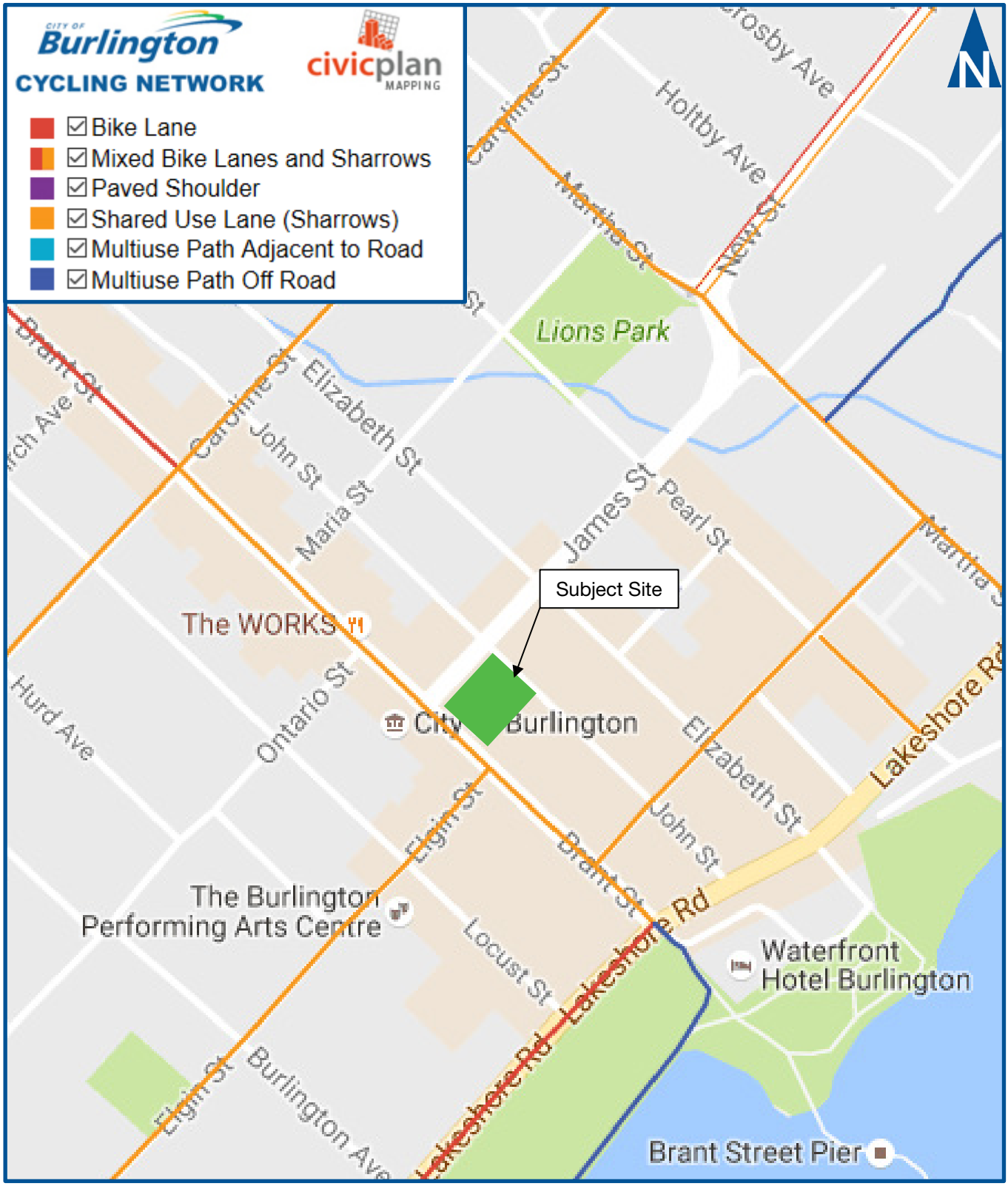
The City’s cycling infrastructure consists of on-street and off-street facilities. On-street routes are comprised of bicycle lanes, signed bicycle routes and paved shoulders. Off-street facilities are in the form of multi-use paths.

The City’s 2016 Cycling Map[2] identifies several cycling facilities on the study area roadways. Brant Street, Caroline Street, and Elgin Street currently operate with shared use shoulders (sharrows). Lakeshore Road currently has a bike lane from Brant Street west to Maple Avenue.

A review of the City’s Cycling Master Plan[3] has identified Brant Street and Caroline Street as proposed Bicycle Priority Streets, and Elgin Street as a future location for bike lane infrastructure. The Cycling Master Plan has also identified Lakeshore Road east of Brant Street as a future location for bike lane infrastructure.

Figure 2.3 illustrates the existing cycling network within the study area.

[1] http://www.walkscore.com/score/409-brant-st-burlington-on-canada
[2] City of Burlington: Cycling Network. Civic Plan Mapping, 2016. http://geostreet.ca/bikeburlington/bikemap2016.html
[3] City of Burlington: Cycling Master Plan. Prepared by IBI Group, July 2009.



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Existing Cycling Facilities

2.4 Existing Traffic Volumes

To assess intersection operations, turning movement counts are used to quantify the movement of vehicles through the area. Existing traffic data at an intersection or on a road section forms the foundation for the analysis. The counts are usually taken during peak periods at an intersection to complete the level of service analysis under its worst-case operating conditions.

2.4.1 Traffic Data

Paradigm utilized turning movement counts collected in October and November 2016 at the study area intersections. **Appendix B** contains the raw turning movement count data sheets. Signal timing data, including phasing plans were obtained for the City, where applicable.

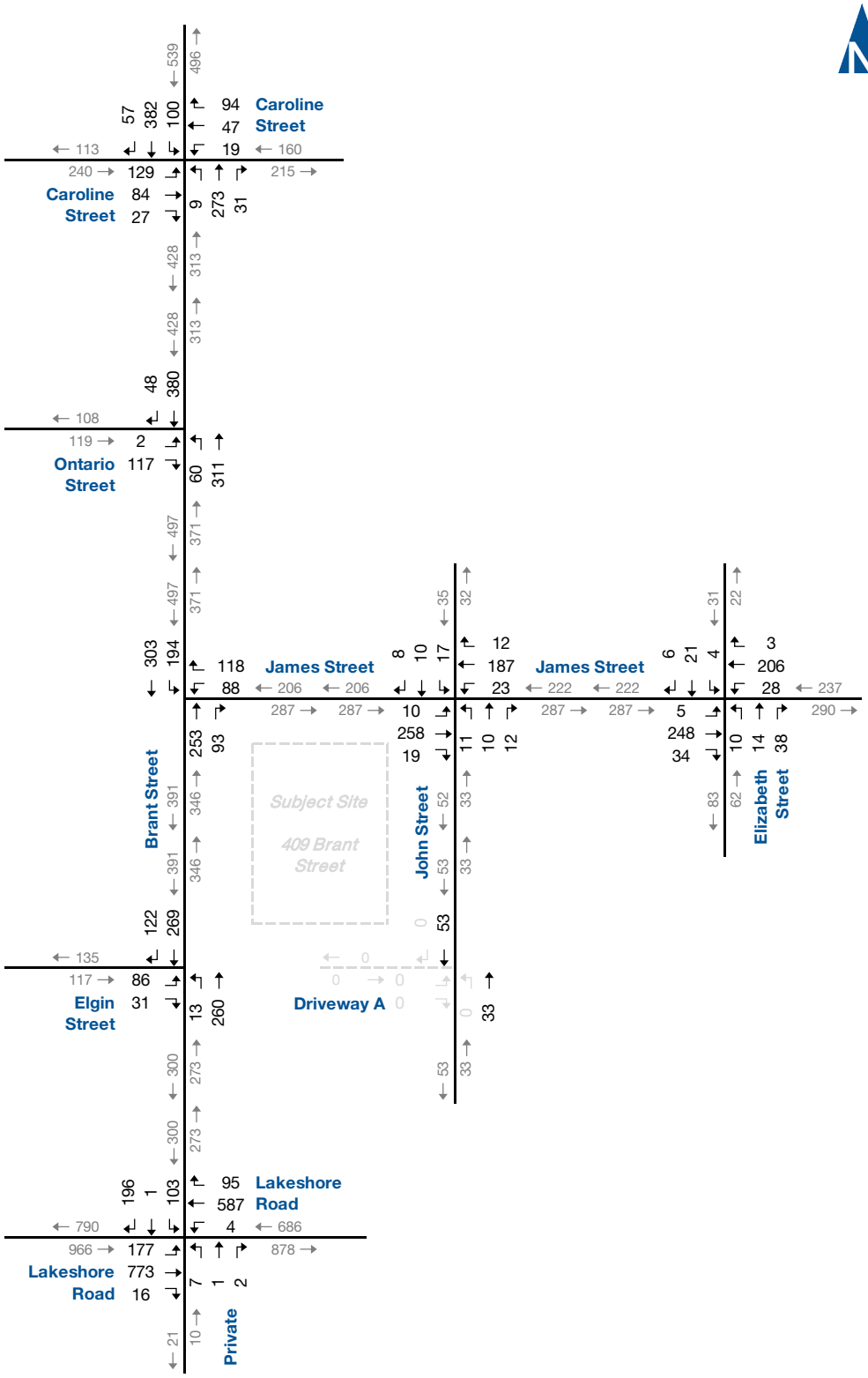
2.4.2 Base Year Adjustments

At the direction of City staff, a growth rate of 1.0 percent per annum was applied to the 2016 count data to represent base year (2017) traffic volumes along the study area roadways.

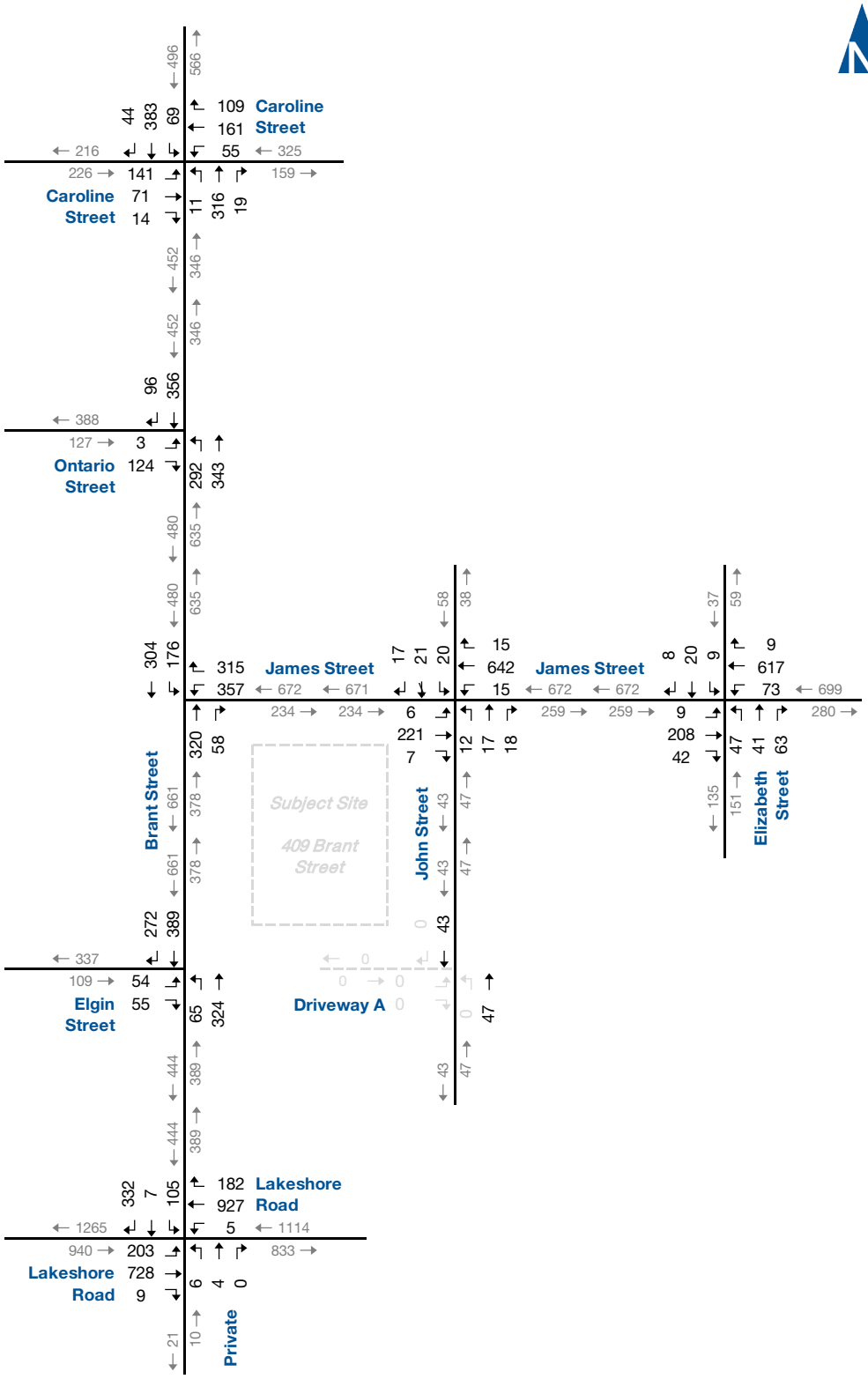
2.4.3 Volume Balancing

As no major intersections or access points are provided between the study area intersections, volume balancing has been applied to the traffic volumes to ensure reasonable upstream and downstream flow is maintained within the study area road network.

Figure 2.4 illustrates the base year (2017) traffic volumes.



Base Year Traffic Volumes
AM Peak Hour



Base Year Traffic Volumes
PM Peak Hour

2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements at an intersection. The delay is related to the number of vehicles desiring to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on several criteria including, but not limited to, vehicle headways, intersection geometry, vehicle composition, opposing traffic flows, and for signalized intersections, signal timing.

Table 2.1 summarizes the level of service criteria for signalized and stop controlled intersections. The highest possible rating is LOS A, under which the average total delay is equal to or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections or 50 seconds for unsignalized intersections, or when the volume-to-capacity (v/c) ratio is greater than 1.00, the movement is classified as LOS F, and improvements are usually implemented, if feasible. LOS D is typically considered acceptable peak-hour performance in an urban setting, and lower LOS values are tolerable for short term time periods during peak hours when heavier traffic volumes are expected.

TABLE 2.1: VEHICLE LEVEL OF SERVICE DEFINITIONS

Level of Service	Signalized Intersections Average Total Delay (sec/veh)	Unsignalized Intersections Average Total Delay (sec/veh)
A	< = 10	< = 10
B	> 10 & < = 20	> 10 & < = 15
C	> 20 & < = 35	> 15 & < = 25
D	> 35 & < = 55	> 25 & < = 35
E	> 55 & < = 80	> 35 & < = 50
F	> 80	> 50

The operations of the intersections in the study area were evaluated with the base year traffic volumes using Synchro 9.1 with Highway Capacity Manual (HCM) 2000 procedures. The intersection analysis considered the following measures of performance:

- The volume to capacity ratio for each intersection;
- The LOS, based on the average control delay for each vehicle, for each turning movement; and
- The estimated 95th percentile queue length.

The key parameters used in the analysis include:

- Existing lane configurations as documented during the site visit;
- Heavy vehicle percentages as derived from the existing turning movement counts;
- Signal timing plans as provided by the City;
- Peak hour factors (PHF) of 0.92;
- Saturday Flow Rate of 1900; and
- Synchro default values for all other inputs.

Table 2.2 summarizes the results of the analysis for the existing weekday AM and PM peak hour intersection operations. The key results of the analysis are as follows:

- The signalized intersection of Brant Street and Caroline Street is operating with acceptable levels of service during the weekday peak hours;
- The unsignalized intersection of Brant Street and Ontario Street is operating with acceptable level of service during the weekday peak hours. Side street delays are noted to be LOS B with a v/c ratio of no greater than 0.24;
- The signalized intersection of Brant Street and James Street is operating with acceptable levels of service during the weekday peak hours;
- The unsignalized intersection Brant Street and Elgin Street is operating with acceptable levels of service during the weekday peak hours. Side street delays are noted to be LOS C with a v/c ratio of no greater than 0.33;
- The signalized intersection of Brant Street and Lakeshore Road is operating with acceptable levels of service during the weekday peak hours;
- The unsignalized intersection John Street and James Street is operating with acceptable levels of service during the weekday peak hours. Side street delays are noted to be between LOS C or better with v/c ratios of no greater than 0.16;
- The signalized intersection Elizabeth Street and James Street is operating with acceptable levels of service during both weekday peak hours.

Appendix C contains the detailed Synchro reports.



TABLE 2.2: BASE YEAR PEAK HOUR TRAFFIC VOLUMES

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- Brant Street & Caroline Street	TCS	LOS	B	C	C	**B**	C	C	>	**C**	B	C	>	**C**	B	C	>	**C**	**C**
			Delay	19	21	20	**20**	20	21	>	**21**	16	21	>	**20**	14	31	>	**28**	**24**
			V/C	0.37	0.20	0.02		0.07	0.21	>		0.07	0.57	>		0.30	0.83	>		**0.55**
			Q	25	23	0		8	21	>		5	66	>		17	119	>		
	2 - Brant Street & Ontario Street	TWSC	LOS	<	B	>	**B**	**Approach Not Applicable**				<	A		**A**		A	>	**A**	
			Delay	<	12	>	**12**					<	2		**2**		0	>	**0**	
			V/C	<	0.20	>						<	0.06				0.27	>		
			Q	<	6	>						<	2				0	>		
	3 - Brant Street & James Street	TCS	LOS	**Approach Not Applicable**				B		B	**B**		B	A	**B**	A	B		**B**	**B**
			Delay					14		14	**14**		12	10	**12**	8	13		**11**	**12**
			V/C					0.26		0.10			0.51	0.13		0.42	0.54			**0.45**
			Q					19		11			38	10		17	44			
	4 - Brant Street & Elgin Street	TWSC	LOS	<	C	>	**C**	**Approach Not Applicable**				<	A		**A**		A	A	**A**	
			Delay	<	16	>	**16**					<	1		**1**		0	0	**0**	
			V/C	<	0.29	>						<	0.01				0.17	0.08		
			Q	<	16	>						<	1				0	0		
	5 - Brant Street & Lakeshore Road	TCS	LOS	A	A	>	**A**	A	A	>	**A**	<	C	>	**C**	C	C	>	**C**	**B**
			Delay	6	5	>	**5**	7	10	>	**10**	<	30	>	**30**	35	31	>	**32**	**11**
			V/C	0.44	0.37	>		0.01	0.39	>		<	0.04	>		0.50	0.16	>		**0.45**
			Q	20	45	>		2	53	>		<	6	>		35	19	>		
	6 - John Street & James Street	TWSC	LOS	<	A	>	**A**	A	A	>	**A**	<	B	>	**B**	<	B	>	**B**	
			Delay	<	0	>	**0**	8	0	>	**1**	<	12	>	**12**	<	12	>	**12**	
			V/C	<	0.01	>		0.02	0.13	>		<	0.07	>		<	0.06	>		
			Q	<	0	>		1	0	>		<	2	>		<	2	>		
	7 - Elizabeth Street & James Street	TCS	LOS	A	A	>	**A**	A	A	>	**A**	<	C	>	**C**	<	C	>	**C**	**A**
			Delay	2	3	>	**3**	2	3	>	**3**	<	23	>	**23**	<	23	>	**23**	**6**
			V/C	0.01	0.29	>		0.05	0.19	>		<	0.19	>		<	0.18	>		**0.28**
			Q	1	21	>		3	15	>		<	11	>		<	9	>		
PM Peak Hour	1- Brant Street & Caroline Street	TCS	LOS	B	C	C	**B**	C	C	>	**C**	B	C	>	**C**	B	C	>	**C**	**C**
			Delay	19	21	20	**20**	22	27	>	**26**	17	24	>	**24**	15	32	>	**30**	**26**
			V/C	0.46	0.16	0.01		0.19	0.63	>		0.08	0.64	>		0.23	0.81	>		**0.64**
			Q	26	20	0		17	61	>		5	79	>		14	119	>		
	2 - Brant Street & Ontario Street	TWSC	LOS	<	B	>	**B**	**Approach Not Applicable**				<	A		**A**		A	>	**A**	
			Delay	<	13	>	**13**					<	7		**7**		0	>	**0**	
			V/C	<	0.24	>						<	0.31				0.29	>		
			Q	<	7	>						<	11				0	>		
	3 - Brant Street & James Street	TCS	LOS	**Approach Not Applicable**				C		B	**B**		C	B	**B**	B	B		**B**	**B**
			Delay					23		15	**20**		21	14	**20**	12	18		**16**	**18**
			V/C					0.72		0.27			0.66	0.09		0.46	0.56			
			Q					88		18			69	11		25	62			
	4 - Brant Street & Elgin Street	TWSC	LOS	<	C	>	**C**	**Approach Not Applicable**				<	A		**A**		A	A	**A**	
			Delay	<	20	>	**20**					<	2		**2**		0	0	**0**	
			V/C	<	0.33	>						<	0.08				0.20	0.17		
			Q	<	11	>						<	2				0	0		
	5 - Brant Street & Lakeshore Road	TCS	LOS	C	A	>	**B**	A	B	>	**B**	<	C	>	**C**	D	D	>	**D**	**B**
			Delay	28	7	>	**12**	9	17	>	**17**	<	33	>	**33**	36	48	>	**45**	**20**
			V/C	0.81	0.39	>		0.01	0.66	>		<	0.04	>		0.40	0.74	>		**0.79**
			Q	53	64	>		3	142	>		<	7	>		38	79	>		
	6 - John Street & James Street	TWSC	LOS	<	A	>	**A**	A	A	>	**A**	<	C	>	**C**	<	C	>	**C**	
			Delay	<	0	>	**0**	8	0	>	**0**	<	15	>	**15**	<	16	>	**16**	
			V/C	<	0.01	>		0.01	0.42	>		<	0.12	>		<	0.16	>		
			Q	<	0	>		0	0	>		<	3	>		<	5	>		
	7 - Elizabeth Street & James Street	TCS	LOS	A	A	>	**A**	A	A	>	**A**	<	C	>	**C**	<	C	>	**C**	**A**
			Delay	4	5	>	**5**	4	8	>	**7**	<	27	>	**27**	<	24	>	**24**	**10**
			V/C	0.03	0.27	>		0.12	0.59	>		<	0.47	>		<	0.11	>		**0.56**
			Q	2	26	>		9	86	>		<	31	>		<	11	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
<- Shared Left/Through Lane
>- Shared Right/Through Lane

3 Development Concept

3.1 Site Description

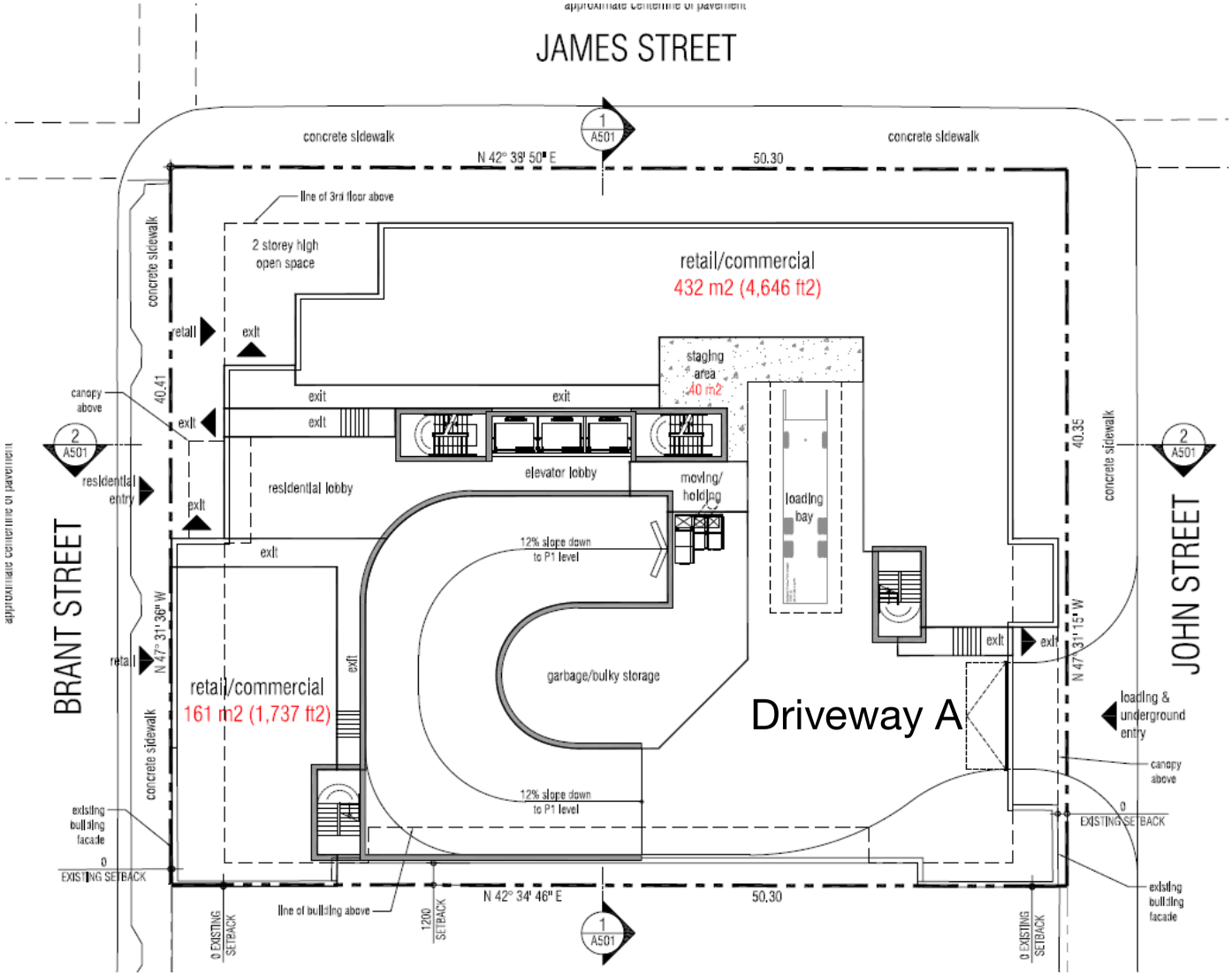
The subject site is located on the southeast corner of Brant Street and James Street, currently occupied by several one to two storey retail establishments. The majority of these existing buildings will be demolished to facilitate development of the subject site.

Redevelopment plans entail constructing a 23-storey mixed-use building containing 227 residential units and 597 square metres (6,425 square feet) of ground floor commercial space. The residential units comprise 123 one-bedroom/studio units, 76 two-bedroom units, and 28 three-bedroom units. A total of 212 parking spaces will be provided on-site within a five-storey underground parking garage. Build-out is anticipated to occur in one phase, at or before Year 2021.

Vehicular access to the site is proposed via one all directional driveway connection (Driveway A) to John Street. Driveway A is proposed to be located 45 metres south of the James Street and John Street intersection (centreline to centreline) and has been designed to operate with a single inbound and outbound travel lane. Stop control will be provided for the west leg (minor approach). The provision of one loading space adjacent to the underground parking ramp is provided to accommodate garbage collection, loading and service activities of the development. Access to the loading facilities will be provided through Driveway A.

For development parcels with frontage on more than one pubic street, separation of vehicle access and loading spaces is typically preferred. However, as John Street is noted to be a lower order street, and Brant Street and James Street is noted to be higher order arterials, shared access to John Street is preferred for both loading and vehicular access. The location of the driveway connection provides a sufficient storage distance on John Street for the southbound queue at the James Street and John Street intersection; see **Section 5.3** for queue analysis. Given the low level of off-peak traffic activity expected at the loading spaces, this arrangement is noted to be appropriate and will support the proposed development.

Figure 3.1 illustrates the conceptual layout of the ground floor of the development.



paradigm TRANSPORTATION SOLUTIONS LIMITED

Site Plan

Figure 3.1

3.2 Trip Generation

Trip generation information is used to forecast the anticipated level of traffic activity as a result of the development. Trip generation for each land use type were summed to establish total site trip generation for the respective weekday AM and PM peak hours. The following sub-sections provides the methodology used.

3.2.1 Institute of Transportation Engineers (ITE)

The rate at which any development generates traffic is dependent upon a number of factors such as size, location and concentration of surrounding developments. To estimate the volume of traffic generated by the Development, traffic projections were based on trip generation data published in ITE's Trip Generation, 10th Edition[4]. The following land uses (LUC) have been utilized:

- 222 – Multi-Family Housing (High-Rise); and
- 820 – Shopping Centre.

Data for the peak hour of adjacent street traffic were used to estimate trip generation. Fitted curve equations with satisfactory R^2 values and independent variables were applied. If no equations were provided or satisfactory R^2 values and independent variables were unavailable, the average rates have been applied.

The resulting summation is the "raw" trip generation – unadjusted for modal split credits. The effects of these other various factors on the actual net new trip generation on the local roadway system is discussed in detail in the following sections.

3.2.2 Internal Trips

The ITE Trip Generation Handbook describes a multi-use development as a single project that consists of two or more ITE land use classifications in which trips can be made between land uses without using the off-site roadway system. This sharing of trips between compatible land uses, without traveling off-site, is known as an internal capture.

Based on this information, the proposed site is considered a multi-use development, with compatible residential and commercial land uses that are likely to share – or capture – trips that do not require vehicular travel outside the site.

By way of example, it is likely that some portion of the traffic destined to and from the retail uses located within the site will originate from the on-site

[4] Trip Generation Tenth Edition, Institute of Transportation Engineers, Washington D.C., 2017

residential units, requiring only a walking trip. The ITE Trip Generation Handbook.[5] has been utilized to account for internal trips within the development. The detailed calculations are provided in **Appendix D**.

ITE data suggests an internal capture rate of 0% for the weekday AM peak hour and 4% for the weekday PM peak hour.

3.2.3 Modal Share

It is recognized that the subject site is located within Downtown Burlington, and the commercial nature of the site is likely to draw pedestrians, cyclists and/or transit users from the surrounding residential community, or the residential component of the development itself. These trips by alternate modes of transportation would reduce the overall trip generation estimates.

To recognize this multi-modal environment, data on primary modes of travel for all home to school based trips were extracted from the 2011 Transportation Tomorrow Survey.[6] **Table 3.1** summarizes the mode of travel.

TABLE 3.1: 2011 TTS MODE OF TRAVEL

Modes of Travel	Percentage
Walk	6%
Vehicle (Driver)	71%
Vehicle (Passenger)	14%
Transit	8%
Cycle	1%
Total	100%
Sustainable Modal Split (Transit/Walk/Cycle/Carpool)	**29%**

Travel by modes other than vehicles is relatively high within the immediate area. Almost 30% of trips are made using sustainable travel. Based on the TTS data and to remain conservative (err on the high side), a reduction of 20% has been applied to account for travel by transit and active travel modes for the residential component.

[5] ITE. 2004. Trip Generation Handbook (2nd Edition). Washington, D.C.
[6] University of Toronto, Data Management Group. 2011. Transportation Tomorrow Survey (TTS).

3.2.4 Net Trip Generation Estimates

Table 3.2 summarizes the projected trip generation associated with the build-out of the development. These estimates were based on the standardized ITE rates with internal and modal split credits made as noted earlier.

Accordingly, no on-site parking is proposed to be provided for visitor and the retail component. These trips are expected to utilize existing on-street and off-street parking facilities near the site. However, given the various off-site parking choices available, the trip assignment has assumed the retail and visitor trips would originate from Driveway A. This assumption is noted to reflect conservative trip estimates at John Street and Driveway A.

As shown, with build-out of the development approximately 66 net new trips during the weekday AM peak hour and 89 net new trips during the weekday PM peak hour are forecast to be added to the area roadways.

TABLE 3.2: NET TRIP GENERATION SUMMARY

Land Use Code	GFA (sq. ft.)	Units	Trips	AM Peak Hour				PM Peak Hour			
				Rate	In	Out	Total	Rate	In	Out	Total
222 - Multi-Family Housing High Rise (Units)	-	227	Total	Eqn.	18	58	**76**	Eqn.	52	34	**86**
			Internal	0%	0	0	**0**	2%	1	1	**2**
			Modal Share	20%	4	12	**16**	20%	10	7	**17**
			New	80%	14	46	**60**	98%	41	26	**67**
820 - Shopping Centre (GFA)	6,425	-	Total	0.94	4	2	**6**	3.81	12	12	**24**
			Internal	0%	0	0	**0**	8%	1	1	**2**
			Modal Share	0%	0	0	**0**	0%	0	0	**0**
			New	100%	4	2	**6**	92%	11	11	**22**
Total Trip Generation			**Total**	100%	22	60	**82**	100%	64	46	**110**
			Internal	0%	0	0	**0**	4%	2	2	**4**
			Modal Share	20%	4	12	**16**	15%	10	7	**17**
			New	80%	18	48	**66**	81%	52	37	**89**

3.3 Trip Distribution and Assignment

3.3.1 Distribution

The trips generated by the proposed development were distributed to the boundary road system based primarily on the existing turning movements at the study area intersections. **Table 3.3** summarizes the trip distribution and indicates that the majority of trips are expected to be to/from Lakeshore Road.

TABLE 3.3: TRIP DISTRIBUTION

Origin/Destination	AM Peak Hour	PM Peak Hour
North via Brant Street	15%	15%
East via Caroline Street	5%	5%
East via James Street	10%	10%
East via Lakeshore Road	25%	25%
West via Lakeshore Road	30%	30%
West via Elgin Street	5%	5%
West via Ontario Street	5%	5%
West via Caroline Street	5%	5%
Total	**100%**	**100%**

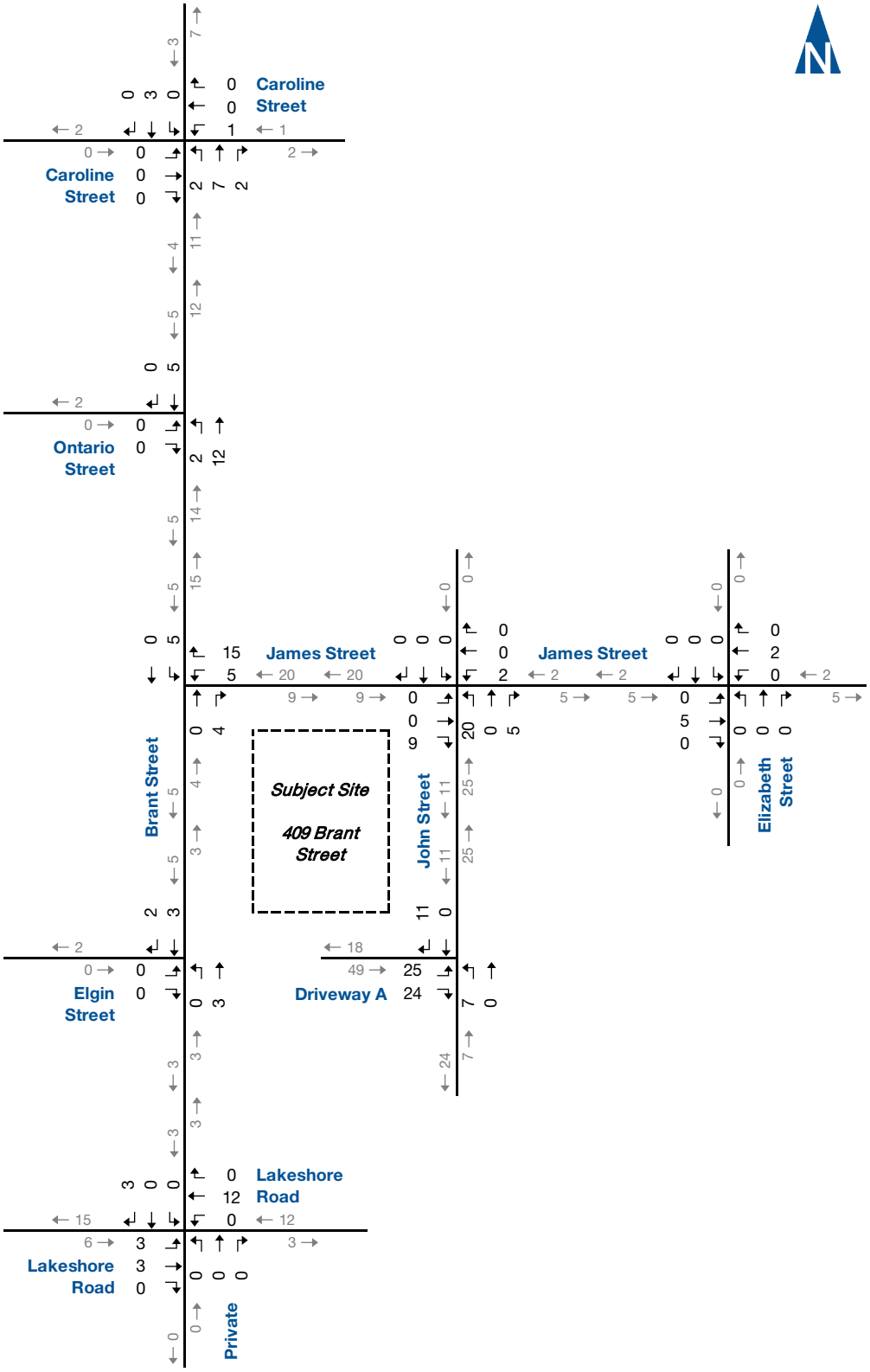
Using the trip generation data and trip distribution estimates the site traffic was assigned to the road network.

3.3.2 Assignment

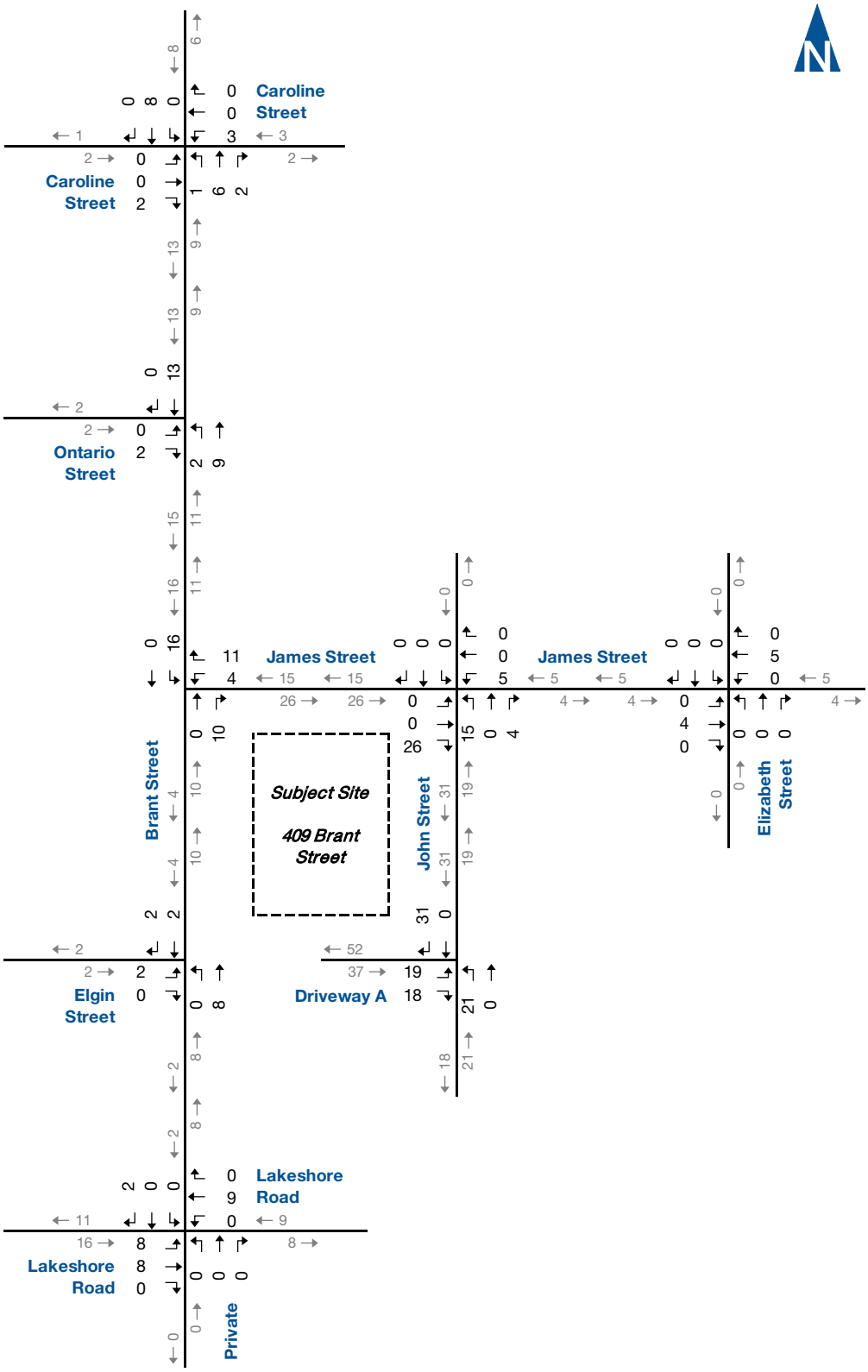
Using the trip generation and distribution estimates, the site generated traffic was assigned to the road network.

It was further assumed that 20% of traffic exiting the subject to head west on Lakeshore Road would do so via James Street and Brant Street. The remaining 80% would access Lakeshore Road via John Street. It was also assumed that 50% of inbound traffic from the west via Lakeshore Road would access the subject site via Brant Street and James Street. The remaining 50% would access the subject site via John Street.

Figure 3.2 illustrates the trip assignment for the new trips forecast to be generated by the development in the weekday AM and PM peak hours, respectively.



Site Generated Traffic Forecast
AM Peak Hour



Site Generated Traffic Forecast
PM Peak Hour

4 Future Conditions

To be consistent with the terms of reference established with the City of Burlington, and with the Region of Halton's Transportation Impact Study Guidelines, a horizon year of 2026, five (5) years beyond the anticipated opening year (2021), has been used for traffic forecasting and analyses purposes.

4.1 Background Growth

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in demographics. A frequently used procedure is to estimate an annual percentage increase and apply that increase to the study area traffic volumes. An alternative procedure is to identify estimated traffic generated by specific planned major developments that would be expected to affect the project study area roadways. For the purpose of this assessment, both methods were utilized.

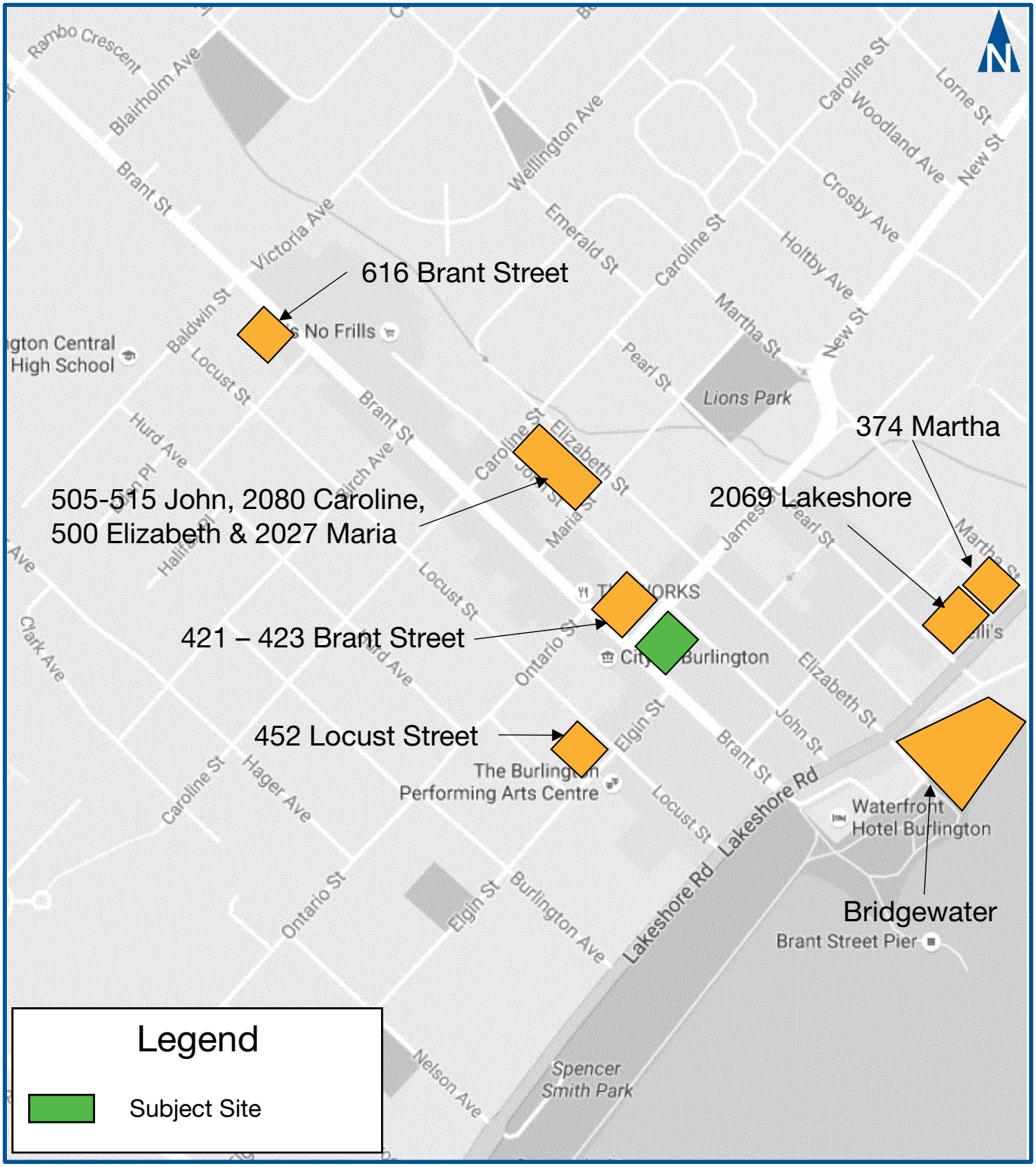
4.1.1 General Background Growth

Generalized traffic growth was determined by applying a growth rate of 1.0% per annum to the base year volumes. This growth rate was confirmed with City staff during pre-consultation.

4.1.2 Site-Specific Growth

In year 2026, it is possible that there will be other new developments in the area that will also increase the traffic volumes on the area roadways. The City's Planning Department advised that there are a number of approved and in-stream residential and commercial developments within close proximity of the study area.

Figure 4.1 illustrates the general locations of these developments, **Table 4.1** outlines the expected number of units.



Approved and In-Stream Developments

TABLE 4.1: APPROVED OR IN-STREAM DEVELOPMENTS

Development	Development Plans
501-515 John Street; 2080 Caroline Street; 500 Elizabeth Street; and 2027 Maria Street	154 residential units; and 8,521 SM (91,719 SF) medial land uses
2042 - 2054 Lakeshore Road	170 residential units; 152 hotel suites; and 770 SM (8,285 SF) commercial land uses
374 Martha Street	192 residential units; and 327 SM (3,520 SF) commercial land uses
425 Locust Street	37 residential units; 245 SM (2,625 SF) office land uses; and 255 SM (2,745 SF) commercial land uses
616 Brant Street	4 residential units; and 212 SM (2,282 SF) commercial land uses
421 - 431 Brant Street	183 residential units; 1,390 SM (14,961 SF) office land uses; and 965 SM (10,407 SF) commercial land uses
2069 Lakeshore Road	232 residential units; and 645 SM (6,945 SF) commercial land uses

It was agreed with the City that projections from the 421 - 431 Brant Street Transportation Impact Study[7] are to be included within the background traffic projections. The 421 – 431 Brant Street Study provides the best source for the overall development context and traffic growth expectations for the immediate study area. **Appendix E** illustrates the in-stream development forecasts.

4.1.3 Background Projections

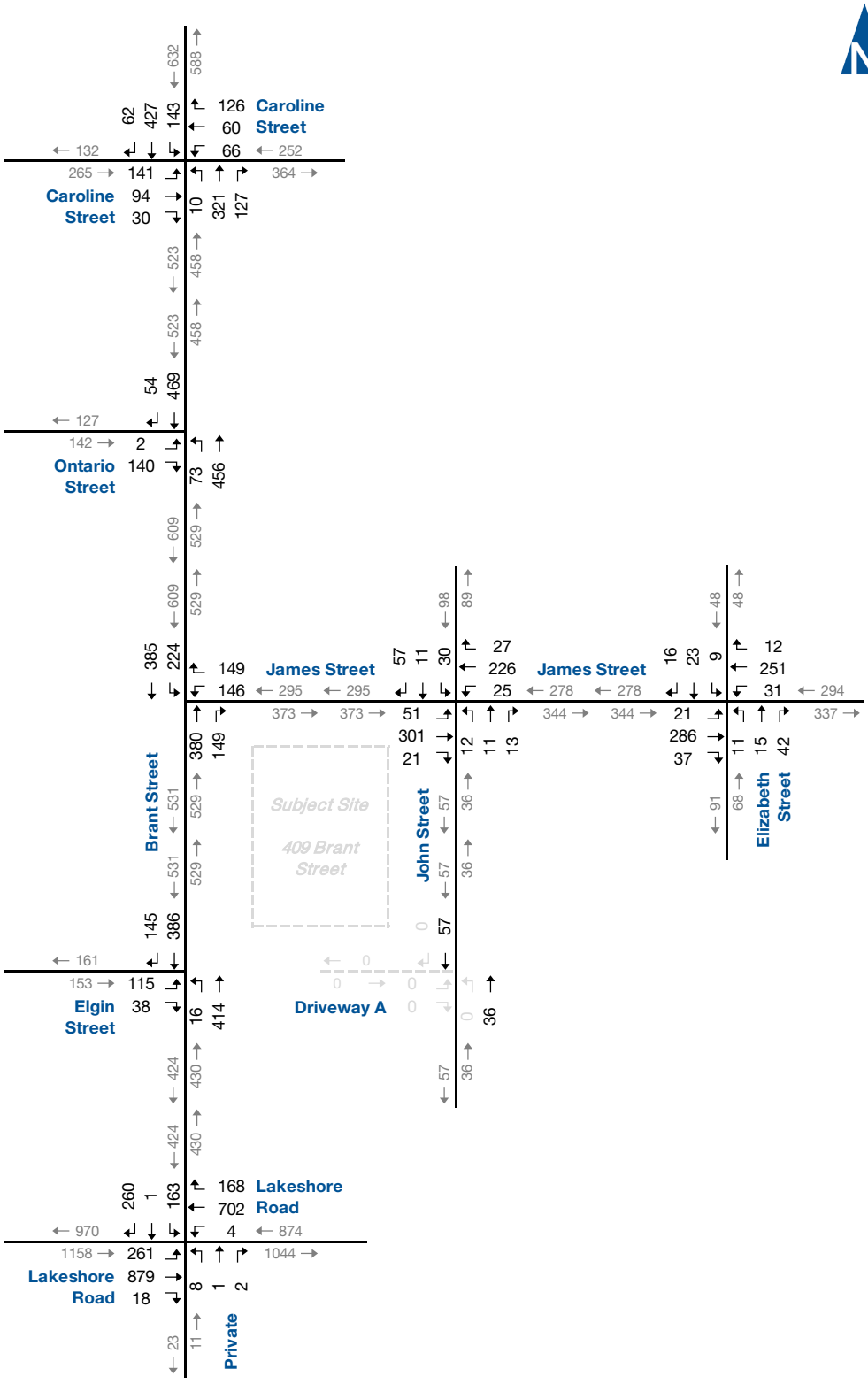
The background traffic volumes within the study area are estimated to consist of generalized background traffic growth of 1.0 percent per annum along with traffic related to the nearby developments. **Figure 4.2** illustrates the 2026 Background traffic forecasts.

4.1.4 Total Projections

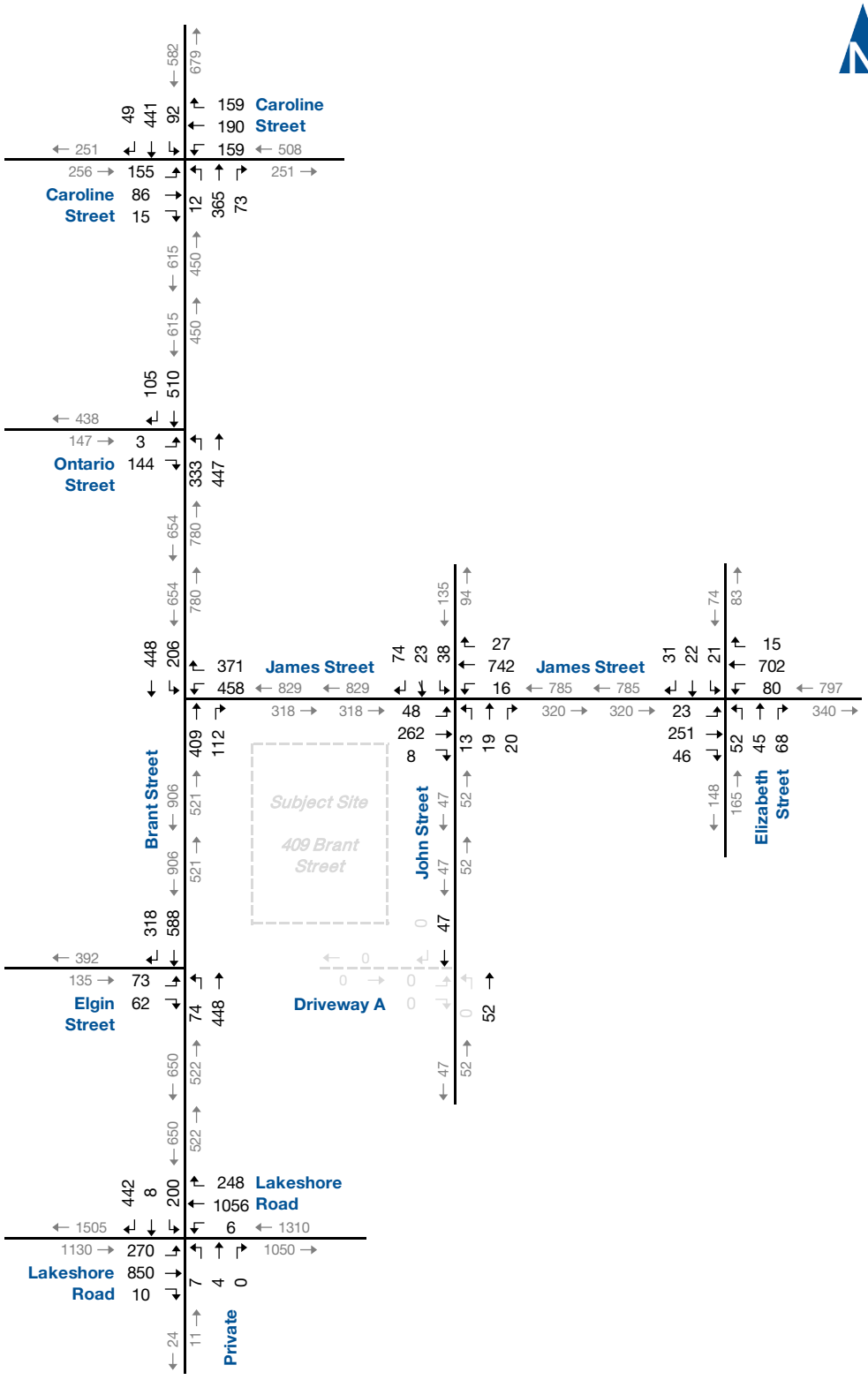
The total traffic volumes within the study area are estimated to consist of generalized background traffic growth of 1.0 percent per annum, traffic related to the nearby developments and development site-generated traffic. **Figure 4.3** illustrates the 2026 Total traffic forecasts.

[7] 162160: 421 – 431 Brant Street TIS, PS and TDM Options Report, Paradigm, December 2016.

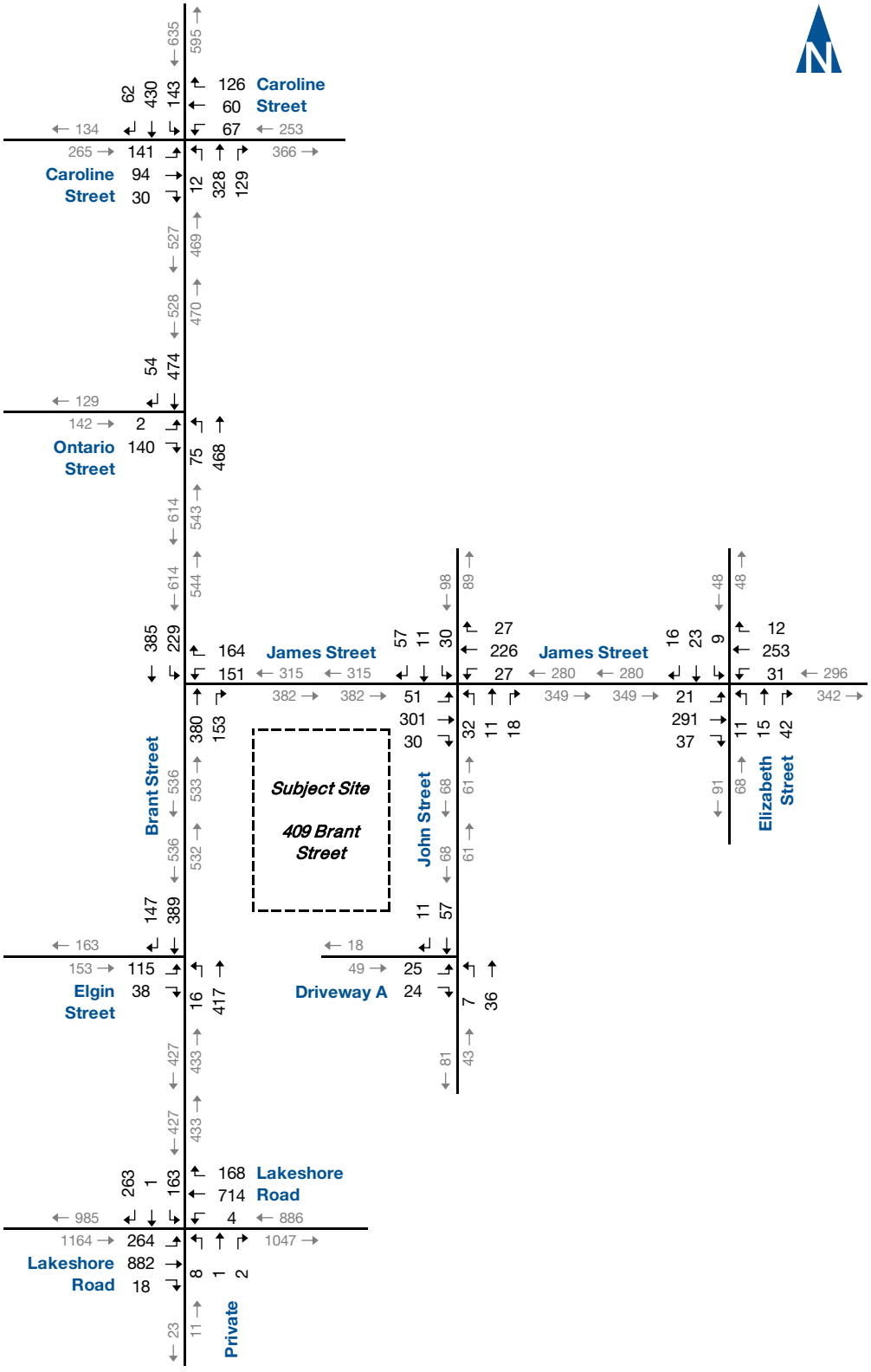




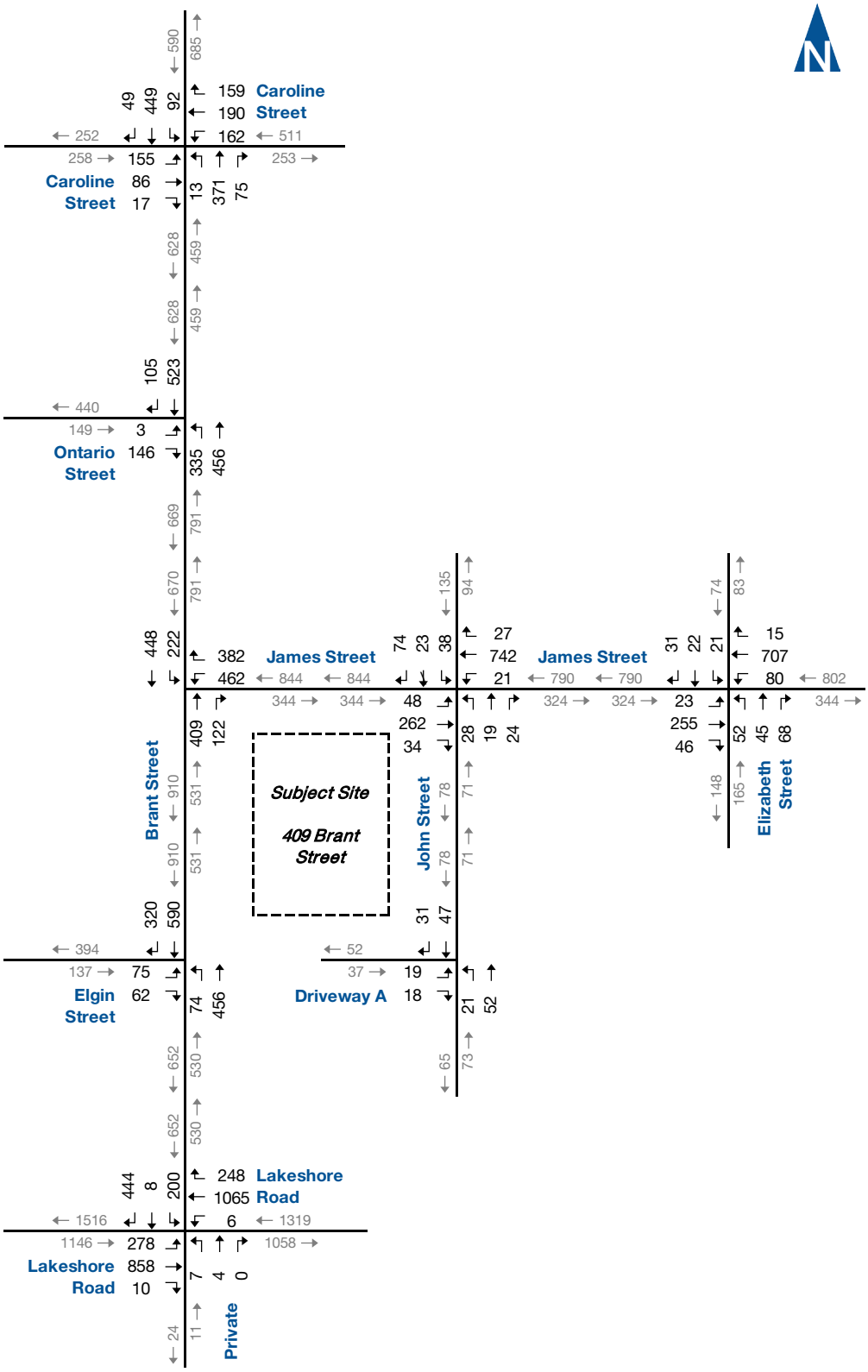
2026 Background Traffic Forecast AM Peak Hour



2026 Background Traffic Forecast
PM Peak Hour



2026 Total Traffic Forecast
AM Peak Hour



2026 Total Traffic Forecast
PM Peak Hour

4.2 Background Traffic Operations

Level of service analyses have been conducted using Synchro 9.1 with HCM 2000 procedures for the weekday AM and PM peak hour conditions at the study area intersections utilizing background traffic forecasts. The intersections within the study area were assessed based on the same parameters as in the analysis of existing conditions except for optimizing signal timing splits at the signalized intersections. **Table 4.2** displays a summary of the future background operations; the following is noted:

- The signalized intersection of Brant Street and Caroline Street is projected to operate with acceptable levels of service during the weekday peak hours;
- The unsignalized intersection of Brant Street and Ontario Street is projected to operate with acceptable levels of service during the weekday peak hours. Side street delays are noted to be LOS C or better with a v/c ratio no greater than 0.36;
- The signalized intersection of Brant Street and James Street is projected to operate with acceptable levels of service during the weekday peak hours;
- The unsignalized intersection of Brant Street and Elgin Street is projected to operate with satisfactory levels of service during the weekday peak hours. Side street delays are noted to be between level of service C and E with a v/c ratio no greater than 0.66;
- The signalized intersection of Brant Street and Lakeshore Road is projected to operate with acceptable levels of service during the weekday peak hours;
- The unsignalized intersection of John Street and James Street is projected to operate with acceptable levels of service during the weekday peak hours. Side street delays are noted to be LOS C or better with a v/c ratio no greater than 0.45; and
- The signalized intersection of Elizabeth Street and James Street is projected to operate with acceptable levels of service during the weekday peak hours.

Appendix F contains the detailed Synchro reports.



TABLE 4.2: 2026 BACKGROUND OPERATIONS SUMMARY

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- Brant Street & Caroline Street	TCS	LOS	C	C	C	C	C	C	>	C	B	C	>	C	B	C	>	C	C
			Delay	22	23	21	22	23	23	>	23	14	25	>	25	16	29	>	26	25
			V/C	0.49	0.24	0.02		0.25	0.30	>		0.07	0.76	>		0.53	0.82	>		0.64
			Q	30	26	0		21	29	>		4	97	>		21	123	>		
	2 - Brant Street & Ontario Street	TWSC	LOS	<	B	>	B	Approach Not Applicable				<	A		A		A	>	A	
			Delay	<	14	>	14					<	2		2		0	>	0	
			V/C	<	0.27	>						<	0.08				0.33	>		
			Q	<	9	>						<	2				0	>		
	3 - Brant Street & James Street	TCS	LOS	Approach Not Applicable				B		B	B		B	B	B	A	B		B	B
			Delay					19		18	19		17	12	16	9	15		13	15
			V/C					0.43		0.13			0.68	0.23		0.52	0.61			0.60
			Q					36		14			78	21		24	74			
	4 - Brant Street & Elgin Street	TWSC	LOS	<	D	>	D	Approach Not Applicable				<	A		A		A	A	A	
			Delay	<	26	>	26					<	1		1		0	0	0	
			V/C	<	0.50	>						<	0.02				0.25	0.09		
			Q	<	21	>						<	0				0	0		
	5 - Brant Street & Lakeshore Road	TCS	LOS	B	A	>	A	B	B	>	B	<	C	>	C	D	C	>	C	B
			Delay	16	8	>	9	13	20	>	20	<	29	>	29	39	31	>	34	17
			V/C	0.71	0.45	>		0.02	0.61	>		<	0.04	>		0.63	0.22	>		0.69
			Q	53	73	>		3	121	>		<	6	>		54	20	>		
	6 - John Street & James Street	TWSC	LOS	<	A	>	A	A	A	>	A	<	B	>	B	<	B	>	B	
			Delay	<	1	>	1	8	0	>	1	<	14	>	14	<	12	>	12	
			V/C	<	0.04	>		0.02	0.16	>		<	0.09	>		<	0.18	>		
			Q	<	1	>		1	0	>		<	2	>		<	5	>		
	7 - Elizabeth Street & James Street	TCS	LOS	A	A	>	A	A	A	>	A	<	C	>	C	<	C	>	C	A
			Delay	2	4	>	4	2	3	>	3	<	23	>	23	<	23	>	23	6
			V/C	0.04	0.34	>		0.05	0.24	>		<	0.20	>		<	0.23	>		0.32
			Q	3	26	>		4	19	>		<	11	>		<	11	>		
PM Peak Hour	1- Brant Street & Caroline Street	TCS	LOS	C	C	C	C	C	D	>	D	B	C	>	C	B	C	>	C	C
			Delay	28	22	21	26	26	40	>	36	16	27	>	27	16	33	>	31	30
			V/C	0.69	0.20	0.01		0.55	0.83	>		0.10	0.77	>		0.37	0.85	>		0.78
			Q	33	23	0		44	100	>		5	105	>		16	131	>		
	2 - Brant Street & Ontario Street	TWSC	LOS	<	C	>	C	Approach Not Applicable				<	A		A		A	>	A	
			Delay	<	17	>	17					<	10		10		0	>	0	
			V/C	<	0.36	>						<	0.43				0.39	>		
			Q	<	13	>						<	17				0	>		
	3 - Brant Street & James Street	TCS	LOS	Approach Not Applicable				C		B	C		C	B	C	C	C		C	C
			Delay					32		17	25		30	16	27	21	28		26	26
			V/C					0.85		0.33			0.81	0.19		0.69	0.80			0.84
			Q					126		20			110	21		35	115			
	4 - Brant Street & Elgin Street	TWSC	LOS	<	E	>	E	Approach Not Applicable				<	A		A		A	A	A	
			Delay	<	48	>	48					<	4		4		0	0	0	
			V/C	<	0.66	>						<	0.14				0.38	0.20		
			Q	<	32	>						<	4				0	0		
	5 - Brant Street & Lakeshore Road	TCS	LOS	E	A	>	C	B	D	>	D	<	C	>	C	D	E	>	D	D
			Delay	70	9	>	24	15	39	>	38	<	33	>	33	47	55	>	53	36
			V/C	0.94	0.46	>		0.03	0.93	>		<	0.06	>		0.70	0.82	>		0.91
			Q	115	72	>		4	231	>		<	7	>		75	113	>		
	6 - John Street & James Street	TWSC	LOS	<	A	>	A	A	A	>	A	<	C	>	C	<	C	>	C	
			Delay	<	2	>	2	8	0	>	0	<	24	>	24	<	25	>	25	
			V/C	<	0.07	>		0.01	0.49	>		<	0.23	>		<	0.45	>		
			Q	<	2	>		0	0	>		<	7	>		<	18	>		
	7 - Elizabeth Street & James Street	TCS	LOS	A	A	>	A	A	A	>	A	<	C	>	C	<	C	>	C	B
			Delay	4	5	>	5	4	9	>	9	<	32	>	32	<	28	>	28	12
			V/C	0.08	0.31	>		0.14	0.66	>		<	0.55	>		<	0.20	>		0.63
			Q	5	36	>		12	129	>		<	41	>		<	18	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
<- Shared Left/Through Lane
>- Shared Right/Through Lane

4.3 Total Traffic Operations

Level of service analyses have been conducted using Synchro 9.1 with HCM 2000 procedures for the weekday AM and PM peak hour conditions at the study area intersections utilizing total traffic forecasts. The intersections within the study area were assessed based on the same parameters as in the analysis of existing conditions except for optimizing signal timing splits at the signalized intersections. **Table 4.3** displays a summary of the future total traffic operations and the following is noted:

- The signalized intersection of Brant Street and Caroline Street is projected to operate with acceptable levels of service during the weekday peak hours;
- The unsignalized intersection of Brant Street and Ontario Street is projected to operate with acceptable levels of service during the weekday peak hours. Side street delays are operating at LOS C or better with a v/c ratio no greater than 0.37;
- The signalized intersection of Brant Street and James Street is projected to operate with acceptable levels of service during the weekday peak hours;
- The unsignalized intersection of Brant Street and Elgin Street is projected to operate with acceptable levels of service during the weekday peak hours. Side street delays are noted to be between LOS D and F with a v/c ratio no greater than 0.69;
- The signalized intersection of Brant Street and Lakeshore Road is projected to operate with acceptable levels of service during the weekday peak hours;
- The unsignalized intersection of John Street and James Street is projected to operate with acceptable levels of service during the weekday peak hours. Side street delays are operating at LOS D or better with a v/c ratio no greater than 0.46;
- The signalized intersection Elizabeth Street and James Street is projected to operate with acceptable levels of service during the weekday peak hours; and
- The unsignalized intersection John Street and Driveway A is projected to operate with acceptable levels of service during the weekday peak hours. Side street delays are noted to be LOS A with a v/c ratio of no greater than 0.06.

Appendix G contains the detailed Synchro reports.

The results of the analysis indicate that the development of the subject site is anticipated to have a negligible effect on traffic operations within the study area. Some side street movements are forecast to operate with high levels of delay; however, this delay is occurring under the background traffic scenario and is not triggered by the proposed development.

TABLE 4.3: 2026 TOTAL TRAFFIC OPERATIONS SUMMARY

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- Brant Street & Caroline Street	TCS	LOS	C	C	C	C	C	C	>	C	B	C	>	C	B	C	>	C	C
			Delay	22	23	21	22	23	23	>	23	14	26	>	26	16	29	>	26	25
			V/C	0.49	0.24	0.02		0.25	0.30	>		0.08	0.77	>		0.54	0.82	>		0.64
			Q	30	26	0		21	29	>		5	102	>		21	124	>		
	2 - Brant Street & Ontario Street	TWSC	LOS	<	B	>	B	Approach Not Applicable				<	A		A		A	>	A	
			Delay	<	14	>	14					<	2		2		0	>	0	
			V/C	<	0.28	>						<	0.09				0.34	>		
			Q	<	9	>						<	2				0	>		
	3 - Brant Street & James Street	TCS	LOS	Approach Not Applicable				B		B	B		B	B	B	A	B		B	B
			Delay					19		18	19		18	12	16	9	16		13	15
			V/C					0.44		0.14			0.68	0.24		0.54	0.62			0.61
			Q					37		14			78	22		25	74			
	4 - Brant Street & Elgin Street	TWSC	LOS	<	D	>	D	Approach Not Applicable				<	A		A		A	A	A	
			Delay	<	26	>	26					<	1		1		0	0	0	
			V/C	<	0.50	>						<	0.02				0.25	0.09		
			Q	<	21	>						<	0				0	0		
	5 - Brant Street & Lakeshore Road	TCS	LOS	B	A	>	A	B	C	>	C	<	C	>	C	D	C	>	C	B
			Delay	17	8	>	10	13	20	>	20	<	29	>	29	39	31	>	34	18
			V/C	0.71	0.45	>		0.02	0.63	>		<	0.04	>		0.63	0.22	>		0.70
			Q	55	73	>		3	124	>		<	6	>		54	20	>		
	6 - John Street & James Street	TWSC	LOS	<	A	>	A	A	A	>	A	<	C	>	C	<	B	>	B	
			Delay	<	1	>	1	8	0	>	1	<	15	>	15	<	13	>	13	
			V/C	<	0.04	>		0.03	0.16	>		<	0.16	>		<	0.18	>		
			Q	<	1	>		1	0	>		<	4	>		<	5	>		
	7 - Elizabeth Street & James Street	TCS	LOS	A	A	>	A	A	A	>	A	<	C	>	C	<	C	>	C	A
			Delay	2	4	>	4	2	3	>	3	<	23	>	23	<	23	>	23	6
			V/C	0.04	0.34	>		0.06	0.24	>		<	0.20	>		<	0.23	>		0.33
			Q	3	26	>		4	19	>		<	11	>		<	11	>		
	8 - John Street & Driveway A	TWSC	LOS	<	A	>	A	Approach Not Applicable				<	A		A		A	>	A	
			Delay	<	9	>	9					<	1		1		0	>	0	
			V/C	<	0.06	>						<	0.01				0.04	>		
			Q	<	2	>						<	0				0	>		
PM Peak Hour	1- Brant Street & Caroline Street	TCS	LOS	C	C	C	C	C	D	>	D	B	C	>	C	B	C	>	C	C
			Delay	34	22	20	29	26	39	>	35	16	26	>	26	15	32	>	29	30
			V/C	0.75	0.20	0.01		0.55	0.83	>		0.10	0.77	>		0.36	0.85	>		0.78
			Q	36	23	0		45	100	>		5	102	>		15	131	>		
	2 - Brant Street & Ontario Street	TWSC	LOS	<	C	>	C	Approach Not Applicable				<	A		A		A	>	A	
			Delay	<	18	>	18					<	10		10		0	>	0	
			V/C	<	0.37	>						<	0.44				0.40	>		
			Q	<	13	>						<	18				0	>		
	3 - Brant Street & James Street	TCS	LOS	Approach Not Applicable				C		B	C		C	B	C	C	C		C	C
			Delay					34		17	26		29	16	26	22	28		26	26
			V/C					0.86		0.35			0.80	0.21		0.73	0.79			0.84
			Q					130		23			106	21		39	104			
	4 - Brant Street & Elgin Street	TWSC	LOS	<	F	>	F	Approach Not Applicable				<	A		A		A	A	A	
			Delay	<	51	>	51					<	4		4		0	0	0	
			V/C	<	0.69	>						<	0.14				0.38	0.20		
			Q	<	35	>						<	4				0	0		
	5 - Brant Street & Lakeshore Road	TCS	LOS	E	A	>	C	B	D	>	D	<	C	>	C	D	D	>	D	D
			Delay	70	9	>	24	15	40	>	40	<	33	>	33	47	54	>	52	37
			V/C	0.94	0.46	>		0.03	0.94	>		<	0.06	>		0.71	0.81	>		0.91
			Q	117	73	>		4	237	>		<	7	>		75	110	>		
	6 - John Street & James Street	TWSC	LOS	<	A	>	A	A	A	>	A	<	D	>	D	<	D	>	D	
			Delay	<	2	>	2	8	0	>	0	<	34	>	33	<	25	>	25	
			V/C	<	0.07	>		0.02	0.49	>		<	0.38	>		<	0.46	>		
			Q	<	2	>		1	0	>		<	13	>		<	18	>		
	7 - Elizabeth Street & James Street	TCS	LOS	A	A	>	A	A	A	>	A	<	C	>	C	<	C	>	C	B
			Delay	4	5	>	5	4	10	>	9	<	32	>	32	<	28	>	28	12
			V/C	0.08	0.31	>		0.14	0.66	>		<	0.55	>		<	0.20	>		0.64
			Q	5	37	>		12	130	>		<	41	>		<	18	>		
	8 - John Street & Driveway A	TWSC	LOS	<	A	>	A	Approach Not Applicable				<	A		A		A	>	A	
			Delay	<	9	>	9					<	2		2		0	>	0	
			V/C	<	0.05	>						<	0.02				0.05	>		
			Q	<	1	>						<	0				0	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
<- Shared Left/Through Lane
>- Shared Right/Through Lane

5 Remedial Measures

The following section reviews what, if any, measures should be implemented to mitigate the traffic impacts of the site.

5.1 Auxiliary Turn Lanes

The need for auxiliary turn lanes was reviewed for the unsignalized intersections within the study area.

5.1.1 Left-Turn Lane Warrants

The unsignalized intersections in the study area have been analyzed to determine if the forecasted traffic volumes warrant left-turn lanes. The warrants for left-turn lanes follow the requirements in the Ministry of Transportation's (MTO) Geometric Design Standards Manual[8]. A design speed of 10 kilometres per hour over the posted speed limit has been utilized.

The percentage of left-turning vehicles in the approaching volume were rounded to the nearest five percent, as nomographs are only provided for five percent increments. **Appendix H** contains the left turn lane warrant nomographs.

The following is noted:

- Brant Street and Ontario Street: Under the 2026 background and total forecasted volumes, a new northbound left turn lane with 90 metres of storage is warranted.
- Brant Street and Elgin Street: Under the 2026 background and total forecasted volumes, a new northbound left turn lane with 40 metres of storage is warranted.
- John Street and James Street: Under the 2026 total forecasted volumes, a new eastbound left turn lane with 15 metres of storage is warranted.
- John Street and Driveway A: Under the 2026 total forecasted volumes, a northbound left turn lane is not warranted.

As level of service "A" is the lowest threshold for delay, implementation of a northbound left turn lane along Brant Street at Ontario Street and Elgin Street would be negligible, as the northbound through movements along Brant Street are projected to operate at level of service "A" with no more than ten (10) seconds of delay.

This statement is also applicable with regard to an eastbound left turn lane along James Street at John Street as the eastbound through movement

[8] MTO Geometric Design Standards for Ontario Highways, Chapter E, 1976

along James Street is projected to operate at level of service “A” with no more than five (5) seconds of delay.

With the urbanized nature of the Downtown Core, as well as the absence of dedicated left-turn lanes at other unsignalized intersections nearby, separate left turn lanes are not recommended along Brant Street and James Street given the limited potential benefits to the overall operation of the intersection and the impacts this turn lane could have on the existing on-street parking supply.

Additionally, if a back-to-back left turn lane is implemented for the eastbound approach at James Street and John Street while maintaining the current on-street parking, the westbound left turn lane at Brant Street and James Street would have the storage significantly reduced which could create queue overflows and spill back into adjacent lanes.

5.1.2 Right-Turn Lane

Although right turns are generally made more efficiently than left turn movements, exclusive right turn lanes are often provided, for many of the same reasons that left turn lanes are provided. In general, an exclusive right turn lane should be considered when the volume of right turning vehicles is between 10 to 20 percent of the through volume, subject to a minimum of 60 vehicles per hour (vph) in the design hour.

The 2026 total forecasted traffic volumes indicate the southbound right turn volume at the intersection of Brant Street and Ontario Street and the intersection of John Street and Driveway A is less than 60 vph. Similarly, the eastbound and westbound right turn volumes at James Street and John Street are less than 60 vph. As the volume of right turning traffic does not meet the specified criteria, separate right turn lanes are not recommended.

The intersection of Brant Street and Elgin Street currently operates with a southbound right turn lane, thus has not been included in the assessment.



5.2 Assessment of Impacts

Based on the analyses, minimal delay and congestion is forecast to occur at the intersections assessed within the study area. A summary of the findings at each intersection is further discussed.

5.2.1 Brant Street and Caroline Street

Under the base year traffic scenario, the intersection currently operates at LOS C or better on all approaches. With general background growth, the westbound through movement is projected to degrade to LOS D during the weekday PM peak hour. No change in level of service is anticipated as a result of the proposed development.

Optimization of timing splits and phasing lengths at the signalized intersection will accommodate future projected growth. No other improvements are warranted or recommended for this intersection.

5.2.2 Brant Street and Ontario Street

Under the base year traffic scenario, the intersection currently operates at LOS B or better on all approaches. With general background growth, the eastbound approach is expected to degrade to LOS C during the weekday PM peak hour. No change in level of service is anticipated as a result of the proposed development. No improvements are warranted or recommended for this intersection.

5.2.3 Brant Street and James Street

Under the base year traffic scenario, the intersection currently operates at LOS C or better on all approaches. No change in level of service is anticipated as a result of the proposed development.

Optimization of timing splits and phasing lengths at the signalized intersection will accommodate future projected growth. No other improvements are warranted or recommended for this intersection.

5.2.4 Brant Street and Elgin Street

Under the base year traffic scenario, the eastbound approach currently operates at LOS C. With general background growth, the eastbound approach is expected to degrade to LOS E during the weekday PM peak hour. Under total traffic conditions which includes development traffic, the eastbound approach is expected to further degrade to LOS F during the weekday PM peak hour.

The overall impact of site related traffic volumes on the minor movement delay is a result of small increases in the through traffic volumes on Brant Street. The proposed development does not add significant traffic volume to the critical movement at this intersection (eastbound left turn).



As Elgin Street is located less than 200 metres from the signalized intersection of Brant Street and James Street, the potential to upgrade the traffic control is not a recommended given the limited spacing.

The most feasible improvement option to the intersection would be to restrict eastbound left turns during the weekday PM peak hour from Monday to Friday. This would reduce the amount of delay significantly. Left turning vehicles would most likely re-route to Caroline Street as this is the closest intersection to the north that permits left turns onto Brant Street.

A sensitivity analysis to assess the study area intersections with restricted eastbound left turns at Brant Street and Elgin Street has been undertaken for the weekday PM peak hour total traffic forecasts. **Table 5.1** summarizes the results of the sensitivity analysis. **Appendix I** contains the detailed Synchro reports.

Under future total traffic conditions, Brant Street and Elgin Street is projected to operate with acceptable level of service during the weekday PM peak hour with the eastbound approach restricted to right turns only. Side street delays are noted to be LOS B with a v/c ratio no greater than 0.14.

Based on the foregoing, restricting eastbound left turns during the weekday PM peak hour from Monday to Friday would help to address the projected operational delays at this intersection.



TABLE 5.1: 2026 TOTAL PM PEAK HOUR SENSITIVITY ANALYSIS

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- Brant Street & Caroline Street	TCS	LOS	E	C	C	D	C	D	>	D	B	C	>	C	B	C	>	C	D
			Delay	60	23	22	47	29	51	>	44	16	23	>	22	15	33	>	30	35
			V/C	0.93	0.26	0.01		0.61	0.90	>		0.11	0.67	>		0.32	0.85	>		0.83
			Q	61	28	0		48	106	>		6	83	>		15	131	>		
	2 - Brant Street & Ontario Street	TWSC	LOS	<	C	>	C	Approach Not Applicable				<	A		A		A	>	A	
			Delay	<	18	>	18					<	10		10		0	>	0	
			V/C	<	0.37	>						<	0.44				0.40	>		
			Q	<	14	>						<	18				0	>		
	3 - Brant Street & James Street	TCS	LOS	Approach Not Applicable				C		B	C		C	B	C	B	C		C	C
			Delay					32		16	25		22	16	21	20	26		24	24
			V/C					0.86		0.33			0.67	0.17		0.66	0.77			0.82
			Q					130		19			77	18		34	101			
	4 - Brant Street & Elgin Street	TWSC	LOS	<	B	>	B	Approach Not Applicable				<	A		A		A	A	A	
			Delay	<	14	>	14					<	4		4		0	0	0	
			V/C	<	0.14	>						<	0.14				0.38	0.20		
			Q	<	4	>						<	4				0	0		
	5 - Brant Street & Lakeshore Road	TCS	LOS	E	A	>	C	B	D	>	D	<	C	>	C	D	D	>	D	D
			Delay	70	9	>	24	15	40	>	40	<	33	>	33	47	54	>	52	37
			V/C	0.94	0.46	>		0.03	0.94	>		<	0.06	>		0.71	0.81	>		0.91
			Q	117	73	>		4	237	>		<	7	>		75	110	>		
	6 - John Street & James Street	TWSC	LOS	<	A	>	A	A	A	>	A	<	D	>	D	<	D	>	D	
			Delay	<	2	>	2	8	0	>	0	<	33	>	33	<	25	>	25	
			V/C	<	0.07	>		0.02	0.49	>		<	0.38	>		<	0.45	>		
			Q	<	2	>		1	0	>		<	13	>		<	18	>		
	7 - Elizabeth Street & James Street	TCS	LOS	A	A	>	A	A	A	>	A	<	C	>	C	<	C	>	C	B
			Delay	4	5	>	5	4	10	>	9	<	32	>	32	<	28	>	28	12
			V/C	0.08	0.30	>		0.13	0.66	>		<	0.55	>		<	0.20	>		0.64
			Q	5	34	>		12	130	>		<	41	>		<	18	>		
	8 - John Street & Driveway A	TWSC	LOS	<	A	>	A	Approach Not Applicable				<	A		A		A	>	A	
			Delay	<	9	>	9					<	2		2		0	>	0	
			V/C	<	0.05	>						<	0.02				0.05	>		
			Q	<	1	>						<	0				0	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
<- Shared Left/Through Lane
>- Shared Right/Through Lane

5.2.5 Brant Street and Lakeshore Road

Under the base year traffic scenario, the intersection currently operates at LOS D or better on all approaches. No change in level of service are anticipated as a result of the proposed development.

Optimization of timing splits and phasing lengths at the signalized intersection will accommodate future projected growth. No other improvements are warranted or recommended for this intersection.

5.2.6 John Street and James Street

Under the base year traffic scenario, the intersection currently operates at LOS C or better on all approaches. No change in level of service are anticipated as a result of the proposed development. No improvements are warranted or recommended for this intersection.

5.2.7 Elizabeth Street and James Street

Under the base year traffic scenario, the intersection currently operates at LOS C or better on all approaches. No change in level of service are anticipated as a result of the proposed development.

Optimization of timing splits and phasing lengths at the signalized intersection will accommodate future projected growth. No other improvements are warranted or recommended for this intersection.

5.2.8 John Street and Driveway A

Under the 2026 total traffic scenario all movements at the intersection are operating with LOS A.

Stop control with a single inbound/outbound travel lane will accommodate development traffic projected at this driveway connection.

5.3 Queue Assessment

Approximately 30 metres of queue storage from Driveway A to the southbound stop bar at James Street and John Street is available under existing conditions. Given the stop control nature of the intersection, there is the potential for northbound vehicles queuing on John Street that may potentially block Driveway A.

Queue length impacts from the upstream intersection of James Street and John Street have been reviewed. SimTraffic simulation has been reviewed for the total traffic forecast to confirm the 95th percentile queue lengths along John Street.

SimTraffic was utilized rather than Synchro in this assessment as microscopic models, such as Sim Traffic, individually track each vehicle in the traffic system through the model and collect comprehensive operational measures of effectiveness for every vehicle during each 0.1 second of the simulation. Unlike Synchro, SimTraffic measures the full impact of queuing and blocking. Synchro is best used to determine level of service and delay at the macro level, but is not ideal for assessments simulating real-world conditions.

The analysis consisted of ten (10) iterations of sixty (60) minute simulations to forecast the delay per vehicle in seconds. **Appendix J** provides the SimTraffic results.

Reviewing these results indicates that during the respective peak hours, a queue length of 35 metres is expected for the intersection of James Street and John Streets southbound approach. As a result, Driveway A may encounter vehicle blockages of no more than a single car length during peak periods. This situation may occasionally create some traffic backups within the site and inbound vehicles maybe delayed. However, this should not significantly interfere with traffic operations on John Street. It is further expected that driver courtesy will allow space in the queue for vehicles to/from the site to proceed.

5.4 Sight Distance Assessment

The Transportation Association of Canada (TAC) recommends that safe stopping sight distance be measured from an approaching driver eye height of 1.05 metres to an object height (e.g. taillights) of 0.38 metres at the proposed connection.

As for departure sight distance, the measurement should be taken from the height of the turning vehicle driver's eye of 1.05 metres to the top of the approaching vehicle, 1.30 metres above the pavement.

Table 5.2 summarizes the minimum sight distance requirements for a 60 kilometre per hour design speed. These standards are based on TAC design manuals.

TABLE 5.2: SIGHT DISTANCE REQUIREMENTS

Sight Distance	Design Speed
	60 km/h
Minimum Stopping Sight Distance (m)	90
Minimum Decision Sight Distance (m)	165
*Minimum Departure (Turning) Sight Distance (m)	165

*Sight distance for passenger vehicle to turn left or right onto two-lane roadway and attain 85% of design speed without being overtaken by a vehicle approaching from the right and reducing speed from design speed to 85% of design speed. (TAC Figure 2.3.3.4)

Sight distance observations based on aerial imagery and a field visit indicate that the stopping and departure sight distance for Driveway A is sufficient as the roadways are relatively flat and straight with the field of view unobstructed for at least 165 metres in either direction.

6 Parking Methodology

6.1 Zoning By-Law Requirements

6.1.1 Vehicle Parking

Zoning By-law 2020 is the current in-force By-law for the City of Burlington. The requirements stipulated in the Zoning By-law are outlined in **Appendix K.** Based on the City Zoning By-law, the subject site is within the Defined Parking Area which exempts all non-residential properties from providing on-site parking.

The minimum parking rates for the proposed development are as follows:

- Apartment Dwelling Units: 1.25 spaces per unit.

Table 6.1 summarizes Zoning By-law 2020 minimum parking standard calculations for the development.

TABLE 6.1: ZONING REQUIREMENTS

Use	Units	Zoning By Law 2020	
		Parking Rate	Parking Spaces Required
Apartment Dwelling	227	1.25 spaces per unit	284
Total Parking Required			**284**

As indicated in **Table 6.1**, under the City's Zoning By-Law, the proposed development requires 284 parking spaces. The proposed parking supply of 212 spaces would result in a potential shortfall of 72 spaces.

6.1.2 Bicycle Parking

The City's Zoning By-Law also stipulates that the development be required to provide bicycle parking for the retail component only. The minimum bicycle parking rates are as follows:

- Two spaces plus one space per 1,000 m^2 GFA

Based on this requirement, the development is required to provide a total of three (3) bicycle parking spaces. A total of three (3) bicycle parking spaces are proposed for the retail component. In addition, a total of 160 bicycle storage lockers will be provided within the underground parking garage.

6.1.3 Evolution of Parking Ratios

Parking standards are increasingly seen as an instrument of planning policy, and parking ratios are now looked at as having a main role in determining car use.

Parking ratios have existed in most cities since at least the 1950's and have often been amended incrementally by various means over time. Consequently, it is not surprising to find that municipalities are often unable to trace the justification or reasoning behind some of the older parking ratios found in their current Zoning By-laws.

Given that parking standards reflect an "average" condition, they will rarely prescribe the number of parking spaces to match the parking demands of any individual development project exactly. The empirical challenge is to develop some understanding of the range over which parking demand for a given use may vary, and the policy question is where in that range should the parking standard or ratio be set.

As noted, the parking ratios of By-law 2020 provides separate rates for multi-residential developments located within the Defined Parking Area and for areas outside of the Downtown. However, this one-size-fits-all-areas approach to the Downtown does not consider the recent widespread adoption of urban "smart growth" practices, with emphasis on transit-supportive development.

A common trend in other jurisdictions is to lower minimum parking requirements in areas with the best transit service to promote further and attract residents to utilize this form of travel. Lower parking requirements for new developments will encourage active transportation by helping to create a better designed urban environment for pedestrians and cyclists.

The general strategy is that minimum parking requirements would be set lowest in areas adjacent to transit stations/Mobility Hubs then incrementally increased through lower density areas where transit service is least available.

Other municipalities in the GTA are recognizing the advantages of varying parking ratios by planning areas in support of broader Official Plan objectives. For example:

- Oakville's new Zoning By-law (2014-014) introduces parking requirements that vary by district based on the Official Plan's designation of five mixed-use "Growth Areas" where "a more stringent" approach to parking standards is applied. Oakville's new Zoning By-law comments that: "In the Growth Areas, the minimum number of parking spaces required are reduced to support the Town's strategic and policy objectives related to transit, growth management, and design."



- Toronto's new Zoning By-law (569-2013), apart from consolidating the provisions of the six former local municipalities, initiates a new set of parking ratios that vary across the planning policy districts identified in the Official Plan's urban structure map. On this basis, four "Parking Policy Areas" with successively lower levels of transit service are defined. The overall approach is to have minimum parking requirements vary inversely with the level of transit service.
- Vaughan initiated a city-wide review of parking standards in 2007 and recommended that minimum parking requirements should vary by four "parking geographies" derived from the proposed Official Plan's urban structure map. Parking maximums are proposed for the Higher Order Transit Hubs, along with maximums on surface parking in the Local Centres and Primary Intensification Areas.
- Richmond Hill is also pursuing the introduction of a similar set of spatially varying minimum parking requirements relating to the Official Plan's urban structure. Four types of parking areas are defined: Richmond Hill Regional Centre; Downtown Local Centre and Key Development Areas; Rapid Transit Corridors, and Business Parks including the Rest of Richmond Hill.[9]

The strategy of introducing spatially varying parking requirements is consistent with current trends occurring in other municipalities and should be considered by the City of Burlington. Factors such as availability to transit, employment, entertainment, arts and cultural events further dictate how residents within a community intend to travel.

6.2 Official Plan

The criteria provided in the By-law 2020, particularly with minimum parking requirements should have some flexibility with granting a lower parking obligation to reflect the policies set out in Burlington's Official Plan (OP)[10] which states:

Policy 3.2.2.D

> *"To encourage alternative travel by creating an urban environment that encourages walking, cycling and transit use and increases opportunities to live close to work and satisfy day-to-day needs locally without relying on the automobile."*

Policy 3.2.2.E

> *"The City will encourage opportunities for developing travel demand management (TDM) measures to reduce single occupancy automobile use, especially during peak travel periods, such as carpooling programs, transit passes,*

[9] City of Markham – Task 9: Review & Assessment of Parking and Loading Standards Comprehensive Zoning By-law Project dated August 17, 2015.
[10] Burlington Official Plan, Last Update (July 2015).



preferential parking for carpool members, telecommuting, flex hours, intranet carpooling and fare incentives."

Policy 3.2.2.J

"Reduced parking ratios and standards and/or on-street parking ratios and/or standards may be permitted subject to evaluation by the City of the appropriateness of such standards, and implement through the approval of development applications or other City initiatives."

Policy 5.2.2.I

"The City may consider the use of reduced parking standards in Mixed Use Activity Areas in order to encourage greater reliance on non-automotive forms of transportation."

Policy 5.3.2.I

"The design and development of Mixed Use Corridors shall encourage the use of public transit, pedestrian and bicycle travel as an alternative to the automobile."

The manner in which intensification can be accommodated is contemplated in a number of Policies within the OP. There is a strong focus on the pedestrian environment and an emphasis on active transportation and transit.

As the development proposal places a focus on accommodating a suitable pedestrian environment, one that would encourage active transportation based on the de-emphasis on parking, the site's location relative to employment, retail, and recreational opportunities, along with a design emphasis on-street activity is consistent with the goals set out in the OP.

As the OP is a guiding document, it is important to look at the future requirements as opposed to the past requirements to maintain and implement the policies developed and to provide a paradigm shift in encouraging residents of the development as well as citizens to consider sustainable mode choices.

Currently in the Downtown, restaurants, drinking establishments and theaters do not require parking (though they may choose to provide it). Consideration to expanding the list of uses to include other land use types to provide flexibility and to encourage sustainable travel modes is encouraged. Since the Downtown is the best-served multi—modal location in Burlington, it makes sense to give new developments this level of flexibility.

The proposed development will create and support a better environment for walking, cycling and transit use by improving the pedestrian environment, and adding density to the Downtown. Moreover, residents of the proposed development will be a short walking distance from the existing amenities of

the Downtown, while at the same time creating new amenities at grade along the street fronts.

6.3 New Direction Policy

The new directions policy has been developed by the City of Burlington to set a fundamental change in the way mobility is approached. The proposed policy is to shift towards walking, cycling and transit as opposed to dependency on automobiles[11]. **Appendix L** outlines the proposed transformational policy shift and how these ideals are implemented in 409 Brant Street.

6.4 Mobility Hub

The Big Move is the regional transportation plan (RTP) published by Metrolinx for the Greater Toronto and Hamilton Area (GTHA). It makes specific recommendations for transit projects. Since its publication, it has been Metrolinx's mandate to implement the RTP, which includes new and improved GO Transit service, local rapid transit, stations, and fare payment systems.

The City's four designated Mobility Hubs include the Burlington GO Station, Downtown Burlington, Appleby GO Station, and Aldershot GO Station. All four areas designated as "Mobility Hubs" encompass an approximately 800 metre radii around the transit station. Downtown Burlington's Mobility Hub is planned to integrate rapid transit, regional transit, and local transit.

Mobility Hubs are more than just a transit station. They are places of connectivity where different modes of transportation — from walking to commuter rail — come together seamlessly and where there is an absolute concentration of places to live, work, shop and play. They serve as a place to wait for and connect with transit whether you are walking, cycling, taking transit or driving.

Burlington envisions a significant increase in density at each of the four designated Mobility Hubs and a shift to compact, higher density, more intense mixed-use developments is encouraged through the revitalization of these areas. The Mobility Hubs are to place emphasis on modes of transportation, including walking, cycling, and transit.

The Big Move has developed strategies that will contribute to the transformation of the GTHA transportation system. One of these strategies focuses on building communities that are pedestrian, cycling, and transit-friendly. How we design our communities is a major factor in determining how we choose to travel. People who live in a higher density neighborhood with a variety of stores and services near their home are more likely to walk,

[11] Transportation Plan – Policy Directions

cycle or take transit. Lower density area's that are far from shops and services, and lacks sidewalks and bike lanes are much more likely to drive[12].

The City's transportation system and land use development are intended to achieve the following minimum transit modal shares when "mature-state" of urban development is reached:

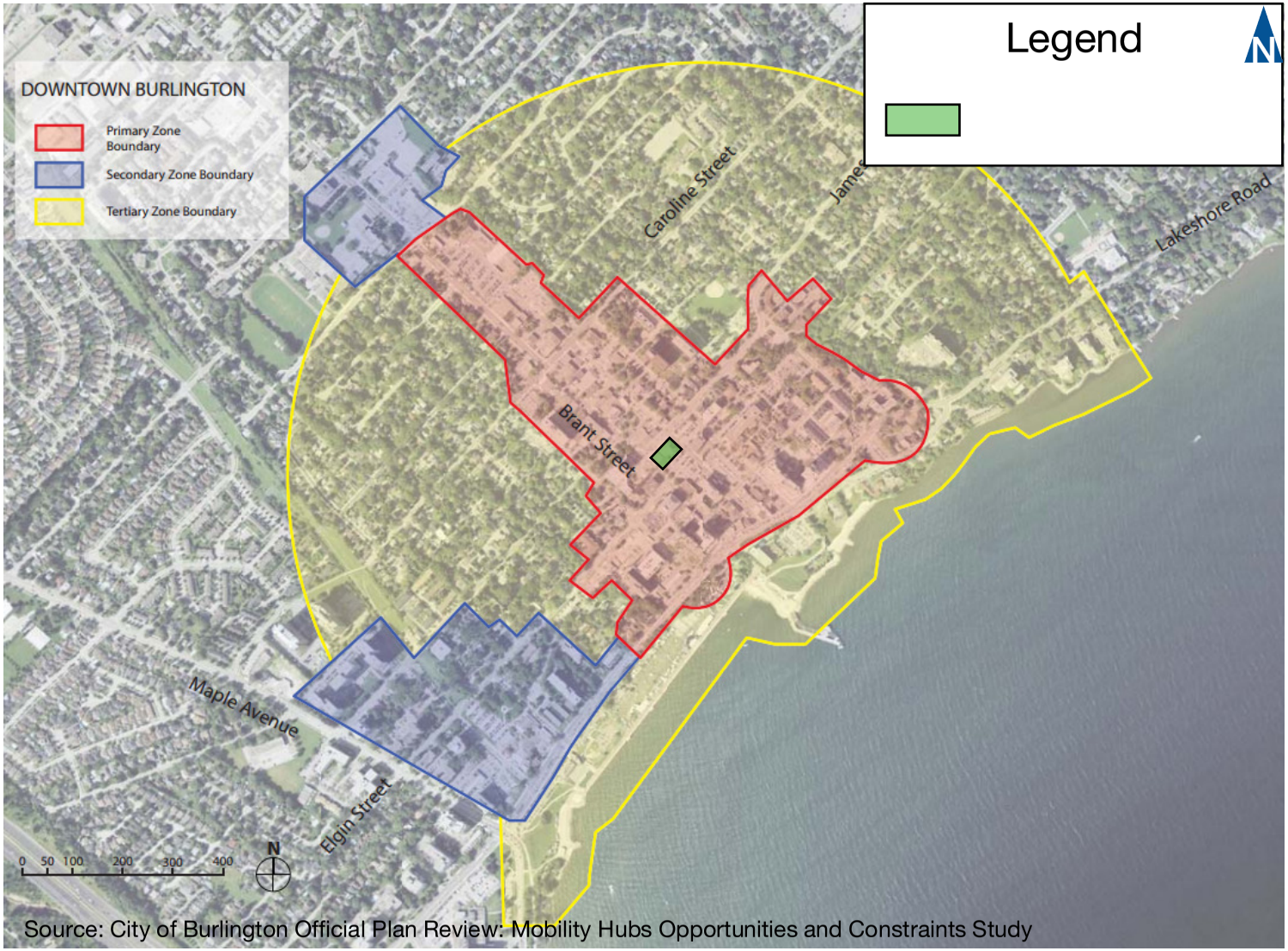
- 15 percent of all trips within Burlington by transit;
- 30 percent of all eastbound trips leaving the City by transit; and
- 10 percent of all westbound trips leaving the City by transit[13].

Based on this projected shift, the demand for automobile parking is also expected to decrease. To contribute to the shift from automobile trips to other modes, reduced parking requirements in and around Mobility Hubs will help contribute to meeting the City's transit modal share targets.

Transit-oriented development does much more than just shift automobile trips to transit. People who live or work in communities with high-quality public transit tend to own fewer automobiles and drive fewer annual miles than they otherwise would. Given the proximity of the subject property to local transit service within and a future Mobility Hub, the reduced parking rate is consistent with the policies set out in the OP. These policies support reduced parking standards in Mixed-Use Activity Areas to encourage the use of alternative forms of transportation including transit, walking and cycling.

Figure 6.1 illustrates the location of the Downtown Mobility Hub in relation to the development.

[12] The Big Move, Metrolinx, November 2008
[13] Discussion Paper 1 – Current State of Transportation in Burlington, Prepared by City of Burlington, June 2014



Source: City of Burlington Official Plan Review: Mobility Hubs Opportunities and Constraints Study

Downtown Mobility Hub Location

Figure 6.1

6.5 Travel Characteristics

A review of travel characteristics provided by the 2011 Transportation Tomorrow Survey (TTS) for residents living in the area surrounding the site confirms that a significant proportion of travel undertaken during the morning and afternoon peak periods is by non-auto means.

Information provided by the TTS program for the site area (GTA 2001 Zones 2059-2069) suggests that the proportion of people who choose to drive for travel purposes (including drivers and motorcycles) in the area during the morning and afternoon peak weekday periods is on average 70 percent of all travel undertaken. The balance of travel is undertaken as passengers in a car (14 percent), using transit (8 percent) or by bicycle/walking (8 percent).

Furthermore, a review of historical TTS information over the past ten years indicates that the makeup of travel modes has been consistent with automobile usage typically accounting for 70 percent of travel. Based on this trend it is reasonable to assume that only 70 percent of unit owners would require the use of an automobile for everyday errands whereas the remainder of the trips are fulfilled through transit and active modes.

Chart 6.2 and 6.3 outline historical trends in peak period commuting trip characteristics within the study area.

CHART 6.2: COMMUTING TRIPS IN STUDY AREA – AM PEAK MODAL SPLIT

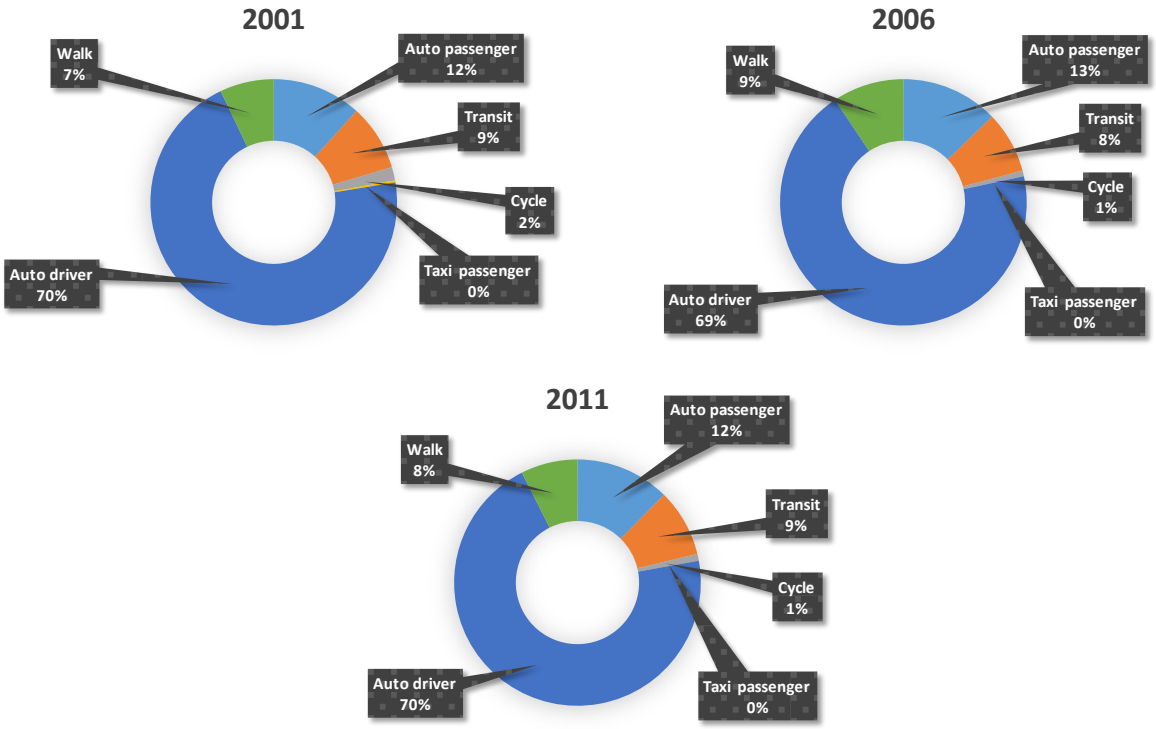
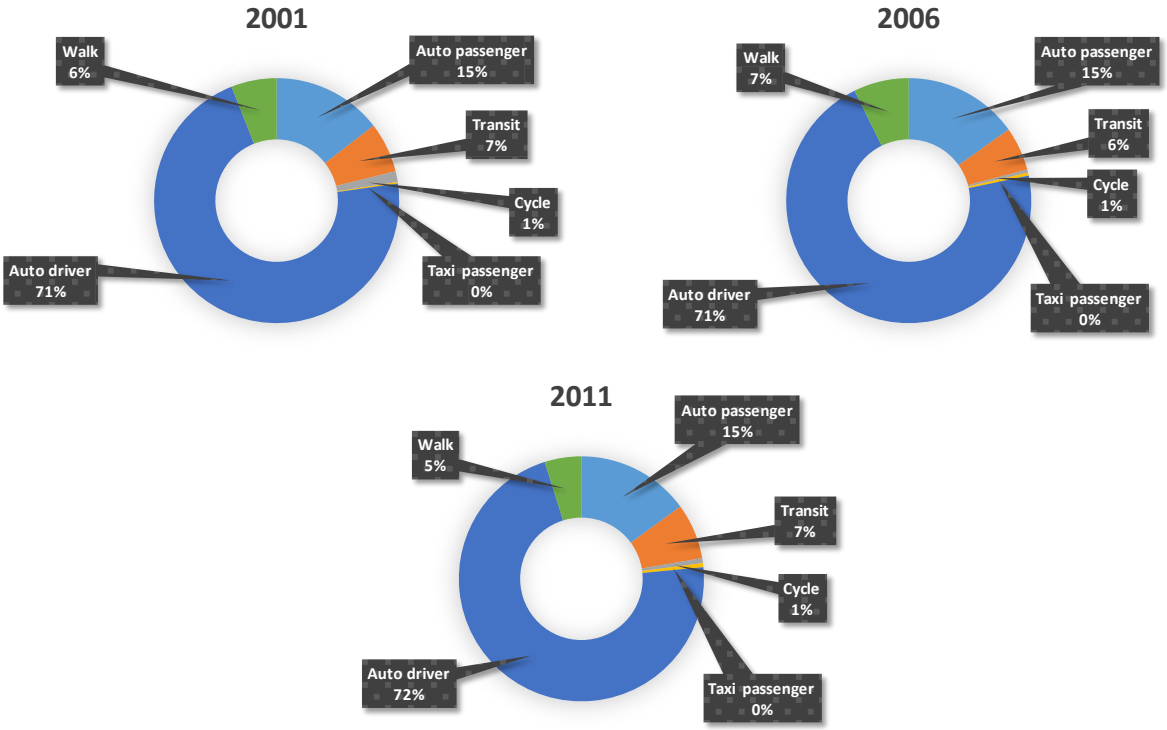


CHART 6.3: COMMUTING TRIPS IN STUDY AREA – PM PEAK MODAL SPLIT



6.6 Vehicle Ownership

A review of vehicle ownership provided by the 2011 Transportation Tomorrow Survey (TTS) for the site area (GTA 2001 Zones 2059-2069) suggests that approximately 25 percent of apartments surveyed do not own a vehicle. Further disposition of the survey results can conclude that the actual vehicle ownership, based on a weighted average is 0.91 vehicles per unit.

Table 6.4 summarizes the vehicle ownership characteristics from 2011.

TABLE 6.4: VEHICLES PER HOUSEHOLD (2011 TTS)

Number of Passenger Vehicles	Number of Households	Total Passenger Vehicles	Percentage
0	1504	0	24.9%
1	3664	3664	60.6%
2	783	1566	13.0%
3	75	225	1.2%
4	19	76	0.3%
Total	6045	5531	100.0%
Average Vehicle Ownership		**0.91**	

A review of historical TTS information over the past ten years indicates that the vehicle ownership has decreased for apartment dwellings within the development area. Based on this trend it is reasonable to assume a further decline in vehicle ownership into the future.

Table 6.5 summarizes the vehicle ownership characteristics from 2001.

TABLE 6.5: VEHICLES PER HOUSEHOLD (2001 TTS)

Number of Passenger Vehicles	Number of Households	Total Passenger Vehicles	Percentage
0	1414	0	26.2%
1	3036	3036	56.1%
2	823	1646	15.2%
3	114	342	2.1%
4	20	80	0.4%
Total	5407	5104	100.0%
Average Vehicle Ownership		**0.94**	

With respect to parking, the vehicle ownership evaluation offers some insight into parking requirements of apartments within the Downtown. In general, this review indicates that, despite preconceived notions, not all residents in



apartment dwellings in Downtown Burlington own a vehicle. This provides further justification that opportunities exist to provide reduced parking requirements associated with the proposed development given the site's location and proximity to transit, and the access to local amenities within the Downtown can be met through active travel modes.

Applying the 2011 vehicle ownership data set, the potential parking supply for the proposed 227 units can be estimated. This analysis provides support that the proposed parking supply of 212 spaces would meet and exceed the residential requirements.

Table 6.6 outlines the estimated the parking demand based on the vehicle ownership rates.

TABLE 6.6: PARKING DEMAND BASED ON VEHICLE OWNERSHIP

Use	Units	2011 TTS Vehicle Ownership Rates	
		Parking Rate	Parking Spaces Required
Residential Parking	227	0.91 spaces per unit	207
		Total Parking Required	**207**

6.7 Residential User Base

In typical condominium buildings in Downtown areas with greater parking supplies that are consistent with Zoning By-laws; there are three primary user groups from a parking perspective for residential uses:

- Indispensable Users
  - Residents who have a parking space, own a car and who need to use a car on a recurring day-to-day basis;
- Occasional Users
  - Residents who have a parking space, own a car but do not use it on a day-to-day basis to travel during peak periods. The use and need to own a car by this group is discretionary;
- Dispensable Users
  - Residents who do not have a parking space and do not have, nor use, a car.

The parking supply proposed will provide a parking resource that will logically be used by building residents who need a car for day-to-day use; indispensable users. Such residents would place a priority on purchasing a unit and expecting to utilize the on-site parking facilities. The proposed parking supply would accommodate parking of all units in the building (assuming one spaces is provided to any particular unit) which exceeds the base proportion of building unit occupants who need to drive on a recurring basis, approximately 70 to 72 percent during the peak periods.



Other unit purchasers who do not need to use a car on an ongoing basis would be satisfied by other methods available within the area such that they would not need to own a vehicle and furthermore not require a parking space.

To build upon the site's location and accessibility as well as enhancing the site's ability to promote alternative travel modes, it is highly encouraged that the development implement a TDM plan for the building with consideration to unbundle parking. This will provide, promote and direct prospective residents to pursue traveling without the use of a car, which ultimately will lead to reduced vehicle car ownership for the overall building.

6.8 Secondary Source

Encouraging compact communities, sustainable transportation choices, and housing affordability are well-established objectives. However, parking is at the centre of these objectives. Given that high-density represents a large portion of new housing starts in the Downtown area, and will remain so over the long term as the population grows. Having current and efficient parking requirements are critical to the achievement of a sustainable region and livable neighborhoods.

The amount of parking required in new high-density developments should reflect current and emerging trends. Transit ridership continues to increase year after year, in part from improved transit service levels as well as future network improvements such as the Mobility Hub proposed within the Downtown. Since 2001, the developments in the surrounding area have experienced a steady increase in resident's willingness to be less dependent on vehicle ownership and embrace sustainable travel modes as quantified by the comparison of TTS data.

The Institute for Transportation & Development Policy presented a case study from 10 European cities that have implemented aggressive parking management strategies that make residential and commercial parking less accessible and more expensive, as well as consider other steps to make neighbourhoods more pedestrian friendly. Some of the results include:

- Significant reductions in private car trips;
- Less congestion;
- Reductions in air pollution;
- Revitalized and thriving town centre; and
- Improved quality of life.

For residential parking, some European cities are reducing or eliminating minimum parking requirements, particularly in town centres and areas with frequent transit service, and in some cases imposing maximum parking provisions.



The European case studies provide evidence that residential parking supply and pricing can have beneficial reductions in vehicle usage, improved modal shares for transit and improved urban landscapes. By applying reduced or even eliminating minimum parking requirements may encourage people to consider other modes of sustainable transportation.

6.8.1 ITE

There are numerous industry associations and institutions that are dedicated to the survey and review of parking requirements related to various land uses. These associations, such as the Institute of Transportation Engineers (ITE), collect, review and disseminate information related to parking demand, supply, and appropriate design standards. This data is useful in establishing a typical range of requirements.

The ITE parking rates are noted to be significantly lower than Burlington's Zoning By-law and stipulate only 102 parking spaces are required for the development. One important point to take from this comparison is that many municipalities are gravitating towards lower standards for residential use within a Downtown area. These trends reflect a recognition that sustainable travel options are having an increasing impact on parking rates, as a change in demographics.

Table 6.7 outlines parking rates from ITE.

TABLE 6.7: ITE PARKING ESTIMATES

Land Use Code	Units	ITE Parking Estimates	
		Parking Rate	Parking Requirements
222 - High-Rise Apartment	227	0.45 spaces per unit[1]	102

1 limited to two sites consisting of 740 and 940 dwelling units

6.8.2 Other Jurisdictions

It is beneficial to look further at parking rates from other jurisdictions to those found in Zoning By-law 2020 to help establish and provide further insight in determining potential reductions in parking that are more in line with urban conditions in a Downton location.

Table 6.8 outlines parking rates from other jurisdictions.

TABLE 6.8 OTHER JURISDICTION PARKING RATES

Jurisdiction	Type	Parking Rate
City of Toronto	Multiple Dwelling Visitor	0.30 - 1.0 spaces per unit[1] 0.10 spaces per unit
City of Vaughan	Multiple Dwelling Visitor	0.70 - 1.7 spaces per unit[2] 0.15 spaces per unit
City of Hamilton	Multiple Dwelling Visitor	0.30 - 1.0 spaces per unit[3] N/A

[1] Range varies dependent on number of bedrooms per unit

[2] Range varies dependent on number of bedrooms per unit and is for Vaughan Metro Centre

[3] Range varies dependent on unit size and is for Downtown

Standards for multiple dwelling in the assessed Canadian municipalities vary by location, zones, the number of bedrooms, and the presence of a private driveway. In general, the parking requirements range from 0.30 spaces per unit (50 square metres or less) for a bachelor unit in Downtown Toronto to 1.85 spaces per unit for a three-bedroom condominium unit in Vaughan.

This comparison provides further evidence that many municipalities are gravitating towards lower standards for residential uses. For example, Hamilton and Toronto are using new draft standards which include rates as low as 0.30 spaces per unit for multi-residential developments. These trends reflect a recognition that sustainable travel options are having an impact on parking rates, as a change in demographics.

It is recognized that Burlington is not the same as Toronto, however it is illustrative to observe trends in similar areas such as Liberty Village (a vibrant urban area just west of the Downtown).

6.8.3 Burlington City-Wide Parking Standard Review

IBI Group conducted a City-Wide Parking Standards Review for the City of Burlington in July 2017[14] that reviewed the “Parking Requirements” contained within By-law 2020. This review provided detailed recommendations on how the requirements should be modified to better reflect the transportation and land use realities and objectives across Burlington.

The identified rates consider a minimum of 1.0 parking space per unit for residents be provided in intensification areas such as the downtown. Applying the recommended rate to the development, 227 parking spaces would be required.

[14] Final Report Burlington City-Wide Parking Standards Review Consolidated Report, IBI Group, July 2017

As the development is situated adjacent to high quality public transit, can accommodate active transportation through cycling and walking, is near retail and employment uses, the provision of these amenities as well as robust TDM plan provides grounds and justification that the proposed parking supply of 212 parking spaces (0.93 spaces per unit) will accommodate the parking requirements of the development.

6.9 Off-Site Parking Supply

The current parking requirements for residential parking in the Zoning By-law does not require any of the spaces provided be designated for residential visitors.

As the area is well served from a transit perspective and permanent public parking facilities are in the area, no on-site visitor parking will be provided. As the primary purpose of off-site public parking facilities is to provide short-stay parking for visitors to the area, the use of these spaces for visitors of the development will not have a negative impact on the surrounding neighborhood.

There are at least 10 publicly accessible parking lots located within a 400-metre radius or 5-minute walk from the development providing a total of approximately 860 parking spaces. In addition, there is a total of 236 on-street parking spaces with the majority being metred spaces.

Figure 6.2 illustrates these parking areas in relation to the proposed development.

6.9.1 2011 Downtown Parking Study

MMM Group conducted a parking study for the City of Burlington in September 2011[15] that assessed the Downtown parking supply and the parking demand. The study analyzed municipal parking lots/garages, privately owned public parking lots/garages, privately operated parking lots/garages, and on-street parking spaces to determine the total Downtown supply.

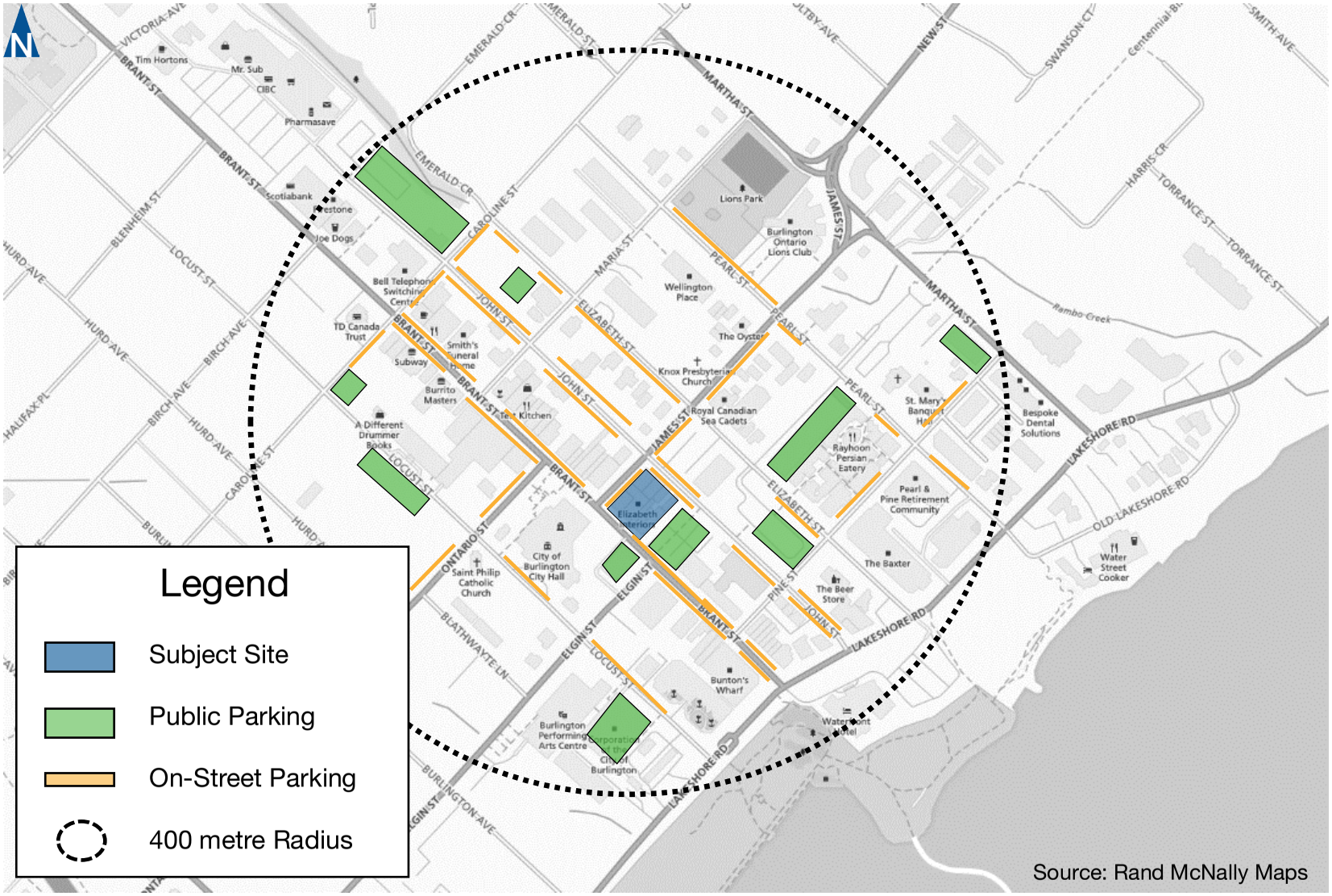
The result of this study found that there was a large surplus of capacity in the Downtown area as the peak parking utilization was only 60% during the weekday morning and afternoon and that parking demand during the evening was found to be around 44 percent. This study also noted that peak demand within the Brant Street and Elizabeth Street lots occurred during evening hours with a peak utilization around 93 percent and is noted to be inconsistent with other peak times within the Downtown.

It is understood that some of these off-site parking lots maybe developed and replaced with infill developments. Given that there is a large surplus of parking within the overall Downtown core and residential developments have

[15] City of Burlington Downton Parking Study, Prepared for City of Burlington by MMM Group dated September 2011.

off-peak parking demands, the development of a handful of these parking areas will not have a significant impact to the overall availability of parking for visitors of the proposed development.

Nevertheless, the MMM Group study has recommended that the City investigate the feasibility of providing additional parking garages with the preferred location at the intersection of Elizabeth Street and Pine Street to address the possibility of infill developments. Additional parking areas would provide ample parking within walking distance of the development and further provides justification and support for limited on-site parking facilities.



Local Area Public Parking Facilities

Figure 6.2

6.9.2 2015 Downtown Limited Survey

To further determine if the results presented in the 2011 Downtown parking study that was conducted by MMM Group are still relevant, a 2015 comprehensive parking study at a limited number of parking lots and on-street parking stalls was reviewed[16]. The utilization survey included surface parking lots, structure parking, metered on-street parking and non-metered on-street parking within the area bounded by Brant Street to the west, James Street to the north, Martha Street to the east and Lakeshore Road to the south.

Figure 6.2 illustrates the parking areas that were surveyed. **Appendix M** contains the survey data.

A review of the parking utilization study indicates the following:

Weekday Morning (9:00 AM to 12:00 PM)

- Occupancy range of 33 to 68 percent;
- Average occupancy of 57 percent;
- 85th percentile occupancy 80 percent;
- 85th percentile parking space availability is 32 percent.

Weekday Afternoon (12:00 PM to 6:00 PM)

- Occupancy range of 60 to 79 percent);
- Average occupancy of 67 percent;
- 85th percentile occupancy is 76 percent);
- 85th percentile parking space availability is 24 percent.

Weekday Evening (6:00 PM to 10:00 PM)

- Peak weekday occupancy occurs between 6:20 PM to 7:20 PM;
- Peak weekday occupancy range of 79 to 83 percent;
- Peak weekday average occupancy of 81 percent.
- Parking accumulation decreases after 7:00 PM;

During weekdays, parking activity at off-site lots and on-street spaces within the survey area typically peaked at 7:00 PM and then gradually decreases towards 9:00 PM. This is noted to be consistent with the findings in the 2011 Downtown parking study for this area. In 2011, the peak utilization at the Brant Street and Elizabeth lots is noted to be 10 percent higher than the

[16] 141970 - 374 Martha Street (Downtown Burlington) Parking Study, Prepared by Paradigm dated January 2015.

observations made in the 2015 study. However, this variance could be a direct result that the study was completed in November as opposed to June.

As capacity in the lots may peak during evening hours within the immediate vicinity of the development, visitors of the site who may have difficulties in locating a parking space, during the individual peak periods, can access available parking in other facilities within less than 100 metres walking distance. This 2011 Downtown parking study further supports this observation:

> *"peak parking demands related to individual off-street parking facilities were observed to occur at different times during the survey day and off-street parking is generally available within walking distance to any Downtown destination at any time of the day."*[17]

6.10 Comparable Sites

To better understand the actual parking demand that can be expected for a development of this type, a parking utilization survey was undertaken at two different sites with similar land uses to the proposed development.

The parking utilization surveys were carried out in 15-minute increments from the hours of 4 PM to 10 PM. The parking surveys are provided in **Appendix N.**

6.10.1 Strata (551 Maple Avenue, Burlington)

Strata is a twenty-one-storey condominium building. Built in 2012, Strata has 186 units with floor plans ranging from 1 bedrooms up to 3 bedrooms with 223 plus 18 tandem spaces provided in an underground parking structure and 47 surface parking spaces for use by visitors. Amenities include indoor pool, hot tub, fitness room, party room, meditation garden and guest suites. This site is located 870 metres west from the proposed development.

The density of this development is noted to be similar with 409 Brant Street. Exception to this is, Strata does not provide for any commercial or office uses on the ground floor. Additionally, this development is noted to be located outside of the Downtown mixed-use area, thus requires the provision of visitor parking spaces.

The parking survey indicates that residential parking demand at Strata was calculated at 0.80 parking spaces per residential unit. Visitor parking was calculated at 0.10 parking spaces per residential unit. **Chart 6.9** outlines the parking demand trend.

[17] City of Burlington Downtown Parking Study, Prepared by MMM Group dated September 2011.

6.10.2 360 on Pearl (360 Pearl Street, Burlington)

360 on Pearl is a seventeen-storey mixed use building. Built in 2009, 360 on Pearl has 75 units with floor plans ranging from 1 bedrooms up to 2 bedrooms plus den and 5,660 square feet of commercial uses on the ground floor. An underground parking garage contains 114 parking and 12 surface parking spaces are provided for use by employees of the bank. Amenities include fitness room, party room, billiards, rooftop terrace and theater. This site is located 340 metres west from the proposed development.

The development is noted to be a mixed use building similar to 409 Brant Street. Densities of the development however are noted to be less. Additionally, this development is noted to be located within the Downtown, thus does not require the provision of visitor parking spaces.

The parking survey indicates that residential Parking demand at 360 on Pearl was calculated at 0.76 parking spaces per residential unit. Visitor parking was calculated at 0.10 parking spaces per residential unit. However, it should be noted that the visitor spaces are assigned to the commercial land use and have noted to peak between the 4:30 PM and 5:30 PM. After peaking, demand steadily declines into the evening. **Chart 6.10** outlines the parking demand trend.

CHART 6.9: 551 MAPLE AVENUE (STRATA) PARKING DEMAND TREND

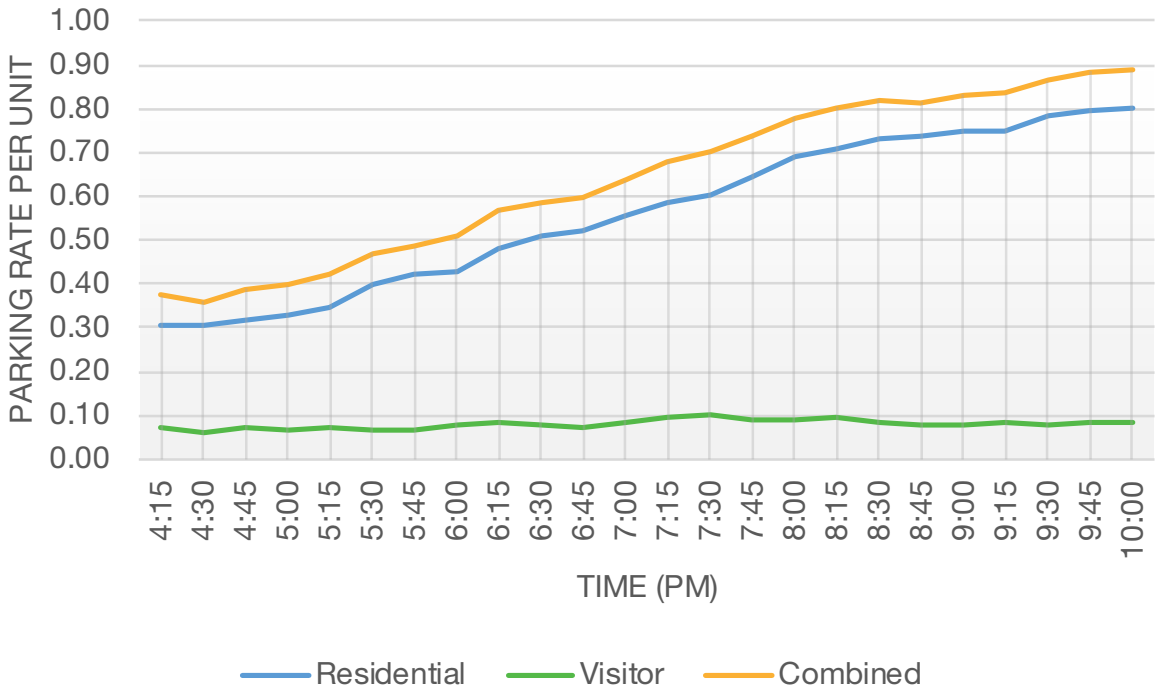
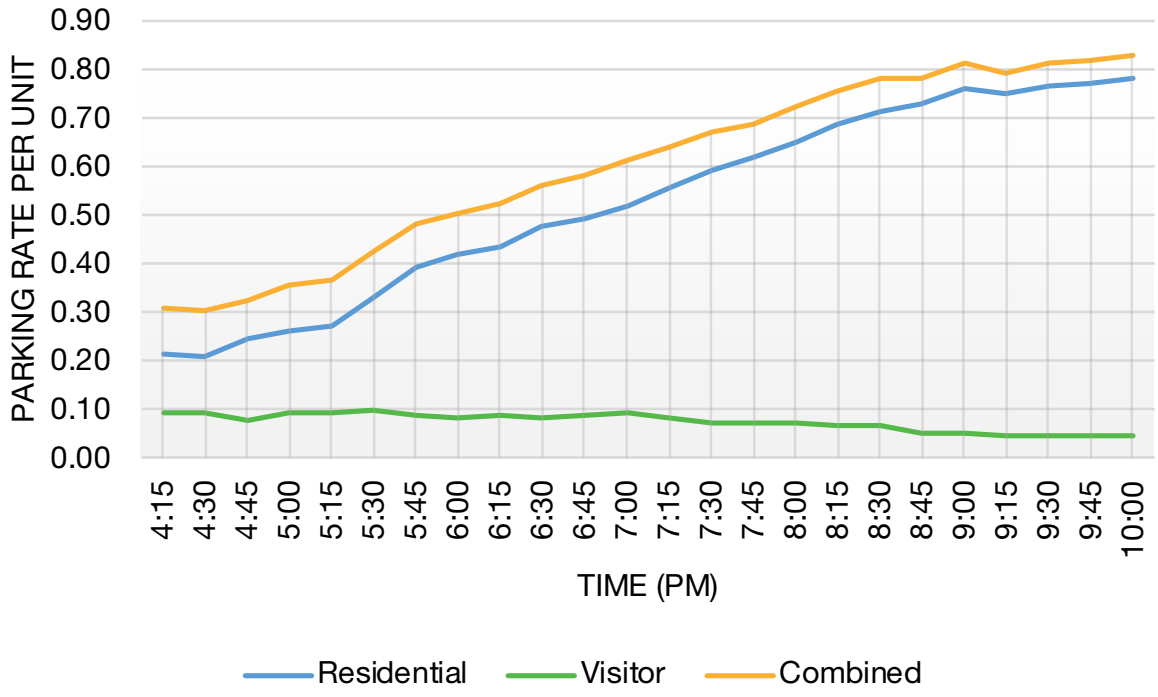


CHART 6.10: 360 PEARL STREET (360 ON PEARL) PARKING DEMAND TREND



6.10.3 Analysis

A peak resident parking demand of 0.80 spaces per unit and a peak visitor demand of 0.10 spaces per unit were observed throughout the survey period. The peak resident and residential visitor parking demands are substantially lower than the City of Burlington's Zoning By-law requirements of 1.25 spaces per residential unit.

Based on the parking utilization surveys, an appropriate design value for the parking requirements is noted to be 0.80 parking spaces per unit. As mentioned earlier, the development is exempt from providing visitor parking spaces, thus visitor parking requirements have not been included.

As Strata is noted to have similar densities and potentially similar unit sizes, the rate outlined above is noted to be an accurate representation of demand expected for the proposed development.

Applying the design value of 0.80 parking spaces per unit, the potential daily peak parking demand for the subject site would be in the order of 182 spaces as outlined in **Table 6.11**.

TABLE 6.11: DESIGN VALUE ESTIMATED DEMAND

Use	Units	Calculated Design Value	
		Parking Rate	Parking Spaces Required
Apartment Dwelling	227	0.80 spaces per unit	182
		Total Parking Required	**182**

6.11 Summary of Parking Demand

The proposed site provides for a total of 212 parking spaces that equates to a parking ratio of 0.93 parking spaces per unit. The existing parking requirement for the development under the City of Burlington's Zoning By-Law 2020 is 285 parking spaces. This however, would require an additional 73 parking spaces to be added.

Paradigm's approach to the overall parking supply for 409 Brant Street is to adopt parking ratios that recognize empirical evidence that parking demand has many factors and varies according to household size, income, auto ownership, and locational factors such as proximity to other uses and availability of multiple transportation mobility options.

The development will be constructed to provide housing options within a complete community that would be sustainable given the multiple number of transportation options available. This is of particular importance as the lands are located within the primary zone boundary of the Downtown Mobility Hub which will provide efficient transit service locally and regionally.

Burlington's OP Policies 3.2.2.D and 3.2.2.J emphasize that all forms of transportation are to be encouraged and that reduced parking standards shall be contemplated to encourage a broader range of land uses and densities to support transit. The proposed development is considered to balance these parking and transportation policy objectives, through a combination of a parking structure, bicycle parking and overall density of the development that support and promote the use of the existing and extensive transit system within the City of Burlington.

The development will be transit supportive and promote active transportation achieving this intent primarily by taking advantage of its geographical location. It will also introduce a significant portion of the residential population of the development to maximize the benefits of the site's walkable access to a comprehensive and integrated transit system. As the development promotes the use of other modes of transportation through limited on-site vehicle parking and increased access too safe and covered bicycle parking, the development plays a significant role in setting an example for residents to consider non-automotive travel if they chose to purchase a unit.

To estimate the potential parking demand of the proposed development, four (4) varied methods have been utilized and are discussed in detail above. The proposed development is estimated to have weekday parking demands in the order of 103 to 284 spaces depending upon the methodology used. Three (3) out of four (4) of these methods supports the proposed supply of 212 parking spaces as being adequate.

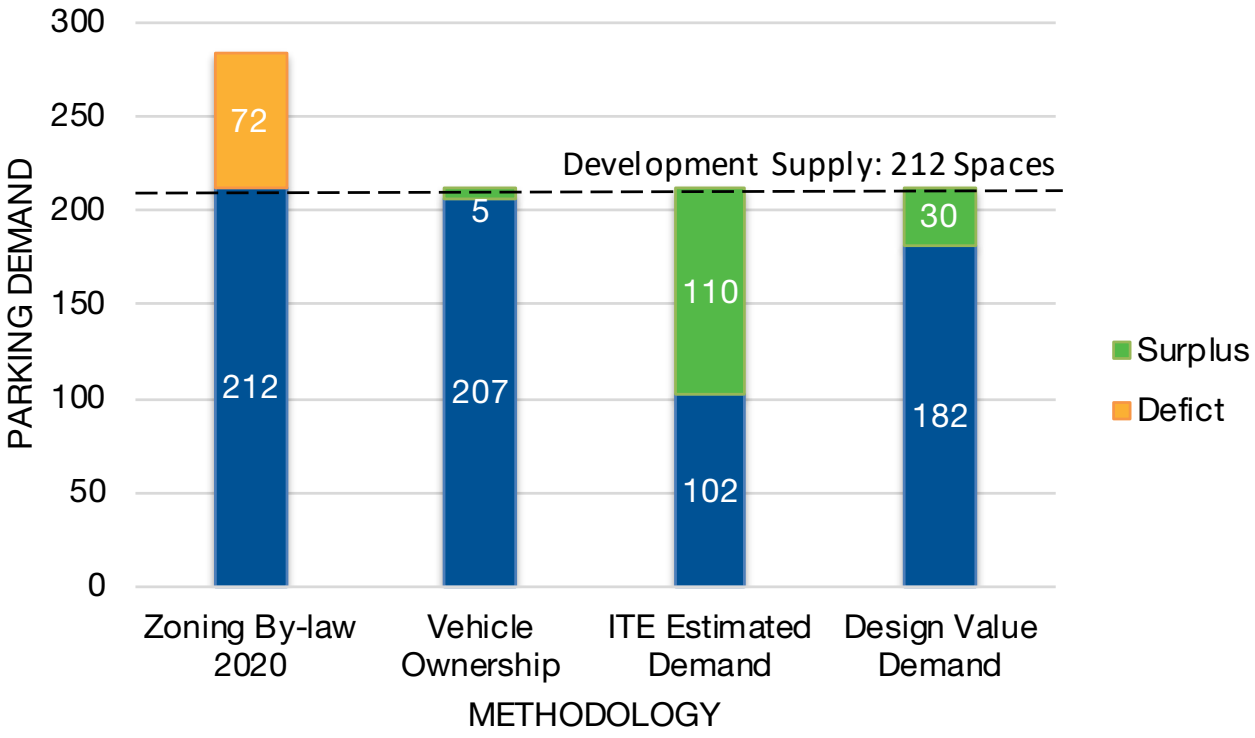
The design value estimated (surveyed sites) is the best predictor of the parking demand as this data is representative of demand at local sources. The parking surveys were conducted on four separate occasions at two separate sites with land uses similar to the proposed development.

The surveys demonstrate that parking demand at higher density development in Downtown Burlington is well below the requirements stipulated in the City of Burlington Zoning By-law 2020, and is more likely less than what the development has proposed.

Collected data at the survey sites are further supported by the vehicle ownership rates and mode split characteristics of apartment units within the immediate area. The 2011 TTS data stipulates that residential automobile use is noted to be about 90 percent per unit. The proposed parking supply of 212 spaces is sufficient and will accommodate the peak parking demands of the subject site.

Chart 6.12 provides a summary of the four (4) methodologies.

CHART 6.12: SUMMARY OF METHODOLOGIES



7 Transportation Demand Management

Transportation Demand Management (TDM) refers to ways of making the capacity of our roads more efficient by reducing vehicle demand. TDM approaches consider how people's choices of travel mode are affected by land use patterns, development design, parking availability, parking cost, and the relative cost, convenience and availability of alternative modes of travel. Various TDM strategies are used to influence those factors so that the alternatives are more competitive with driving alone and can potentially reduce reliance on motor vehicles.

TDM strategies at a development can be divided into two basic categories.

- Pre-occupancy: things that need to be done while a development is being designed and built, and
- Post-occupancy: things that can be done once people are using the development.

The pre-occupancy actions are critical because they are most likely to determine how attractive, convenient, and safe alternative travel modes will be once the site is occupied. Before a site is occupied, or during a remodel/ renovation, it can be designed to be convenient and safe for pedestrians and cyclists, and vehicle parking can be provided to meet but not exceed demand.

After the development is built, incentives can be offered, but those incentives will not work as well if the site and its surroundings are oriented to motor vehicles. The incentives generally include subsidies to use transit or rideshare and information about where and how to use alternatives.

TDM is one of the tools that municipalities are using to create a more vibrant and sustainable community.

7.1 TDM Measures

A TDM plan is recommended to be developed and implemented for prospective residents to enhance their ability to travel, to as great a degree as possible, without the use of an automobile, thereby reducing the need for residents to own a car.

The development offers an environment where convenient transportation options are available for area residents, including public transit, bicycle networks and a wide range of employment, retail, activity centres and amenities located in close proximity. These factors combine to allow for a reduced need for residents to own a private vehicle and are strongly supportive of the development of a building with a reduced residential parking supply.

The parking survey data outlined in **Chapter 4** has indicated that the development's parking supply of 212 spaces can accommodate the

estimated parking demand. However, to further promote sustainable modes of travel, a TDM plan is recommended for the development.

Details of the TDM plan will be further refined as part of a subsequent site plan application. A summary of the main components of the plan is provided where the development will engage to maximize prospective residents' abilities to take advantage of the non-automotive travel opportunities offered.

7.1.1 TDM Coordinator

The condominium board is recommended to oversee site-related transportation demand management and serve as the sites TDM Coordinator. The person (or persons) in this role will coordinate with other parties within the site area to help alleviate the reliance on single-occupant motor vehicle travel to the site.

To that end, the TDM measures identified in the following section are recommended. The duties of the TDM Coordinator will include, but not be limited to: disseminating information on alternate modes of transportation and developing related marketing materials; developing and implementing appropriate TDM measures; and monitoring the effectiveness of those measures.

7.1.2 Walk-able Environment

Due to the site's proximity to commercial/office neighborhoods within an established urban area, walking is encouraged by the provision of a pedestrian-friendly site layout that features an extensive network of sidewalks and entrances at key points both within the site and connecting to the existing pedestrian network.

The concept opens the majority of the site to public access for pedestrians by providing three street level entrances from John Street, James Street and Brant Street. This will allow for a comprehensive network of pedestrian access to allow for an enhanced pedestrian experience for retail customers, visitors and residents of the development. The on-site pedestrian network will also provide access to a number of transit stops and the various municipal car parking areas located within the immediate study area.

By taking advantage of the public sidewalk to attract and serve pedestrians with multiple connections and offsetting parking underground, the development offers walkability as one of the key design features.

7.1.3 Active Transportation

Active transportation modes play important roles in a diverse transport system. Walking and cycling provide access to public transit; often the best way to improve and encourage public transit travel is to improve local walking and cycling conditions. As stated within the City's OP, the desire is to make walking, cycling and public transit preferred transportation options.

An established sidewalk network through the neighbourhood currently exists which provides good connectivity to surrounding communities and is within walking distance of several services, shops and employment opportunities that could substantially minimize the demand for private car ownership. Crosswalks, pedestrian pushbuttons and indicators are provided for all approaches at the signalized intersections within the study area.

The development proposes to maintain this connectivity and further improve it by providing a barrier free concrete walkway with depressed curbs along all frontages of the building. Additionally, the vehicular access connection along John Street is recommended to be hardscaped through the drive aisle to further emphasis the presence of the north-south pedestrian crossing.

The City's Zoning By-Law stipulates that the development is required to provide bicycle parking for the retail component only. The minimum bicycle parking rates are as follows:

- 2 spaces plus 1 space per 1,000 m^2 GFA

Based on this requirement, the development is required to provide a total of three (3) bicycle parking spaces. The development meets this requirement as three (3) bicycle parking spaces will be provided. In addition, a total of 160 bicycle storage lockers will be provided within the underground parking garage for use by residents to provide additional opportunities and safeguards for residents that choose to travel to/from the development by means of cycling.

7.1.4 Complete Streets

Complete Streets refers to design concepts and principles that focus more specifically on design of the street for all potential users – transit, bicyclists and pedestrians as well as cars. In the past, modes other than the automobile may not have been prioritized and many performance measures of our roadways have focused on moving automobiles.

The development adheres to the complete streets philosophy by including sidewalks that exceed the minimum width requirements, bicycle storage for both public use and residential use, comfortable and accessible public transportation stops, frequent and safe crossing opportunities, median islands, and interaction between the streetscape and building through retail uses provided on the ground floor.

7.1.5 Parking Management

Parking Management is a general term for strategies that encourage more efficient use of existing parking facilities, reduce parking demand and shift travel to non-single occupant vehicle (SOV) modes. Managing parking helps to reduce the undesirable impacts of parking demand on local and regional traffic levels and the resulting impacts on community livability and design.

The most effective parking strategies are cost based or pricing measures that link parking rates more directly to demand. Unbundling parking costs is one tool that can be implemented which requires parking spaces be leased or sold separately ("unbundled") from the rent or sale price of a unit. This gives a financial incentive inducing individuals to drive less or own fewer cars. Overall, this serves to reduce parking demand and shift peak-hour commute trips to non-single occupant vehicle modes. Including the price of parking in an overall lease can increase costs whether the tenant has a car, but be perceived as an invisible cost by the customer.

The TDM plan will need to provide unbundled parking spaces to allow residents to adjust their parking supply to reflect their needs. This is an important factor that supports providing a reduced parking supply as residents are notified at the onset of the project that parking will be on a limited basis and will be provided as an additional cost in lieu of the price to purchase a unit. If residents are unwilling to purchase a parking space or change their travel behaviour, they will not purchase a unit.

7.1.6 Car Sharing Program

Car sharing programs are services that provide members with access to a fleet of vehicles, usually on an hourly basis. It is an increasingly effective way of encouraging people to reconsider purchasing a car, or in some cases acquiring a second car. Success of car sharing programs relies upon having cars in conveniently located areas with parking spaces allocated directly to the service.

The TDM plan will need to include and make available the use of a car-share vehicle within walking distance of the site. The car-share vehicle would be funded through the condominium corporation with an emphasis for the vehicle to be parked in a municipal lot. The rationale behind this is that if the vehicle were to be parked in the underground parking garage, users of the car share vehicle would largely be limited to the development rather than the overall community. The ideal criteria for the space should be in highly visible and accessible locations to encourage the use of the program.

7.1.7 Ride Share

Ride-share involves two or more people sharing a vehicle for a trip. The cost of the journey (fuel, tolls, parking, etc.) can be split between the driver and passengers, resulting in a saving for all concerned. This also reduces the number of vehicle trips and parking demands.

There are several tools available such as Car Pool World, which allow the setting up of an online ride sharing database. This enables people to enter their journeys so that the database can automatically search out residents or employees whose journeys match.

Notice boards are recommended to be put up in the lobby of the residential buildings and at the tenant's office for future residents who may organize informal carpools as well.

7.1.8 Individualized Travel Planning

Research has indicated that going directly to residents and workplaces increases the likelihood that a shift to more sustainable modes of transportation will occur. The OECD and the Global Environmental Change Program of the UK Economic and Social Research council hosted a workshop[18] that recognized the importance of understanding the forces that motivate and shape individuals' travel behaviour. It identified several key messages of benefit to TDM policy development:

- Hierarchy of Choice: An employer can make decisions that influence how all his/her employees travel to work. Similarly, an individual's decision to buy his/her house may affect how all the members of the household travel. A greater understanding of this hierarchy can assist in identifying those high-order organizations and individual choices. TDM strategies and policies should target those key decision makers.
- The Perception of Individuals: Individuals' perceptions of time, environment, and alternative modes of travel and travel behaviour, determine whether they feel they have a choice in how they travel. For example, people who have rarely taken public transport or cycled may not perceive these modes as suited to their lifestyle because of perceived disadvantages which they associate with these modes. In many cases, individuals over-estimate the benefits of their current choice and under-estimate the capacity of alternative modes to satisfy their needs. Altering these perceptions can open the range of options available to travelers.
- Culture: Culture plays an important role in determining the status, image and acceptability of different types of travel behaviour. For example, the car has social and cultural attributes that go well beyond its role as a mode of transportation. TDM strategies must recognize and take into consideration these cultural factors.
- Education (Information and Learning): Individuals need targeted, relevant, effective and positive information to better understand the consequences of different travel choices on their own, and their community's quality of life. This information would be most effective if available before individuals engage prior to car and home purchases.

Individual travel planning has demonstrated that working directly with residents as well as providing appropriate infrastructure increases the use of sustainable modes and reduces the dependency on vehicles. It is therefore an important component to the encouragement of the use of sustainable modes of transportation at 409 Brant Street.

[18] Organisation for Economic Co-operation and Development (OECD). 1997. Second OECD Workshop on Individual Travel Behaviour: "Culture, Choice and Technology" Final Report. University of Sussex, Brighton, UK 17-19 July 1996. Paris: OECD.



The TDM coordinator (on-site property manager) will be able to provide personalized travel information for residents and visitors to the site. The earlier the information is provided to the residents (or even potential residents), the more likely it is that the use of sustainable options will occur and the use of the private automobile may not be the presumed mode of choice for these households.

7.1.9 Information Package

The travel patterns of new residents are most pliable. Hence informing new residents about the alternative transportation options available should be provided. It is possible, for example, to provide "Information Packs" that combines positive messages on health, environmental and financial benefits of not using an automobile with basic information on public transit, walking, cycling, carpool and car sharing options. Existing travel information services such as the TransLink website should be promoted.

7.2 Summary

The proposed development represents a compact, transit-supportive built form that maximizes the utility of the land and will create additional housing choices and new retail opportunities and employment uses in Downtown Burlington. Further realization of a complete community will be achieved by promoting transit use through its location in proximity to the John Street Transit Terminal which will be the centre of the future Downtown Mobility Hub. Facilities for active transportation will be provided through bicycle parking areas for residents, as well as creating a high quality and safe pedestrian environment to promote activity throughout the day.

The parking survey data outlined in **Chapter 6** has indicated that the development's parking supply of 212 spaces can accommodate the estimated parking demand. The development will promote the use of active transportation through the provision of 160 bicycle parking spaces and a reduced parking standard that will meet the needs of the development while minimizing potential oversupply.

Furthermore, the supplemental element of the parking strategy will be the adoption of a sustainable plan for the project that will attempt to influence the way people travel to and from the site through a comprehensive suite of TDM strategies. The site's mix of uses and proximity to transit opportunities will help promote alternative modes of travel and reduce the number of cars traveling to the site.

8 Conclusions and Recommendations

8.1 Conclusions

This study evaluated existing conditions, the impacts of background traffic growth and projected the impacts of the development with the construction of 227 condominium units and 6,425± sf of ground floor retail uses.

Access to the site is proposed via one all-direction driveway connection to John Street. Full-build out of the development is projected to generate approximately 66 new vehicle trips during the weekday AM peak hour and 89 new vehicle trips during the weekday PM peak hour.

The traffic analysis conducted as part of this assessment indicates that development volumes will only result in minor increases to the surrounding study area intersections under peak conditions. This analysis indicates that the transportation infrastructure currently provided is still adequate for accommodating traffic associated with the proposed development.

It is acknowledged that deficiencies at the Brant Street and Elgin Street intersection are projected to occur in the future with anticipated growth in traffic, independent of the development. To address these deficiencies the following mitigation measures should be considered to be implemented by the City:

- Brant Street and Elgin Street – The City consider restricting the eastbound approach to right turns only during the weekday PM peak hours from Monday to Friday. This improvement is recommended to address projected capacity deficiencies and potential delay, independent of the proposed development.

The results of the methodologies utilized in the parking analysis provide a general understanding of parking behavior. The parking analysis conducted indicates that the proposed supply of 0.93 parking space per unit (212 parking spaces) will meet and exceed the parking demand for the following reasons:

- The development is located within a Mixed-Use Activity Area under the Burlington Official Plan which encourages greater reliance on non-automotive forms of transportation;
- The development will be marketed towards individuals and families who prefer living in the Downtown with a strong support for using non-automotive travel modes;
- There is an established sidewalk network through the neighbourhood which provides good connectivity to surrounding communities and the site is within walking distance of several services, shops and other employment opportunities that generally reduce the demand for private car ownership;

- The development will promote the use of active transportation through the provision of 160 bicycle parking spaces for residents, three bicycle parking spaces for the retail land uses and a reduced parking standard that will meet the needs of the development while minimizing potential oversupply; and
- A review of other municipalities, rates found within the ITE Parking Generation 4th Edition and the City of Burlington's City-Wide Parking Standards Review has shown a trend towards lower parking standards within major urban and intensification areas. Parking supply variances are also granted on a case-by-case basis for developments that meet certain criteria such as proximity to higher order transit, provision of quality bike facilities and/or car share programs. This approach is setting a precedent for becoming a best practice in certain parking management strategies. The proposed development generally satisfies many of these criteria and the proposed parking rate of 0.93 is noted to be acceptable.
- To better understand the actual parking demand that can be expected for a development of this type, a parking utilization survey was undertaken at two different sites with similar land uses to the proposed development.
    - Parking demand at the Strata Condominium (551 Maple Avenue) was calculated at 0.80 parking spaces per unit. Applying these rates to the proposed development indicates a total of 182 parking spaces is required. The development exceeds this requirement.
    - Parking demand at 360 on Pearl Condominium (360 Pearl Street) was calculated at 0.76 parking spaces per unit. Applying these rates to the proposed development indicates a total of 173 parking spaces is required. The development exceeds this requirement.
- The site provides significant opportunity with respect to transit availability. Bus service is available within the immediate location and is within 150 metres walk of the John Street Transit Terminal. This is an important terminal that provides significant access to all local transit and higher order transit routes.
- Alternative transportation options provide significant encouragement to residents given the fact that parking will be at a premium in terms of cost and provided on a limited basis.
- The proposed parking supply would accommodate parking for 93% of the units in the building (assuming one space is provided to any specific unit) which exceeds the base proportion of building unit occupants who need to drive on a recurring basis, approximately 70 to 72 percent during the peak periods based on the 2011 TTS data.
- There will be some visitor vehicle parking demand that will impact adjacent public parking facilities and on-street supply. This however

will be managed within the context of the overall transportation system. No residential spillover is projected.

- There are 860 existing parking spaces available within a 400-metre radius of the development. Capacity within the Brant Street and Elizabeth Street lots peaked during the evening hours whereas the remaining lots within the Downtown noted to experience limited use in the evening. Visitors of the site who may have difficulties in locating a parking space adjacent to the development can access available parking in other facilities within less than a 100-metre walking distance.
- To manage any future risk to on-street parking supply, the City does have pricing techniques available to affect the demands on the on-street parking supply.
- The proposed reduced parking supply on site is considered appropriate and will meet the base parking needs of the future residents who need to own a car for the purposes of day-to-day travel.
- The most important aspect to the proposed parking supply is that if residents are unwilling to change their travel behaviour, they will not purchase a unit.
- The development is considered an innovative, adaptive redevelopment, which successfully balances intensification and promotion of non-automotive use which are both compatible and respectful of the existing character of the area.

Within the context of being in a future Mobility Hub area, the land use lends itself to being less reliant on auto use where residents and visitors can take advantage of the additional transportation choices such as walking, cycling and transit. It is expected that the land use will generate reduced parking demands due to the locale in combination with the proposed overall design and marketing strategy of the project.

To further promote the site as a sustainable development a variety of transportation demand management measures (TDM) to reduce parking demand is recommended to be incorporated. The TDM plan will focus on making the site a model of sustainable transportation by promoting alternative modes of transportation over the use of private automobiles.

The TDM plan and the developments transportation context will provide residents with a range of mobility choices other than using privately-owned vehicles and supports the provision of an appropriate parking supply in the building.

8.2 Recommendations

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

- The City of Burlington recognize the conclusions drawn above;
- Driveway A operate with a single inbound and outbound travel lane with stop control provided for the west leg;
- Optimizing select traffic control signals at study area intersections, if necessary, after build-out to better support the future traffic volumes and travel patterns;
- The intersection of Brant Street and Elgin Street be monitored by the City of Burlington when build-out of in-stream developments within the area occurs to determine if time of day turning restrictions may be required during the weekday peak hours;
- The City of Burlington support the proposed Zoning By-law parking rate to allow the provision of 212 parking spaces for the development (0.93 parking spaces per unit); and
- To promote alternative modes and further reduce the risk attached to reduced parking ratios, the owner develops and implements a TDM plan with the following measures:
  - TDM Coordinator;
  - Unbundled parking;
  - Car-share vehicle within walking distance of the site; and
  - Information packages to residents outlining sustainable travel information.

Appendix A

Terms of Reference



Andrew Steinsky

From: Adam Makarewicz
Sent: December 5, 2017 12:09 PM
To: Andrew Steinsky
Subject: FW: 170317: 409 Brant Street TRIS and PJ - Terms of Reference

Hi Andrew,

See comments back from the City.

Adam J. Makarewicz, Dipl.T., C.E.T. MITE
Transportation Engineering Technologist

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22 King Street South, Suite 300, Waterloo ON N2J 1N8
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w: www.ptsl.com

From: Zunic, John [mailto:John.Zunic@burlington.ca]
Sent: Tuesday, December 5, 2017 12:07 PM
To: Adam Makarewicz <amakarewicz@ptsl.com>
Cc: Minaji, Rosalind <Rosalind.Minaji@burlington.ca>
Subject: RE: 170317: 409 Brant Street TRIS and PJ - Terms of Reference

Hi Adam,

I've provided my comments below, in red.

Please note that the City has a By-law requiring that a formal preconsultation take place prior to an application being submitted.

Should you have any questions regarding Transportation Planning's comments, please do not hesitate to contact me.

Thank you,

John Zunic
Transportation Planning Technologist
Transportation Services Department, City of Burlington
426 Brant Street, Burlington, Ontario L7R 3Z6

tel. 905-335-7600 ext. 7691
john.zunic@burlington.ca

Please consider the environment before printing this e-mail.

From: Adam Makarewicz [mailto:amakarewicz@ptsl.com]
Sent: Wednesday, November 29, 2017 1:49 PM
To: Zunic, John
Subject: 170317: 409 Brant Street TRIS and PJ - Terms of Reference

Hi John,

Paradigm is providing engineering assistance for an Official Plan Amendment for the proposed mixed-use development at 409 Brant Street in Burlington, Ontario. The property is located within the southeast quadrant of Brant Street and James Street. A Transportation Impact, Parking Justification and Transportation Demand Management Study is required to support said applications for this 200-residential unit and 600± (sqm) development. A preliminary concept plan is enclosed for your reference.

The Terms of Reference will follow the Region of Halton's Guidelines for the Preparation of Traffic Impact Studies. The following items supplement these guidelines:

1. The public roadway intersections to be analyzed will be:
   - Brant Street and James Street (*November 2016 TMC*);
   - Brant Street and Lakeshore Road (*October 2016 TMC*);
   - Brant Street and Elgin Street (*October 2016 TMC*);
   - Brant Street and Ontario Street (*October 2016 TMC*);
   - Brant Street and Caroline Street (*November 2016 TMC*);
   - James Street and Elizabeth Street (*November 2016 TMC*);
   - James Street and John Street (*November 2016 TMC*),

2. We request confirmation that the TMC we have on file from October and November of 2016 are sufficient for use in this study.
   The TMCs on file from October and November 2016 are sufficient for use in this study, provided that the 1% growth rate (compounded annually) is applied to the TMCs.

3. To reflect the peak use of the site being concurrent with commuter hours, the weekday AM and PM peak hours will be analyzed.

4. Base Year (2017) and five years beyond full-build out (2027) will be included in the analysis.

5. Review TTS data for the area and consider the percentage of trips made by alternative modes of travel.

6. Trip generation will be based on ITE rates. Reduction in trip generation will be based on pass-by, interconnection, and modal split credits.

7. Trip distribution will be based on existing travel patterns and most logical routes to the arterial road network.
   TTS data will also be considered.

8. General background growth will be accounted for at 1.0% per annum,

9. Traffic growth from nearby developments will be based on projections developed in the 421 – 431 Brant Street TIS, PS and TDM Options Report, December 2016, prepared by our firm.
   Additionally, please contact Rosalind Minaji for information on approved developments within the study area. Her contact information is provided below:

Rosalind Minaji MCIP RPP
Coordinator of Development Review
Burlington Planning & Building Department
426 Brant Street, Burlington L7R 3Z6
Phone: 905-335-7600 Ext. 7809
Fax: 905-335-7880
Email: rosalind.minaji@burlington.ca

10. Inventory of parking facilities in the area including on-site, on-street and off-street.
    Including municipal parking lots.

11. Estimate of the parking demand generated by each component of the development according to the City's Zoning By-Law.

12. Review our in-house parking demand data and the ITE Parking Generation – 4th Edition to assess the parking generation for the site.

13. Review parking utilization survey at similar sites located within the City of Burlington.
    We would like Paradigm to provide Transportation staff with the addresses of the two high-rise proxy sites, for review and endorsement prior to undertaking the study. Rather than being limited to Burlington, we encourage Paradigm to identify sites with products similar to the one proposed at 409 Brant Street, in municipalities such as Oakville, Mississauga, Vaughan, Richmond Hill and Markham.

14. Assess the extent to which parking demand can be accommodated on the site based on the various methodologies.
    Paradigm needs to identify the extent of spillover (if any) that is anticipated at this site, and communicate the results with Transportation Planning staff.

15. Assessment of a TDM Plan to reduce the project's overall traffic/parking impact through the implementation of measures that are aimed at affecting the demand side of the transportation equation.

We respectfully request your review and approval of these proposed Terms of Reference. Should you have any question or require additional information, please do not hesitate to contact me.

Regards,

Adam J. Makarewicz, Dipl.T., C.E.T. MITE
Transportation Engineering Technologist

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m: 519.497.7179
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Appendix B

Traffic Data

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Brant Street & Caroline Street
Site Code:
Start Date: 11/08/2016

Turning Movement Data

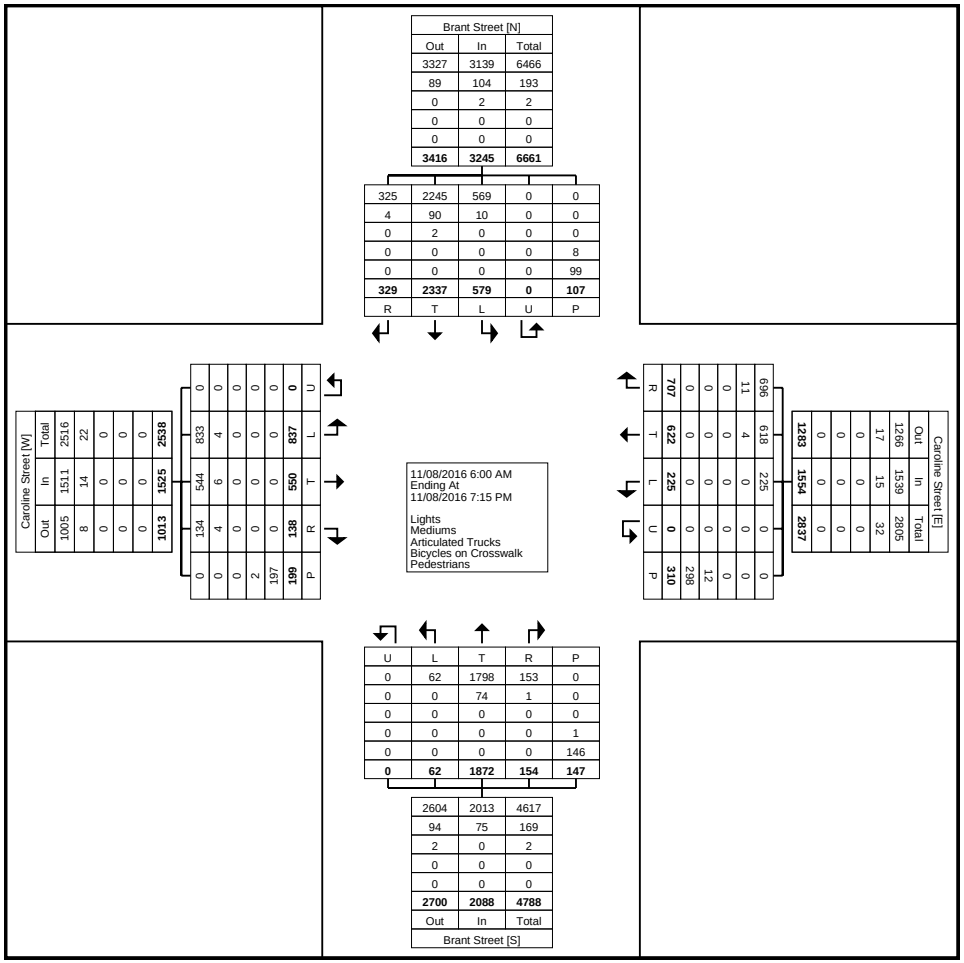
Start Time	Caroline Street Eastbound						Caroline Street Westbound						Brant Street Northbound						Brant Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
6:00 AM	8	2	2	0	0	12	1	1	8	0	4	10	0	20	3	0	0	23	1	22	1	0	1	24	69
6:15 AM	13	10	1	0	0	24	1	4	7	0	1	12	0	27	2	0	3	29	4	26	0	0	0	30	95
6:30 AM	16	6	1	0	2	23	4	4	8	0	2	16	1	30	3	0	3	34	3	38	0	0	0	41	114
6:45 AM	13	10	3	0	1	26	1	3	10	0	0	14	1	26	0	0	2	27	0	22	0	0	1	22	89
Hourly Total	50	28	7	0	3	85	7	12	33	0	7	52	2	103	8	0	8	113	8	108	1	0	2	117	367
7:00 AM	18	7	2	0	1	27	0	3	14	0	2	17	1	35	4	0	2	40	8	38	5	0	0	51	135
7:15 AM	18	18	3	0	0	39	4	4	21	0	1	29	4	39	2	0	1	45	8	33	5	0	0	46	159
7:30 AM	27	10	3	0	3	40	4	3	26	0	9	33	0	46	3	0	2	49	18	48	7	0	1	73	195
7:45 AM	29	26	8	0	4	63	4	13	24	0	5	41	1	43	6	0	3	50	10	60	8	0	3	78	232
Hourly Total	92	61	16	0	8	169	12	23	85	0	17	120	6	163	15	0	8	184	44	179	25	0	4	248	721
8:00 AM	32	30	6	0	9	68	2	13	23	0	19	38	1	54	2	0	4	57	21	66	16	0	5	103	266
8:15 AM	36	25	5	0	10	66	6	19	21	0	3	46	3	58	5	0	4	66	31	73	15	0	4	119	297
8:30 AM	24	26	4	0	7	54	4	16	16	0	9	36	0	61	4	0	5	65	31	67	15	0	0	113	268
8:45 AM	30	30	7	0	21	67	8	21	17	0	7	46	1	48	2	0	5	51	24	84	15	0	7	123	287
Hourly Total	122	111	22	0	47	255	20	69	77	0	38	166	5	221	13	0	18	239	107	290	61	0	16	458	1118
9:00 AM	46	27	7	0	5	80	1	13	22	0	13	36	1	66	7	0	11	74	20	73	14	0	2	107	297
9:15 AM	31	15	2	0	12	48	5	12	23	0	12	40	2	64	6	0	11	72	36	87	16	0	4	139	299
9:30 AM	18	22	5	0	7	45	4	9	21	0	7	34	2	56	9	0	4	67	18	96	14	0	1	128	274
9:45 AM	33	19	11	0	7	63	7	13	27	0	17	47	3	76	8	0	1	87	25	93	12	0	5	130	327
Hourly Total	128	83	25	0	31	236	17	47	93	0	49	157	8	262	30	0	27	300	99	349	56	0	12	504	1197
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	27	18	4	0	16	49	8	21	27	0	27	56	3	77	2	0	11	82	28	89	5	0	12	122	309
3:15 PM	32	15	5	0	8	52	11	27	14	0	21	52	2	84	3	0	13	89	14	94	17	0	6	125	318
3:30 PM	35	23	3	0	11	61	10	22	25	0	9	57	2	79	4	0	6	85	25	83	5	0	7	113	316
3:45 PM	42	15	4	0	9	61	5	36	29	0	6	70	2	70	9	0	6	81	35	81	7	0	7	123	335
Hourly Total	136	71	16	0	44	223	34	106	95	0	63	235	9	310	18	0	36	337	102	347	34	0	32	483	1278
4:00 PM	32	18	6	0	14	56	17	33	29	0	17	79	2	66	7	0	4	75	22	86	6	0	4	114	324
4:15 PM	27	13	0	0	5	40	6	31	25	0	16	62	4	84	5	0	4	93	17	91	13	0	3	121	316
4:30 PM	41	20	2	0	9	63	15	44	34	0	20	93	1	80	4	0	3	85	21	88	8	0	3	117	358
4:45 PM	23	21	7	0	1	51	13	38	30	0	11	81	5	69	2	0	1	76	8	103	13	0	3	124	332
Hourly Total	123	72	15	0	29	210	51	146	118	0	64	315	12	299	18	0	12	329	68	368	40	0	13	476	1330
5:00 PM	49	16	5	0	5	70	18	46	19	0	11	83	1	78	8	0	3	87	22	89	10	0	5	121	361
5:15 PM	20	22	8	0	6	50	21	30	32	0	6	83	3	57	4	0	8	64	18	86	12	0	4	116	313
5:30 PM	27	15	2	0	4	44	16	35	27	0	9	78	3	69	7	0	5	79	16	95	18	0	3	129	330
5:45 PM	22	26	7	0	4	55	8	32	23	0	11	63	3	78	11	0	5	92	15	93	8	0	4	116	326

Hourly Total	118	79	22	0	19	219	63	143	101	0	37	307	10	282	30	0	21	322	71	363	48	0	16	482	1330
6:00 PM	23	12	3	0	3	38	8	28	23	0	9	59	4	49	5	0	5	58	17	77	15	0	4	109	264
6:15 PM	16	12	4	0	7	32	3	15	27	0	8	45	1	67	5	0	3	73	17	109	21	0	5	147	297
6:30 PM	12	6	4	0	4	22	5	23	30	0	7	58	4	69	4	0	2	77	22	79	18	0	3	119	276
6:45 PM	17	15	4	0	4	36	5	10	25	0	11	40	1	47	8	0	7	56	24	68	10	0	0	102	234
Hourly Total	68	45	15	0	18	128	21	76	105	0	35	202	10	232	22	0	17	264	80	333	64	0	12	477	1071
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	837	550	138	0	199	1525	225	622	707	0	310	1554	62	1872	154	0	147	2088	579	2337	329	0	107	3245	8412
Approach %	54.9	36.1	9.0	0.0	-	-	14.5	40.0	45.5	0.0	-	-	3.0	89.7	7.4	0.0	-	-	17.8	72.0	10.1	0.0	-	-	-
Total %	10.0	6.5	1.6	0.0	-	18.1	2.7	7.4	8.4	0.0	-	18.5	0.7	22.3	1.8	0.0	-	24.8	6.9	27.8	3.9	0.0	-	38.6	-
Lights	833	544	134	0	-	1511	225	618	696	0	-	1539	62	1798	153	0	-	2013	569	2245	325	0	-	3139	8202
% Lights	99.5	98.9	97.1	-	-	99.1	100.0	99.4	98.4	-	-	99.0	100.0	96.0	99.4	-	-	96.4	98.3	96.1	98.8	-	-	96.7	97.5
Mediums	4	6	4	0	-	14	0	4	11	0	-	15	0	74	1	0	-	75	10	90	4	0	-	104	208
% Mediums	0.5	1.1	2.9	-	-	0.9	0.0	0.6	1.6	-	-	1.0	0.0	4.0	0.6	-	-	3.6	1.7	3.9	1.2	-	-	3.2	2.5
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	2
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	12	-	-	-	-	-	1	-	-	-	-	-	8	-	-
% Bicycles on Crosswalk	-	-	-	-	1.0	-	-	-	-	-	3.9	-	-	-	-	-	0.7	-	-	-	-	-	7.5	-	-
Pedestrians	-	-	-	-	197	-	-	-	-	-	298	-	-	-	-	-	146	-	-	-	-	-	99	-	-
% Pedestrians	-	-	-	-	99.0	-	-	-	-	-	96.1	-	-	-	-	-	99.3	-	-	-	-	-	92.5	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Brant Street & Caroline Street
Site Code:
Start Date: 11/08/2016



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
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Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Brant Street & Caroline Street
Site Code:
Start Date: 11/08/2016

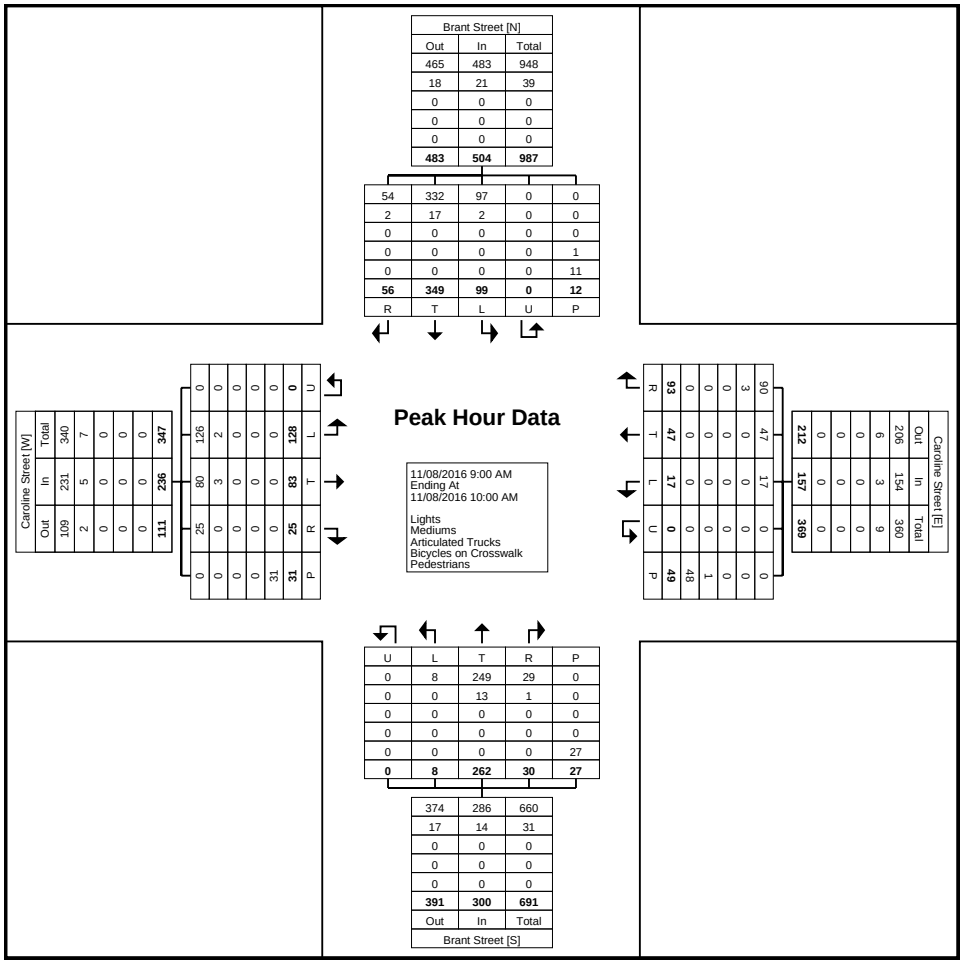
Turning Movement Peak Hour Data (9:00 AM)

Start Time	Caroline Street Eastbound						Caroline Street Westbound						Brant Street Northbound						Brant Street Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
9:00 AM	46	27	7	0	5	80	1	13	22	0	13	36	1	66	7	0	11	74	20	73	14	0	2	107	297
9:15 AM	31	15	2	0	12	48	5	12	23	0	12	40	2	64	6	0	11	72	36	87	16	0	4	139	299
9:30 AM	18	22	5	0	7	45	4	9	21	0	7	34	2	56	9	0	4	67	18	96	14	0	1	128	274
9:45 AM	33	19	11	0	7	63	7	13	27	0	17	47	3	76	8	0	1	87	25	93	12	0	5	130	327
Total	128	83	25	0	31	236	17	47	93	0	49	157	8	262	30	0	27	300	99	349	56	0	12	504	1197
Approach %	54.2	35.2	10.6	0.0	-	-	10.8	29.9	59.2	0.0	-	-	2.7	87.3	10.0	0.0	-	-	19.6	69.2	11.1	0.0	-	-	-
Total %	10.7	6.9	2.1	0.0	-	19.7	1.4	3.9	7.8	0.0	-	13.1	0.7	21.9	2.5	0.0	-	25.1	8.3	29.2	4.7	0.0	-	42.1	-
PHF	0.696	0.769	0.568	0.000	-	0.738	0.607	0.904	0.861	0.000	-	0.835	0.667	0.862	0.833	0.000	-	0.862	0.688	0.909	0.875	0.000	-	0.906	0.915
Lights	126	80	25	0	-	231	17	47	90	0	-	154	8	249	29	0	-	286	97	332	54	0	-	483	1154
% Lights	98.4	96.4	100.0	-	-	97.9	100.0	100.0	96.8	-	-	98.1	100.0	95.0	96.7	-	-	95.3	98.0	95.1	96.4	-	-	95.8	96.4
Mediums	2	3	0	0	-	5	0	0	3	0	-	3	0	13	1	0	-	14	2	17	2	0	-	21	43
% Mediums	1.6	3.6	0.0	-	-	2.1	0.0	0.0	3.2	-	-	1.9	0.0	5.0	3.3	-	-	4.7	2.0	4.9	3.6	-	-	4.2	3.6
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	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	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	2.0	-	-	-	-	-	0.0	-	-	-	-	-	8.3	-	-
Pedestrians	-	-	-	-	31	-	-	-	-	-	48	-	-	-	-	-	27	-	-	-	-	-	11	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	98.0	-	-	-	-	-	100.0	-	-	-	-	-	91.7	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Brant Street & Caroline Street
Site Code:
Start Date: 11/08/2016



Turning Movement Peak Hour Data Plot (9:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Brant Street & Caroline Street
Site Code:
Start Date: 11/08/2016

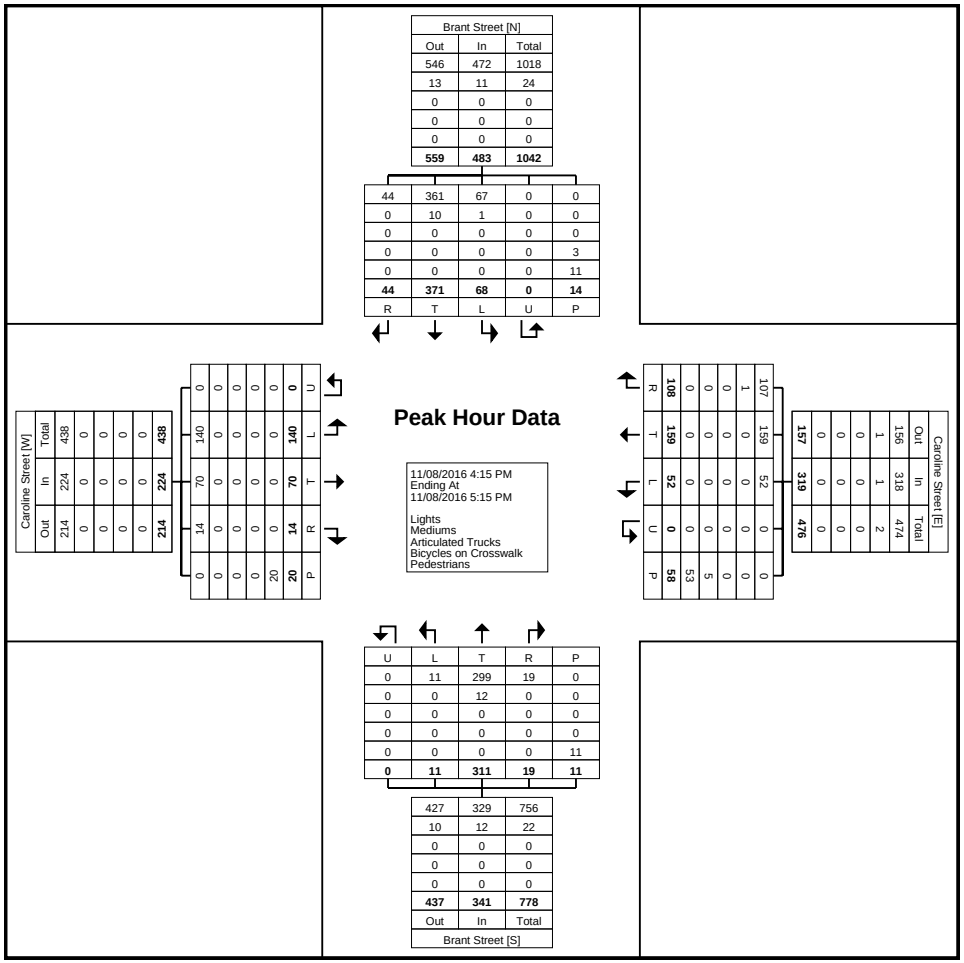
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Caroline Street Eastbound						Caroline Street Westbound						Brant Street Northbound						Brant Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	27	13	0	0	5	40	6	31	25	0	16	62	4	84	5	0	4	93	17	91	13	0	3	121	316
4:30 PM	41	20	2	0	9	63	15	44	34	0	20	93	1	80	4	0	3	85	21	88	8	0	3	117	358
4:45 PM	23	21	7	0	1	51	13	38	30	0	11	81	5	69	2	0	1	76	8	103	13	0	3	124	332
5:00 PM	49	16	5	0	5	70	18	46	19	0	11	83	1	78	8	0	3	87	22	89	10	0	5	121	361
Total	140	70	14	0	20	224	52	159	108	0	58	319	11	311	19	0	11	341	68	371	44	0	14	483	1367
Approach %	62.5	31.3	6.3	0.0	-	-	16.3	49.8	33.9	0.0	-	-	3.2	91.2	5.6	0.0	-	-	14.1	76.8	9.1	0.0	-	-	-
Total %	10.2	5.1	1.0	0.0	-	16.4	3.8	11.6	7.9	0.0	-	23.3	0.8	22.8	1.4	0.0	-	24.9	5.0	27.1	3.2	0.0	-	35.3	-
PHF	0.714	0.833	0.500	0.000	-	0.800	0.722	0.864	0.794	0.000	-	0.858	0.550	0.926	0.594	0.000	-	0.917	0.773	0.900	0.846	0.000	-	0.974	0.947
Lights	140	70	14	0	-	224	52	159	107	0	-	318	11	299	19	0	-	329	67	361	44	0	-	472	1343
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	100.0	99.1	-	-	99.7	100.0	96.1	100.0	-	-	96.5	98.5	97.3	100.0	-	-	97.7	98.2
Mediums	0	0	0	0	-	0	0	0	1	0	-	1	0	12	0	0	-	12	1	10	0	0	-	11	24
% Mediums	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.9	-	-	0.3	0.0	3.9	0.0	-	-	3.5	1.5	2.7	0.0	-	-	2.3	1.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	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	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	8.6	-	-	-	-	-	0.0	-	-	-	-	-	21.4	-	-
Pedestrians	-	-	-	-	20	-	-	-	-	-	53	-	-	-	-	-	11	-	-	-	-	-	11	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	91.4	-	-	-	-	-	100.0	-	-	-	-	-	78.6	-	-

Paradigm Transportation Solutions Limited
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519-896-3163 cbowness@ptsl.com

Count Name: Brant Street & Caroline Street
Site Code:
Start Date: 11/08/2016



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

Paradigm Transportation Solutions Limited
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Count Name: Brant Street & Caroline Street
Site Code:
Start Date: 11/08/2016

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519-896-3163 cbowness@ptsl.com

Count Name: Brant Street & Ontario Street
Site Code:
Start Date: 10/27/2016

Turning Movement Data

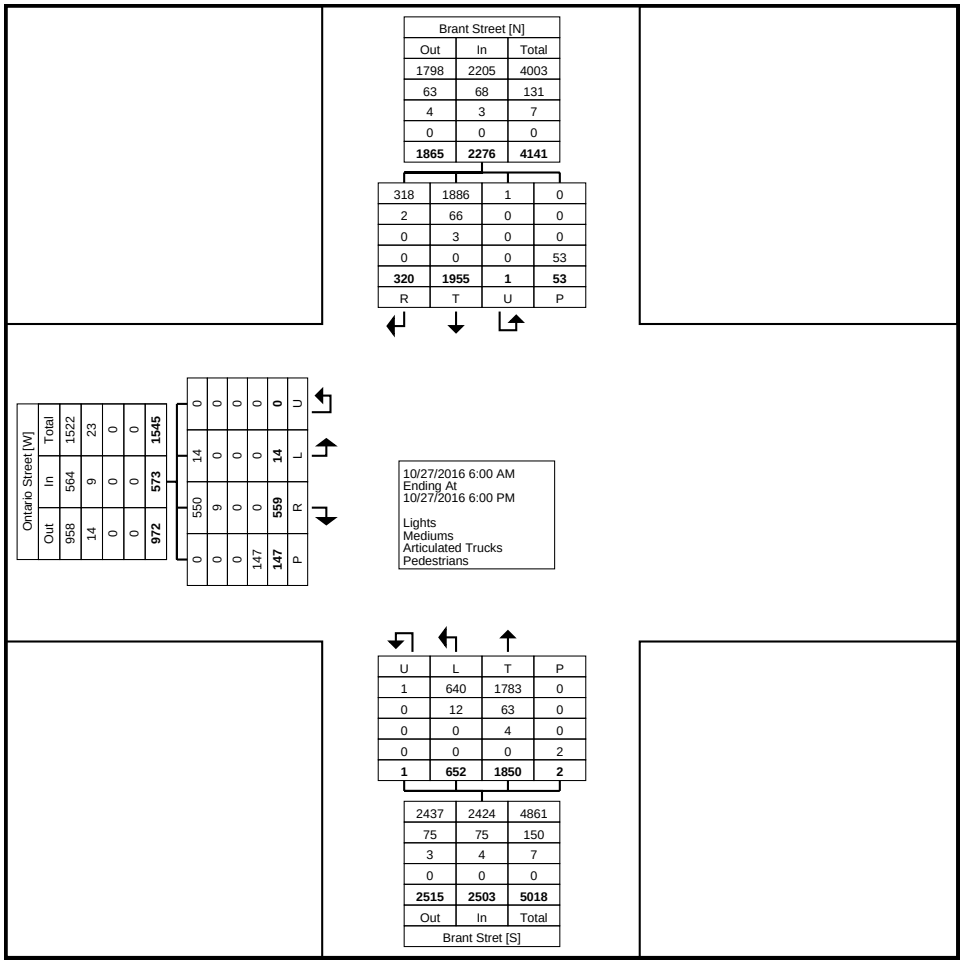
Start Time	Ontario Street Eastbound					Brant Stret Northbound					Brant Street Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
6:00 AM	0	0	0	1	0	0	14	0	0	14	22	2	0	0	24	38
6:15 AM	0	8	0	3	8	0	25	0	0	25	18	1	0	0	19	52
6:30 AM	1	15	0	0	16	4	24	0	0	28	21	1	0	0	22	66
6:45 AM	1	10	0	0	11	2	20	0	0	22	22	3	0	0	25	58
Hourly Total	2	33	0	4	35	6	83	0	0	89	83	7	0	0	90	214
7:00 AM	0	11	0	0	11	0	33	0	0	33	30	2	0	0	32	76
7:15 AM	2	18	0	0	20	4	41	0	1	45	44	2	0	1	46	111
7:30 AM	0	15	0	1	15	3	45	0	0	48	40	3	0	0	43	106
7:45 AM	0	31	0	2	31	3	59	0	0	62	55	6	0	0	61	154
Hourly Total	2	75	0	3	77	10	178	0	1	188	169	13	0	1	182	447
8:00 AM	0	19	0	5	19	7	56	0	0	63	65	10	0	2	75	157
8:15 AM	0	29	0	4	29	16	78	0	0	94	100	10	0	2	110	233
8:30 AM	0	29	0	9	29	15	64	0	0	79	82	15	0	2	97	205
8:45 AM	1	28	0	5	29	11	56	0	0	67	79	13	0	3	92	188
Hourly Total	1	105	0	23	106	49	254	0	0	303	326	48	0	9	374	783
9:00 AM	1	20	0	3	21	16	65	0	0	81	77	9	0	1	86	188
9:15 AM	0	16	0	9	16	13	79	0	0	92	52	6	0	0	58	166
9:30 AM	0	13	0	9	13	12	78	0	0	90	87	3	0	0	90	193
9:45 AM	1	9	0	6	10	10	72	0	0	82	87	10	0	0	97	189
Hourly Total	2	58	0	27	60	51	294	0	0	345	303	28	0	1	331	736
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	24	0	5	24	25	85	0	0	110	89	23	0	4	112	246
3:15 PM	0	25	0	4	25	20	92	0	0	112	99	15	0	2	114	251
3:30 PM	0	24	0	7	24	13	93	0	0	106	83	18	0	5	101	231
3:45 PM	0	23	0	9	23	19	94	0	0	113	100	14	0	3	114	250
Hourly Total	0	96	0	25	96	77	364	0	0	441	371	70	0	14	441	978
4:00 PM	1	24	0	6	25	44	89	0	0	133	80	16	0	5	96	254
4:15 PM	0	15	0	7	15	48	95	1	0	144	92	16	0	3	108	267
4:30 PM	1	35	0	11	36	81	83	0	0	164	73	30	0	7	103	303
4:45 PM	0	33	0	9	33	72	95	0	0	167	84	17	0	4	101	301
Hourly Total	2	107	0	33	109	245	362	1	0	608	329	79	0	19	408	1125
5:00 PM	0	23	0	11	23	74	80	0	0	154	88	28	0	3	116	293
5:15 PM	2	30	0	4	32	62	73	0	1	135	103	20	0	4	123	290
5:30 PM	2	19	0	6	21	38	80	0	0	118	91	17	1	1	109	248
5:45 PM	1	13	0	11	14	40	82	0	0	122	92	10	0	1	102	238
Hourly Total	5	85	0	32	90	214	315	0	1	529	374	75	1	9	450	1069

Grand Total	14	559	0	147	573	652	1850	1	2	2503	1955	320	1	53	2276	5352
Approach %	2.4	97.6	0.0	-	-	26.0	73.9	0.0	-	-	85.9	14.1	0.0	-	-	-
Total %	0.3	10.4	0.0	-	10.7	12.2	34.6	0.0	-	46.8	36.5	6.0	0.0	-	42.5	-
Lights	14	550	0	-	564	640	1783	1	-	2424	1886	318	1	-	2205	5193
% Lights	100.0	98.4	-	-	98.4	98.2	96.4	100.0	-	96.8	96.5	99.4	100.0	-	96.9	97.0
Mediums	0	9	0	-	9	12	63	0	-	75	66	2	0	-	68	152
% Mediums	0.0	1.6	-	-	1.6	1.8	3.4	0.0	-	3.0	3.4	0.6	0.0	-	3.0	2.8
Articulated Trucks	0	0	0	-	0	0	4	0	-	4	3	0	0	-	3	7
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	0.2	0.2	0.0	0.0	-	0.1	0.1
Pedestrians	-	-	-	147	-	-	-	-	2	-	-	-	-	53	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Count Name: Brant Street & Ontario Street
Site Code:
Start Date: 10/27/2016



Turning Movement Data Plot

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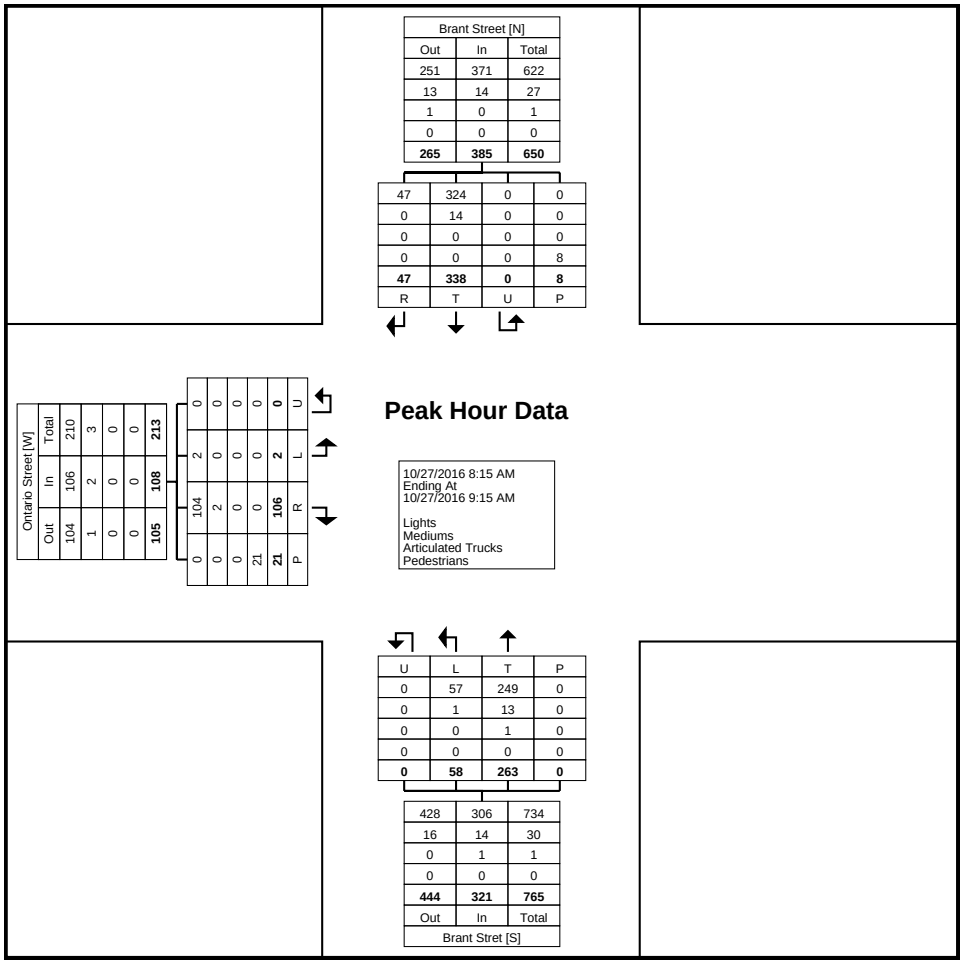
Turning Movement Peak Hour Data (8:15 AM)

Start Time	Ontario Street Eastbound					Brant Stret Northbound					Brant Street Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:15 AM	0	29	0	4	29	16	78	0	0	94	100	10	0	2	110	233
8:30 AM	0	29	0	9	29	15	64	0	0	79	82	15	0	2	97	205
8:45 AM	1	28	0	5	29	11	56	0	0	67	79	13	0	3	92	188
9:00 AM	1	20	0	3	21	16	65	0	0	81	77	9	0	1	86	188
Total	2	106	0	21	108	58	263	0	0	321	338	47	0	8	385	814
Approach %	1.9	98.1	0.0	-	-	18.1	81.9	0.0	-	-	87.8	12.2	0.0	-	-	-
Total %	0.2	13.0	0.0	-	13.3	7.1	32.3	0.0	-	39.4	41.5	5.8	0.0	-	47.3	-
PHF	0.500	0.914	0.000	-	0.931	0.906	0.843	0.000	-	0.854	0.845	0.783	0.000	-	0.875	0.873
Lights	2	104	0	-	106	57	249	0	-	306	324	47	0	-	371	783
% Lights	100.0	98.1	-	-	98.1	98.3	94.7	-	-	95.3	95.9	100.0	-	-	96.4	96.2
Mediums	0	2	0	-	2	1	13	0	-	14	14	0	0	-	14	30
% Mediums	0.0	1.9	-	-	1.9	1.7	4.9	-	-	4.4	4.1	0.0	-	-	3.6	3.7
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.4	-	-	0.3	0.0	0.0	-	-	0.0	0.1
Pedestrians	-	-	-	21	-	-	-	-	0	-	-	-	-	8	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

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Turning Movement Peak Hour Data Plot (8:15 AM)

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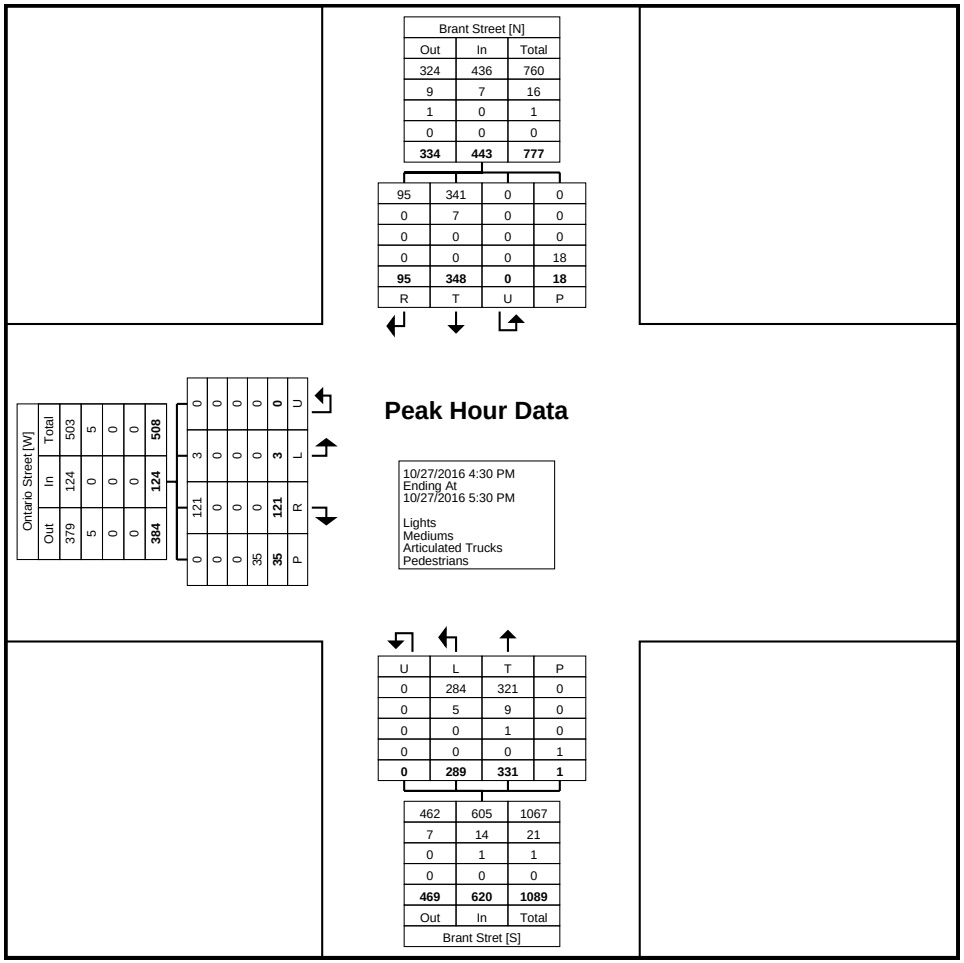
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Ontario Street Eastbound					Brant Stret Northbound					Brant Street Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	1	35	0	11	36	81	83	0	0	164	73	30	0	7	103	303
4:45 PM	0	33	0	9	33	72	95	0	0	167	84	17	0	4	101	301
5:00 PM	0	23	0	11	23	74	80	0	0	154	88	28	0	3	116	293
5:15 PM	2	30	0	4	32	62	73	0	1	135	103	20	0	4	123	290
Total	3	121	0	35	124	289	331	0	1	620	348	95	0	18	443	1187
Approach %	2.4	97.6	0.0	-	-	46.6	53.4	0.0	-	-	78.6	21.4	0.0	-	-	-
Total %	0.3	10.2	0.0	-	10.4	24.3	27.9	0.0	-	52.2	29.3	8.0	0.0	-	37.3	-
PHF	0.375	0.864	0.000	-	0.861	0.892	0.871	0.000	-	0.928	0.845	0.792	0.000	-	0.900	0.979
Lights	3	121	0	-	124	284	321	0	-	605	341	95	0	-	436	1165
% Lights	100.0	100.0	-	-	100.0	98.3	97.0	-	-	97.6	98.0	100.0	-	-	98.4	98.1
Mediums	0	0	0	-	0	5	9	0	-	14	7	0	0	-	7	21
% Mediums	0.0	0.0	-	-	0.0	1.7	2.7	-	-	2.3	2.0	0.0	-	-	1.6	1.8
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Pedestrians	-	-	-	35	-	-	-	-	1	-	-	-	-	18	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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Turning Movement Peak Hour Data Plot (4:30 PM)

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Count Name: Brant Street & James Street
Site Code:
Start Date: 11/08/2016

Turning Movement Data

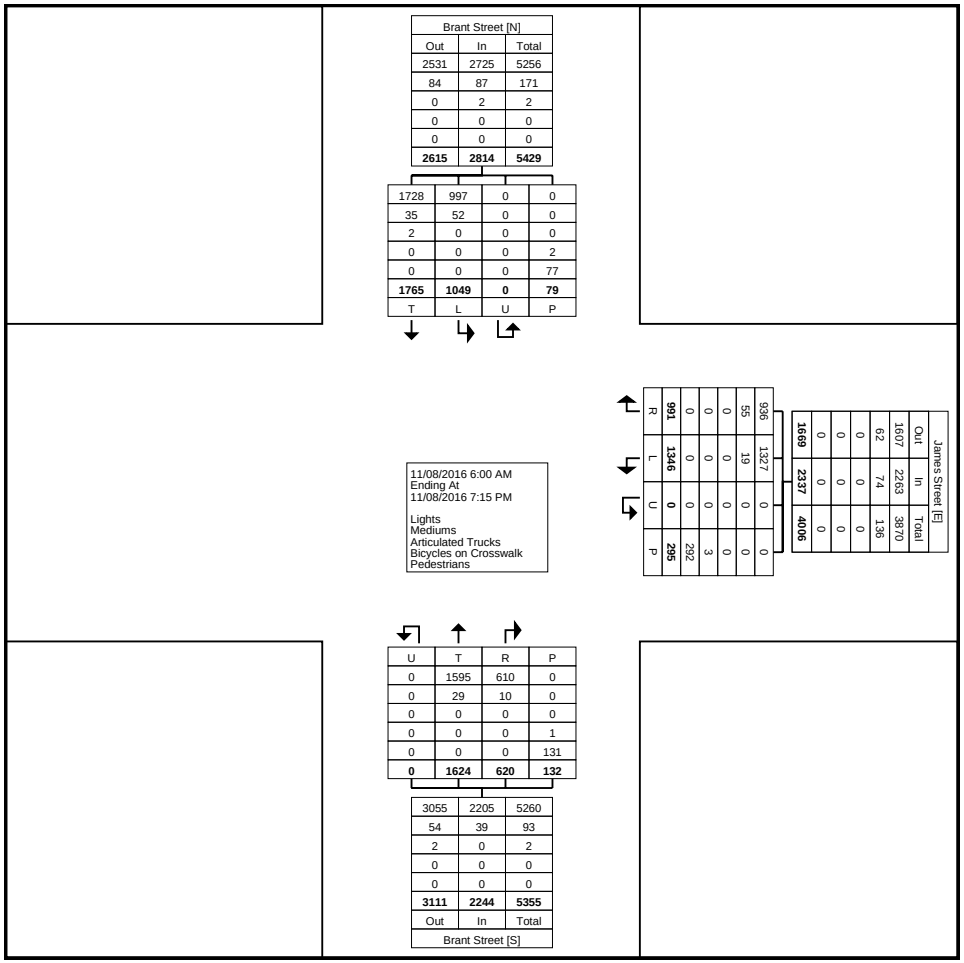
Start Time	James Street Westbound					Brant Street Northbound					Brant Street Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
6:00 AM	3	2	0	11	5	21	19	0	0	40	6	18	0	0	24	69
6:15 AM	4	6	0	1	10	25	26	0	0	51	16	20	0	0	36	97
6:30 AM	12	6	0	1	18	29	24	0	0	53	23	27	0	0	50	121
6:45 AM	12	4	0	5	16	25	18	0	0	43	16	24	0	1	40	99
Hourly Total	31	18	0	18	49	100	87	0	0	187	61	89	0	1	150	386
7:00 AM	12	10	0	1	22	34	27	0	0	61	17	25	0	1	42	125
7:15 AM	26	9	0	0	35	38	33	0	0	71	29	33	0	0	62	168
7:30 AM	20	12	0	3	32	43	35	0	0	78	33	33	0	2	66	176
7:45 AM	26	12	0	4	38	44	29	0	1	73	40	40	0	2	80	191
Hourly Total	84	43	0	8	127	159	124	0	1	283	119	131	0	5	250	660
8:00 AM	35	15	0	12	50	48	31	0	5	79	43	42	0	0	85	214
8:15 AM	32	19	0	4	51	51	24	0	5	75	48	62	0	4	110	236
8:30 AM	21	25	0	5	46	55	20	0	1	75	38	42	0	0	80	201
8:45 AM	20	24	0	8	44	39	33	0	4	72	44	55	0	1	99	215
Hourly Total	108	83	0	29	191	193	108	0	15	301	173	201	0	5	374	866
9:00 AM	17	35	0	11	52	61	19	0	26	80	42	59	0	3	101	233
9:15 AM	26	20	0	8	46	58	16	0	6	74	24	62	0	5	86	206
9:30 AM	23	25	0	15	48	50	18	0	6	68	29	66	0	4	95	211
9:45 AM	21	36	0	24	57	70	16	0	4	86	32	70	0	9	102	245
Hourly Total	87	116	0	58	203	239	69	0	42	308	127	257	0	21	384	895
10:00 AM	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	3
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	3
3:00 PM	42	37	0	19	79	59	18	0	8	77	41	57	0	7	98	254
3:15 PM	45	38	0	13	83	65	18	0	8	83	30	73	0	1	103	269
3:30 PM	43	30	0	19	73	67	15	0	8	82	31	72	0	7	103	258
3:45 PM	65	39	0	11	104	67	21	0	3	88	34	58	0	2	92	284
Hourly Total	195	144	0	62	339	258	72	0	27	330	136	260	0	17	396	1065
4:00 PM	63	43	0	7	106	59	14	0	5	73	33	68	0	9	101	280
4:15 PM	76	45	0	14	121	66	12	0	5	78	39	75	0	4	114	313
4:30 PM	85	57	0	12	142	60	19	0	8	79	38	69	0	3	107	328
4:45 PM	96	61	0	13	157	61	11	0	6	72	49	79	0	1	128	357
Hourly Total	320	206	0	46	526	246	56	0	24	302	159	291	0	17	450	1278
5:00 PM	96	81	0	4	177	60	12	0	6	72	40	73	0	7	113	362
5:15 PM	83	45	0	5	128	49	16	0	2	65	36	75	0	1	111	304
5:30 PM	73	59	0	9	132	60	18	0	0	78	33	66	0	2	99	309
5:45 PM	78	54	0	14	132	68	9	0	2	77	37	60	0	2	97	306
Hourly Total	330	239	0	32	569	237	55	0	10	292	146	274	0	12	420	1281

6:00 PM	59	41	0	10	100	47	7	0	2	54	33	69	0	0	102	256
6:15 PM	69	34	0	16	103	54	16	0	8	70	37	78	0	1	115	288
6:30 PM	30	36	0	7	66	53	9	0	3	62	29	60	0	0	89	217
6:45 PM	33	31	0	9	64	38	17	0	0	55	27	54	0	0	81	200
Hourly Total	191	142	0	42	333	192	49	0	13	241	126	261	0	1	387	961
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1346	991	0	295	2337	1624	620	0	132	2244	1049	1765	0	79	2814	7395
Approach %	57.6	42.4	0.0	-	-	72.4	27.6	0.0	-	-	37.3	62.7	0.0	-	-	-
Total %	18.2	13.4	0.0	-	31.6	22.0	8.4	0.0	-	30.3	14.2	23.9	0.0	-	38.1	-
Lights	1327	936	0	-	2263	1595	610	0	-	2205	997	1728	0	-	2725	7193
% Lights	98.6	94.5	-	-	96.8	98.2	98.4	-	-	98.3	95.0	97.9	-	-	96.8	97.3
Mediums	19	55	0	-	74	29	10	0	-	39	52	35	0	-	87	200
% Mediums	1.4	5.5	-	-	3.2	1.8	1.6	-	-	1.7	5.0	2.0	-	-	3.1	2.7
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	2	0	-	2	2
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.1	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	3	-	-	-	-	1	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	1.0	-	-	-	-	0.8	-	-	-	-	2.5	-	-
Pedestrians	-	-	-	292	-	-	-	-	131	-	-	-	-	77	-	-
% Pedestrians	-	-	-	99.0	-	-	-	-	99.2	-	-	-	-	97.5	-	-

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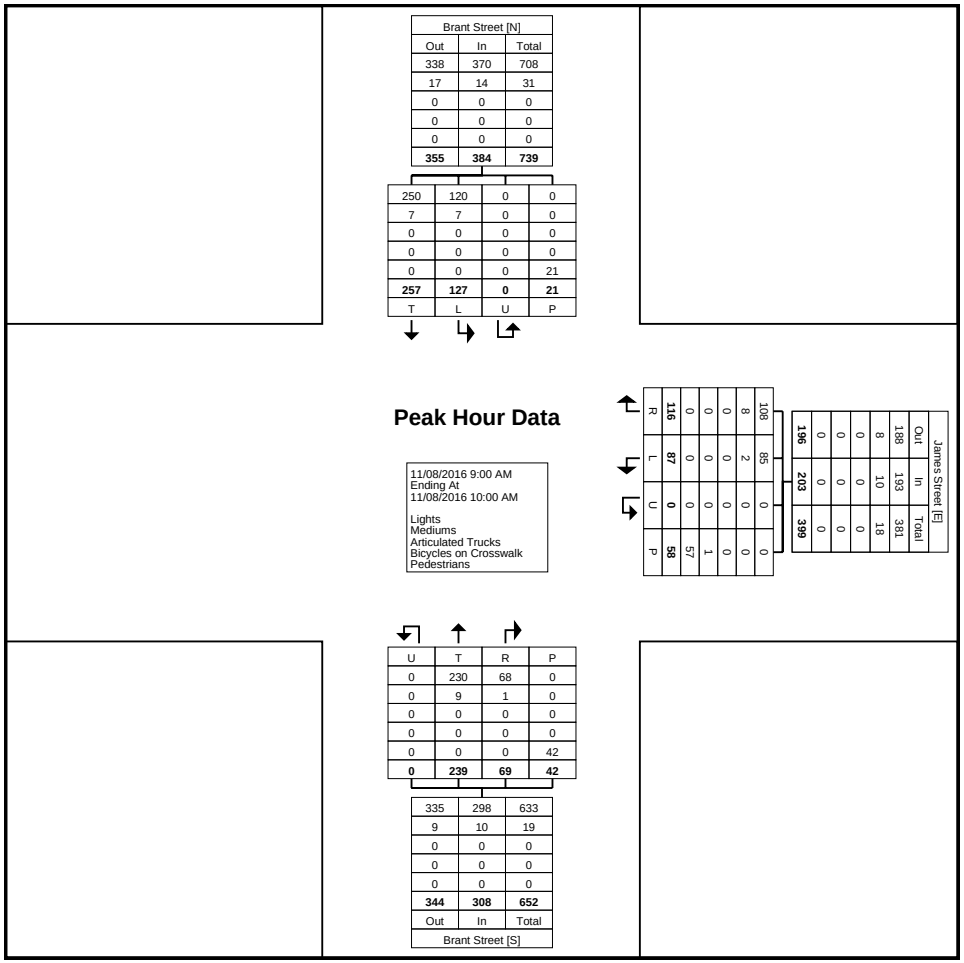
Turning Movement Peak Hour Data (9:00 AM)

Start Time	James Street Westbound					Brant Street Northbound					Brant Street Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
9:00 AM	17	35	0	11	52	61	19	0	26	80	42	59	0	3	101	233
9:15 AM	26	20	0	8	46	58	16	0	6	74	24	62	0	5	86	206
9:30 AM	23	25	0	15	48	50	18	0	6	68	29	66	0	4	95	211
9:45 AM	21	36	0	24	57	70	16	0	4	86	32	70	0	9	102	245
Total	87	116	0	58	203	239	69	0	42	308	127	257	0	21	384	895
Approach %	42.9	57.1	0.0	-	-	77.6	22.4	0.0	-	-	33.1	66.9	0.0	-	-	-
Total %	9.7	13.0	0.0	-	22.7	26.7	7.7	0.0	-	34.4	14.2	28.7	0.0	-	42.9	-
PHF	0.837	0.806	0.000	-	0.890	0.854	0.908	0.000	-	0.895	0.756	0.918	0.000	-	0.941	0.913
Lights	85	108	0	-	193	230	68	0	-	298	120	250	0	-	370	861
% Lights	97.7	93.1	-	-	95.1	96.2	98.6	-	-	96.8	94.5	97.3	-	-	96.4	96.2
Mediums	2	8	0	-	10	9	1	0	-	10	7	7	0	-	14	34
% Mediums	2.3	6.9	-	-	4.9	3.8	1.4	-	-	3.2	5.5	2.7	-	-	3.6	3.8
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	1.7	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	57	-	-	-	-	42	-	-	-	-	21	-	-
% Pedestrians	-	-	-	98.3	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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Turning Movement Peak Hour Data Plot (9:00 AM)

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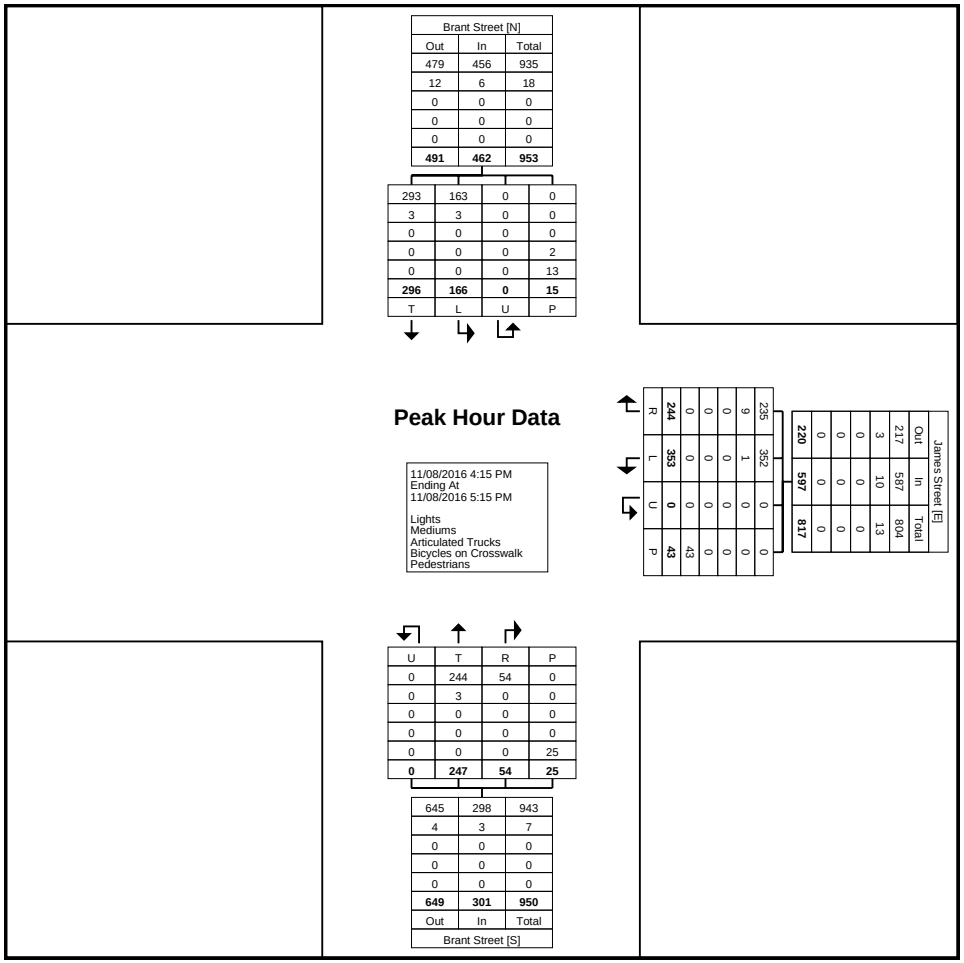
Turning Movement Peak Hour Data (4:15 PM)

Start Time	James Street Westbound					Brant Street Northbound					Brant Street Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
4:15 PM	76	45	0	14	121	66	12	0	5	78	39	75	0	4	114	313
4:30 PM	85	57	0	12	142	60	19	0	8	79	38	69	0	3	107	328
4:45 PM	96	61	0	13	157	61	11	0	6	72	49	79	0	1	128	357
5:00 PM	96	81	0	4	177	60	12	0	6	72	40	73	0	7	113	362
Total	353	244	0	43	597	247	54	0	25	301	166	296	0	15	462	1360
Approach %	59.1	40.9	0.0	-	-	82.1	17.9	0.0	-	-	35.9	64.1	0.0	-	-	-
Total %	26.0	17.9	0.0	-	43.9	18.2	4.0	0.0	-	22.1	12.2	21.8	0.0	-	34.0	-
PHF	0.919	0.753	0.000	-	0.843	0.936	0.711	0.000	-	0.953	0.847	0.937	0.000	-	0.902	0.939
Lights	352	235	0	-	587	244	54	0	-	298	163	293	0	-	456	1341
% Lights	99.7	96.3	-	-	98.3	98.8	100.0	-	-	99.0	98.2	99.0	-	-	98.7	98.6
Mediums	1	9	0	-	10	3	0	0	-	3	3	3	0	-	6	19
% Mediums	0.3	3.7	-	-	1.7	1.2	0.0	-	-	1.0	1.8	1.0	-	-	1.3	1.4
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	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	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	13.3	-	-
Pedestrians	-	-	-	43	-	-	-	-	25	-	-	-	-	13	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	86.7	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Brant Street & James Street
Site Code:
Start Date: 11/08/2016



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

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Count Name: Brant Street & Elgin Street
Site Code:
Start Date: 10/06/2016

Turning Movement Data

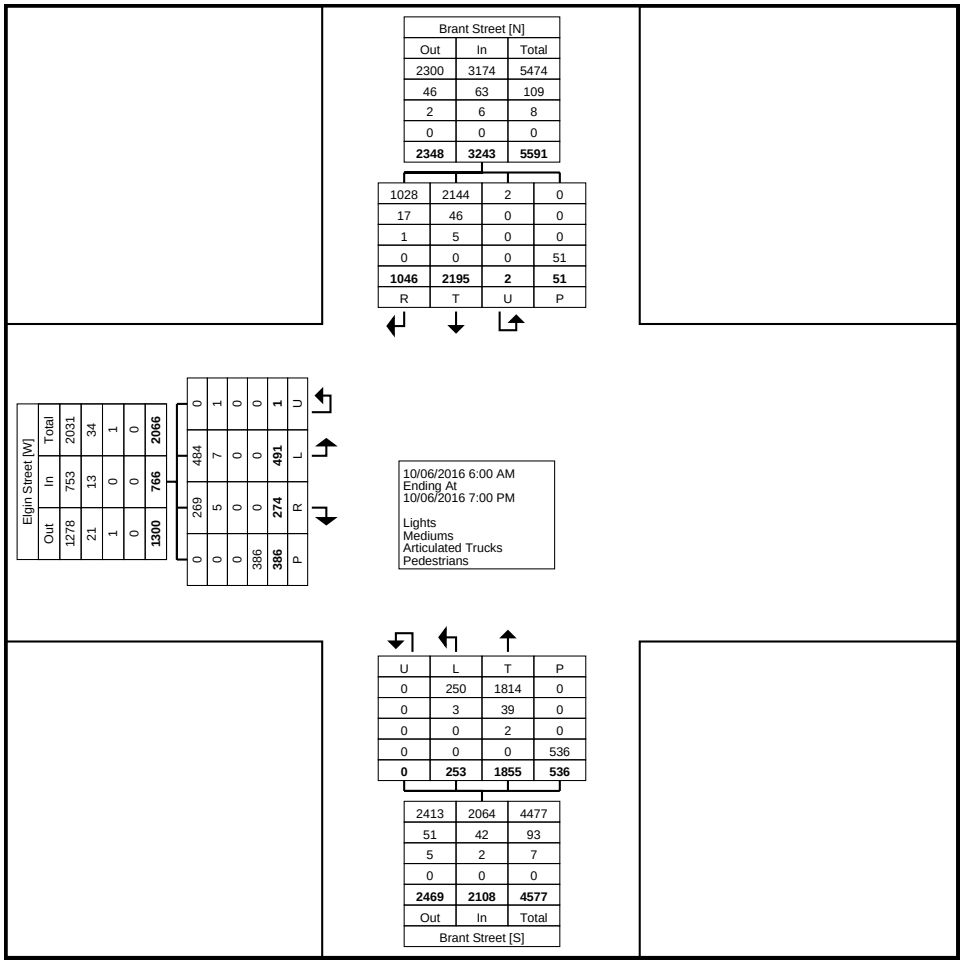
Start Time	Elgin Street Eastbound					Brant Street Northbound					Brant Street Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
6:00 AM	5	0	1	3	6	1	18	0	0	19	15	3	0	0	18	43
6:15 AM	19	1	0	2	20	0	41	0	5	41	22	5	0	0	27	88
6:30 AM	38	5	0	0	43	0	31	0	6	31	24	4	0	0	28	102
6:45 AM	14	2	0	4	16	0	29	0	8	29	23	6	0	2	29	74
Hourly Total	76	8	1	9	85	1	119	0	19	120	84	18	0	2	102	307
7:00 AM	12	1	0	0	13	0	38	0	7	38	42	8	0	0	50	101
7:15 AM	15	6	0	1	21	1	40	0	4	41	46	9	0	0	55	117
7:30 AM	26	7	0	3	33	0	36	0	8	36	43	12	0	0	55	124
7:45 AM	18	7	0	6	25	0	51	0	13	51	51	20	0	0	71	147
Hourly Total	71	21	0	10	92	1	165	0	32	166	182	49	0	0	231	489
8:00 AM	22	8	0	8	30	5	51	0	21	56	62	18	0	3	80	166
8:15 AM	28	10	0	7	38	3	53	0	25	56	59	18	0	4	77	171
8:30 AM	27	7	0	8	34	1	64	0	23	65	65	18	0	0	83	182
8:45 AM	24	9	0	10	33	4	64	0	13	68	63	26	0	1	89	190
Hourly Total	101	34	0	33	135	13	232	0	82	245	249	80	0	8	329	709
9:00 AM	20	8	0	12	28	4	59	0	18	63	49	32	0	2	81	172
9:15 AM	9	7	0	17	16	4	53	0	15	57	71	37	0	1	108	181
9:30 AM	18	10	0	9	28	2	55	0	20	57	66	28	0	0	94	179
9:45 AM	17	11	0	17	28	4	72	0	11	76	73	15	1	0	89	193
Hourly Total	64	36	0	55	100	14	239	0	64	253	259	112	1	3	372	725
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	12	13	0	12	25	20	89	0	17	109	77	12	0	2	89	223
3:15 PM	13	11	0	22	24	23	77	0	23	100	81	40	0	6	121	245
3:30 PM	14	11	0	11	25	29	66	0	25	95	69	46	0	0	115	235
3:45 PM	13	12	0	23	25	28	63	0	28	91	88	44	0	0	132	248
Hourly Total	52	47	0	68	99	100	295	0	93	395	315	142	0	8	457	951
4:00 PM	16	12	0	14	28	15	64	0	17	79	99	47	0	1	146	253
4:15 PM	10	13	0	23	23	11	71	0	17	82	106	55	0	0	161	266
4:30 PM	10	16	0	27	26	21	71	0	33	92	84	58	0	3	142	260
4:45 PM	15	8	0	9	23	13	78	0	24	91	90	74	1	1	165	279
Hourly Total	51	49	0	73	100	60	284	0	91	344	379	234	1	5	614	1058
5:00 PM	11	17	0	15	28	18	60	0	18	78	98	77	0	0	175	281
5:15 PM	11	11	0	14	22	15	55	0	15	70	86	78	0	2	164	256
5:30 PM	14	17	0	20	31	12	65	0	21	77	94	49	0	4	143	251
5:45 PM	8	11	0	9	19	2	60	0	27	62	91	65	0	1	156	237
Hourly Total	44	56	0	58	100	47	240	0	81	287	369	269	0	7	638	1025

6:00 PM	5	7	0	25	12	5	80	0	25	85	96	50	0	4	146	243
6:15 PM	10	7	0	10	17	3	66	0	12	69	97	33	0	6	130	216
6:30 PM	9	6	0	20	15	2	76	0	22	78	81	28	0	5	109	202
6:45 PM	8	3	0	25	11	7	59	0	15	66	84	31	0	3	115	192
Hourly Total	32	23	0	80	55	17	281	0	74	298	358	142	0	18	500	853
Grand Total	491	274	1	386	766	253	1855	0	536	2108	2195	1046	2	51	3243	6117
Approach %	64.1	35.8	0.1	-	-	12.0	88.0	0.0	-	-	67.7	32.3	0.1	-	-	-
Total %	8.0	4.5	0.0	-	12.5	4.1	30.3	0.0	-	34.5	35.9	17.1	0.0	-	53.0	-
Lights	484	269	0	-	753	250	1814	0	-	2064	2144	1028	2	-	3174	5991
% Lights	98.6	98.2	0.0	-	98.3	98.8	97.8	-	-	97.9	97.7	98.3	100.0	-	97.9	97.9
Mediums	7	5	1	-	13	3	39	0	-	42	46	17	0	-	63	118
% Mediums	1.4	1.8	100.0	-	1.7	1.2	2.1	-	-	2.0	2.1	1.6	0.0	-	1.9	1.9
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	5	1	0	-	6	8
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.1	-	-	0.1	0.2	0.1	0.0	-	0.2	0.1
Pedestrians	-	-	-	386	-	-	-	-	536	-	-	-	-	51	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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Count Name: Brant Street & Elgin Street
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Start Date: 10/06/2016



Turning Movement Data Plot

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Count Name: Brant Street & Elgin Street
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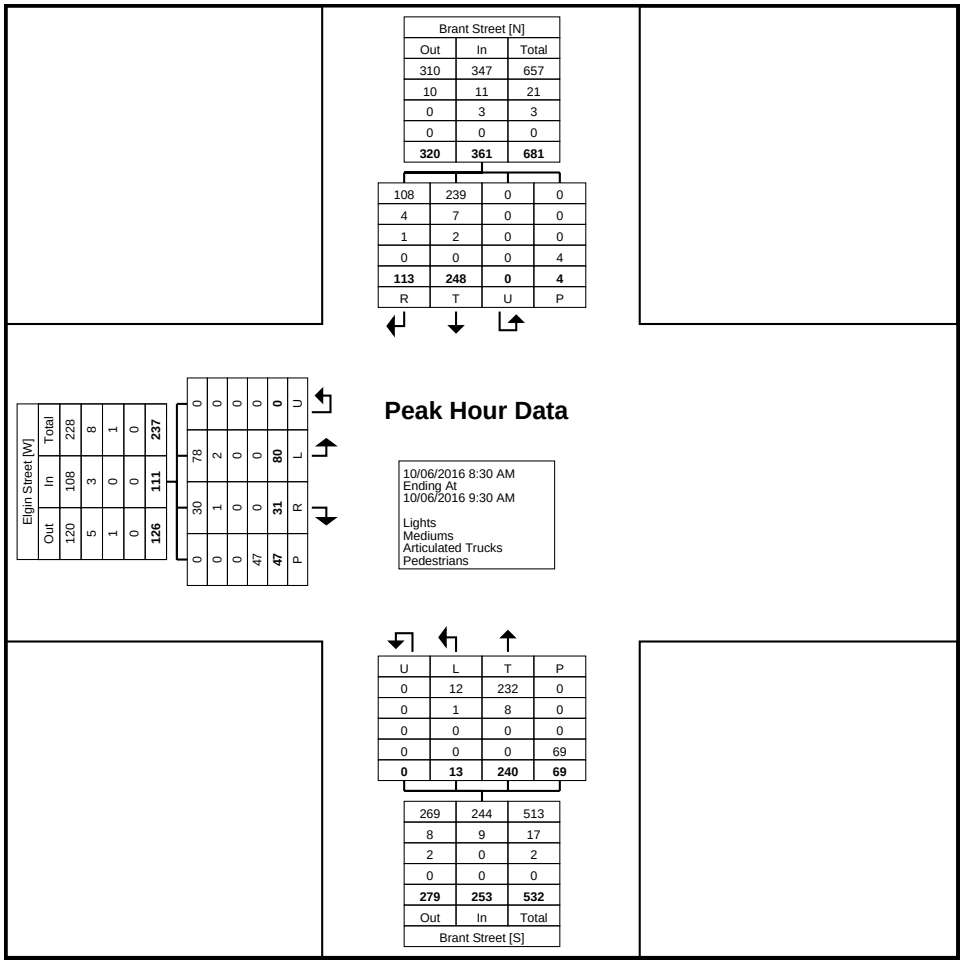
Turning Movement Peak Hour Data (8:30 AM)

Start Time	Elgin Street Eastbound					Brant Street Northbound					Brant Street Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:30 AM	27	7	0	8	34	1	64	0	23	65	65	18	0	0	83	182
8:45 AM	24	9	0	10	33	4	64	0	13	68	63	26	0	1	89	190
9:00 AM	20	8	0	12	28	4	59	0	18	63	49	32	0	2	81	172
9:15 AM	9	7	0	17	16	4	53	0	15	57	71	37	0	1	108	181
Total	80	31	0	47	111	13	240	0	69	253	248	113	0	4	361	725
Approach %	72.1	27.9	0.0	-	-	5.1	94.9	0.0	-	-	68.7	31.3	0.0	-	-	-
Total %	11.0	4.3	0.0	-	15.3	1.8	33.1	0.0	-	34.9	34.2	15.6	0.0	-	49.8	-
PHF	0.741	0.861	0.000	-	0.816	0.813	0.938	0.000	-	0.930	0.873	0.764	0.000	-	0.836	0.954
Lights	78	30	0	-	108	12	232	0	-	244	239	108	0	-	347	699
% Lights	97.5	96.8	-	-	97.3	92.3	96.7	-	-	96.4	96.4	95.6	-	-	96.1	96.4
Mediums	2	1	0	-	3	1	8	0	-	9	7	4	0	-	11	23
% Mediums	2.5	3.2	-	-	2.7	7.7	3.3	-	-	3.6	2.8	3.5	-	-	3.0	3.2
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	2	1	0	-	3	3
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.8	0.9	-	-	0.8	0.4
Pedestrians	-	-	-	47	-	-	-	-	69	-	-	-	-	4	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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Count Name: Brant Street & Elgin Street
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Start Date: 10/06/2016



Turning Movement Peak Hour Data Plot (8:30 AM)

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Count Name: Brant Street & Elgin Street
Site Code:
Start Date: 10/06/2016

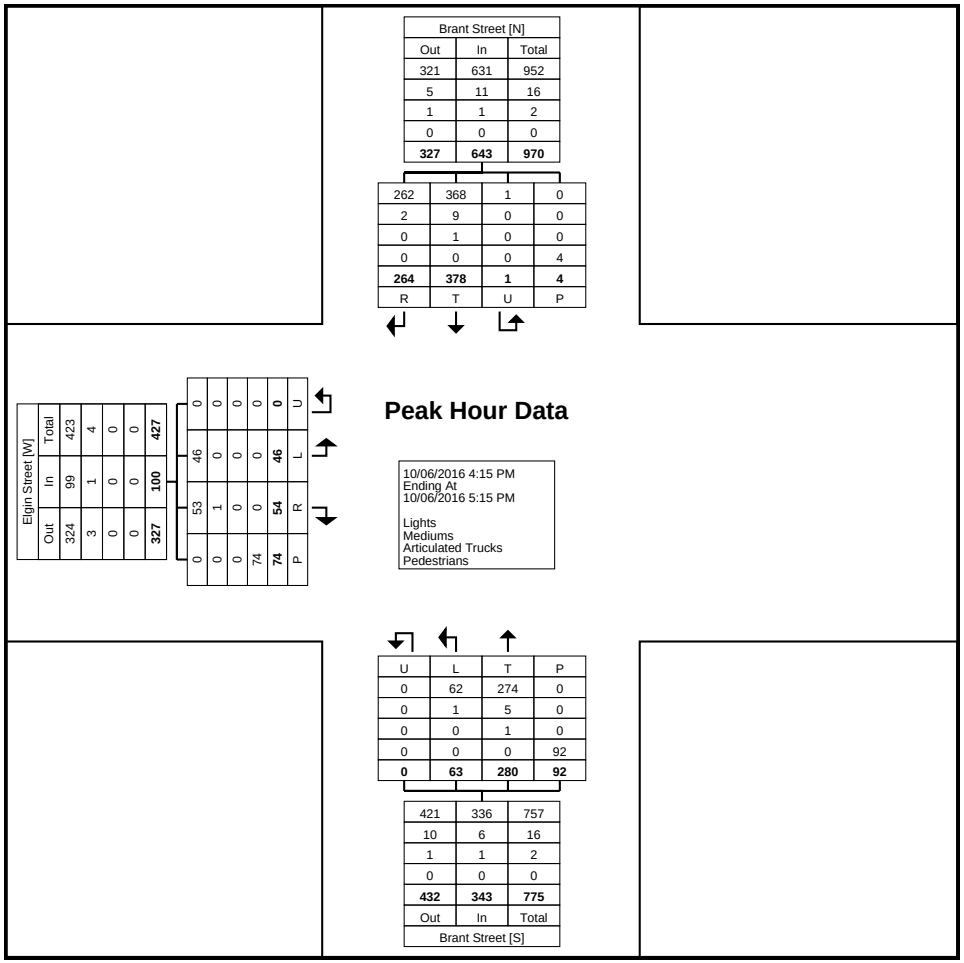
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Elgin Street Eastbound					Brant Street Northbound					Brant Street Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:15 PM	10	13	0	23	23	11	71	0	17	82	106	55	0	0	161	266
4:30 PM	10	16	0	27	26	21	71	0	33	92	84	58	0	3	142	260
4:45 PM	15	8	0	9	23	13	78	0	24	91	90	74	1	1	165	279
5:00 PM	11	17	0	15	28	18	60	0	18	78	98	77	0	0	175	281
Total	46	54	0	74	100	63	280	0	92	343	378	264	1	4	643	1086
Approach %	46.0	54.0	0.0	-	-	18.4	81.6	0.0	-	-	58.8	41.1	0.2	-	-	-
Total %	4.2	5.0	0.0	-	9.2	5.8	25.8	0.0	-	31.6	34.8	24.3	0.1	-	59.2	-
PHF	0.767	0.794	0.000	-	0.893	0.750	0.897	0.000	-	0.932	0.892	0.857	0.250	-	0.919	0.966
Lights	46	53	0	-	99	62	274	0	-	336	368	262	1	-	631	1066
% Lights	100.0	98.1	-	-	99.0	98.4	97.9	-	-	98.0	97.4	99.2	100.0	-	98.1	98.2
Mediums	0	1	0	-	1	1	5	0	-	6	9	2	0	-	11	18
% Mediums	0.0	1.9	-	-	1.0	1.6	1.8	-	-	1.7	2.4	0.8	0.0	-	1.7	1.7
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	1	0	0	-	1	2
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.4	-	-	0.3	0.3	0.0	0.0	-	0.2	0.2
Pedestrians	-	-	-	74	-	-	-	-	92	-	-	-	-	4	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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Count Name: Brant Street & Elgin Street
Site Code:
Start Date: 10/06/2016



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

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Start Date: 10/06/2016

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Count Name: Brant Street & Lakeshore Road
Site Code:
Start Date: 10/06/2016

Turning Movement Data

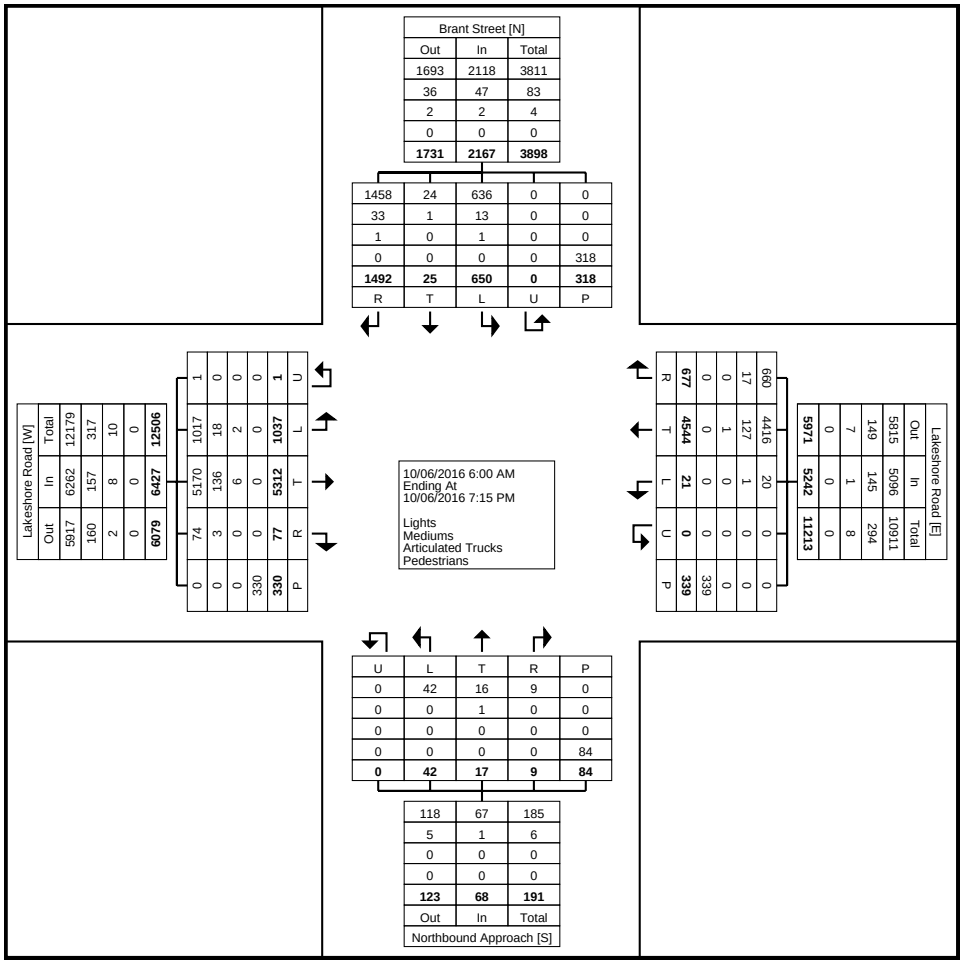
Start Time	Lakeshore Road Eastbound						Lakeshore Road Westbound						Northbound Approach Northbound						Brant Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
6:00 AM	19	83	0	0	5	102	0	26	2	0	3	28	0	0	0	0	0	0	6	0	11	0	1	17	147
6:15 AM	37	166	0	0	1	203	0	38	7	0	5	45	1	0	0	0	0	1	6	0	21	0	2	27	276
6:30 AM	19	191	1	0	0	211	0	53	4	0	3	57	0	0	0	0	0	0	12	0	17	0	2	29	297
6:45 AM	21	197	1	0	5	219	0	61	8	0	4	69	0	0	0	0	1	0	6	0	16	0	3	22	310
Hourly Total	96	637	2	0	11	735	0	178	21	0	15	199	1	0	0	0	1	1	30	0	65	0	8	95	1030
7:00 AM	38	213	0	0	2	251	0	85	5	0	1	90	1	1	1	0	0	3	16	1	25	0	0	42	386
7:15 AM	30	195	0	0	1	225	0	97	6	0	0	103	1	1	0	0	3	2	21	2	32	0	3	55	385
7:30 AM	17	195	4	0	4	216	0	114	16	0	2	130	2	0	0	0	0	2	12	1	34	0	1	47	395
7:45 AM	28	181	2	0	5	211	0	122	20	0	7	142	2	1	0	0	0	3	17	1	39	0	5	57	413
Hourly Total	113	784	6	0	12	903	0	418	47	0	10	465	6	3	1	0	3	10	66	5	130	0	9	201	1579
8:00 AM	22	204	8	0	1	234	1	147	23	0	4	171	1	0	0	0	1	1	24	0	33	0	11	57	463
8:15 AM	28	195	3	0	8	226	1	160	19	0	3	180	1	0	0	0	1	1	21	1	38	0	5	60	467
8:30 AM	35	194	2	0	7	231	1	135	23	0	5	159	0	0	0	0	0	0	16	0	52	0	6	68	458
8:45 AM	51	172	3	0	12	226	1	139	8	0	2	148	5	1	2	0	2	8	21	0	33	0	10	54	436
Hourly Total	136	765	16	0	28	917	4	581	73	0	14	658	7	1	2	0	4	10	82	1	156	0	32	239	1824
9:00 AM	35	181	3	0	11	219	0	136	23	0	8	159	0	1	0	0	2	1	19	2	35	0	9	56	435
9:15 AM	31	159	2	0	5	192	2	118	18	0	11	138	0	0	1	0	3	1	17	3	45	0	9	65	396
9:30 AM	31	161	7	0	2	199	2	119	18	0	4	139	4	0	1	0	2	5	21	0	45	0	5	66	409
9:45 AM	43	165	5	0	13	213	0	104	22	0	4	126	1	0	0	0	2	1	24	2	42	0	10	68	408
Hourly Total	140	666	17	0	31	823	4	477	81	0	27	562	5	1	2	0	9	8	81	7	167	0	33	255	1648
10:00 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 PM	50	126	3	0	13	179	0	117	35	0	23	152	3	0	1	0	6	4	25	1	55	0	9	81	416
3:15 PM	43	147	0	0	15	190	0	107	31	0	17	138	1	1	0	0	3	2	33	0	55	0	8	88	418
3:30 PM	39	136	0	0	18	175	1	96	30	0	22	127	1	0	1	0	4	2	28	0	39	0	18	67	371
3:45 PM	34	171	6	0	16	211	0	143	23	0	14	166	2	0	0	0	10	2	28	0	53	0	18	81	460
Hourly Total	166	580	9	0	62	755	1	463	119	0	76	583	7	1	2	0	23	10	114	1	202	0	53	317	1665
4:00 PM	35	156	3	0	8	194	0	185	24	0	17	209	0	1	0	0	0	1	33	0	68	0	16	101	505
4:15 PM	44	185	2	0	5	231	1	223	19	0	18	243	5	0	0	0	3	5	26	0	72	0	12	98	577
4:30 PM	30	178	2	0	23	210	1	206	26	0	21	233	2	2	1	0	5	5	26	1	54	0	22	81	529
4:45 PM	36	198	4	0	10	238	0	241	32	0	25	273	2	1	0	0	5	3	18	2	68	0	15	88	602
Hourly Total	145	717	11	0	46	873	2	855	101	0	81	958	9	4	1	0	13	14	103	3	262	0	65	368	2213
5:00 PM	30	167	0	0	11	197	1	198	26	0	5	225	3	1	0	0	3	4	20	1	82	0	6	103	529
5:15 PM	35	184	1	0	15	220	3	225	22	0	18	250	0	0	0	0	5	0	21	1	63	0	11	85	555
5:30 PM	23	172	4	0	26	199	1	254	31	0	11	286	1	1	0	0	8	2	29	1	68	0	19	98	585
5:45 PM	23	157	1	0	12	181	3	222	32	0	5	257	2	2	0	0	0	4	16	0	67	0	19	83	525

Hourly Total	111	680	6	0	64	797	8	899	111	0	39	1018	6	4	0	0	16	10	86	3	280	0	55	369	2194
6:00 PM	28	120	7	0	19	155	1	227	35	0	15	263	0	0	0	0	4	0	24	1	62	0	11	87	505
6:15 PM	34	138	2	1	16	175	0	170	20	0	16	190	0	2	0	0	3	2	17	0	67	0	18	84	451
6:30 PM	41	103	0	0	19	144	0	138	30	0	26	168	1	1	0	0	3	2	28	1	55	0	12	84	398
6:45 PM	27	122	1	0	22	150	1	138	38	0	20	177	0	0	1	0	5	1	19	3	46	0	22	68	396
Hourly Total	130	483	10	1	76	624	2	673	123	0	77	798	1	3	1	0	15	5	88	5	230	0	63	323	1750
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1037	5312	77	1	330	6427	21	4544	677	0	339	5242	42	17	9	0	84	68	650	25	1492	0	318	2167	13904
Approach %	16.1	82.7	1.2	0.0	-	-	0.4	86.7	12.9	0.0	-	-	61.8	25.0	13.2	0.0	-	-	30.0	1.2	68.9	0.0	-	-	-
Total %	7.5	38.2	0.6	0.0	-	46.2	0.2	32.7	4.9	0.0	-	37.7	0.3	0.1	0.1	0.0	-	0.5	4.7	0.2	10.7	0.0	-	15.6	-
Lights	1017	5170	74	1	-	6262	20	4416	660	0	-	5096	42	16	9	0	-	67	636	24	1458	0	-	2118	13543
% Lights	98.1	97.3	96.1	100.0	-	97.4	95.2	97.2	97.5	-	-	97.2	100.0	94.1	100.0	-	-	98.5	97.8	96.0	97.7	-	-	97.7	97.4
Mediums	18	136	3	0	-	157	1	127	17	0	-	145	0	1	0	0	-	1	13	1	33	0	-	47	350
% Mediums	1.7	2.6	3.9	0.0	-	2.4	4.8	2.8	2.5	-	-	2.8	0.0	5.9	0.0	-	-	1.5	2.0	4.0	2.2	-	-	2.2	2.5
Articulated Trucks	2	6	0	0	-	8	0	1	0	0	-	1	0	0	0	0	-	0	1	0	1	0	-	2	11
% Articulated Trucks	0.2	0.1	0.0	0.0	-	0.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2	0.0	0.1	-	-	0.1	0.1
Pedestrians	-	-	-	-	330	-	-	-	-	-	339	-	-	-	-	-	84	-	-	-	-	-	318	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Brant Street & Lakeshore Road
Site Code:
Start Date: 10/06/2016



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
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Count Name: Brant Street & Lakeshore Road
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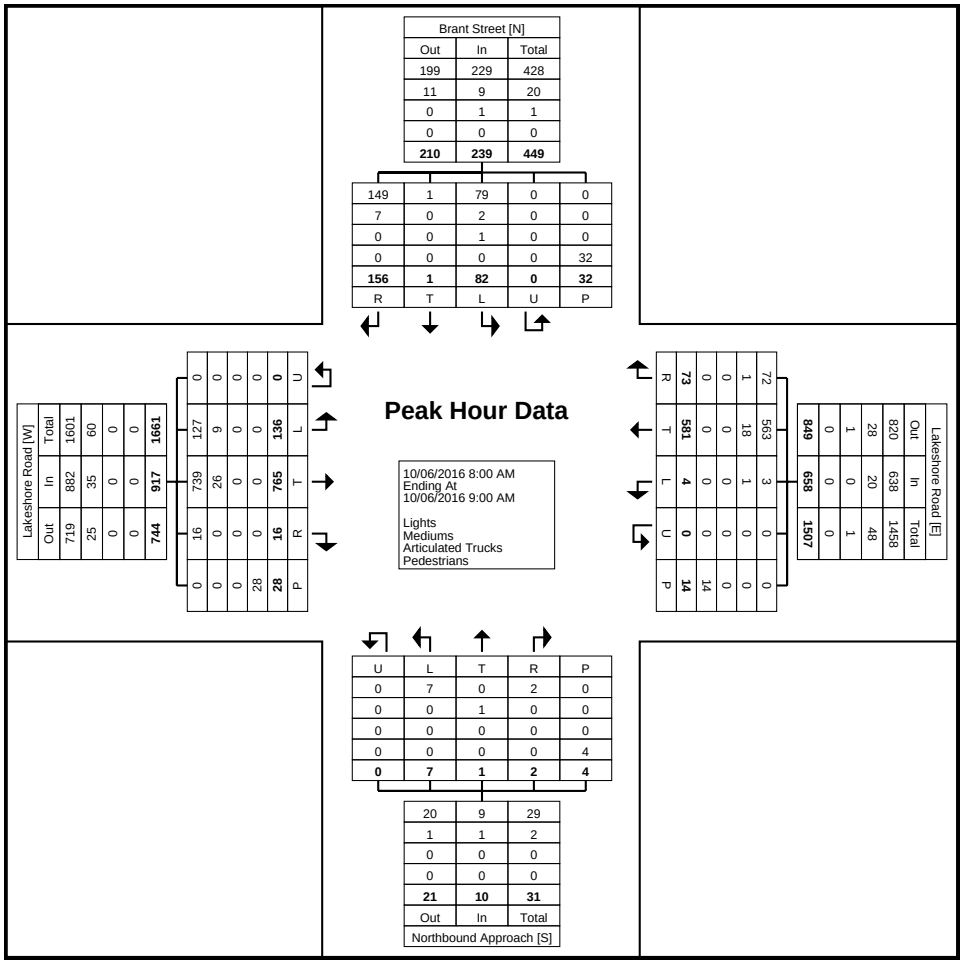
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Lakeshore Road Eastbound						Lakeshore Road Westbound						Northbound Approach Northbound						Brant Street Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	22	204	8	0	1	234	1	147	23	0	4	171	1	0	0	0	1	1	24	0	33	0	11	57	463
8:15 AM	28	195	3	0	8	226	1	160	19	0	3	180	1	0	0	0	1	1	21	1	38	0	5	60	467
8:30 AM	35	194	2	0	7	231	1	135	23	0	5	159	0	0	0	0	0	0	16	0	52	0	6	68	458
8:45 AM	51	172	3	0	12	226	1	139	8	0	2	148	5	1	2	0	2	8	21	0	33	0	10	54	436
Total	136	765	16	0	28	917	4	581	73	0	14	658	7	1	2	0	4	10	82	1	156	0	32	239	1824
Approach %	14.8	83.4	1.7	0.0	-	-	0.6	88.3	11.1	0.0	-	-	70.0	10.0	20.0	0.0	-	-	34.3	0.4	65.3	0.0	-	-	-
Total %	7.5	41.9	0.9	0.0	-	50.3	0.2	31.9	4.0	0.0	-	36.1	0.4	0.1	0.1	0.0	-	0.5	4.5	0.1	8.6	0.0	-	13.1	-
PHF	0.667	0.938	0.500	0.000	-	0.980	1.000	0.908	0.793	0.000	-	0.914	0.350	0.250	0.250	0.000	-	0.313	0.854	0.250	0.750	0.000	-	0.879	0.976
Lights	127	739	16	0	-	882	3	563	72	0	-	638	7	0	2	0	-	9	79	1	149	0	-	229	1758
% Lights	93.4	96.6	100.0	-	-	96.2	75.0	96.9	98.6	-	-	97.0	100.0	0.0	100.0	-	-	90.0	96.3	100.0	95.5	-	-	95.8	96.4
Mediums	9	26	0	0	-	35	1	18	1	0	-	20	0	1	0	0	-	1	2	0	7	0	-	9	65
% Mediums	6.6	3.4	0.0	-	-	3.8	25.0	3.1	1.4	-	-	3.0	0.0	100.0	0.0	-	-	10.0	2.4	0.0	4.5	-	-	3.8	3.6
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	1.2	0.0	0.0	-	-	0.4	0.1
Pedestrians	-	-	-	-	28	-	-	-	-	-	14	-	-	-	-	-	4	-	-	-	-	-	32	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Count Name: Brant Street & Lakeshore Road
Site Code:
Start Date: 10/06/2016



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

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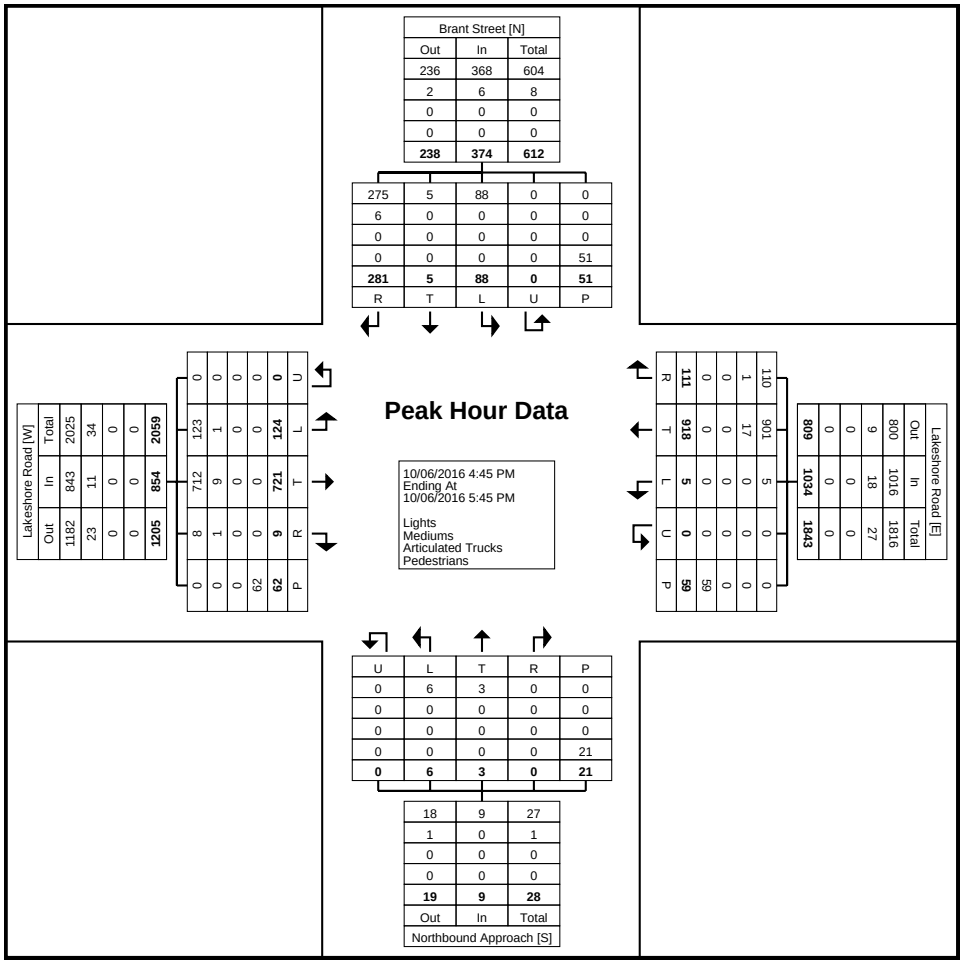
Turning Movement Peak Hour Data (4:45 PM)

Start Time	Lakeshore Road Eastbound						Lakeshore Road Westbound						Northbound Approach Northbound						Brant Street Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:45 PM	36	198	4	0	10	238	0	241	32	0	25	273	2	1	0	0	5	3	18	2	68	0	15	88	602
5:00 PM	30	167	0	0	11	197	1	198	26	0	5	225	3	1	0	0	3	4	20	1	82	0	6	103	529
5:15 PM	35	184	1	0	15	220	3	225	22	0	18	250	0	0	0	0	5	0	21	1	63	0	11	85	555
5:30 PM	23	172	4	0	26	199	1	254	31	0	11	286	1	1	0	0	8	2	29	1	68	0	19	98	585
Total	124	721	9	0	62	854	5	918	111	0	59	1034	6	3	0	0	21	9	88	5	281	0	51	374	2271
Approach %	14.5	84.4	1.1	0.0	-	-	0.5	88.8	10.7	0.0	-	-	66.7	33.3	0.0	0.0	-	-	23.5	1.3	75.1	0.0	-	-	-
Total %	5.5	31.7	0.4	0.0	-	37.6	0.2	40.4	4.9	0.0	-	45.5	0.3	0.1	0.0	0.0	-	0.4	3.9	0.2	12.4	0.0	-	16.5	-
PHF	0.861	0.910	0.563	0.000	-	0.897	0.417	0.904	0.867	0.000	-	0.904	0.500	0.750	0.000	0.000	-	0.563	0.759	0.625	0.857	0.000	-	0.908	0.943
Lights	123	712	8	0	-	843	5	901	110	0	-	1016	6	3	0	0	-	9	88	5	275	0	-	368	2236
% Lights	99.2	98.8	88.9	-	-	98.7	100.0	98.1	99.1	-	-	98.3	100.0	100.0	-	-	-	100.0	100.0	100.0	97.9	-	-	98.4	98.5
Mediums	1	9	1	0	-	11	0	17	1	0	-	18	0	0	0	0	-	0	0	0	6	0	-	6	35
% Mediums	0.8	1.2	11.1	-	-	1.3	0.0	1.9	0.9	-	-	1.7	0.0	0.0	-	-	-	0.0	0.0	0.0	2.1	-	-	1.6	1.5
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	62	-	-	-	-	-	59	-	-	-	-	-	21	-	-	-	-	-	51	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Count Name: Brant Street & Lakeshore Road
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Start Date: 10/06/2016



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

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Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: James Street & John Street
Site Code:
Start Date: 11/08/2016

Turning Movement Data

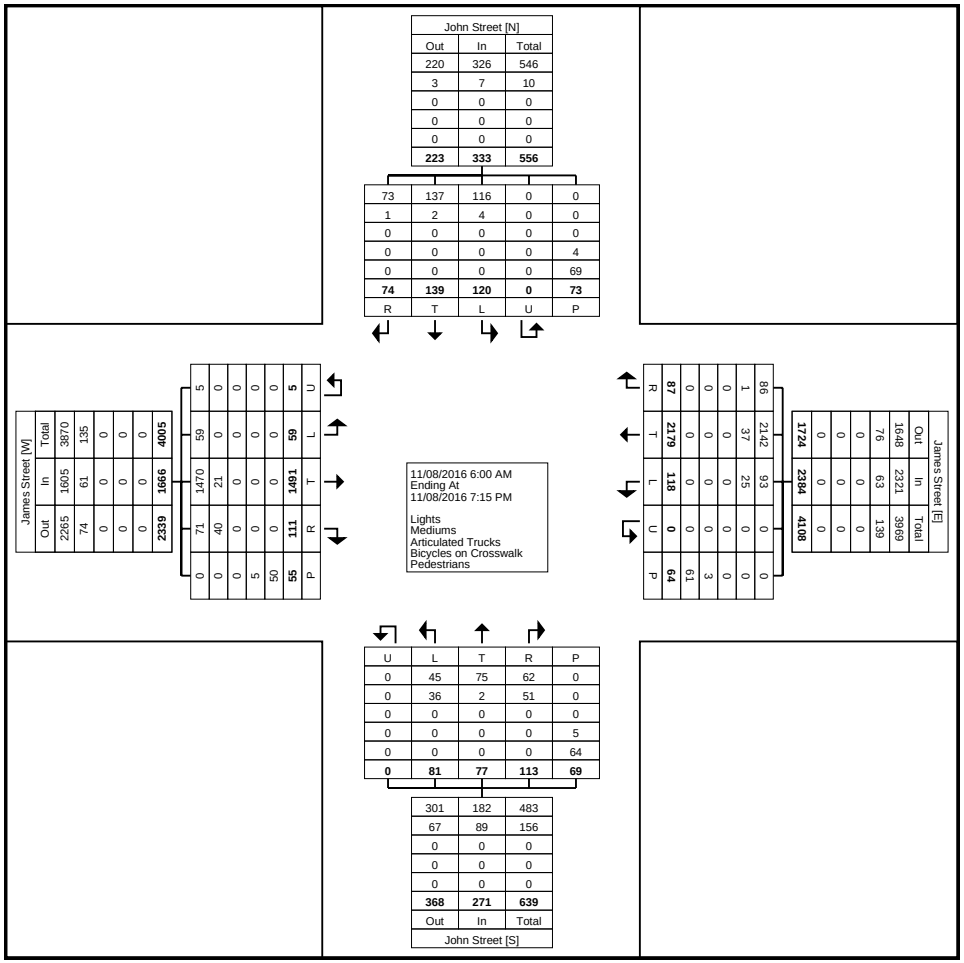
Start Time	James Street Eastbound						James Street Westbound						John Street Northbound						John Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
6:00 AM	0	24	1	0	1	25	2	5	1	0	2	8	0	0	0	0	1	0	0	0	0	0	0	0	33
6:15 AM	0	40	2	0	0	42	1	7	0	0	0	8	2	0	2	0	0	4	1	1	1	0	0	3	57
6:30 AM	1	46	3	0	1	50	2	16	0	0	2	18	2	0	1	0	2	3	3	0	0	0	1	3	74
6:45 AM	2	30	1	0	0	33	0	13	1	0	0	14	2	0	1	0	1	3	0	0	0	0	0	0	50
Hourly Total	3	140	7	0	2	150	5	41	2	0	4	48	6	0	4	0	4	10	4	1	1	0	1	6	214
7:00 AM	0	42	2	0	0	44	1	20	2	0	0	23	2	0	1	0	0	3	1	3	0	0	0	4	74
7:15 AM	1	59	3	0	1	63	4	34	0	0	3	38	1	0	2	0	0	3	2	2	3	0	0	7	111
7:30 AM	2	62	3	0	1	67	4	29	0	0	0	33	1	1	2	0	2	4	1	1	0	0	1	2	106
7:45 AM	1	66	3	0	3	70	2	33	1	0	1	36	1	1	7	0	1	9	0	2	4	0	1	6	121
Hourly Total	4	229	11	0	5	244	11	116	3	0	4	130	5	2	12	0	3	19	4	8	7	0	2	19	412
8:00 AM	1	68	4	0	1	73	5	46	1	0	1	52	2	0	1	0	2	3	3	2	1	0	2	6	134
8:15 AM	1	68	3	0	2	72	3	50	3	0	3	56	4	4	4	0	2	12	8	1	1	0	1	10	150
8:30 AM	2	50	7	0	4	59	4	39	2	0	1	45	3	2	3	0	0	8	5	0	3	0	2	8	120
8:45 AM	6	69	5	0	1	80	10	37	5	0	1	52	2	4	4	0	2	10	1	7	3	0	1	11	153
Hourly Total	10	255	19	0	8	284	22	172	11	0	6	205	11	10	12	0	6	33	17	10	8	0	6	35	557
9:00 AM	2	53	2	0	1	57	2	48	4	0	1	54	3	2	3	0	1	8	3	2	1	0	2	6	125
9:15 AM	2	31	6	1	8	40	4	46	3	0	3	53	1	0	4	0	2	5	3	3	2	0	6	8	106
9:30 AM	2	37	7	0	2	46	3	39	2	0	4	44	4	9	2	0	3	15	4	4	0	0	6	8	113
9:45 AM	5	41	3	1	2	50	4	54	2	0	4	60	1	6	5	0	2	12	4	7	1	0	2	12	134
Hourly Total	11	162	18	2	13	193	13	187	11	0	12	211	9	17	14	0	8	40	14	16	4	0	16	34	478
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	7	40	7	0	8	54	6	72	4	0	5	82	2	2	5	0	6	9	7	10	5	0	6	22	167
3:15 PM	1	45	2	0	4	48	2	79	4	0	2	85	3	3	7	0	4	13	3	9	2	0	1	14	160
3:30 PM	2	41	4	0	0	47	7	79	3	0	5	89	2	6	3	0	4	11	9	10	4	0	4	23	170
3:45 PM	2	47	3	1	2	53	3	81	6	0	8	90	5	3	5	0	2	13	4	9	5	0	6	18	174
Hourly Total	12	173	16	1	14	202	18	311	17	0	20	346	12	14	20	0	16	46	23	38	16	0	17	77	671
4:00 PM	0	47	3	0	1	50	4	97	7	0	0	108	5	2	6	0	0	13	6	5	3	0	4	14	185
4:15 PM	3	49	1	0	2	53	5	118	4	0	3	127	5	4	3	0	5	12	8	6	2	0	0	16	208
4:30 PM	0	57	1	0	1	58	3	139	6	0	6	148	2	3	5	0	5	10	5	3	3	0	9	11	227
4:45 PM	1	56	4	0	2	61	3	155	3	0	0	161	2	5	6	0	6	13	3	6	3	0	5	12	247
Hourly Total	4	209	9	0	6	222	15	509	20	0	9	544	14	14	20	0	16	48	22	20	11	0	18	53	867
5:00 PM	3	47	2	0	1	52	4	160	3	0	2	167	4	2	2	0	5	8	8	4	5	0	3	17	244
5:15 PM	1	50	0	0	0	51	5	127	3	0	0	135	3	7	4	0	1	14	3	8	4	0	0	15	215
5:30 PM	0	37	11	1	1	49	4	131	4	0	2	139	4	2	4	0	4	10	4	4	2	0	1	10	208
5:45 PM	3	42	4	0	2	49	4	121	4	0	0	129	3	2	2	0	2	7	2	6	3	0	4	11	196

Hourly Total	7	176	17	1	4	201	17	539	14	0	4	570	14	13	12	0	12	39	17	22	14	0	8	53	863
6:00 PM	1	33	4	1	1	39	6	99	1	0	1	106	2	0	6	0	0	8	5	7	3	0	0	15	168
6:15 PM	4	43	6	0	1	53	5	94	1	0	2	100	1	1	3	0	2	5	6	5	2	0	0	13	171
6:30 PM	0	35	1	0	1	36	4	60	3	0	0	67	4	3	6	0	2	13	5	8	3	0	0	16	132
6:45 PM	3	36	3	0	0	42	2	51	4	0	2	57	3	3	4	0	0	10	3	4	5	0	5	12	121
Hourly Total	8	147	14	1	3	170	17	304	9	0	5	330	10	7	19	0	4	36	19	24	13	0	5	56	592
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	59	1491	111	5	55	1666	118	2179	87	0	64	2384	81	77	113	0	69	271	120	139	74	0	73	333	4654
Approach %	3.5	89.5	6.7	0.3	-	-	4.9	91.4	3.6	0.0	-	-	29.9	28.4	41.7	0.0	-	-	36.0	41.7	22.2	0.0	-	-	-
Total %	1.3	32.0	2.4	0.1	-	35.8	2.5	46.8	1.9	0.0	-	51.2	1.7	1.7	2.4	0.0	-	5.8	2.6	3.0	1.6	0.0	-	7.2	-
Lights	59	1470	71	5	-	1605	93	2142	86	0	-	2321	45	75	62	0	-	182	116	137	73	0	-	326	4434
% Lights	100.0	98.6	64.0	100.0	-	96.3	78.8	98.3	98.9	-	-	97.4	55.6	97.4	54.9	-	-	67.2	96.7	98.6	98.6	-	-	97.9	95.3
Mediums	0	21	40	0	-	61	25	37	1	0	-	63	36	2	51	0	-	89	4	2	1	0	-	7	220
% Mediums	0.0	1.4	36.0	0.0	-	3.7	21.2	1.7	1.1	-	-	2.6	44.4	2.6	45.1	-	-	32.8	3.3	1.4	1.4	-	-	2.1	4.7
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	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	-	-	-	-	5	-	-	-	-	-	3	-	-	-	-	-	5	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	9.1	-	-	-	-	-	4.7	-	-	-	-	-	7.2	-	-	-	-	-	5.5	-	-
Pedestrians	-	-	-	-	50	-	-	-	-	-	61	-	-	-	-	-	64	-	-	-	-	-	69	-	-
% Pedestrians	-	-	-	-	90.9	-	-	-	-	-	95.3	-	-	-	-	-	92.8	-	-	-	-	-	94.5	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: James Street & John Street
Site Code:
Start Date: 11/08/2016



Turning Movement Data Plot

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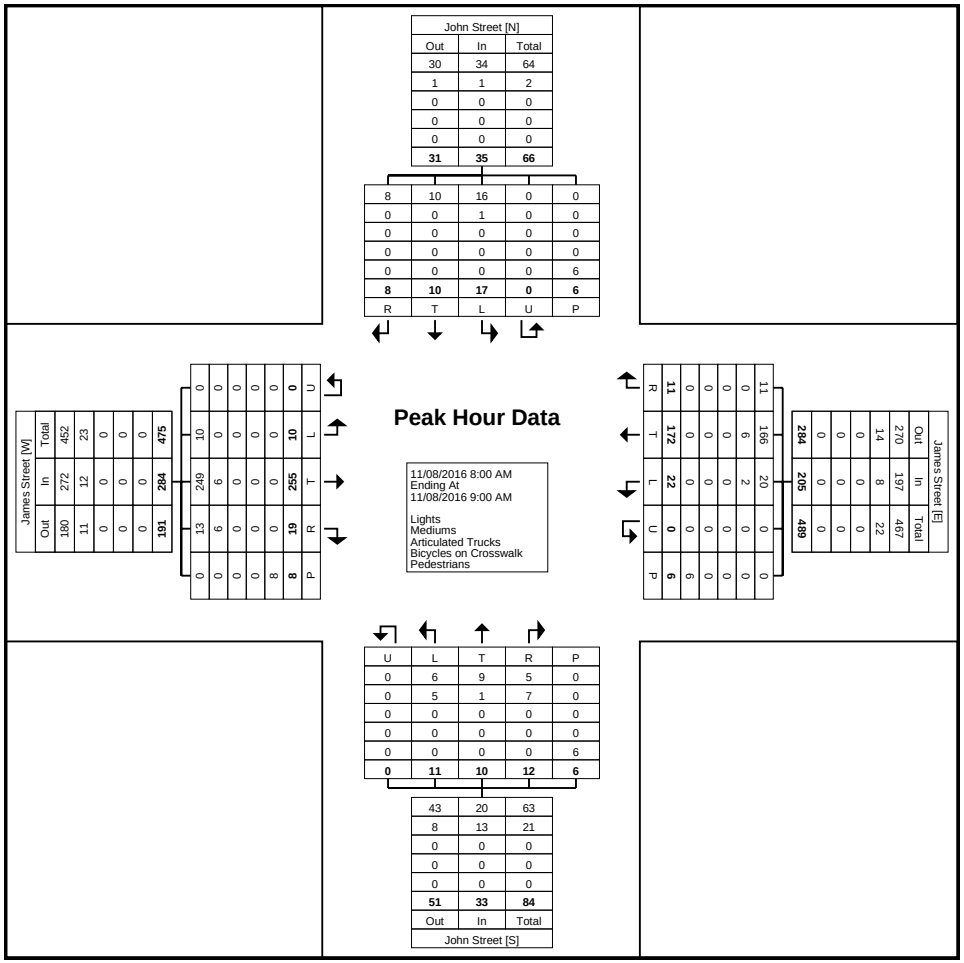
Turning Movement Peak Hour Data (8:00 AM)

Start Time	James Street Eastbound						James Street Westbound						John Street Northbound						John Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	1	68	4	0	1	73	5	46	1	0	1	52	2	0	1	0	2	3	3	2	1	0	2	6	134
8:15 AM	1	68	3	0	2	72	3	50	3	0	3	56	4	4	4	0	2	12	8	1	1	0	1	10	150
8:30 AM	2	50	7	0	4	59	4	39	2	0	1	45	3	2	3	0	0	8	5	0	3	0	2	8	120
8:45 AM	6	69	5	0	1	80	10	37	5	0	1	52	2	4	4	0	2	10	1	7	3	0	1	11	153
Total	10	255	19	0	8	284	22	172	11	0	6	205	11	10	12	0	6	33	17	10	8	0	6	35	557
Approach %	3.5	89.8	6.7	0.0	-	-	10.7	83.9	5.4	0.0	-	-	33.3	30.3	36.4	0.0	-	-	48.6	28.6	22.9	0.0	-	-	-
Total %	1.8	45.8	3.4	0.0	-	51.0	3.9	30.9	2.0	0.0	-	36.8	2.0	1.8	2.2	0.0	-	5.9	3.1	1.8	1.4	0.0	-	6.3	-
PHF	0.417	0.924	0.679	0.000	-	0.888	0.550	0.860	0.550	0.000	-	0.915	0.688	0.625	0.750	0.000	-	0.688	0.531	0.357	0.667	0.000	-	0.795	0.910
Lights	10	249	13	0	-	272	20	166	11	0	-	197	6	9	5	0	-	20	16	10	8	0	-	34	523
% Lights	100.0	97.6	68.4	-	-	95.8	90.9	96.5	100.0	-	-	96.1	54.5	90.0	41.7	-	-	60.6	94.1	100.0	100.0	-	-	97.1	93.9
Mediums	0	6	6	0	-	12	2	6	0	0	-	8	5	1	7	0	-	13	1	0	0	0	-	1	34
% Mediums	0.0	2.4	31.6	-	-	4.2	9.1	3.5	0.0	-	-	3.9	45.5	10.0	58.3	-	-	39.4	5.9	0.0	0.0	-	-	2.9	6.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	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	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	6	-	-	-	-	-	6	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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

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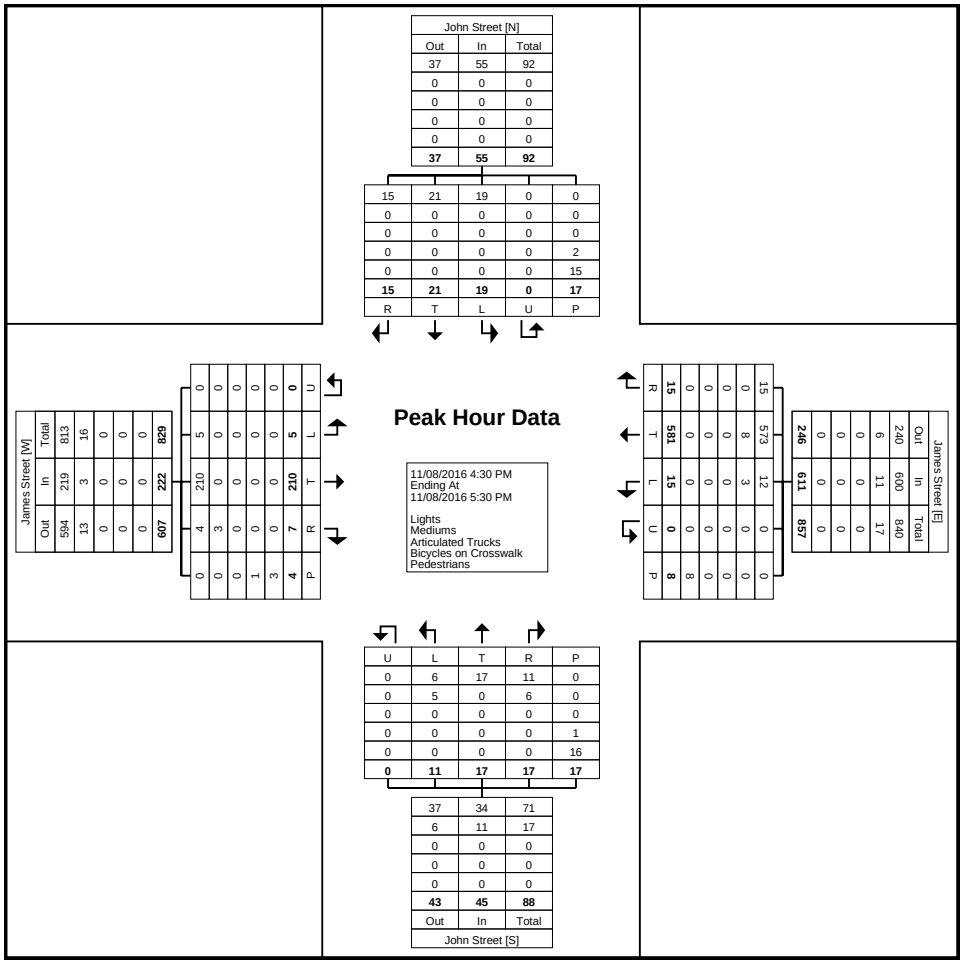
Turning Movement Peak Hour Data (4:30 PM)

Start Time	James Street Eastbound						James Street Westbound						John Street Northbound						John Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	0	57	1	0	1	58	3	139	6	0	6	148	2	3	5	0	5	10	5	3	3	0	9	11	227
4:45 PM	1	56	4	0	2	61	3	155	3	0	0	161	2	5	6	0	6	13	3	6	3	0	5	12	247
5:00 PM	3	47	2	0	1	52	4	160	3	0	2	167	4	2	2	0	5	8	8	4	5	0	3	17	244
5:15 PM	1	50	0	0	0	51	5	127	3	0	0	135	3	7	4	0	1	14	3	8	4	0	0	15	215
Total	5	210	7	0	4	222	15	581	15	0	8	611	11	17	17	0	17	45	19	21	15	0	17	55	933
Approach %	2.3	94.6	3.2	0.0	-	-	2.5	95.1	2.5	0.0	-	-	24.4	37.8	37.8	0.0	-	-	34.5	38.2	27.3	0.0	-	-	-
Total %	0.5	22.5	0.8	0.0	-	23.8	1.6	62.3	1.6	0.0	-	65.5	1.2	1.8	1.8	0.0	-	4.8	2.0	2.3	1.6	0.0	-	5.9	-
PHF	0.417	0.921	0.438	0.000	-	0.910	0.750	0.908	0.625	0.000	-	0.915	0.688	0.607	0.708	0.000	-	0.804	0.594	0.656	0.750	0.000	-	0.809	0.944
Lights	5	210	4	0	-	219	12	573	15	0	-	600	6	17	11	0	-	34	19	21	15	0	-	55	908
% Lights	100.0	100.0	57.1	-	-	98.6	80.0	98.6	100.0	-	-	98.2	54.5	100.0	64.7	-	-	75.6	100.0	100.0	100.0	-	-	100.0	97.3
Mediums	0	0	3	0	-	3	3	8	0	0	-	11	5	0	6	0	-	11	0	0	0	0	-	0	25
% Mediums	0.0	0.0	42.9	-	-	1.4	20.0	1.4	0.0	-	-	1.8	45.5	0.0	35.3	-	-	24.4	0.0	0.0	0.0	-	-	0.0	2.7
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	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	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	25.0	-	-	-	-	-	0.0	-	-	-	-	-	5.9	-	-	-	-	-	11.8	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	8	-	-	-	-	-	16	-	-	-	-	-	15	-	-
% Pedestrians	-	-	-	-	75.0	-	-	-	-	-	100.0	-	-	-	-	-	94.1	-	-	-	-	-	88.2	-	-

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Turning Movement Peak Hour Data Plot (4:30 PM)

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Turning Movement Data

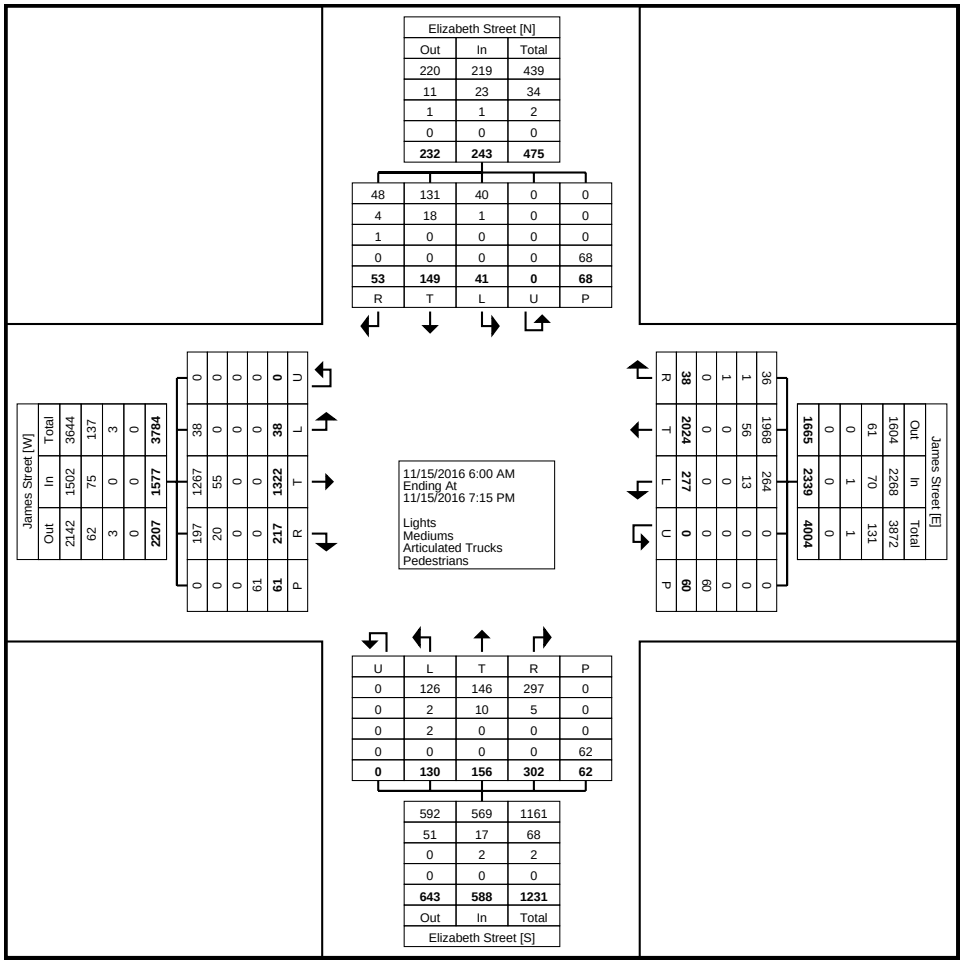
Start Time	James Street Eastbound						James Street Westbound						Elizabeth Street Northbound						Elizabeth Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
6:00 AM	0	31	0	0	1	31	0	6	0	0	0	6	0	0	4	0	0	4	0	0	1	0	1	1	42
6:15 AM	0	25	2	0	0	27	0	9	0	0	0	9	1	1	3	0	1	5	0	1	1	0	0	2	43
6:30 AM	0	58	0	0	1	58	1	20	0	0	0	21	0	0	2	0	2	2	0	1	0	0	1	1	82
6:45 AM	0	40	3	0	1	43	1	15	0	0	0	16	1	1	7	0	1	9	0	1	1	0	0	2	70
Hourly Total	0	154	5	0	3	159	2	50	0	0	0	52	2	2	16	0	4	20	0	3	3	0	2	6	237
7:00 AM	0	34	3	0	0	37	4	17	0	0	2	21	2	0	4	0	0	6	0	3	0	0	0	3	67
7:15 AM	1	41	1	0	3	43	4	28	0	0	0	32	1	0	3	0	0	4	0	3	0	0	1	3	82
7:30 AM	0	53	1	0	3	54	5	25	0	0	0	30	0	2	6	0	1	8	0	1	3	0	1	4	96
7:45 AM	1	53	5	0	0	59	8	36	2	0	0	46	0	2	6	0	2	8	0	7	1	0	2	8	121
Hourly Total	2	181	10	0	6	193	21	106	2	0	2	129	3	4	19	0	3	26	0	14	4	0	4	18	366
8:00 AM	0	60	8	0	2	68	3	45	0	0	1	48	0	3	6	0	2	9	0	2	4	0	2	6	131
8:15 AM	0	67	8	0	2	75	12	58	0	0	4	70	4	2	7	0	0	13	1	4	0	0	3	5	163
8:30 AM	2	61	5	0	2	68	10	56	1	0	4	67	3	4	10	0	3	17	3	5	1	0	3	9	161
8:45 AM	3	52	12	0	2	67	3	45	2	0	5	50	3	5	15	0	3	23	0	10	1	0	3	11	151
Hourly Total	5	240	33	0	8	278	28	204	3	0	14	235	10	14	38	0	8	62	4	21	6	0	11	31	606
9:00 AM	1	38	2	0	1	41	7	43	2	0	0	52	4	5	5	0	0	14	3	3	2	0	1	8	115
9:15 AM	1	29	8	0	2	38	8	46	1	0	0	55	1	3	5	0	0	9	0	3	5	0	3	8	110
9:30 AM	1	44	8	0	4	53	4	37	1	0	1	42	4	4	6	0	4	14	1	1	2	0	0	4	113
9:45 AM	3	28	11	0	5	42	7	51	6	0	2	64	2	5	6	0	4	13	3	3	4	0	2	10	129
Hourly Total	6	139	29	0	12	174	26	177	10	0	3	213	11	17	22	0	8	50	7	10	13	0	6	30	467
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	1	35	6	0	4	42	9	57	1	0	2	67	6	10	15	0	7	31	2	6	2	0	4	10	150
3:15 PM	1	44	7	0	6	52	9	62	2	0	0	73	3	10	15	0	6	28	3	9	3	0	2	15	168
3:30 PM	2	33	9	0	2	44	9	72	1	0	5	82	5	5	7	0	1	17	2	15	3	0	2	20	163
3:45 PM	5	26	11	0	2	42	9	77	2	0	7	88	4	10	10	0	2	24	2	7	1	0	7	10	164
Hourly Total	9	138	33	0	14	180	36	268	6	0	14	310	18	35	47	0	16	100	9	37	9	0	15	55	645
4:00 PM	1	39	8	0	2	48	10	86	0	0	5	96	4	8	16	0	0	28	1	5	2	0	2	8	180
4:15 PM	1	34	5	0	2	40	10	110	2	0	1	122	9	6	14	0	5	29	3	9	1	0	2	13	204
4:30 PM	0	58	13	0	2	71	17	102	2	0	1	121	10	8	16	0	3	34	2	2	0	0	5	4	230
4:45 PM	4	56	15	0	2	75	19	113	3	0	0	135	16	9	19	0	2	44	2	8	4	0	0	14	268
Hourly Total	6	187	41	0	8	234	56	411	7	0	7	474	39	31	65	0	10	135	8	24	7	0	9	39	882
5:00 PM	2	40	7	0	1	49	15	141	2	0	3	158	8	16	9	0	0	33	2	2	3	0	0	7	247
5:15 PM	3	52	7	0	3	62	21	156	2	0	4	179	5	9	19	0	0	33	3	8	0	0	11	11	285
5:30 PM	1	37	9	0	2	47	18	131	3	0	0	152	5	2	8	0	6	15	0	1	2	0	3	3	217
5:45 PM	0	32	9	0	3	41	17	118	1	0	1	136	10	10	11	0	1	31	2	4	2	0	0	8	216

Hourly Total	6	161	32	0	9	199	71	546	8	0	8	625	28	37	47	0	7	112	7	15	7	0	14	29	965
6:00 PM	2	34	8	0	0	44	10	99	0	0	3	109	3	5	9	0	0	17	1	7	1	0	4	9	179
6:15 PM	1	36	10	0	1	47	10	75	0	0	3	85	6	4	13	0	2	23	4	10	1	0	1	15	170
6:30 PM	0	22	10	0	0	32	6	52	0	0	2	58	2	1	8	0	2	11	1	2	2	0	1	5	106
6:45 PM	1	30	6	0	0	37	11	36	2	0	4	49	8	6	18	0	2	32	0	6	0	0	1	6	124
Hourly Total	4	122	34	0	1	160	37	262	2	0	12	301	19	16	48	0	6	83	6	25	4	0	7	35	579
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	38	1322	217	0	61	1577	277	2024	38	0	60	2339	130	156	302	0	62	588	41	149	53	0	68	243	4747
Approach %	2.4	83.8	13.8	0.0	-	-	11.8	86.5	1.6	0.0	-	-	22.1	26.5	51.4	0.0	-	-	16.9	61.3	21.8	0.0	-	-	-
Total %	0.8	27.8	4.6	0.0	-	33.2	5.8	42.6	0.8	0.0	-	49.3	2.7	3.3	6.4	0.0	-	12.4	0.9	3.1	1.1	0.0	-	5.1	-
Lights	38	1267	197	0	-	1502	264	1968	36	0	-	2268	126	146	297	0	-	569	40	131	48	0	-	219	4558
% Lights	100.0	95.8	90.8	-	-	95.2	95.3	97.2	94.7	-	-	97.0	96.9	93.6	98.3	-	-	96.8	97.6	87.9	90.6	-	-	90.1	96.0
Mediums	0	55	20	0	-	75	13	56	1	0	-	70	2	10	5	0	-	17	1	18	4	0	-	23	185
% Mediums	0.0	4.2	9.2	-	-	4.8	4.7	2.8	2.6	-	-	3.0	1.5	6.4	1.7	-	-	2.9	2.4	12.1	7.5	-	-	9.5	3.9
Articulated Trucks	0	0	0	0	-	0	0	0	1	0	-	1	2	0	0	0	-	2	0	0	1	0	-	1	4
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	2.6	-	-	0.0	1.5	0.0	0.0	-	-	0.3	0.0	0.0	1.9	-	-	0.4	0.1
Pedestrians	-	-	-	-	61	-	-	-	-	-	60	-	-	-	-	-	62	-	-	-	-	-	68	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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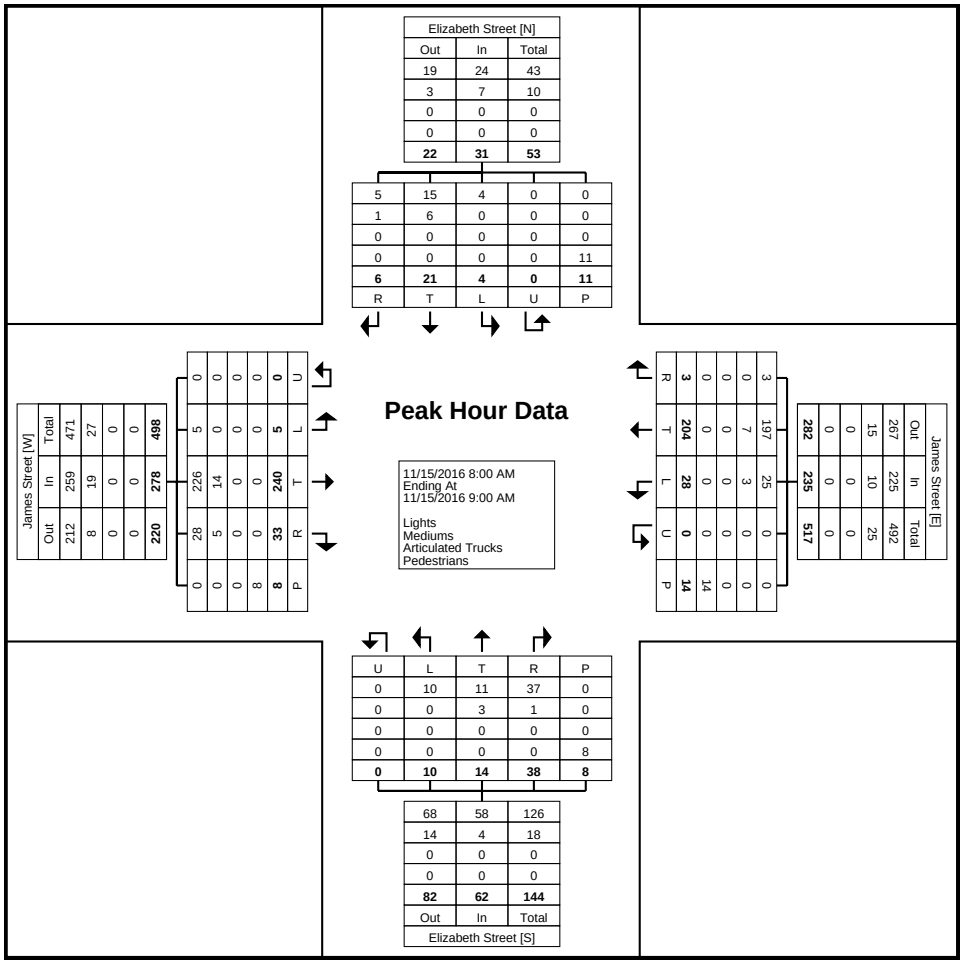
Turning Movement Peak Hour Data (8:00 AM)

Start Time	James Street Eastbound						James Street Westbound						Elizabeth Street Northbound						Elizabeth Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	0	60	8	0	2	68	3	45	0	0	1	48	0	3	6	0	2	9	0	2	4	0	2	6	131
8:15 AM	0	67	8	0	2	75	12	58	0	0	4	70	4	2	7	0	0	13	1	4	0	0	3	5	163
8:30 AM	2	61	5	0	2	68	10	56	1	0	4	67	3	4	10	0	3	17	3	5	1	0	3	9	161
8:45 AM	3	52	12	0	2	67	3	45	2	0	5	50	3	5	15	0	3	23	0	10	1	0	3	11	151
Total	5	240	33	0	8	278	28	204	3	0	14	235	10	14	38	0	8	62	4	21	6	0	11	31	606
Approach %	1.8	86.3	11.9	0.0	-	-	11.9	86.8	1.3	0.0	-	-	16.1	22.6	61.3	0.0	-	-	12.9	67.7	19.4	0.0	-	-	-
Total %	0.8	39.6	5.4	0.0	-	45.9	4.6	33.7	0.5	0.0	-	38.8	1.7	2.3	6.3	0.0	-	10.2	0.7	3.5	1.0	0.0	-	5.1	-
PHF	0.417	0.896	0.688	0.000	-	0.927	0.583	0.879	0.375	0.000	-	0.839	0.625	0.700	0.633	0.000	-	0.674	0.333	0.525	0.375	0.000	-	0.705	0.929
Lights	5	226	28	0	-	259	25	197	3	0	-	225	10	11	37	0	-	58	4	15	5	0	-	24	566
% Lights	100.0	94.2	84.8	-	-	93.2	89.3	96.6	100.0	-	-	95.7	100.0	78.6	97.4	-	-	93.5	100.0	71.4	83.3	-	-	77.4	93.4
Mediums	0	14	5	0	-	19	3	7	0	0	-	10	0	3	1	0	-	4	0	6	1	0	-	7	40
% Mediums	0.0	5.8	15.2	-	-	6.8	10.7	3.4	0.0	-	-	4.3	0.0	21.4	2.6	-	-	6.5	0.0	28.6	16.7	-	-	22.6	6.6
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	8	-	-	-	-	-	14	-	-	-	-	-	8	-	-	-	-	-	11	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: James Street & Elizabeth Street
Site Code:
Start Date: 11/15/2016



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

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: James Street & Elizabeth Street
Site Code:
Start Date: 11/15/2016

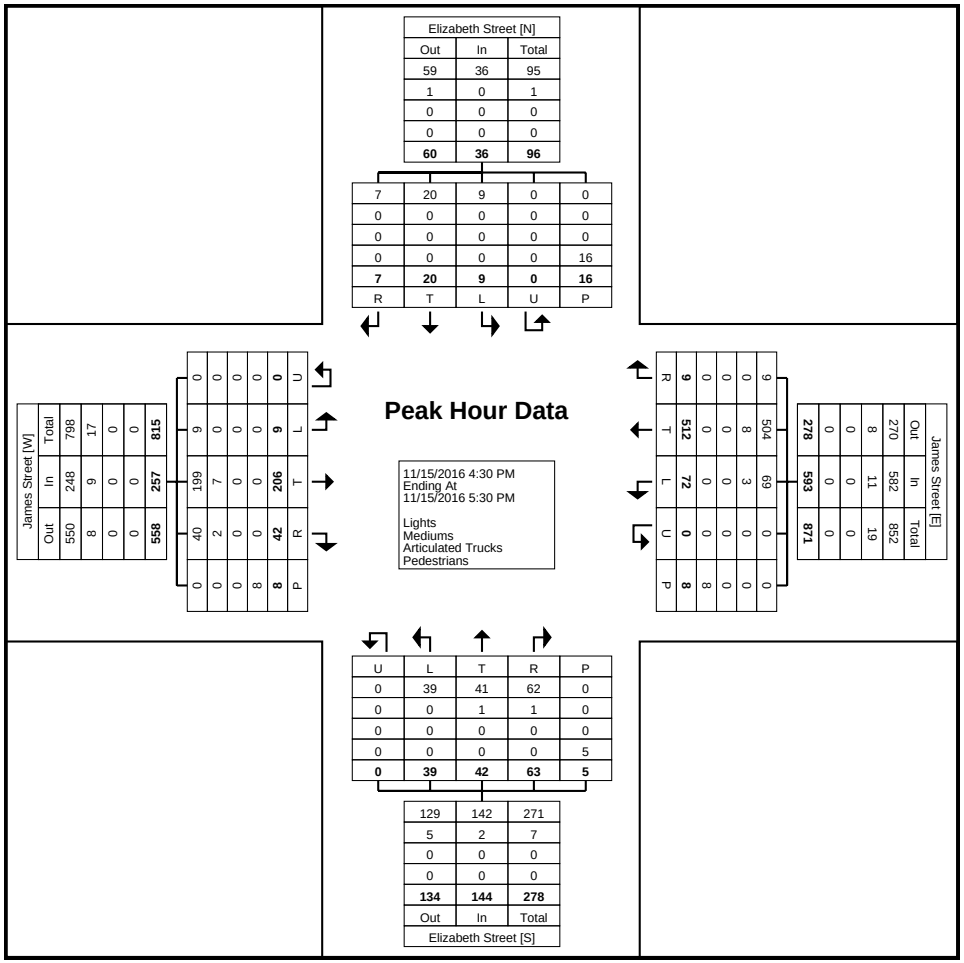
Turning Movement Peak Hour Data (4:30 PM)

Start Time	James Street Eastbound						James Street Westbound						Elizabeth Street Northbound						Elizabeth Street Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	0	58	13	0	2	71	17	102	2	0	1	121	10	8	16	0	3	34	2	2	0	0	5	4	230
4:45 PM	4	56	15	0	2	75	19	113	3	0	0	135	16	9	19	0	2	44	2	8	4	0	0	14	268
5:00 PM	2	40	7	0	1	49	15	141	2	0	3	158	8	16	9	0	0	33	2	2	3	0	0	7	247
5:15 PM	3	52	7	0	3	62	21	156	2	0	4	179	5	9	19	0	0	33	3	8	0	0	11	11	285
Total	9	206	42	0	8	257	72	512	9	0	8	593	39	42	63	0	5	144	9	20	7	0	16	36	1030
Approach %	3.5	80.2	16.3	0.0	-	-	12.1	86.3	1.5	0.0	-	-	27.1	29.2	43.8	0.0	-	-	25.0	55.6	19.4	0.0	-	-	-
Total %	0.9	20.0	4.1	0.0	-	25.0	7.0	49.7	0.9	0.0	-	57.6	3.8	4.1	6.1	0.0	-	14.0	0.9	1.9	0.7	0.0	-	3.5	-
PHF	0.563	0.888	0.700	0.000	-	0.857	0.857	0.821	0.750	0.000	-	0.828	0.609	0.656	0.829	0.000	-	0.818	0.750	0.625	0.438	0.000	-	0.643	0.904
Lights	9	199	40	0	-	248	69	504	9	0	-	582	39	41	62	0	-	142	9	20	7	0	-	36	1008
% Lights	100.0	96.6	95.2	-	-	96.5	95.8	98.4	100.0	-	-	98.1	100.0	97.6	98.4	-	-	98.6	100.0	100.0	100.0	-	-	100.0	97.9
Mediums	0	7	2	0	-	9	3	8	0	0	-	11	0	1	1	0	-	2	0	0	0	0	-	0	22
% Mediums	0.0	3.4	4.8	-	-	3.5	4.2	1.6	0.0	-	-	1.9	0.0	2.4	1.6	-	-	1.4	0.0	0.0	0.0	-	-	0.0	2.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	8	-	-	-	-	-	8	-	-	-	-	-	5	-	-	-	-	-	16	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: James Street & Elizabeth Street
Site Code:
Start Date: 11/15/2016



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: James Street & Elizabeth Street
Site Code:
Start Date: 11/15/2016

Intersection Name:	TS ID:	Group NO:	IP address:
Brant St @ Caroline St	145		172.22.61.2

Controller Make:	Model:	Firmware Rev. No:	
Econolite	ACS/3		

Type of Operation 4 Phase Semi-Actuated

Revision

NO	Date Y	Date M	Date D	Description	Prepared by:
1	2014	09	03	Implement timings in Centracs	YK

*- Start From Main Menu

PHASE DESCRIPTION

Ph1	SB LT - Brant St.	Ph5	
Ph2	NB/SB - Brant St.	PH6	
Ph3	EB LT - Caroline St	Ph7	
Ph4	EB/WB - Caroline St.	Ph8	

CONFIGURATION (PHASE SEQ): PHASE IN USE /EXCLUSIVE PED (MM) * - 1 - 2

Phase:	1	2	3	4	5	6	7	8
Phase in Use :	X	X	X	X				
Exclusive PED :								

CONTROLLER: CONTROLLER TIMING DATA - VEHICLE TIMINGS (4 available) * - 2 - 1

Timing Plan 1 Phase:	1	2	3	4	5	6	7	8
Minimum Green :	6	8	6	8				
Conditional Service Min. Green :								
Walk :		15		10				
Ped. Clearance :		8		8				
Pedestrians Carry Over :								
Vehicle Extension :	3	3	3	3				
MAX 1 :	10	35	10	20				
MAX 2 :	10	35	10	20				
Yellow Change :	3	4	3	4				
Red Clearance :		2		2				

CONTROLLER: PHASE RECALL OPTIONS * - 2 - 8

Phase:	1	2	3	4	5	6	7	8
Lock Detector :								
Vehicle Recall :		X						
Pedestrian Recall :		X		X				
MAX Recall :								
Soft Recall :								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN * - 3 - 2, - 3 - 3

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec) 1	2	3	4	5	6	7	8
1	80	54	1	1	10	31	12	27				
2	80	50	1	2	11	31	11	27				
3	80	57	1	3	10	31	12	27				
10	0	0	1	10	0	0		0				

Intersection Name:		TS ID:	Group NO:	IP address:
Brant St @ Caroline St		145		172.22.61.2
Controller Make:	**Model:**		**Firmware Rev. No:**	
Econolite	ACS/3			

CP # 1, 2, 10	Phase:	1	2	3	4	5	6	7	8
Coord Phase	:		X						
Vehicle Recall	:								
Pedestrian Recall *(3-3, 5-2)	:		X						
Recall to MAX Time	:								
Phase Omit	:								
Special Function Outputs	:								

Coordinator Pattern #	Prefer.	Phase 1	2	3	4	5	6	7	8
	1								
	2								

X - select "." deselect

TIME BASE: ACTION PLAN, DAY PLAN *** - 5 - 2, - 5 - 3, - 5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	1	07:30	1	1
1	1	2	09:30	2	1
1	1	3	15:30	3	1
1	1	2	19:00	2	1
1	1	10	22:00	254	1
2	2	2	09:30	2	1
2	2	10	18:00	254	1
3	3	2	10:30	2	1
3	3	10	17:00	254	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

TIME BASE DATA - TIME OF YEAR EVENTS *** - 5 - 5**

Events	Exception Day		MON/ MON	DOW/ DOM	WOM/ Year	Day Plan
New Year's Day	1	Fixed	01	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	04	6	1	3
Victoria Day	4	Float	05	2	3	3
Canada Day	5	Fixed	07	1	0	3
Civic Day	6	Float	08	2	1	3
Labour Day	7	Float	09	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name:	TS ID:	Group NO:	IP address:
Brant St @ James St	147		172.22.60.2
Controller Make:	**Model:**	**Firmware Rev. No:**	
Econolite	ACS/3		

Type of Operation 4 Phase Semi-Actuated

Revision

NO	Date Y	Date M	Date D	Description	Prepared by:
2	2016	5	10	Implement Advance Pedestrian Timings	MA

*- Start From Main Menu

PHASE DESCRIPTION

Ph1	SB LT - Brant St.	Ph5	
Ph2	NB/SB - Brant St.	PH6	
Ph3		Ph7	
Ph4	WB - James St.	Ph8	

CONFIGURATION (PHASE SEQ): PHASE IN USE /EXCLUSIVE PED (MM) * - 1 - 2

Phase:	1	2	3	4	5	6	7	8
Phase in Use :	X	X		X				
Exclusive PED :								

CONTROLLER: CONTROLLER TIMING DATA - VEHICLE TIMINGS (4 available) * - 2 - 1

Timing Plan: 2

Phase:	1	2	3	4	5	6	7	8
Minimum Green :	6	8		8				
Delay Green :				8				
Walk :		20		8				
Ped. Clearance :		8		15				
Pedestrians Carry Over :								
Vehicle Extension :	3	3		3				
MAX 1 :	10	35		20				
MAX 2 :	10	35		20				
Yellow Change :	3	4		4				
Red Clearance :		2		2				

CONTROLLER: PHASE RECALL OPTIONS * - 2 - 8

Phase:	1	2	3	4	5	6	7	8
Lock Detector :								
Vehicle Recall :		X						
Pedestrian Recall :		X		X				
MAX Recall :								
Soft Recall :								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN * - 3 - 2, - 3 - 3

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec) 1	2	3	4	5	6	7	8
1	80	0	2	1	10	38	0	32				
2	80	0	2	2	12	36		32				
3	80	0	1	3	12	36		32				
10	0	0	2	10	0	0		0				

Intersection Name:		TS ID:	Group NO:	IP address:
Brant St @ James St		147		172.22.60.2
Controller Make:	**Model:**		**Firmware Rev. No:**	
Econolite	ACS/3			

CP # 1, 2, 10	Phase:	1	2	3	4	5	6	7	8
Coord Phase	:		X						
Vehicle Recall	:								
Pedestrian Recall *(3-3, 5-2)	:		X						
Recall to MAX Time	:								
Phase Omit	:								
Special Function Outputs	:								

Coordinator Pattern #	Prefer.	Phase 1	2	3	4	5	6	7	8
	1								
	2								

X - select "." deselect

TIME BASE: ACTION PLAN, DAY PLAN *** - 5 - 2, - 5 - 3, - 5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	1	07:00	1	2
1	1	2	09:00	2	2
1	1	3	16:00	3	1
1	1	2	17:30	2	2
1	1	1	18:00	1	2
1	1	10	20:00	254	2
2	2	2	09:30	2	2
2	2	10	18:00	254	2
3	3	2	10:30	2	2
3	3	10	17:00	254	2

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

TIME BASE DATA - TIME OF YEAR EVENTS *** - 5 - 5**

Events	Exception Day		MON/ MON	DOW/ DOM	WOM/ Year	Day Plan
New Year's Day	1	Fixed	01	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	04	6	1	3
Victoria Day	4	Float	05	2	3	3
Canada Day	5	Fixed	07	1	0	3
Civic Day	6	Float	08	2	1	3
Labour Day	7	Float	09	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name:	TS ID:	Group No:	IP address:
James St @ Elizabeth St	213		172.22.156.2

Controller Make:	Model:
Econolite	ACS/3

Type of Operation: 8 Phase Semi-Actuated

No	Date Y	M	D	Description	Prepared by
3	2016	7	1	Canada Day Closure Timings	EN

*- Start from Main Manu

PHASE DESCRIPTION

Ph1		Ph5	
Ph2	EB - James St	Ph6	WB - James St
Ph3		Ph7	
Ph4	NB - Elizabeth St	Ph8	SB - Elizabeth St

CONFIGURATION (PHASE SEQ): PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2

Phase:	1	2	3	4	5	6	7	8
Phase in Use :		X		X		X		X
Exclusive PED :								

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1 Phase:	1	2	3	4	5	6	7	8
Minimum Green :		8		8		8		8
Conditional Service Min. Green :								
Walk :		20		12		20		12
Ped. Clearance :		7		8		7		8
Pedestrian Carry Over :								
Vehicle Extension :		3		3		3		3
MAX 1 :		35		25		35		25
MAX 2 :		35		25		35		25
Yellow Change :		4		4		4		4
Red Clearance :		2		2		2		2

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS * - 2 - 8

Phase:	1	2	3	4	5	6	7	8
Lock Detector :								
Vehicle Recall :								
Pedestrian Recall :		X				X		
MAX Recall :		X				X		
Soft Recall :								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN * - 3 - 2, - 3 - 3

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec) 1	2	3	4	5	6	7	8
1	70	44	1	1		40		30		40		30
2	70	44	1	2		40		30		40		30
3	90	43	1	3		50		40		50		40
4	70	43	1	4		40		30		40		30
10	0	0	1	10		0		0		0		0
14	110	0	1	14		34		76		34		76

CP # 1, 2, 10	Phase:	1	2	3	4	5	6	7	8
Coord Phase	:		X				X		
Vehicle Recall	:								
Pedestrian Recall *(3-3, 5-2)	:		X				X		
Recall to MAX Time	:								
Phase Omit	:								
Special Function Outputs	:								

Coordinator Pattern #	Prefer.	Phase							
		1	2	3	4	5	6	7	8
	1								
	2								

X - select "." deselect

TIME BASE: ACTION PLAN, DAY PLAN *** - 5 - 2, - 5 - 3, -5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	4	06:00	4	1
1	1	1	07:30	1	1
1	1	2	09:00	2	1
1	1	3	15:30	3	1
1	1	4	19:00	4	1
1	1	10	21:00	254	1
2	2	2	08:00	2	1
2	2	10	21:00	254	1
3	3	4	8:00	4	1
3	3	10	21:30	254	1
4	**4**	**14**	**21:00**	**14**	**1**

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3
Schedule 4 = Day Plan 4

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)
Day Plan 4 (Canada Day Closure)

Action Plan 10 = free (254)

TIME BASE DATA - TIME OF YEAR EVENTS *** - 5 - 5**

Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	**1**	**Fixed**	**1**	**1**	**0**	**3**
Family Day	**2**	**Float**	**2**	**2**	**3**	**3**
Good Friday	**3**	**Float**	**4**	**6**	**1**	**3**
Victoria Day	**4**	**Float**	**5**	**2**	**3**	**3**
Canada Day	**5**	**Fixed**	**7**	**1**	**0**	**4**
Civic Day	**6**	**Float**	**8**	**2**	**1**	**3**
Labour Day	**7**	**Float**	**9**	**2**	**1**	**3**
Thanksgiving	**8**	**Float**	**10**	**2**	**2**	**3**
Christmas Day	**9**	**Fixed**	**12**	**25**	**0**	**3**

Sum of 1&2 = 5&6		**Sum of 3&4 = 7&8**		**Culculated**	
				Total 1-4	Total 5-8
1&2	5&6	3&4	7&8	Actual Cycle	Actual Cycle
40	40	30	30	70	70
40	40	30	30	70	70
50	50	40	40	90	90
40	40	30	30	70	70
0	0	0	0	0	0
34	34	76	76	110	110
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Intersection Name:	TS ID:	Group NO:	IP address:
Lakeshore Rd @ Brant St	210		172.22.41.2
Controller Make:	**Model:**	**Firmware Rev. No:**	
Econolite	ACS/3		

Type of Operation 4 Phase Semi-Actuated

Revision

NO	Date Y	M	D	Description	Prepared by
2	2015	10	14	Splits and offsets adjusted as part of corridor review	BP

*- Start From Main Menu

PHASE DESCRIPTION

Ph1	EB LT - Lakeshore Rd	Ph5	
Ph2	EB/WB - Lakeshore Rd	PH6	
Ph3		Ph7	
Ph4	NB/SB - Brant St	Ph8	

CONFIGURATION (PHASE SEQ): PHASE IN USE /EXCLUSIVE PED (MM) * - 1 - 2

	Phase:	1	2	3	4	5	6	7	8
Phase in Use	:	X	X		X				
Exclusive PED	:								

CONTROLLER TIMING DATA - VEHICLE TIMINGS (4 available) * - 2 - 1

Timing Plan: 1

	Phase:	1	2	3	4	5	6	7	8
Minimum Green	:	6	8		8				
Conditional Service Min. Green	:								
Walk	:		11		12				
Ped. Clearance	:		16		19				
Pedestrians Carry Over	:								
Vehicle Extension	:	3	3		3				
MAX 1	:	10	35		25				
MAX 2	:	10	35		25				
Yellow Change	:	3	4		4				
Red Clearance	:		2		3				

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS * - 2 - 8

	Phase:	1	2	3	4	5	6	7	8
Lock Detector	:								
Vehicle Recall	:								
Pedestrian Recall	:		X						
MAX Recall	:		X						
Soft Recall	:								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN * - 3 - 2, - 3 - 3

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec) 1	2	3	4	5	6	7	8
1	110	47	1	1	11	58		41				
2	100	44	1	2	11	48		41				
3	120	51	1	3	11	68		41				
4	90	78	1	4	12	38		40				
10	0	0	1	10	0	0		0				

Intersection Name:	TS ID:	Group NO:	IP address:
Lakeshore Rd @ Brant St	210		172.22.41.2
Controller Make:	**Model:**	**Firmware Rev. No:**	
Econolite	ACS/3		

CP # 1, 2, 10	Phase:	1	2	3	4	5	6	7	8
Coord Phase	:		X						
Vehicle Recall	:								
Pedestrian Recall *(3-3, 5-2)	:		X						
Recall to MAX Time	:								
Phase Omit	:								
Special Function Outputs	:								

Coordinator Pattern #	Prefer.	Phase							
		1	2	3	4	5	6	7	8
	1								
	2								

X - select "." deselect

TIME BASE: ACTION PLAN, DAY PLAN *** - 5 - 2, - 5 - 3, - 5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	4	06:30	4	1
1	1	1	07:00	1	1
1	1	2	09:00	2	1
1	1	3	15:30	3	1
1	1	4	19:00	4	1
1	1	10	22:00	254	1
2	2	1	07:00	1	1
2	2	10	23:00	254	1
3	3	1	8:30	1	1
3	3	10	22:00	254	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

TIME BASE DATA - TIME OF YEAR EVENTS *** - 5 - 5**

Events	Exception Day		MON/ MON	DOW/ DOM	WOM/ Year	Day Plan
New Year's Day	1	Fixed	01	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	04	6	1	3
Victoria Day	4	Float	05	2	3	3
Canada Day	5	Fixed	07	1	0	3
Civic Day	6	Float	08	2	1	3
Labour Day	7	Float	09	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Appendix C

Base Year Traffic Operations Reports

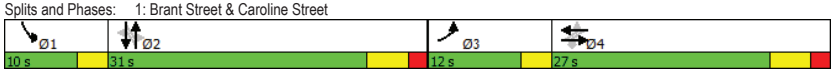


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	84	27	19	47	94	9	273	31	100	382	57
Future Volume (vph)	129	84	27	19	47	94	9	273	31	100	382	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		10.0	20.0		0.0	25.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92		0.91	0.94	0.92		0.99	0.99		0.98	0.99	
Frt			0.850		0.900			0.985			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1593	1644	1454	1624	1384	0	1624	1596	0	1593	1592	0
Flt Permitted	0.622			0.698			0.248			0.408		
Satd. Flow (perm)	956	1644	1326	1121	1384	0	421	1596	0	667	1592	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		102			8			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.3			80.7			104.4			184.8	
Travel Time (s)		7.4			5.8			7.5			13.3	
Confl. Peds. (#/hr)	48		31	31		48	11		27	27		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	0%	0%	3%	0%	5%	3%	2%	5%	4%
Adj. Flow (vph)	140	91	29	21	51	102	10	297	34	109	415	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	140	91	29	21	153	0	10	331	0	109	477	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Detector Phase	3	4	4	4	4		2	2		1	2	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	24.0	24.0	24.0	24.0		29.0	29.0		9.0	29.0	
Total Split (s)	12.0	27.0	27.0	27.0	27.0		31.0	31.0		10.0	31.0	
Total Split (%)	15.0%	33.8%	33.8%	33.8%	33.8%		38.8%	38.8%		12.5%	38.8%	
Maximum Green (s)	9.0	21.0	21.0	21.0	21.0		25.0	25.0		7.0	25.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		0.0	-2.0	
Total Lost Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Ped	Ped	Ped	Ped		Ped	Ped		Min	Ped	
Walk Time (s)		10.0	10.0	10.0	10.0		15.0	15.0			15.0	
Flash Dont Walk (s)		8.0	8.0	8.0	8.0		8.0	8.0			8.0	
Pedestrian Calls (#/hr)		0	0	0	0		0	0			0	
Act Effct Green (s)	28.0	20.2	20.2	20.2	20.2		26.7	26.7		34.6	26.7	
Actuated g/C Ratio	0.38	0.27	0.27	0.27	0.27		0.36	0.36		0.47	0.36	
v/c Ratio	0.32	0.20	0.06	0.07	0.34		0.07	0.57		0.27	0.82	
Control Delay	16.3	23.9	0.3	22.4	11.7		18.2	24.0		12.6	35.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.3	23.9	0.3	22.4	11.7		18.2	24.0		12.6	35.9	
LOS	B	C	A	C	B		B	C		B	D	
Approach Delay		17.1			13.0			23.9			31.6	
Approach LOS		B			B			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 73.9			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 24.5		Intersection LOS: C	
Intersection Capacity Utilization 69.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Brant Street & Caroline Street



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	91	29	21	153	10	331	109	477
v/c Ratio	0.32	0.20	0.06	0.07	0.34	0.07	0.57	0.27	0.82
Control Delay	16.3	23.9	0.3	22.4	11.7	18.2	24.0	12.6	35.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	23.9	0.3	22.4	11.7	18.2	24.0	12.6	35.9
Queue Length 50th (m)	13.0	10.9	0.0	2.4	6.0	1.0	39.8	8.6	65.1
Queue Length 95th (m)	24.6	22.7	0.0	8.0	20.8	4.5	66.2	17.0	#119.3
Internal Link Dist (m)		78.3			56.7		80.4		160.8
Turn Bay Length (m)	40.0		10.0	20.0		25.0		40.0	
Base Capacity (vph)	441	515	500	351	503	154	592	402	592
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.18	0.06	0.06	0.30	0.06	0.56	0.27	0.81

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	84	27	19	47	94	9	273	31	100	382	57
Future Volume (vph)	129	84	27	19	47	94	9	273	31	100	382	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.92		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00	1.00	0.94	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.90		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1518	1644	1333	1533	1391		1614	1596		1579	1591	
Flt Permitted	0.62	1.00	1.00	0.70	1.00		0.25	1.00		0.41	1.00	
Satd. Flow (perm)	993	1644	1333	1126	1391		421	1596		677	1591	
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)	140	91	29	21	51	102	10	297	34	109	415	62
RTOR Reduction (vph)	0	0	21	0	74	0	0	5	0	0	6	0
Lane Group Flow (vph)	140	91	8	21	79	0	10	326	0	109	471	0
Confl. Peds. (#/hr)	48		31	31		48	11		27	27		11
Heavy Vehicles (%)	2%	4%	0%	0%	0%	3%	0%	5%	3%	2%	5%	4%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)	24.9	18.1	18.1	18.1	18.1		24.7	24.7		31.5	24.7	
Effective Green, g (s)	24.9	20.1	20.1	20.1	20.1		26.7	26.7		31.5	26.7	
Actuated g/C Ratio	0.33	0.27	0.27	0.27	0.27		0.36	0.36		0.42	0.36	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	380	444	360	304	375		151	572		369	570	
v/s Ratio Prot	c0.03	0.06			0.06			0.20		c0.03	c0.30	
v/s Ratio Perm	c0.09		0.01	0.02			0.02			0.10		
v/c Ratio	0.37	0.20	0.02	0.07	0.21		0.07	0.57		0.30	0.83	
Uniform Delay, d1	18.1	21.0	19.9	20.2	21.0		15.7	19.2		13.6	21.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.2	0.0	0.1	0.3		0.2	1.3		0.4	9.5	
Delay (s)	18.8	21.2	20.0	20.3	21.3		15.8	20.5		14.1	31.2	
Level of Service	B	C	B	C	C		B	C		B	C	
Approach Delay (s)		19.7			21.2			20.4			28.0	
Approach LOS		B			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	69.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	117	60	311	380	48
Future Volume (vph)	2	117	60	311	380	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.867				0.985	
Flt Protected	0.999			0.992		
Satd. Flow (prot)	1452	0	0	1449	1464	0
Flt Permitted	0.999			0.992		
Satd. Flow (perm)	1452	0	0	1449	1464	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	187.1			83.2	180.0	
Travel Time (s)	16.8			6.0	13.0	
Confl. Peds. (#/hr)		21	8			8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	6%	4%	0%
Parking (#/hr)				0	0	
Adj. Flow (vph)	2	127	65	338	413	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	0	0	403	465	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.30	1.30	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	117	60	311	380	48
Future Volume (Veh/h)	2	117	60	311	380	48
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	127	65	338	413	52
Pedestrians	8			21		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			2		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				83	284	
pX, platoon unblocked	0.85	0.80	0.80			
vC, conflicting volume	915	468	473			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	516	205	211			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	80	94			
cM capacity (veh/h)	416	650	1076			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	129	403	465
Volume Left	2	65	0
Volume Right	127	0	52
cSH	644	1076	1700
Volume to Capacity	0.20	0.06	0.27
Queue Length 95th (m)	5.9	1.5	0.0
Control Delay (s)	12.0	1.9	0.0
Lane LOS	B	A	
Approach Delay (s)	12.0	1.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	118	253	93	194	303
Future Volume (vph)	88	118	253	93	194	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0		8.0	20.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.93	0.88		0.92	0.98	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1593	1358	1480	1439	1533	1660
Flt Permitted	0.950				0.539	
Satd. Flow (perm)	1476	1199	1480	1326	853	1660
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		128		57		
Link Speed (k/h)	50		50			50
Link Distance (m)	69.8		76.6			83.2
Travel Time (s)	5.0		5.5			6.0
Confl. Peds. (#/hr)	42	57		42	21	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	7%	4%	1%	6%	3%
Parking (#/hr)			0			
Adj. Flow (vph)	96	128	275	101	211	329
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	128	275	101	211	329
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane	Yes					
Headway Factor	1.14	1.14	1.30	1.14	1.14	1.14
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	29.0	29.0	34.0	34.0	9.0	34.0
Total Split (s)	32.0	32.0	38.0	38.0	10.0	38.0
Total Split (%)	40.0%	40.0%	47.5%	47.5%	12.5%	47.5%
Maximum Green (s)	26.0	26.0	32.0	32.0	7.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	0.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0	8.0	20.0	20.0		20.0
Flash Dont Walk (s)	15.0	15.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	11.5	11.5	16.9	16.9	25.0	16.9
Actuated g/C Ratio	0.25	0.25	0.36	0.36	0.54	0.36
v/c Ratio	0.27	0.33	0.51	0.20	0.38	0.55
Control Delay	18.0	6.7	15.4	6.4	6.6	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	6.7	15.4	6.4	6.6	15.6
LOS	B	A	B	A	A	B
Approach Delay	11.6		13.0			12.1
Approach LOS	B		B			B

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 46.6			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 60.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Brant Street & James Street



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	96	128	275	101	211	329
v/c Ratio	0.27	0.33	0.51	0.20	0.38	0.55
Control Delay	18.0	6.7	15.4	6.4	6.6	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	6.7	15.4	6.4	6.6	15.6
Queue Length 50th (m)	6.6	0.0	16.9	2.3	6.3	20.5
Queue Length 95th (m)	19.2	11.0	37.5	10.2	16.5	43.6
Internal Link Dist (m)	45.8		52.6			59.2
Turn Bay Length (m)	15.0			8.0	20.0	
Base Capacity (vph)	904	783	1101	1001	563	1235
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.16	0.25	0.10	0.37	0.27

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	118	253	93	194	303
Future Volume (vph)	88	118	253	93	194	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.92	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1525	1255	1480	1361	1523	1660
Flt Permitted	0.95	1.00	1.00	1.00	0.54	1.00
Satd. Flow (perm)	1525	1255	1480	1361	864	1660
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	128	275	101	211	329
RTOR Reduction (vph)	0	96	0	36	0	0
Lane Group Flow (vph)	96	32	275	65	211	329
Confl. Peds. (#/hr)	42	57		42	21	
Heavy Vehicles (%)	2%	7%	4%	1%	6%	3%
Parking (#/hr)			0			
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Actuated Green, G (s)	9.4	9.4	14.9	14.9	21.9	14.9
Effective Green, g (s)	11.4	11.4	16.9	16.9	21.9	16.9
Actuated g/C Ratio	0.25	0.25	0.37	0.37	0.47	0.37
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	375	309	540	496	508	605
v/s Ratio Prot			0.19		c0.06	c0.20
v/s Ratio Perm	c0.06	0.03		0.05	0.13	
v/c Ratio	0.26	0.10	0.51	0.13	0.42	0.54
Uniform Delay, d1	14.0	13.5	11.5	9.8	7.5	11.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	0.8	0.1	0.6	1.0
Delay (s)	14.4	13.6	12.2	9.9	8.0	12.6
Level of Service	B	B	B	A	A	B
Approach Delay (s)	14.0		11.6			10.8
Approach LOS	B		B			B

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	46.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	86	31	13	260	269	122
Future Volume (vph)	86	31	13	260	269	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			20.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.964					0.850
Flt Protected	0.965			0.998		
Satd. Flow (prot)	1544	0	0	1653	1644	1384
Flt Permitted	0.965			0.998		
Satd. Flow (perm)	1544	0	0	1653	1644	1384
Link Speed (k/h)	40			50	50	
Link Distance (m)	184.7			166.5	76.6	
Travel Time (s)	16.6			12.0	5.5	
Confl. Peds. (#/hr)	69	47	4			4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	3%	4%	5%
Adj. Flow (vph)	93	34	14	283	292	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	127	0	0	297	292	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	86	31	13	260	269	122
Future Volume (Veh/h)	86	31	13	260	269	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	93	34	14	283	292	133
Pedestrians	4			47	69	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			4	6	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				166	77	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	676	343	429			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	613	255	347			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	76	95	99			
cM capacity (veh/h)	391	695	1092			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	127	297	292	133
Volume Left	93	14	0	0
Volume Right	34	0	0	133
cSH	443	1092	1700	1700
Volume to Capacity	0.29	0.01	0.17	0.08
Queue Length 95th (m)	9.4	0.3	0.0	0.0
Control Delay (s)	16.4	0.5	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	16.4	0.5	0.0	
Approach LOS	C			

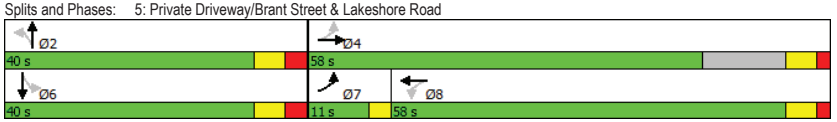
Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	773	16	4	587	95	7	1	2	103	1	196
Future Volume (vph)	177	773	16	4	587	95	7	1	2	103	1	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		0.0	0.0		0.0	0.0		15.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.98	0.99			0.98		1.00	0.96	
Frt		0.997			0.979			0.975			0.851	
Flt Protected	0.950			0.950				0.965		0.950		
Satd. Flow (prot)	1518	3142	0	1300	3076	0	0	1470	0	1562	1324	0
Flt Permitted	0.312			0.330				0.773		0.750		
Satd. Flow (perm)	495	3142	0	444	3076	0	0	1158	0	1228	1324	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			23			2			213	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		84.2			131.5			34.5			166.5	
Travel Time (s)		6.1			9.5			2.5			12.0	
Confl. Peds. (#/hr)	14		28	28		14	32		4	4		32
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%	3%	0%	25%	3%	1%	0%	100%	0%	4%	0%	5%
Adj. Flow (vph)	192	840	17	4	638	103	8	1	2	112	1	213
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	857	0	4	741	0	0	11	0	112	214	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.0	33.0		33.0	33.0		38.0	38.0		38.0	38.0	
Total Split (s)	11.0	58.0		58.0	58.0		40.0	40.0		40.0	40.0	
Total Split (%)	10.1%	53.2%		53.2%	53.2%		36.7%	36.7%		36.7%	36.7%	
Maximum Green (s)	8.0	52.0		52.0	52.0		33.0	33.0		33.0	33.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	-2.0		-2.0	-2.0			-3.0		-3.0	-3.0	
Total Lost Time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)		16.0		16.0	16.0		19.0	19.0		19.0	19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	66.0	65.0		54.1	54.1			16.3		16.3	16.3	
Actuated g/C Ratio	0.74	0.73		0.61	0.61			0.18		0.18	0.18	
v/c Ratio	0.42	0.37		0.01	0.40			0.05		0.50	0.51	
Control Delay	7.0	5.6		8.8	10.2			27.1		40.6	9.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	7.0	5.6		8.8	10.2			27.1		40.6	9.3	
LOS	A	A		A	B			C		D	A	
Approach Delay		5.8			10.2			27.1			20.1	
Approach LOS		A			B			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 109			
Actuated Cycle Length: 89.3			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 9.6		Intersection LOS: A	
Intersection Capacity Utilization 66.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: Private Driveway/Brant Street & Lakeshore Road



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	192	857	4	741	11	112	214
v/c Ratio	0.42	0.37	0.01	0.40	0.05	0.50	0.51
Control Delay	7.0	5.6	8.8	10.2	27.1	40.6	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	5.6	8.8	10.2	27.1	40.6	9.3
Queue Length 50th (m)	8.5	25.1	0.3	32.2	1.4	18.4	0.2
Queue Length 95th (m)	19.8	44.8	1.9	52.8	5.9	35.0	18.6
Internal Link Dist (m)		60.2		107.5	10.5		142.5
Turn Bay Length (m)	55.0		25.0				
Base Capacity (vph)	457	2292	268	1872	468	496	661
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.37	0.01	0.40	0.02	0.23	0.32

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	773	16	4	587	95	7	1	2	103	1	196
Future Volume (vph)	177	773	16	4	587	95	7	1	2	103	1	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99		1.00	1.00	
Frt	1.00	1.00		1.00	0.98			0.98		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1515	3143		1281	3079			1451		1557	1332	
Flt Permitted	0.31	1.00		0.33	1.00			0.77		0.75	1.00	
Satd. Flow (perm)	497	3143		445	3079			1162		1230	1332	
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)	192	840	17	4	638	103	8	1	2	112	1	213
RTOR Reduction (vph)	0	1	0	0	9	0	0	2	0	0	174	0
Lane Group Flow (vph)	192	856	0	4	732	0	0	9	0	112	40	0
Confl. Peds. (#/hr)	14		28	28		14	32		4	4		32
Heavy Vehicles (%)	7%	3%	0%	25%	3%	1%	0%	100%	0%	4%	0%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	63.0	63.0		52.2	52.2			13.3		13.3	13.3	
Effective Green, g (s)	63.0	65.0		54.2	54.2			16.3		16.3	16.3	
Actuated g/C Ratio	0.71	0.73		0.61	0.61			0.18		0.18	0.18	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	439	2287		270	1868			212		224	243	
v/s Ratio Prot	c0.04	0.27			0.24						0.03	
v/s Ratio Perm	c0.27			0.01				0.01		c0.09		
v/c Ratio	0.44	0.37		0.01	0.39			0.04		0.50	0.16	
Uniform Delay, d1	5.1	4.5		7.0	9.1			30.1		32.8	30.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.5		0.1	0.6			0.1		1.8	0.3	
Delay (s)	5.8	5.0		7.1	9.7			30.2		34.6	31.1	
Level of Service	A	A		A	A			C		C	C	
Approach Delay (s)		5.2			9.7			30.2			32.3	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.45				
Actuated Cycle Length (s)	89.3	Sum of lost time (s)	11.0		
Intersection Capacity Utilization	66.0%	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)	10	258	19	23	187	12	11	10	12	17	10	8
Future Volume (vph)	10	258	19	23	187	12	11	10	12	17	10	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.991			0.951			0.968	
Flt Protected		0.998		0.950				0.984			0.977	
Satd. Flow (prot)	0	1627	0	1490	1633	0	0	1148	0	0	1573	0
Flt Permitted		0.998		0.950				0.984			0.977	
Satd. Flow (perm)	0	1627	0	1490	1633	0	0	1148	0	0	1573	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		69.8			62.9			41.7			138.8	
Travel Time (s)		5.0			4.5			3.0			10.0	
Confl. Peds. (#/hr)	6		8	8		6	6		6	6		6
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%	32%	9%	4%	0%	46%	10%	58%	6%	0%	0%
Adj. Flow (vph)	11	280	21	25	203	13	12	11	13	18	11	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	312	0	25	216	0	0	36	0	0	38	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	37.5%	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)	10	258	19	23	187	12	11	10	12	17	10	8
Future Volume (Veh/h)	10	258	19	23	187	12	11	10	12	17	10	8
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)	11	280	21	25	203	13	12	11	13	18	11	9
Pedestrians		6			6			8			6	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		70			63							
pX, platoon unblocked	0.99						0.99	0.99		0.99	0.99	0.99
vC, conflicting volume	222			309			594	592	304	602	596	222
vC1, stage 1 conf vol							320	320		266	266	
vC2, stage 2 conf vol							274	272		337	331	
vCu, unblocked vol	209			309			585	583	304	593	587	208
tC, single (s)	4.1			4.2			7.6	6.6	6.8	7.2	6.5	6.2
tC, 2 stage (s)							6.6	5.6		6.2	5.5	
tF (s)	2.2			2.3			3.9	4.1	3.8	3.6	4.0	3.3
p0 queue free %	99			98			98	98	98	97	98	99
cM capacity (veh/h)	1353			1205			501	542	614	546	548	820

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	312	25	216	36	38
Volume Left	11	25	0	12	18
Volume Right	21	0	13	13	9
cSH	1353	1205	1700	550	593
Volume to Capacity	0.01	0.02	0.13	0.07	0.06
Queue Length 95th (m)	0.2	0.5	0.0	1.7	1.6
Control Delay (s)	0.3	8.1	0.0	12.0	11.5
Lane LOS	A	A		B	B
Approach Delay (s)	0.3	0.8		12.0	11.5
Approach LOS				B	B

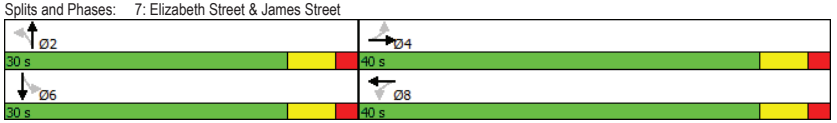
Intersection Summary					
Average Delay	1.9				
Intersection Capacity Utilization	37.5%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	248	34	28	206	3	10	14	38	4	21	6
Future Volume (vph)	5	248	34	28	206	3	10	14	38	4	21	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00			0.98			0.99	
Frt		0.982			0.998			0.917			0.972	
Flt Protected	0.950			0.950				0.992			0.994	
Satd. Flow (prot)	1462	1406	0	1464	1657	0	0	1430	0	0	1331	0
Flt Permitted	0.617			0.573				0.935			0.953	
Satd. Flow (perm)	937	1406	0	877	1657	0	0	1344	0	0	1274	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			1			41			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		62.9			180.3			274.6			209.7	
Travel Time (s)		4.5			13.0			19.8			15.1	
Confl. Peds. (#/hr)	14		8	8		14	11		8	8		11
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%	6%	15%	11%	3%	0%	0%	21%	3%	0%	29%	17%
Parking (#/hr)	0	0	0									
Adj. Flow (vph)	5	270	37	30	224	3	11	15	41	4	23	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	307	0	30	227	0	0	67	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.30	1.30	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	35.5	35.5		35.5	35.5		27.5	27.5		27.5	27.5	
Total Split (s)	40.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Total Split (%)	57.1%	57.1%		57.1%	57.1%		42.9%	42.9%		42.9%	42.9%	
Maximum Green (s)	34.0	34.0		34.0	34.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	20.0	20.0		20.0	20.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	7.0	7.0		7.0	7.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	43.6	43.6		43.6	43.6			10.3			10.3	
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.19			0.19	
v/c Ratio	0.01	0.27		0.04	0.17			0.24			0.14	
Control Delay	3.4	3.9		3.5	3.4			12.5			17.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	3.4	3.9		3.5	3.4			12.5			17.2	
LOS	A	A		A	A			B			B	
Approach Delay		3.9			3.4			12.5			17.2	
Approach LOS		A			A			B			B	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 70			
Actuated Cycle Length: 54.7			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.27			
Intersection Signal Delay: 5.2		Intersection LOS: A	
Intersection Capacity Utilization 42.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Elizabeth Street & James Street

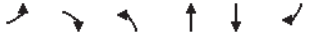


Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	5	307	30	227	67	34
v/c Ratio	0.01	0.27	0.04	0.17	0.24	0.14
Control Delay	3.4	3.9	3.5	3.4	12.5	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	3.9	3.5	3.4	12.5	17.2
Queue Length 50th (m)	0.2	9.8	0.8	7.0	2.3	2.4
Queue Length 95th (m)	1.0	21.2	3.1	14.9	10.8	8.5
Internal Link Dist (m)		38.9		156.3	250.6	185.7
Turn Bay Length (m)	15.0		30.0			
Base Capacity (vph)	746	1123	698	1320	660	609
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.27	0.04	0.17	0.10	0.06

Intersection Summary

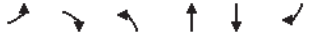
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	248	34	28	206	3	10	14	38	4	21	6
Future Volume (vph)	5	248	34	28	206	3	10	14	38	4	21	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
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			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.92			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1446	1406		1455	1657			1429			1331	
Flt Permitted	0.62	1.00		0.57	1.00			0.93			0.95	
Satd. Flow (perm)	939	1406		878	1657			1347			1275	
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)	5	270	37	30	224	3	11	15	41	4	23	7
RTOR Reduction (vph)	0	4	0	0	0	0	0	36	0	0	6	0
Lane Group Flow (vph)	5	303	0	30	227	0	0	31	0	0	28	0
Confl. Peds. (#/hr)	14		8	8		14	11		8	8		11
Heavy Vehicles (%)	0%	6%	15%	11%	3%	0%	0%	21%	3%	0%	29%	17%
Parking (#/hr)	0	0	0									
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)	40.0	40.0		40.0	40.0			5.1			5.1	
Effective Green, g (s)	42.0	42.0		42.0	42.0			7.1			7.1	
Actuated g/C Ratio	0.74	0.74		0.74	0.74			0.12			0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	690	1034		645	1218			167			158	
v/s Ratio Prot		c0.22			0.14							
v/s Ratio Perm	0.01			0.03				c0.02			0.02	
v/c Ratio	0.01	0.29		0.05	0.19			0.19			0.18	
Uniform Delay, d1	2.0	2.5		2.1	2.3			22.4			22.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.7		0.1	0.3			0.5			0.5	
Delay (s)	2.0	3.3		2.2	2.7			23.0			22.9	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		3.2			2.6			23.0			22.9	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	6.0	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.28				
Actuated Cycle Length (s)	57.1	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	42.3%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	33	53	0
Future Volume (vph)	0	0	0	33	53	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)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.6			209.5	41.7	
Travel Time (s)	3.5			15.1	3.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	36	58	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	36	58	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	33	53	0
Future Volume (Veh/h)	0	0	0	33	53	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	36	58	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	94	58	58			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	94	58	58			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	906	1008	1546			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	36	58
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1546	1700
Volume to Capacity	0.00	0.00	0.03
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		

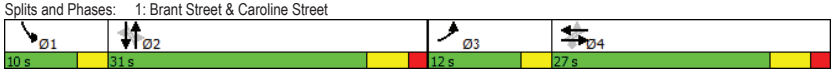
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	71	14	55	161	109	11	316	19	69	383	44
Future Volume (vph)	141	71	14	55	161	109	11	316	19	69	383	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		10.0	20.0		0.0	25.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.94		0.94	0.96	0.95		0.99	1.00		0.99	1.00	
Frt			0.850		0.940			0.991			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1454	1624	1514	0	1624	1629	0	1593	1632	0
Flt Permitted	0.375			0.707			0.244			0.350		
Satd. Flow (perm)	601	1710	1361	1161	1514	0	414	1629	0	581	1632	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		43			4			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.3			80.7			104.4			184.8	
Travel Time (s)		7.4			5.8			7.5			13.3	
Confl. Peds. (#/hr)	53		20	20		53	11		11	11		11
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%	0%	0%	0%	0%	1%	0%	4%	0%	2%	3%	0%
Adj. Flow (vph)	153	77	15	60	175	118	12	343	21	75	416	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	153	77	15	60	293	0	12	364	0	75	464	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Detector Phase	3	4	4	4	4		2	2		1	2	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	24.0	24.0	24.0	24.0		29.0	29.0		9.0	29.0	
Total Split (s)	12.0	27.0	27.0	27.0	27.0		31.0	31.0		10.0	31.0	
Total Split (%)	15.0%	33.8%	33.8%	33.8%	33.8%		38.8%	38.8%		12.5%	38.8%	
Maximum Green (s)	9.0	21.0	21.0	21.0	21.0		25.0	25.0		7.0	25.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		0.0	-2.0	
Total Lost Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Ped	Ped	Ped	Ped		Ped	Ped		Min	Ped	
Walk Time (s)		10.0	10.0	10.0	10.0		15.0	15.0			15.0	
Flash Dont Walk (s)		8.0	8.0	8.0	8.0		8.0	8.0			8.0	
Pedestrian Calls (#/hr)		0	0	0	0		0	0			0	
Act Effct Green (s)	30.6	21.2	21.2	21.2	21.2		26.5	26.5		34.2	26.5	
Actuated g/C Ratio	0.40	0.28	0.28	0.28	0.28		0.34	0.34		0.44	0.34	
v/c Ratio	0.44	0.16	0.03	0.19	0.65		0.08	0.65		0.22	0.82	
Control Delay	17.8	22.7	0.1	23.6	29.0		20.0	27.8		12.9	37.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.8	22.7	0.1	23.6	29.0		20.0	27.8		12.9	37.0	
LOS	B	C	A	C	C		B	C		B	D	
Approach Delay		18.2			28.1			27.5			33.6	
Approach LOS		B			C			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 76.9			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 28.3		Intersection LOS: C	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Brant Street & Caroline Street



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	153	77	15	60	293	12	364	75	464
v/c Ratio	0.44	0.16	0.03	0.19	0.65	0.08	0.65	0.22	0.82
Control Delay	17.8	22.7	0.1	23.6	29.0	20.0	27.8	12.9	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	22.7	0.1	23.6	29.0	20.0	27.8	12.9	37.0
Queue Length 50th (m)	14.3	9.1	0.0	7.2	34.4	1.2	45.3	5.8	62.2
Queue Length 95th (m)	26.2	19.6	0.0	16.7	61.3	5.3	78.7	13.7	#119.4
Internal Link Dist (m)		78.3			56.7		80.4		160.8
Turn Bay Length (m)	40.0		10.0	20.0		25.0		40.0	
Base Capacity (vph)	363	512	493	347	483	145	575	353	579
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.15	0.03	0.17	0.61	0.08	0.63	0.21	0.80

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	71	14	55	161	109	11	316	19	69	383	44
Future Volume (vph)	141	71	14	55	161	109	11	316	19	69	383	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	0.95		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00	1.00	0.96	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.94		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1591	1710	1364	1562	1516		1613	1630		1588	1633	
Flt Permitted	0.37	1.00	1.00	0.71	1.00		0.24	1.00		0.35	1.00	
Satd. Flow (perm)	627	1710	1364	1162	1516		415	1630		585	1633	
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)	153	77	15	60	175	118	12	343	21	75	416	48
RTOR Reduction (vph)	0	0	11	0	31	0	0	3	0	0	5	0
Lane Group Flow (vph)	153	77	4	60	262	0	12	361	0	75	459	0
Confl. Peds. (#/hr)	53		20	20		53	11		11	11		11
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	4%	0%	2%	3%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)	27.6	19.2	19.2	19.2	19.2		24.5	24.5		31.2	24.5	
Effective Green, g (s)	27.6	21.2	21.2	21.2	21.2		26.5	26.5		31.2	26.5	
Actuated g/C Ratio	0.36	0.28	0.28	0.28	0.28		0.35	0.35		0.41	0.35	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	330	472	376	320	418		143	562		325	563	
v/s Ratio Prot	c0.05	0.05			c0.17			0.22		c0.02	c0.28	
v/s Ratio Perm	0.12		0.00	0.05			0.03			0.07		
v/c Ratio	0.46	0.16	0.01	0.19	0.63		0.08	0.64		0.23	0.81	
Uniform Delay, d1	17.8	21.1	20.2	21.2	24.3		17.0	21.2		14.8	22.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.2	0.0	0.3	2.9		0.3	2.5		0.4	8.9	
Delay (s)	18.8	21.2	20.2	21.5	27.3		17.2	23.7		15.1	31.8	
Level of Service	B	C	C	C	C		B	C		B	C	
Approach Delay (s)		19.7			26.3			23.5			29.5	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	76.8	Sum of lost time (s)	14.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	124	292	343	356	96
Future Volume (vph)	3	124	292	343	356	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868				0.971	
Flt Protected	0.999			0.978		
Satd. Flow (prot)	1483	0	0	1468	1471	0
Flt Permitted	0.999			0.978		
Satd. Flow (perm)	1483	0	0	1468	1471	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	187.1			83.2	180.0	
Travel Time (s)	16.8			6.0	13.0	
Confl. Peds. (#/hr)		35	18			18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	3%	2%	0%
Parking (#/hr)				0	0	
Adj. Flow (vph)	3	135	317	373	387	104
Shared Lane Traffic (%)						
Lane Group Flow (vph)	138	0	0	690	491	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.30	1.30	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	124	292	343	356	96
Future Volume (Veh/h)	3	124	292	343	356	96
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	135	317	373	387	104
Pedestrians	18			35		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	2			3		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				83	284	
pX, platoon unblocked	0.88	0.79	0.79			
vC, conflicting volume	1464	492	509			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1008	227	248			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	78	69			
cM capacity (veh/h)	161	619	1027			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	138	690	491
Volume Left	3	317	0
Volume Right	135	0	104
cSH	583	1027	1700
Volume to Capacity	0.24	0.31	0.29
Queue Length 95th (m)	7.3	10.6	0.0
Control Delay (s)	13.1	6.8	0.0
Lane LOS	B	A	
Approach Delay (s)	13.1	6.8	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		4.9		
Intersection Capacity Utilization		88.5%	ICU Level of Service	E
Analysis Period (min)		15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	357	315	320	58	176	304
Future Volume (vph)	357	315	320	58	176	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0		8.0	20.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.91		0.94	0.98	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1608	1398	1524	1454	1593	1693
Flt Permitted	0.950				0.389	
Satd. Flow (perm)	1538	1267	1524	1374	640	1693
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		342		27		
Link Speed (k/h)	50		50			50
Link Distance (m)	69.8		76.6			83.2
Travel Time (s)	5.0		5.5			6.0
Confl. Peds. (#/hr)	25	43		25	25	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	4%	1%	0%	2%	1%
Parking (#/hr)			0			
Adj. Flow (vph)	388	342	348	63	191	330
Shared Lane Traffic (%)						
Lane Group Flow (vph)	388	342	348	63	191	330
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane	Yes					
Headway Factor	1.14	1.14	1.30	1.14	1.14	1.14
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	29.0	29.0	34.0	34.0	9.0	34.0
Total Split (s)	32.0	32.0	36.0	36.0	12.0	36.0
Total Split (%)	40.0%	40.0%	45.0%	45.0%	15.0%	45.0%
Maximum Green (s)	26.0	26.0	30.0	30.0	9.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	0.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0	8.0	20.0	20.0		20.0
Flash Dont Walk (s)	15.0	15.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	22.4	22.4	22.5	22.5	32.1	22.5
Actuated g/C Ratio	0.34	0.34	0.35	0.35	0.49	0.35
v/c Ratio	0.73	0.52	0.66	0.13	0.43	0.56
Control Delay	29.4	5.5	25.5	10.7	11.8	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	5.5	25.5	10.7	11.8	22.1
LOS	C	A	C	B	B	C
Approach Delay	18.2		23.2			18.3
Approach LOS	B		C			B

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 65			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 19.5		Intersection LOS: B	
Intersection Capacity Utilization 64.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Brant Street & James Street





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	388	342	348	63	191	330
v/c Ratio	0.73	0.52	0.66	0.13	0.43	0.56
Control Delay	29.4	5.5	25.5	10.7	11.8	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	5.5	25.5	10.7	11.8	22.1
Queue Length 50th (m)	43.4	0.0	38.2	3.1	12.1	34.7
Queue Length 95th (m)	#88.1	17.5	69.3	11.1	24.9	62.1
Internal Link Dist (m)	45.8		52.6			59.2
Turn Bay Length (m)	15.0			8.0	20.0	
Base Capacity (vph)	693	759	785	721	462	873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.45	0.44	0.09	0.41	0.38

Intersection Summary

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



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	357	315	320	58	176	304
Future Volume (vph)	357	315	320	58	176	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.92	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.97	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1287	1524	1384	1584	1693
Flt Permitted	0.95	1.00	1.00	1.00	0.39	1.00
Satd. Flow (perm)	1552	1287	1524	1384	648	1693
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	388	342	348	63	191	330
RTOR Reduction (vph)	0	223	0	18	0	0
Lane Group Flow (vph)	388	119	348	45	191	330
Confl. Peds. (#/hr)	25	43		25	25	
Heavy Vehicles (%)	1%	4%	1%	0%	2%	1%
Parking (#/hr)			0			
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Actuated Green, G (s)	20.3	20.3	20.4	20.4	29.0	20.4
Effective Green, g (s)	22.3	22.3	22.4	22.4	29.0	22.4
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.45	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	538	446	530	482	417	589
v/s Ratio Prot			c0.23		c0.06	0.19
v/s Ratio Perm	c0.25	0.09		0.03	0.15	
v/c Ratio	0.72	0.27	0.66	0.09	0.46	0.56
Uniform Delay, d1	18.3	15.1	17.7	14.1	11.4	17.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	0.3	2.9	0.1	0.8	1.2
Delay (s)	23.0	15.4	20.6	14.2	12.2	18.2
Level of Service	C	B	C	B	B	B
Approach Delay (s)	19.5		19.6			16.0
Approach LOS	B		B			B

Intersection Summary

HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	54	55	65	324	389	272
Future Volume (vph)	54	55	65	324	389	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			20.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.932					0.850
Flt Protected	0.976			0.992		
Satd. Flow (prot)	1540	0	0	1663	1660	1439
Flt Permitted	0.976			0.992		
Satd. Flow (perm)	1540	0	0	1663	1660	1439
Link Speed (k/h)	40			50	50	
Link Distance (m)	184.7			166.5	76.6	
Travel Time (s)	16.6			12.0	5.5	
Confl. Peds. (#/hr)	4	74	4			4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	3%	1%
Adj. Flow (vph)	59	60	71	352	423	296
Shared Lane Traffic (%)						
Lane Group Flow (vph)	119	0	0	423	423	296
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	54	55	65	324	389	272
Future Volume (Veh/h)	54	55	65	324	389	272
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	60	71	352	423	296
Pedestrians	4			74	4	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			6	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				166	77	
pX, platoon unblocked	0.97					
vC, conflicting volume	925	501	723			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	910	501	723			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	89	92			
cM capacity (veh/h)	273	533	876			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	119	423	423	296
Volume Left	59	71	0	0
Volume Right	60	0	0	296
cSH	362	876	1700	1700
Volume to Capacity	0.33	0.08	0.25	0.17
Queue Length 95th (m)	11.2	2.1	0.0	0.0
Control Delay (s)	19.7	2.4	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	19.7	2.4	0.0	
Approach LOS	C			

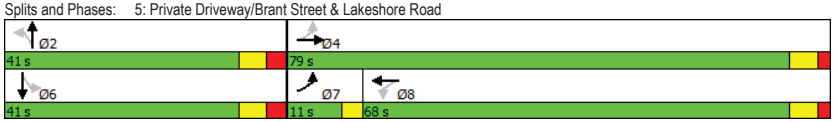
Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	68.7%	ICU Level of Service	C	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	728	9	5	927	182	6	4	0	105	7	332
Future Volume (vph)	203	728	9	5	927	182	6	4	0	105	7	332
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		0.0	0.0		0.0	0.0		15.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		0.95	0.98			0.98		0.98	0.93	
Frt		0.998			0.975						0.853	
Flt Protected	0.950			0.950				0.969		0.950		
Satd. Flow (prot)	1608	2972	0	1624	3035	0	0	1657	0	1624	1333	0
Flt Permitted	0.151			0.349				0.656		0.750		
Satd. Flow (perm)	256	2972	0	570	3035	0	0	1103	0	1252	1333	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			29						182	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		84.2			131.5			34.5			166.5	
Travel Time (s)		6.1			9.5			2.5			12.0	
Confl. Peds. (#/hr)	59		62	62		59	51		21	21		51
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 (%)	1%	9%	1%	0%	2%	1%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	221	791	10	5	1008	198	7	4	0	114	8	361
Shared Lane Traffic (%)												
Lane Group Flow (vph)	221	801	0	5	1206	0	0	11	0	114	369	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.0	33.0		33.0	33.0		38.0	38.0		38.0	38.0	
Total Split (s)	11.0	79.0		68.0	68.0		41.0	41.0		41.0	41.0	
Total Split (%)	9.2%	65.8%		56.7%	56.7%		34.2%	34.2%		34.2%	34.2%	
Maximum Green (s)	8.0	73.0		62.0	62.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	-2.0		-2.0	-2.0			-3.0		-3.0	-3.0	
Total Lost Time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)		16.0		16.0	16.0		19.0	19.0		19.0	19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	76.5	75.5		64.4	64.4			24.9		24.9	24.9	
Actuated g/C Ratio	0.71	0.70		0.59	0.59			0.23		0.23	0.23	
v/c Ratio	0.79	0.39		0.01	0.66			0.04		0.40	0.83	
Control Delay	30.3	8.6		12.4	18.1			30.7		38.5	35.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	30.3	8.6		12.4	18.1			30.7		38.5	35.4	
LOS	C	A		B	B			C		D	D	
Approach Delay		13.3			18.1			30.7			36.2	
Approach LOS		B			B			C			D	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 108.4			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 85.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 5: Private Driveway/Brant Street & Lakeshore Road



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	221	801	5	1206	11	114	369
v/c Ratio	0.79	0.39	0.01	0.66	0.04	0.40	0.83
Control Delay	30.3	8.6	12.4	18.1	30.7	38.5	35.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	8.6	12.4	18.1	30.7	38.5	35.4
Queue Length 50th (m)	15.2	35.3	0.5	88.0	1.9	21.5	40.9
Queue Length 95th (m)	#53.3	63.5	2.7	142.0	6.6	38.1	78.8
Internal Link Dist (m)		60.2		107.5	10.5		142.5
Turn Bay Length (m)	55.0		25.0				
Base Capacity (vph)	281	2069	338	1814	378	430	577
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.39	0.01	0.66	0.03	0.27	0.64

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	728	9	5	927	182	6	4	0	105	7	332
Future Volume (vph)	203	728	9	5	927	182	6	4	0	105	7	332
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.98			1.00		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		0.96	1.00			0.99		0.98	1.00	
Frt	1.00	1.00		1.00	0.98			1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1606	2973		1558	3042			1633		1589	1341	
Flt Permitted	0.15	1.00		0.35	1.00			0.66		0.75	1.00	
Satd. Flow (perm)	256	2973		572	3042			1105		1255	1341	
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)	221	791	10	5	1008	198	7	4	0	114	8	361
RTOR Reduction (vph)	0	1	0	0	12	0	0	0	0	0	140	0
Lane Group Flow (vph)	221	800	0	5	1194	0	0	11	0	114	229	0
Confl. Peds. (#/hr)	59		62	62		59	51		21	21		51
Heavy Vehicles (%)	1%	9%	1%	0%	2%	1%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	73.5	73.5		62.4	62.4			21.9		21.9	21.9	
Effective Green, g (s)	73.5	75.5		64.4	64.4			24.9		24.9	24.9	
Actuated g/C Ratio	0.68	0.70		0.59	0.59			0.23		0.23	0.23	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	274	2070		339	1807			253		288	308	
v/s Ratio Prot	c0.06	0.27			0.39						c0.17	
v/s Ratio Perm	c0.49			0.01				0.01		0.09		
v/c Ratio	0.81	0.39		0.01	0.66			0.04		0.40	0.74	
Uniform Delay, d1	12.0	6.8		9.0	14.7			32.5		35.4	38.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	15.8	0.5		0.1	1.9			0.1		0.9	9.3	
Delay (s)	27.8	7.4		9.1	16.6			32.6		36.3	48.1	
Level of Service	C	A		A	B			C		D	D	
Approach Delay (s)		11.8			16.6			32.6			45.3	
Approach LOS		B			B			C			D	

Intersection Summary					
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.79				
Actuated Cycle Length (s)	108.4	Sum of lost time (s)		11.0	
Intersection Capacity Utilization	85.3%	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)	6	221	7	15	642	15	12	17	18	20	21	17
Future Volume (vph)	6	221	7	15	642	15	12	17	18	20	21	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.997			0.947			0.961	
Flt Protected		0.999		0.950				0.987			0.983	
Satd. Flow (prot)	0	1679	0	1354	1688	0	0	1274	0	0	1615	0
Flt Permitted		0.999		0.950				0.987			0.983	
Satd. Flow (perm)	0	1679	0	1354	1688	0	0	1274	0	0	1615	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		69.8			62.9			48.7			132.9	
Travel Time (s)		5.0			4.5			3.5			9.6	
Confl. Peds. (#/hr)	8		3	3		8	15		16	16		15
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%	0%	43%	20%	1%	0%	46%	0%	35%	0%	0%	0%
Adj. Flow (vph)	7	240	8	16	698	16	13	18	20	22	23	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	255	0	16	714	0	0	51	0	0	63	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	54.0%	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)	6	221	7	15	642	15	12	17	18	20	21	17
Future Volume (Veh/h)	6	221	7	15	642	15	12	17	18	20	21	17
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)	7	240	8	16	698	16	13	18	20	22	23	18
Pedestrians		15			16			3			8	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		70			63							
pX, platoon unblocked	0.79						0.79	0.79		0.79	0.79	0.79
vC, conflicting volume	722			251			1036	1015	263	1049	1011	729
vC1, stage 1 conf vol							261	261		746	746	
vC2, stage 2 conf vol							774	754		303	265	
vCu, unblocked vol	513			251			911	885	263	928	880	522
tC, single (s)	4.1			4.3			7.6	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)							6.6	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.9	4.0	3.6	3.5	4.0	3.3
p0 queue free %	99			99			95	95	97	94	94	96
cM capacity (veh/h)	832			1213			277	368	691	366	375	432

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	255	16	714	51	63
Volume Left	7	16	0	13	22
Volume Right	8	0	16	20	18
cSH	832	1213	1700	409	386
Volume to Capacity	0.01	0.01	0.42	0.12	0.16
Queue Length 95th (m)	0.2	0.3	0.0	3.4	4.6
Control Delay (s)	0.3	8.0	0.0	15.1	16.1
Lane LOS	A	A		C	C
Approach Delay (s)	0.3	0.2		15.1	16.1
Approach LOS				C	C

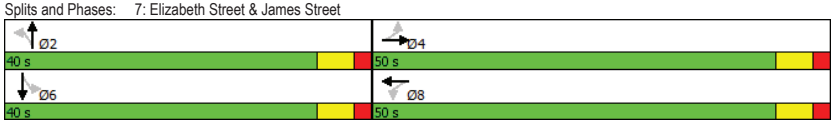
Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	54.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	208	42	73	617	9	47	41	63	9	20	8
Future Volume (vph)	9	208	42	73	617	9	47	41	63	9	20	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	1.00			0.98			0.99	
Frt		0.975			0.998			0.944			0.970	
Flt Protected	0.950			0.950				0.985			0.988	
Satd. Flow (prot)	1462	1444	0	1562	1673	0	0	1548	0	0	1619	0
Flt Permitted	0.330			0.592				0.888			0.930	
Satd. Flow (perm)	506	1444	0	965	1673	0	0	1381	0	0	1521	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			1			47			9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		62.9			180.3			274.6			209.7	
Travel Time (s)		4.5			13.0			19.8			15.1	
Confl. Peds. (#/hr)	8		8	8		8	16		5	5		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	4%	2%	0%	0%	2%	2%	0%	0%	0%
Parking (#/hr)	0	0	0									
Adj. Flow (vph)	10	226	46	79	671	10	51	45	68	10	22	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	272	0	79	681	0	0	164	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.30	1.30	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	35.5	35.5		35.5	35.5		27.5	27.5		27.5	27.5	
Total Split (s)	50.0	50.0		50.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	44.0	44.0		44.0	44.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	20.0	20.0		20.0	20.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	7.0	7.0		7.0	7.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	48.9	48.9		48.9	48.9			13.6			13.6	
Actuated g/C Ratio	0.69	0.69		0.69	0.69			0.19			0.19	
v/c Ratio	0.03	0.27		0.12	0.59			0.54			0.14	
Control Delay	4.8	5.2		5.0	8.9			24.0			19.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.8	5.2		5.0	8.9			24.0			19.1	
LOS	A	A		A	A			C			B	
Approach Delay		5.2			8.5			24.0			19.1	
Approach LOS		A			A			C			B	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 90			
Actuated Cycle Length: 70.5			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 68.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 7: Elizabeth Street & James Street



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	10	272	79	681	164	41
v/c Ratio	0.03	0.27	0.12	0.59	0.54	0.14
Control Delay	4.8	5.2	5.0	8.9	24.0	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	5.2	5.0	8.9	24.0	19.1
Queue Length 50th (m)	0.3	10.3	2.9	38.0	13.7	3.5
Queue Length 95th (m)	2.1	25.5	9.1	86.4	30.6	10.8
Internal Link Dist (m)		38.9		156.3	250.6	185.7
Turn Bay Length (m)	15.0		30.0			
Base Capacity (vph)	350	1006	669	1159	731	785
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.27	0.12	0.59	0.22	0.05

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	208	42	73	617	9	47	41	63	9	20	8
Future Volume (vph)	9	208	42	73	617	9	47	41	63	9	20	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.94			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1457	1444		1551	1673			1537			1620	
Flt Permitted	0.33	1.00		0.59	1.00			0.89			0.93	
Satd. Flow (perm)	506	1444		966	1673			1386			1524	
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)	10	226	46	79	671	10	51	45	68	10	22	9
RTOR Reduction (vph)	0	5	0	0	0	0	0	38	0	0	7	0
Lane Group Flow (vph)	10	267	0	79	681	0	0	126	0	0	34	0
Confl. Peds. (#/hr)	8		8	8		8	16		5	5		16
Heavy Vehicles (%)	0%	3%	5%	4%	2%	0%	0%	2%	2%	0%	0%	0%
Parking (#/hr)	0	0	0									
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)	46.8	46.8		46.8	46.8			11.6			11.6	
Effective Green, g (s)	48.8	48.8		48.8	48.8			13.6			13.6	
Actuated g/C Ratio	0.69	0.69		0.69	0.69			0.19			0.19	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	350	1000		669	1159			267			294	
v/s Ratio Prot		0.18			c0.41							
v/s Ratio Perm	0.02			0.08				c0.09			0.02	
v/c Ratio	0.03	0.27		0.12	0.59			0.47			0.11	
Uniform Delay, d1	3.4	4.1		3.6	5.6			25.2			23.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.7		0.4	2.2			1.3			0.2	
Delay (s)	3.5	4.7		4.0	7.8			26.5			23.6	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		4.7			7.4			26.5			23.6	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.56				
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	8.0		
Intersection Capacity Utilization	68.0%	ICU Level of Service	C		
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	47	43	0
Future Volume (vph)	0	0	0	47	43	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)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.6			202.5	48.7	
Travel Time (s)	3.5			14.6	3.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	51	47	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	51	47	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	47	43	0
Future Volume (Veh/h)	0	0	0	47	43	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	51	47	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	98	47	47			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	98	47	47			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	901	1022	1560			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	51	47
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1560	1700
Volume to Capacity	0.00	0.00	0.03
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	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D

ITE Trip Reduction Worksheet

Name of Development

409 Brant Street

Time Period

AM Peak Hour

LAND USE A

ITE LU Code: Res. Condo/TH (222)

Size: 227 units

	Total	Internal	External
Enter	18	0	18
Exit	58	0	58
Total	76	0	76
%	100%	0%	100%

18 Enter from External

Exit to External 58

22 | 38% Demand

6 | 33% Demand

0 Demand

0 Demand

0 Balanced

0 Balanced

0 Balanced

0 Balanced

0 | 9% Demand

0 | 11% Demand

0 Demand

0 Demand

LAND USE B

ITE LU Code: Shopping Center (820)

Size: 6,425 ft²

LAND USE C

ITE LU Code

Size

2 Exit to External

Enter from External 4

	Total	Internal	External
Enter	4	0	4
Exit	2	0	2
Total	6	0	6
%	100%	0%	100%

0 Demand

0 Demand

Balanced 0

Balanced 0

0 Demand

0 Demand

	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%	100%	#DIV/0!	#DIV/0!

0 Enter from External

Exit to External 0

Net External Trips for Multi-Use Development

	Land Use A	Land Use B	Land Use C	TOTAL
Enter	18	4	0	22
Exit	58	2	0	60
Total	76	6	0	82
Single Use Trip Gen	76	6	0	82

Internal Capture: 0%

Unconstrained Internal Capture Rates for Trip Origins within a Multi-Use Development

Daily Rate

From OFFICE	to Office	2%
	to Retail	22%
	to Residential	2%
From RETAIL	to Office	3%
	to Retail	30%
	to Residential	11%
From RESIDENTIAL	to Office	N/A
	to Retail	38%
	to Residential	N/A

Unconstrained Internal Capture Rates for Trip Destinations within a Multi-Use Development

Daily Rate

To OFFICE	from Office	2%
	from Retail	15%
	from Residential	N/A
to RETAIL	from Office	4%
	from Retail	28%
	from Residential	9%
to RESIDENTIAL	from Office	3%
	from Retail	33%
	from Residential	N/A

Name of Development

409 Brant Street

Time Period

PM Peak Hour

LAND USE A

ITE LU Code: Res. Condo/TH (222)

Size: 227 units

	Total	Internal	External
Enter	52	1	51
Exit	34	1	33
Total	86	2	84
%	100%	2%	98%

51 Enter from External

Exit to External 33

18 | 53% Demand

16 | 31% Demand

0 | 0% Demand

0 | 0% Demand

1 Balanced

1 Balanced

0 Balanced

0 Balanced

1 | 9% Demand

1 | 12% Demand

0 | 0% Demand

0 | 0% Demand

LAND USE B

ITE LU Code: Shopping Center (820)

Size: 6,425 ft²

LAND USE C

ITE LU Code

Size

11 Exit to External

Enter from External 11

	Total	Internal	External
Enter	12	1	11
Exit	12	1	11
Total	24	2	22
%	100%	8%	92%

Demand 0 | 2%

Balanced 0

Demand 0 | 23%

Demand 0 | 3%

Balanced 0

Demand 0 | 31%

	Total	Internal	External
Enter		0	0
Exit		0	0
Total	0	0	0
%	100%	#DIV/0!	#DIV/0!

0 Enter from External

Exit to External 0

Net External Trips for Multi-Use Development				
	Land Use A	Land Use B	Land Use C	TOTAL
Enter	51	11	0	62
Exit	33	11	0	44
Total	84	22	0	106
Single Use Trip Gen	86	24	0	110

Internal Capture: 4%

Unconstrained Internal Capture Rates for Trip Origins within a Multi-Use Development

Weekday PM Peak of Adjacent Street

From OFFICE	to Office	1%
	to Retail	23%
	to Residential	2%
From RETAIL	to Office	3%
	to Retail	20%
	to Residential	12%
From RESIDENTIAL	to Office	N/A
	to Retail	53%
	to Residential	N/A

Unconstrained Internal Capture Rates for Trip Destinations within a Multi-Use Development

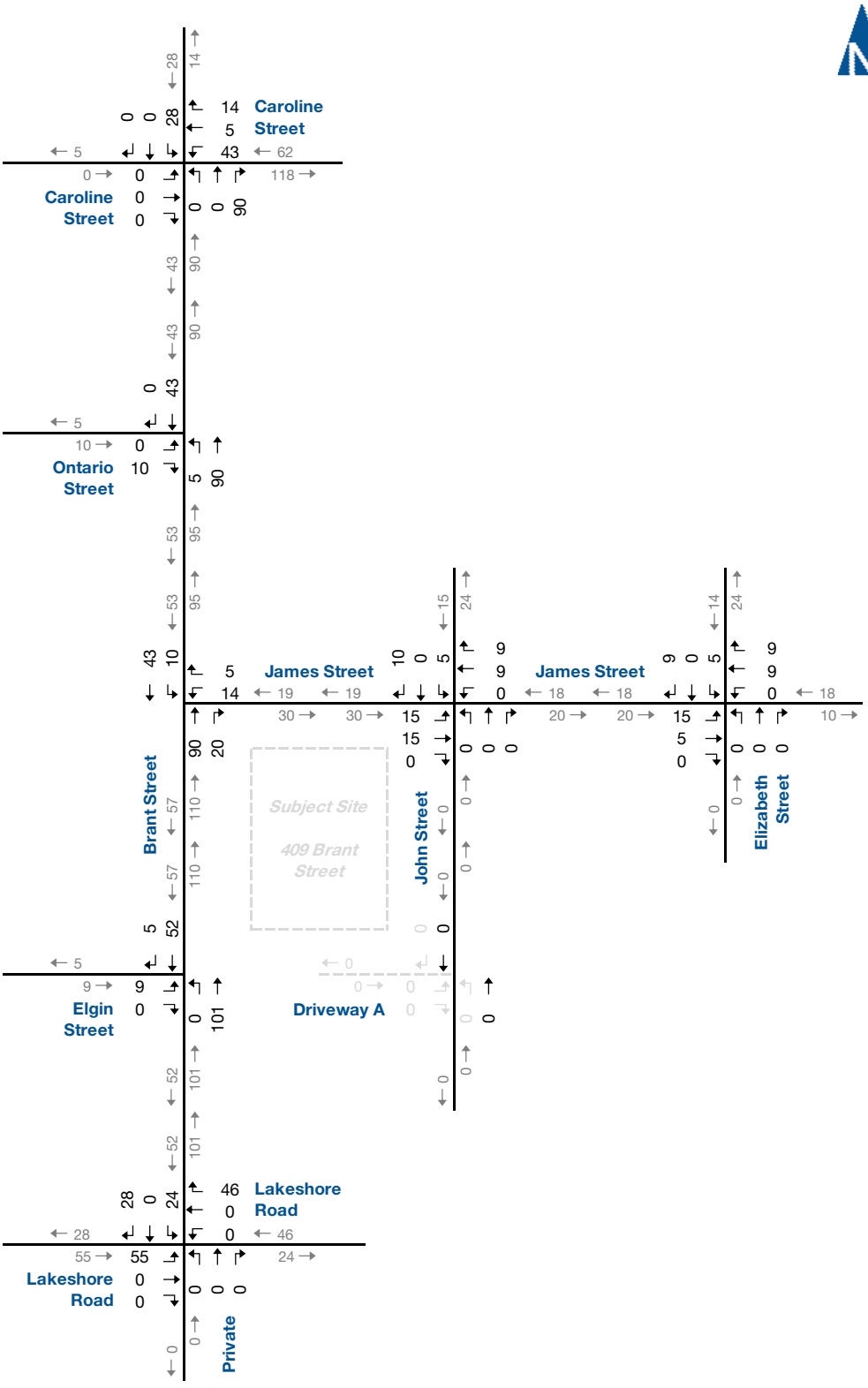
Weekday PM Peak of Adjacent Street

To OFFICE	from Office	6%
	from Retail	31%
	from Residential	0%
to RETAIL	from Office	2%
	from Retail	20%
	from Residential	9%
to RESIDENTIAL	from Office	2%
	from Retail	31%
	from Residential	N/A

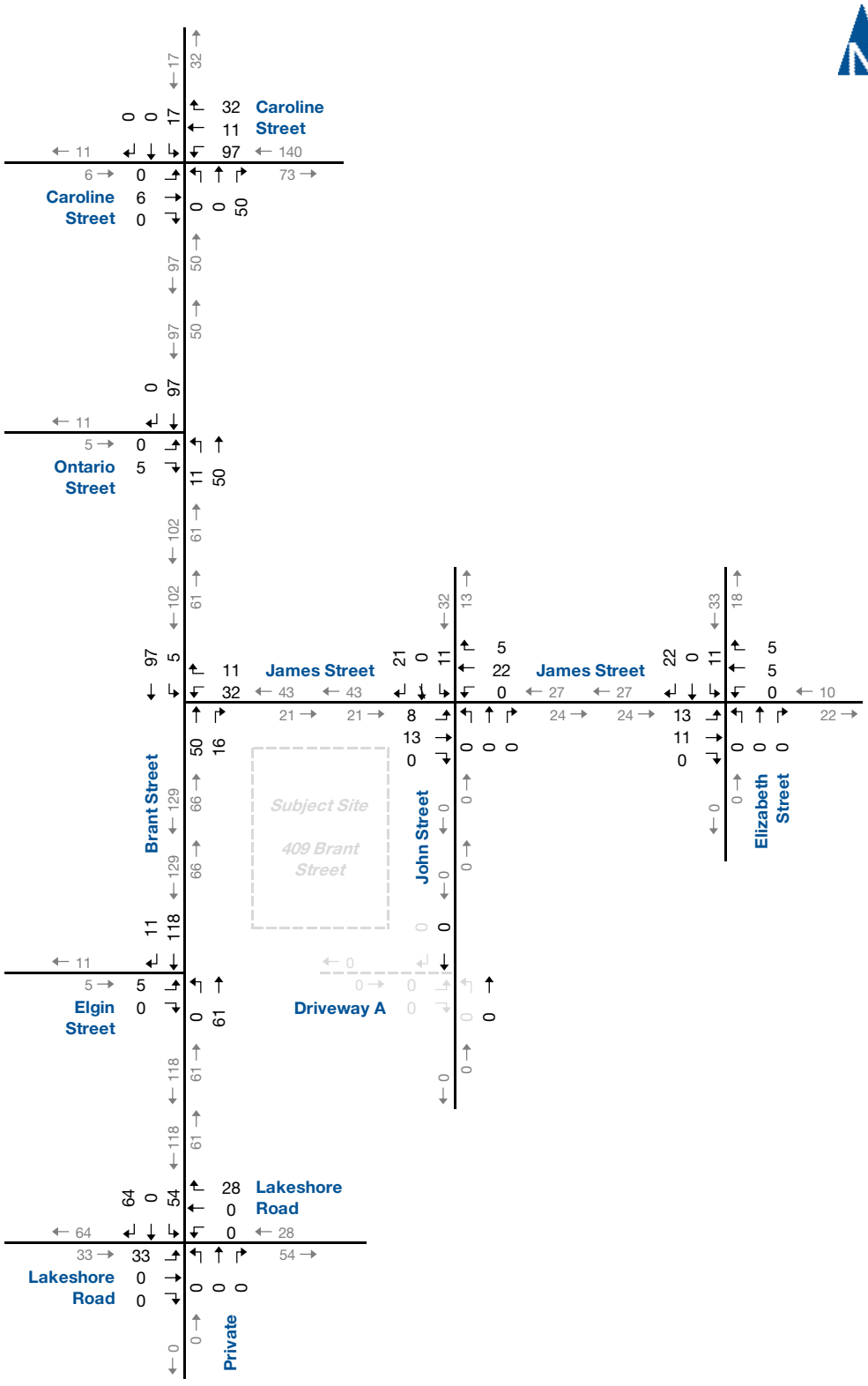
Appendix E

Approved Developments Trip Generation & Projections

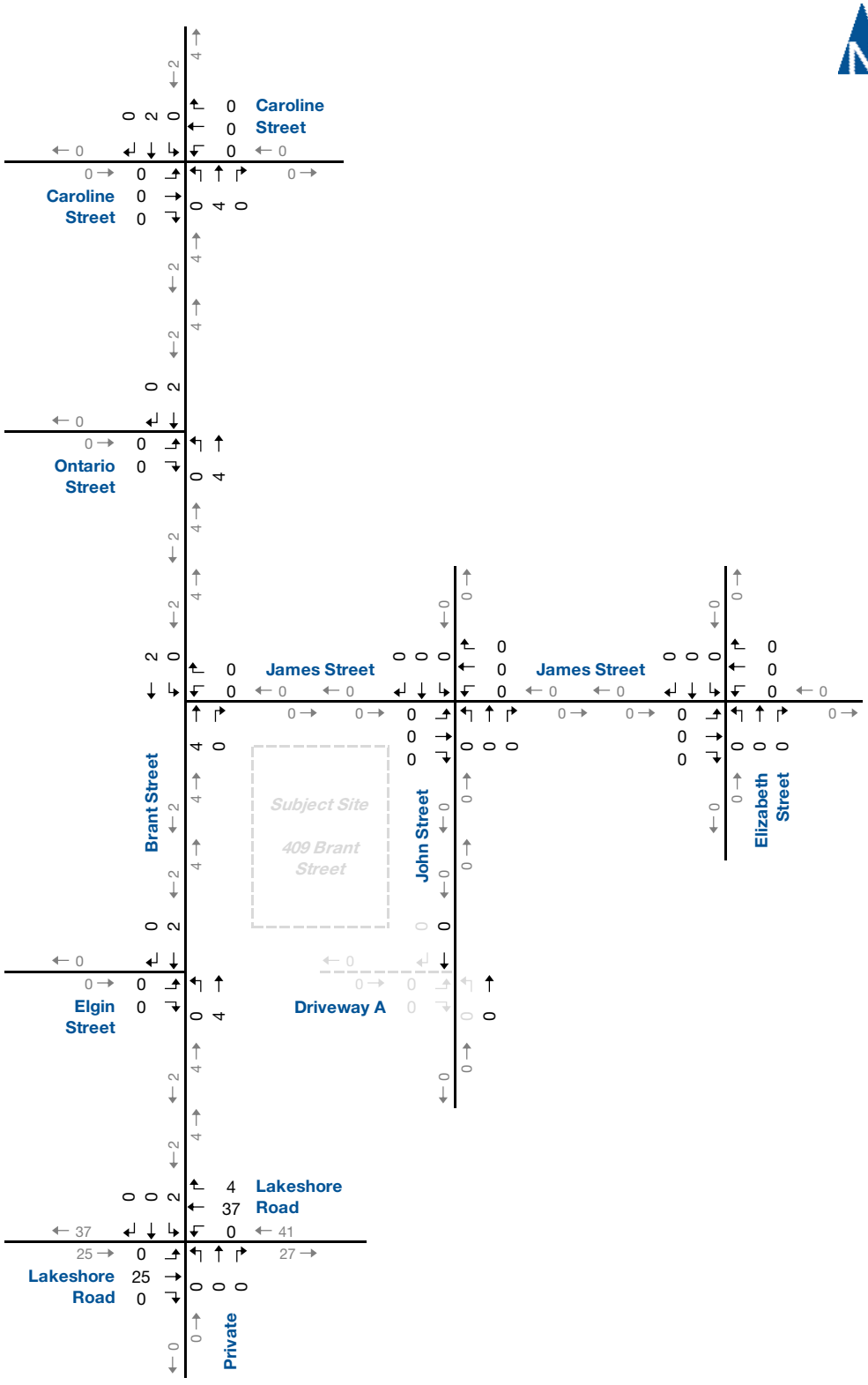




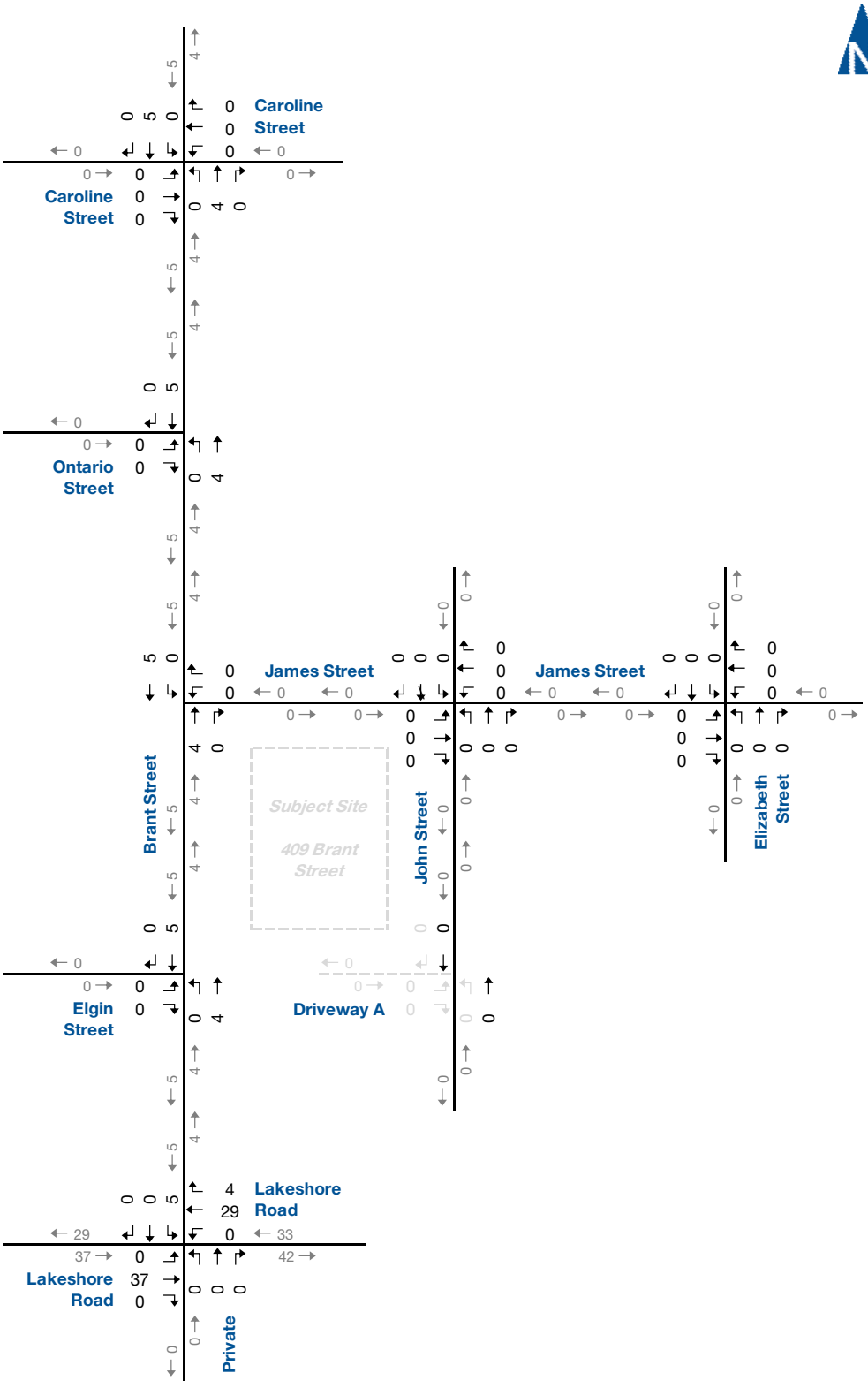
501 John Street
AM Peak Hour Forecast



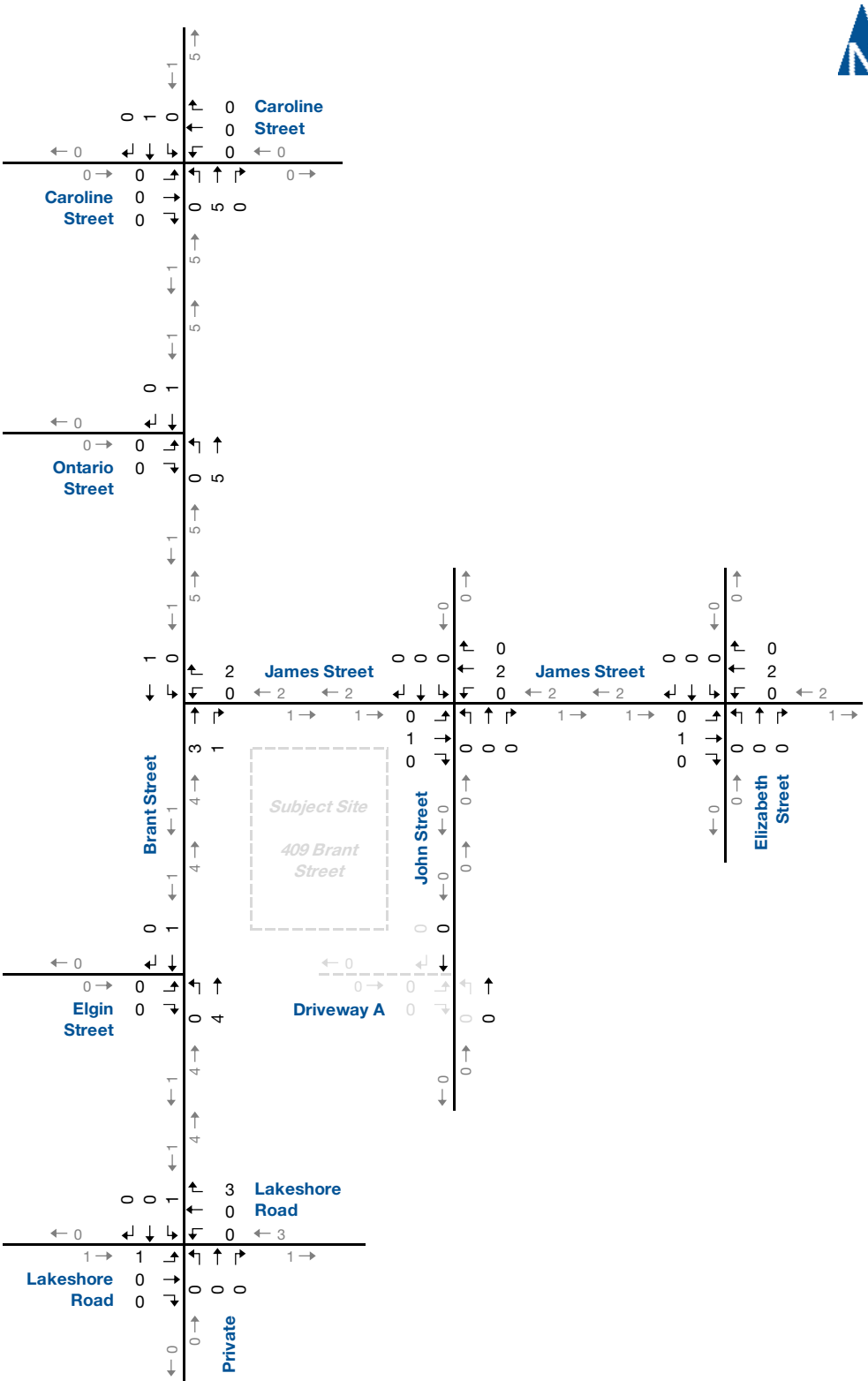
501 John Street
PM Peak Hour Forecast



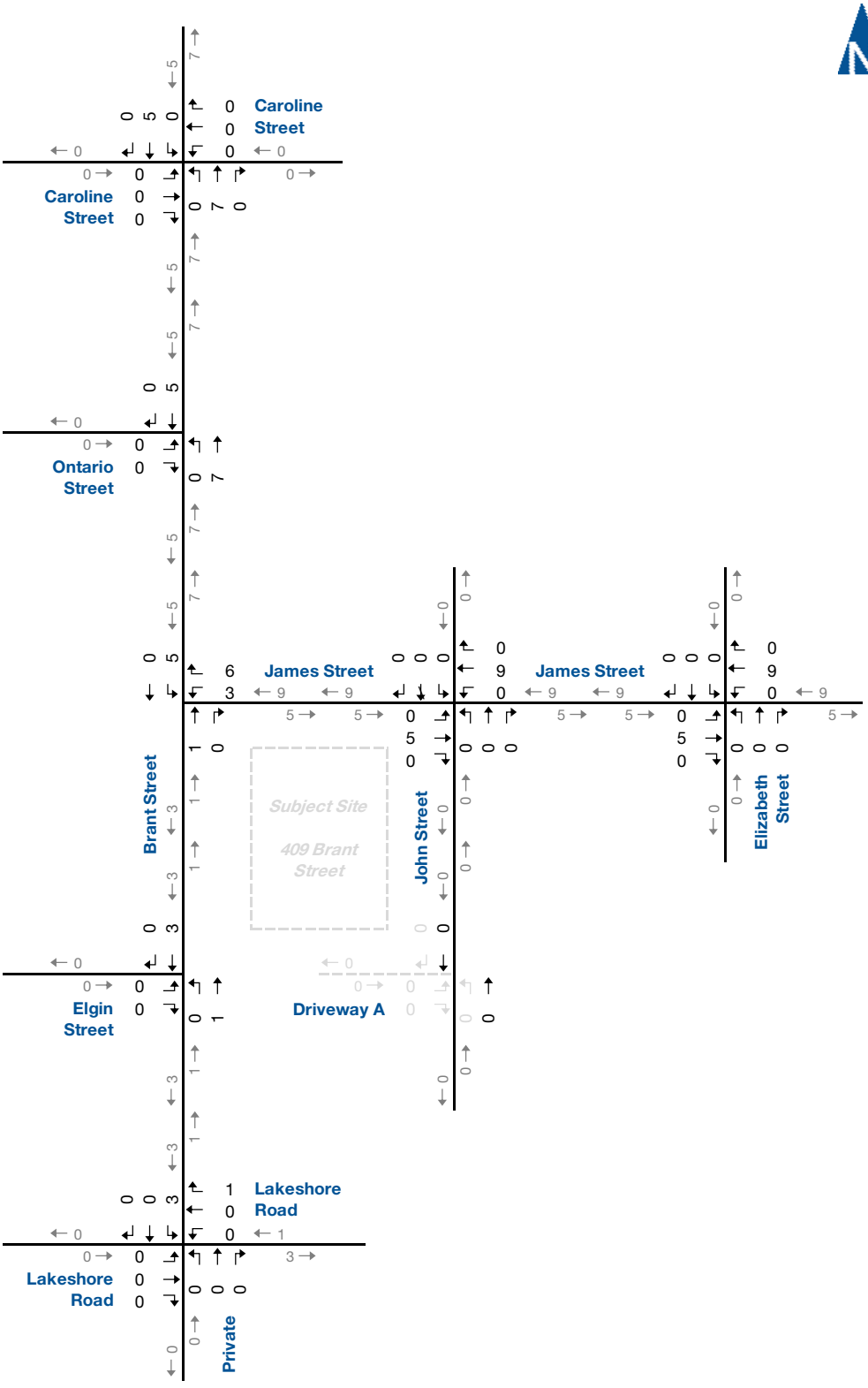
Bridgewater Development
AM Peak Hour Forecast



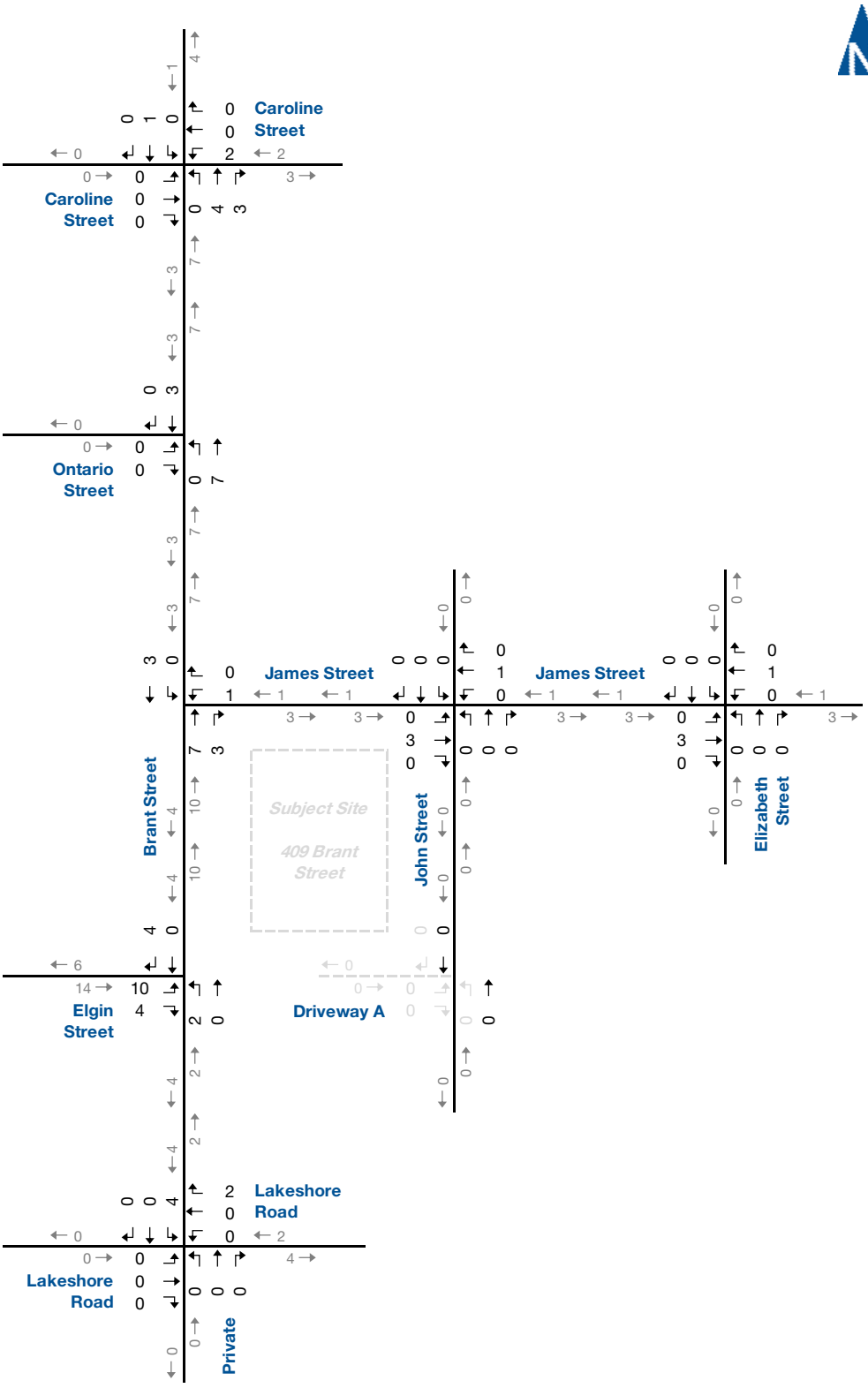
Bridgewater Development
PM Peak Hour Forecast



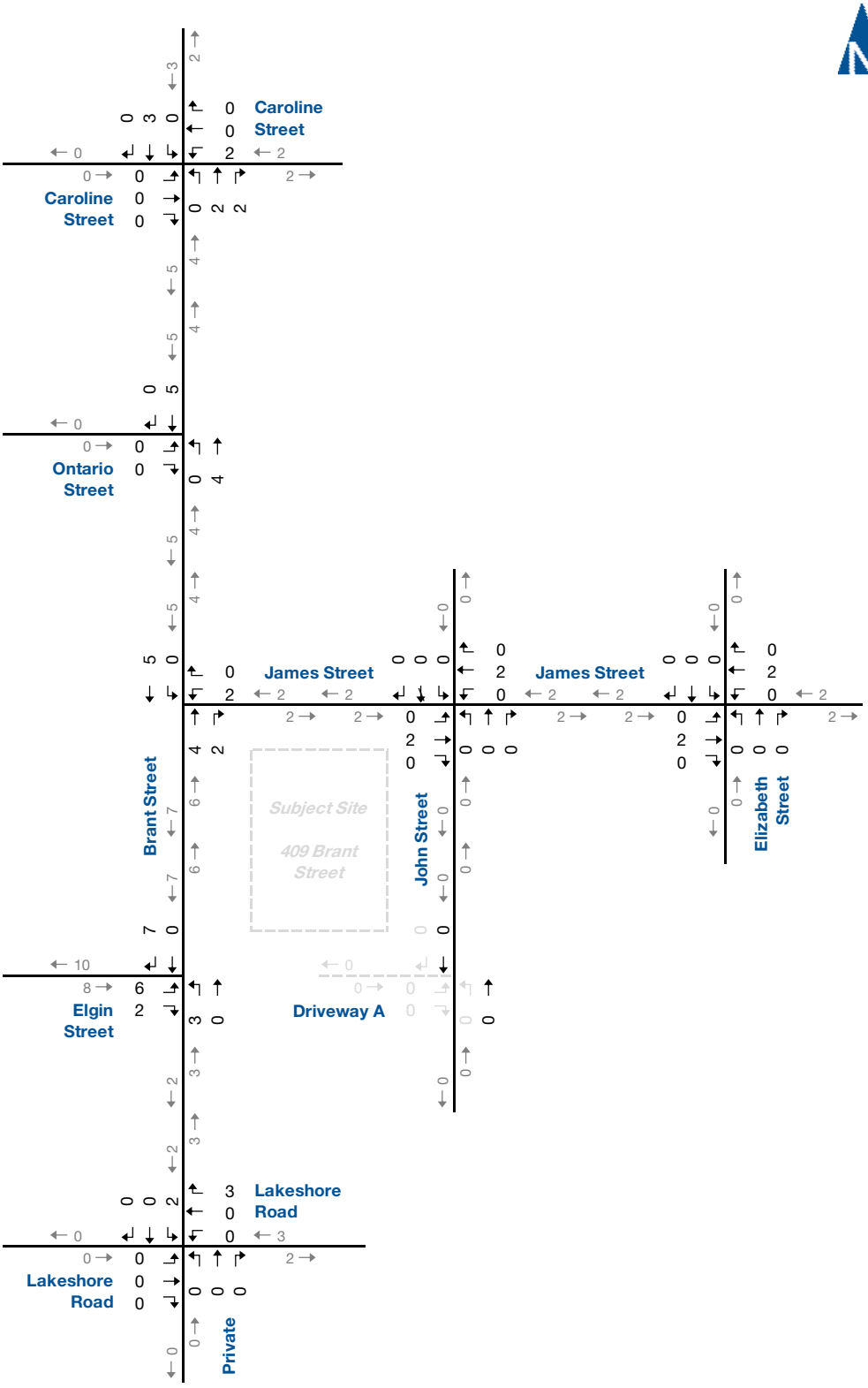
374 Martha Street
AM Peak Hour Forecast



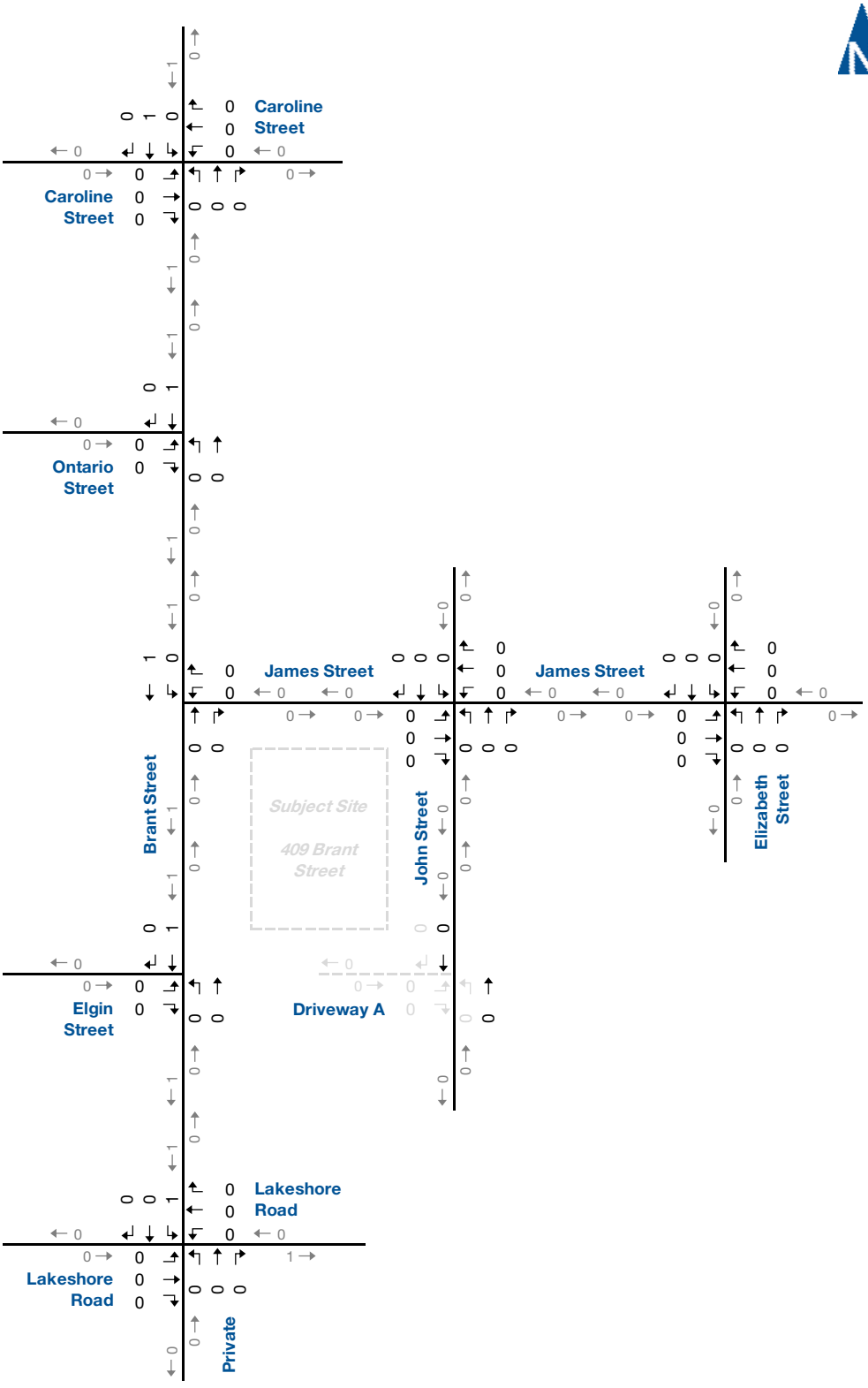
374 Martha Street
PM Peak Hour Forecast



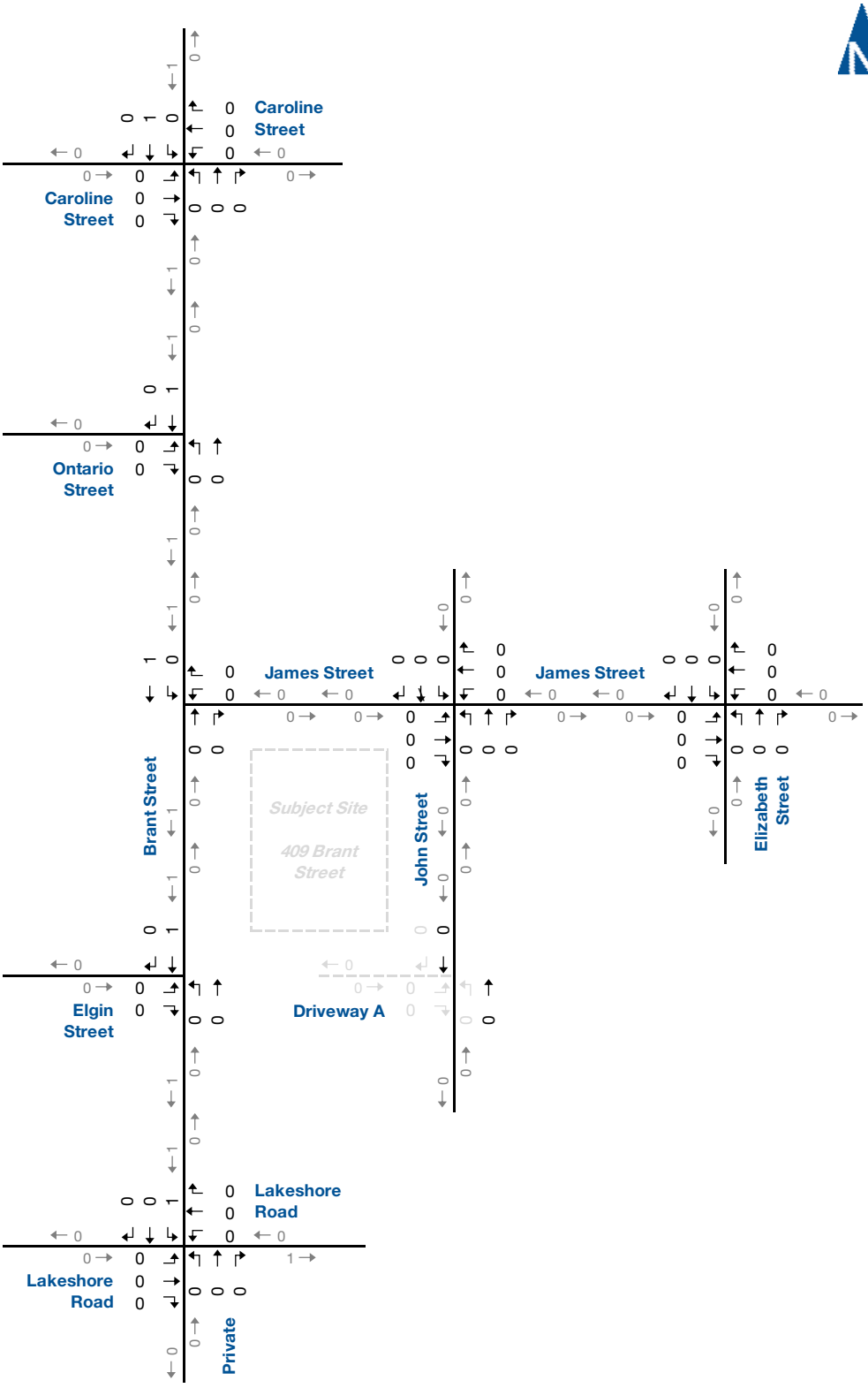
452 Locust Street
AM Peak Hour Forecast



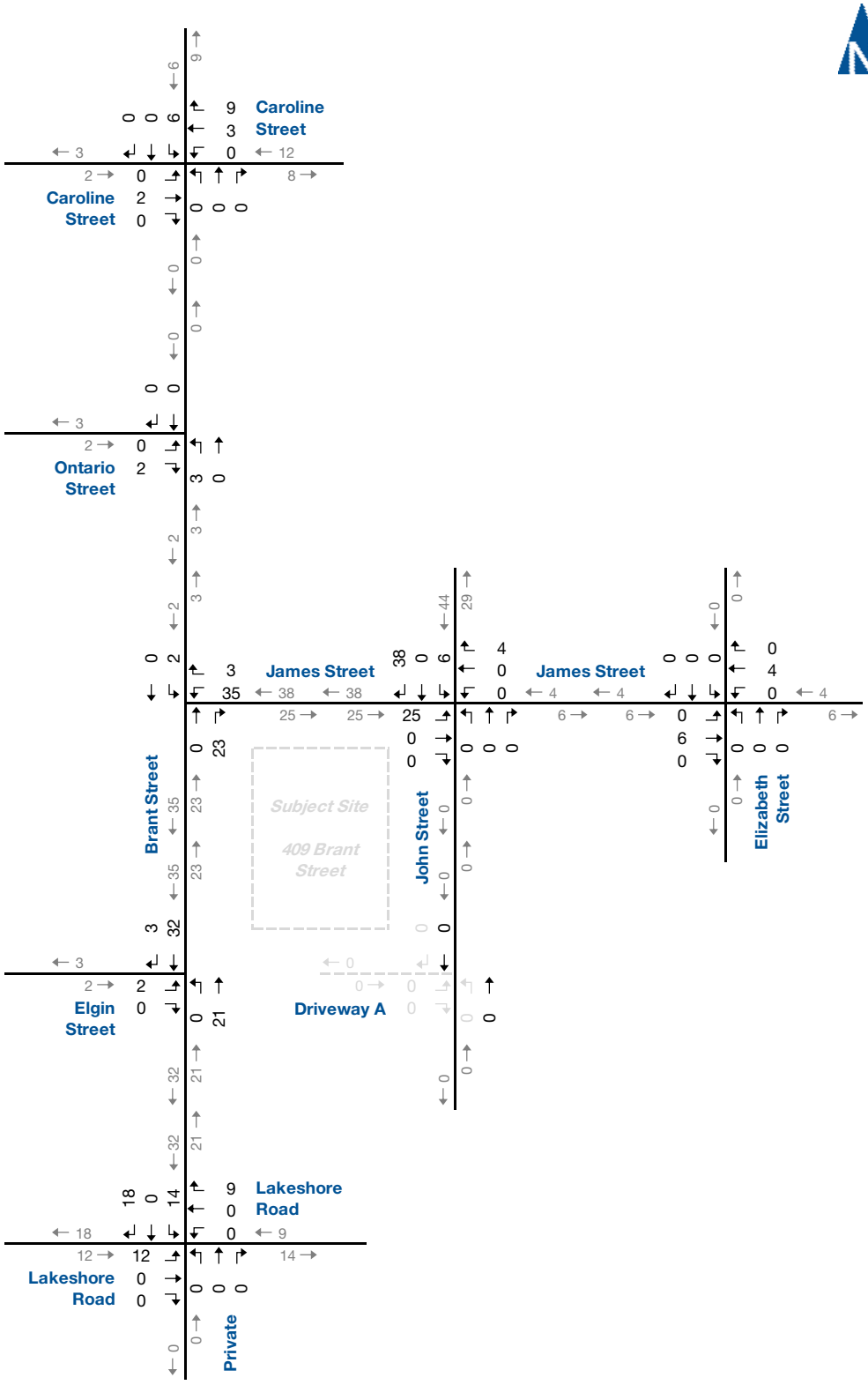
452 Locust Street
PM Peak Hour Forecast



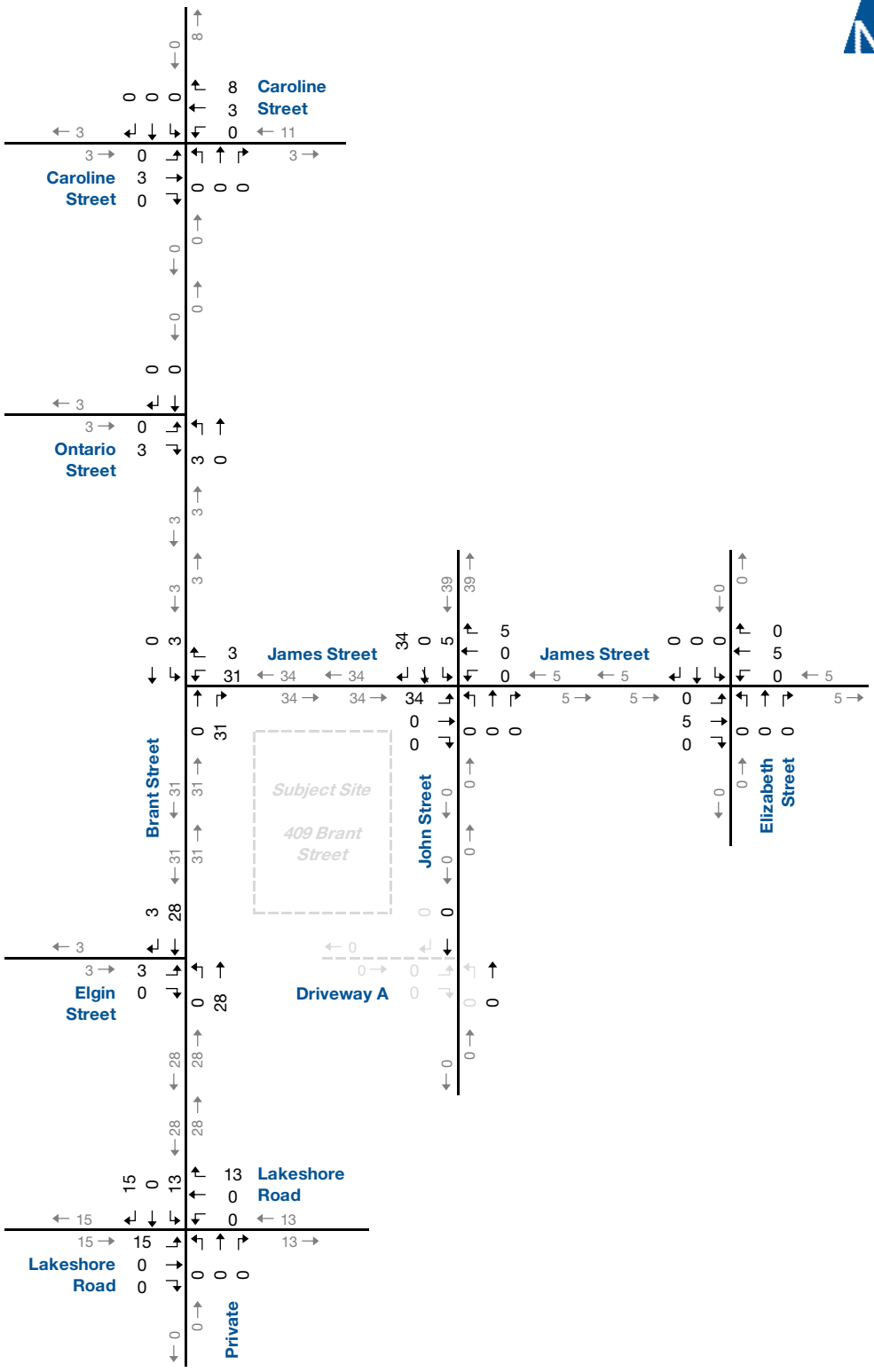
616 Brant Street
AM Peak Hour Forecast



616 Brant Street
PM Peak Hour Forecast



421 Brant Street
AM Peak Hour Forecast



421 Brant Street
PM Peak Hour Forecast

Appendix F

2026 Background Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	94	30	66	60	126	10	321	127	143	427	62
Future Volume (vph)	141	94	30	66	60	126	10	321	127	143	427	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		10.0	20.0		0.0	25.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.93		0.91	0.94	0.92		0.99	0.98		0.98	1.00	
Frt			0.850		0.898			0.957			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1593	1644	1454	1624	1378	0	1624	1538	0	1593	1592	0
Flt Permitted	0.519			0.691			0.237			0.267		
Satd. Flow (perm)	807	1644	1326	1111	1378	0	403	1538	0	440	1592	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		126			31			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.3			80.7			104.4			184.8	
Travel Time (s)		7.4			5.8			7.5			13.3	
Confl. Peds. (#/hr)	48		31	31		48	11		27	27		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	0%	0%	3%	0%	5%	3%	2%	5%	4%
Adj. Flow (vph)	153	102	33	72	65	137	11	349	138	155	464	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	153	102	33	72	202	0	11	487	0	155	531	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Detector Phase	3	4	4	4	4		2	2		1	2	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	24.0	24.0	24.0	24.0		29.0	29.0		9.0	29.0	
Total Split (s)	9.0	24.0	24.0	24.0	24.0		38.0	38.0		9.0	38.0	
Total Split (%)	11.3%	30.0%	30.0%	30.0%	30.0%		47.5%	47.5%		11.3%	47.5%	
Maximum Green (s)	6.0	18.0	18.0	18.0	18.0		32.0	32.0		6.0	32.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		0.0	-2.0	
Total Lost Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Ped	Ped	Ped	Ped		Ped	Ped		Min	Ped	
Walk Time (s)		10.0	10.0	10.0	10.0		15.0	15.0			15.0	
Flash Dont Walk (s)		8.0	8.0	8.0	8.0		8.0	8.0			8.0	
Pedestrian Calls (#/hr)		0	0	0	0		0	0			0	
Act Effct Green (s)	27.1	20.0	20.0	20.0	20.0		31.0	31.0		38.0	31.0	
Actuated g/C Ratio	0.35	0.26	0.26	0.26	0.26		0.40	0.40		0.49	0.40	
v/c Ratio	0.44	0.24	0.08	0.25	0.45		0.07	0.76		0.51	0.82	
Control Delay	22.1	25.4	0.3	26.7	13.9		15.1	27.6		15.6	32.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.1	25.4	0.3	26.7	13.9		15.1	27.6		15.6	32.3	
LOS	C	C	A	C	B		B	C		B	C	
Approach Delay		20.8			17.3			27.4			28.5	
Approach LOS		C			B			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 77.1			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 25.2		Intersection LOS: C	
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Brant Street & Caroline Street



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	153	102	33	72	202	11	487	155	531
v/c Ratio	0.44	0.24	0.08	0.25	0.45	0.07	0.76	0.51	0.82
Control Delay	22.1	25.4	0.3	26.7	13.9	15.1	27.6	15.6	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	25.4	0.3	26.7	13.9	15.1	27.6	15.6	32.3
Queue Length 50th (m)	16.6	13.1	0.0	9.3	9.7	1.0	58.7	11.5	69.3
Queue Length 95th (m)	30.4	26.1	0.0	20.6	28.7	4.3	96.8	21.0	#122.6
Internal Link Dist (m)		78.3			56.7		80.4		160.8
Turn Bay Length (m)	40.0		10.0	20.0		25.0		40.0	
Base Capacity (vph)	344	427	435	288	451	178	696	306	709
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.24	0.08	0.25	0.45	0.06	0.70	0.51	0.75

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	94	30	66	60	126	10	321	127	143	427	62
Future Volume (vph)	141	94	30	66	60	126	10	321	127	143	427	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.92		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	0.97	1.00	1.00	0.94	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.90		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1537	1644	1330	1531	1382		1615	1539		1587	1592	
Flt Permitted	0.52	1.00	1.00	0.69	1.00		0.24	1.00		0.27	1.00	
Satd. Flow (perm)	839	1644	1330	1114	1382		403	1539		446	1592	
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)	153	102	33	72	65	137	11	349	138	155	464	67
RTOR Reduction (vph)	0	0	24	0	93	0	0	19	0	0	7	0
Lane Group Flow (vph)	153	102	9	72	109	0	11	468	0	155	524	0
Confl. Peds. (#/hr)	48		31	31		48	11		27	27		11
Heavy Vehicles (%)	2%	4%	0%	0%	0%	3%	0%	5%	3%	2%	5%	4%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)	24.0	18.0	18.0	18.0	18.0		29.0	29.0		35.0	29.0	
Effective Green, g (s)	24.0	20.0	20.0	20.0	20.0		31.0	31.0		35.0	31.0	
Actuated g/C Ratio	0.31	0.26	0.26	0.26	0.26		0.40	0.40		0.45	0.40	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	315	427	345	289	358		162	619		291	640	
v/s Ratio Prot	c0.04	0.06			0.08			0.30		c0.04	c0.33	
v/s Ratio Perm	c0.11		0.01	0.06			0.03			0.20		
v/c Ratio	0.49	0.24	0.02	0.25	0.30		0.07	0.76		0.53	0.82	
Uniform Delay, d1	20.3	22.5	21.2	22.6	22.9		14.1	19.8		14.1	20.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.3	0.0	0.5	0.5		0.2	5.3		1.9	8.1	
Delay (s)	21.5	22.8	21.3	23.0	23.4		14.3	25.0		15.9	28.6	
Level of Service	C	C	C	C	C		B	C		B	C	
Approach Delay (s)		21.9			23.3			24.8			25.7	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	73.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	140	73	456	469	54
Future Volume (vph)	2	140	73	456	469	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.867				0.986	
Flt Protected	0.999			0.993		
Satd. Flow (prot)	1452	0	0	1449	1465	0
Flt Permitted	0.999			0.993		
Satd. Flow (perm)	1452	0	0	1449	1465	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	187.1			83.2	180.0	
Travel Time (s)	16.8			6.0	13.0	
Confl. Peds. (#/hr)		21	8			8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	6%	4%	0%
Parking (#/hr)				0	0	
Adj. Flow (vph)	2	152	79	496	510	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	154	0	0	575	569	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.30	1.30	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	140	73	456	469	54
Future Volume (Veh/h)	2	140	73	456	469	54
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	152	79	496	510	59
Pedestrians	8			21		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			2		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				83	284	
pX, platoon unblocked	0.87	0.76	0.76			
vC, conflicting volume	1202	568	577			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	615	280	291			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	73	92			
cM capacity (veh/h)	362	565	964			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	154	575	569
Volume Left	2	79	0
Volume Right	152	0	59
cSH	561	964	1700
Volume to Capacity	0.27	0.08	0.33
Queue Length 95th (m)	8.9	2.1	0.0
Control Delay (s)	13.8	2.2	0.0
Lane LOS	B	A	
Approach Delay (s)	13.8	2.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	146	149	380	149	224	385
Future Volume (vph)	146	149	380	149	224	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0		8.0	20.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.93	0.88		0.92	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1593	1358	1480	1439	1533	1660
Flt Permitted	0.950				0.371	
Satd. Flow (perm)	1476	1199	1480	1326	590	1660
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		162		60		
Link Speed (k/h)	50		50			50
Link Distance (m)	69.8		76.6			83.2
Travel Time (s)	5.0		5.5			6.0
Confl. Peds. (#/hr)	42	57		42	21	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	7%	4%	1%	6%	3%
Parking (#/hr)			0			
Adj. Flow (vph)	159	162	413	162	243	418
Shared Lane Traffic (%)						
Lane Group Flow (vph)	159	162	413	162	243	418
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane	Yes					
Headway Factor	1.14	1.14	1.30	1.14	1.14	1.14
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	29.0	29.0	34.0	34.0	9.0	34.0
Total Split (s)	29.0	29.0	37.0	37.0	14.0	37.0
Total Split (%)	36.3%	36.3%	46.3%	46.3%	17.5%	46.3%
Maximum Green (s)	23.0	23.0	31.0	31.0	11.0	31.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	0.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0	8.0	20.0	20.0		20.0
Flash Dont Walk (s)	15.0	15.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	14.5	14.5	24.3	24.3	34.7	24.3
Actuated g/C Ratio	0.24	0.24	0.41	0.41	0.58	0.41
v/c Ratio	0.44	0.39	0.69	0.28	0.50	0.62
Control Delay	25.9	7.4	21.9	9.7	8.9	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	7.4	21.9	9.7	8.9	19.2
LOS	C	A	C	A	A	B
Approach Delay	16.6		18.5			15.4
Approach LOS	B		B			B

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 59.7			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 64.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Brant Street & James Street



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	159	162	413	162	243	418
v/c Ratio	0.44	0.39	0.69	0.28	0.50	0.62
Control Delay	25.9	7.4	21.9	9.7	8.9	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	7.4	21.9	9.7	8.9	19.2
Queue Length 50th (m)	15.8	0.0	36.6	7.1	9.8	35.6
Queue Length 95th (m)	36.4	13.6	77.7	21.1	24.1	73.5
Internal Link Dist (m)	45.8		52.6			59.2
Turn Bay Length (m)	15.0			8.0	20.0	
Base Capacity (vph)	647	617	857	793	542	961
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.26	0.48	0.20	0.45	0.43

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	146	149	380	149	224	385
Future Volume (vph)	146	149	380	149	224	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.91	1.00	0.94	1.00	1.00
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1507	1234	1480	1348	1527	1660
Flt Permitted	0.95	1.00	1.00	1.00	0.37	1.00
Satd. Flow (perm)	1507	1234	1480	1348	596	1660
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	162	413	162	243	418
RTOR Reduction (vph)	0	122	0	35	0	0
Lane Group Flow (vph)	159	40	413	127	243	418
Confl. Peds. (#/hr)	42	57		42	21	
Heavy Vehicles (%)	2%	7%	4%	1%	6%	3%
Parking (#/hr)			0			
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Actuated Green, G (s)	12.4	12.4	22.2	22.2	31.6	22.2
Effective Green, g (s)	14.4	14.4	24.2	24.2	31.6	24.2
Actuated g/C Ratio	0.24	0.24	0.41	0.41	0.54	0.41
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	367	301	607	552	467	680
v/s Ratio Prot			c0.28		c0.08	0.25
v/s Ratio Perm	c0.11	0.03		0.09	0.20	
v/c Ratio	0.43	0.13	0.68	0.23	0.52	0.61
Uniform Delay, d1	18.9	17.4	14.2	11.3	8.1	13.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.2	3.1	0.2	1.0	1.7
Delay (s)	19.7	17.6	17.4	11.5	9.1	15.4
Level of Service	B	B	B	B	A	B
Approach Delay (s)	18.6		15.7			13.1
Approach LOS	B		B			B

Intersection Summary

HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	115	38	16	414	386	145
Future Volume (vph)	115	38	16	414	386	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			20.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.967					0.850
Flt Protected	0.964			0.998		
Satd. Flow (prot)	1548	0	0	1654	1644	1384
Flt Permitted	0.964			0.998		
Satd. Flow (perm)	1548	0	0	1654	1644	1384
Link Speed (k/h)	40			50	50	
Link Distance (m)	184.7			166.5	76.6	
Travel Time (s)	16.6			12.0	5.5	
Confl. Peds. (#/hr)	69	47	4			4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	3%	4%	5%
Adj. Flow (vph)	125	41	17	450	420	158
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	0	0	467	420	158
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	38	16	414	386	145
Future Volume (Veh/h)	115	38	16	414	386	145
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	41	17	450	420	158
Pedestrians	4			47	69	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			4	6	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				166	77	
pX, platoon unblocked	0.86	0.84	0.84			
vC, conflicting volume	977	471	582			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	770	269	402			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	57	93	98			
cM capacity (veh/h)	291	614	937			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	166	467	420	158
Volume Left	125	17	0	0
Volume Right	41	0	0	158
cSH	335	937	1700	1700
Volume to Capacity	0.50	0.02	0.25	0.09
Queue Length 95th (m)	21.0	0.4	0.0	0.0
Control Delay (s)	25.9	0.5	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	25.9	0.5	0.0	
Approach LOS	D			

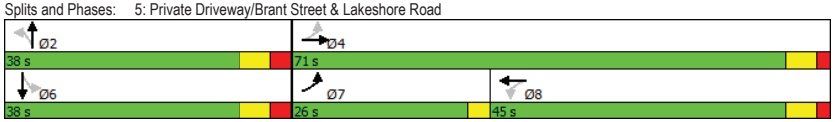
Intersection Summary				
Average Delay		3.8		
Intersection Capacity Utilization		58.0%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	261	879	18	4	702	168	8	1	2	163	1	260
Future Volume (vph)	261	879	18	4	702	168	8	1	2	163	1	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		0.0	0.0		0.0	0.0		15.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		0.99	0.99			0.98		1.00	0.96	
Frt		0.997			0.971			0.977			0.851	
Flt Protected	0.950			0.950				0.964		0.950		
Satd. Flow (prot)	1518	3142	0	1300	3046	0	0	1483	0	1562	1324	0
Flt Permitted	0.194			0.294				0.762		0.750		
Satd. Flow (perm)	309	3142	0	396	3046	0	0	1155	0	1228	1324	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			31			2			283	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		84.2			131.5			34.5			166.5	
Travel Time (s)		6.1			9.5			2.5			12.0	
Confl. Peds. (#/hr)	14		28	28		14	32		4	4		32
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%	3%	0%	25%	3%	1%	0%	100%	0%	4%	0%	5%
Adj. Flow (vph)	284	955	20	4	763	183	9	1	2	177	1	283
Shared Lane Traffic (%)												
Lane Group Flow (vph)	284	975	0	4	946	0	0	12	0	177	284	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.0	33.0		33.0	33.0		38.0	38.0		38.0	38.0	
Total Split (s)	26.0	71.0		45.0	45.0		38.0	38.0		38.0	38.0	
Total Split (%)	23.9%	65.1%		41.3%	41.3%		34.9%	34.9%		34.9%	34.9%	
Maximum Green (s)	23.0	65.0		39.0	39.0		31.0	31.0		31.0	31.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	-2.0		-2.0	-2.0			-3.0		-3.0	-3.0	
Total Lost Time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)		16.0		16.0	16.0		19.0	19.0		19.0	19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	68.3	67.3		48.5	48.5			22.3		22.3	22.3	
Actuated g/C Ratio	0.70	0.69		0.50	0.50			0.23		0.23	0.23	
v/c Ratio	0.69	0.45		0.02	0.62			0.05		0.63	0.55	
Control Delay	18.8	8.5		19.2	22.1			25.5		44.2	7.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	18.8	8.5		19.2	22.1			25.5		44.2	7.9	
LOS	B	A		B	C			C		D	A	
Approach Delay		10.8			22.0			25.5			21.8	
Approach LOS		B			C			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 109			
Actuated Cycle Length: 97.6			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 78.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Private Driveway/Brant Street & Lakeshore Road





Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	284	975	4	946	12	177	284
v/c Ratio	0.69	0.45	0.02	0.62	0.05	0.63	0.55
Control Delay	18.8	8.5	19.2	22.1	25.5	44.2	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	8.5	19.2	22.1	25.5	44.2	7.9
Queue Length 50th (m)	17.9	39.5	0.4	66.7	1.5	31.7	0.2
Queue Length 95th (m)	53.1	72.8	3.0	121.1	6.2	54.1	20.3
Internal Link Dist (m)		60.2		107.5	10.5		142.5
Turn Bay Length (m)	55.0		25.0				
Base Capacity (vph)	502	2166	197	1530	405	429	647
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.45	0.02	0.62	0.03	0.41	0.44

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	261	879	18	4	702	168	8	1	2	163	1	260
Future Volume (vph)	261	879	18	4	702	168	8	1	2	163	1	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99		1.00	1.00	
Frt	1.00	1.00		1.00	0.97			0.98		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1517	3142		1283	3048			1464		1556	1328	
Flt Permitted	0.19	1.00		0.29	1.00			0.76		0.75	1.00	
Satd. Flow (perm)	310	3142		397	3048			1157		1228	1328	
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)	284	955	20	4	763	183	9	1	2	177	1	283
RTOR Reduction (vph)	0	1	0	0	16	0	0	2	0	0	218	0
Lane Group Flow (vph)	284	974	0	4	930	0	0	10	0	177	66	0
Confl. Peds. (#/hr)	14		28	28		14	32		4	4		32
Heavy Vehicles (%)	7%	3%	0%	25%	3%	1%	0%	100%	0%	4%	0%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	65.3	65.3		46.6	46.6			19.3		19.3	19.3	
Effective Green, g (s)	65.3	67.3		48.6	48.6			22.3		22.3	22.3	
Actuated g/C Ratio	0.67	0.69		0.50	0.50			0.23		0.23	0.23	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	401	2166		197	1517			264		280	303	
v/s Ratio Prot	c0.11	0.31			0.31						0.05	
v/s Ratio Perm	c0.36			0.01				0.01		c0.14		
v/c Ratio	0.71	0.45		0.02	0.61			0.04		0.63	0.22	
Uniform Delay, d1	10.5	6.8		12.4	17.7			29.3		34.0	30.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	5.6	0.7		0.2	1.9			0.1		4.6	0.4	
Delay (s)	16.1	7.5		12.6	19.6			29.4		38.6	30.9	
Level of Service	B	A		B	B			C		D	C	
Approach Delay (s)		9.4			19.5			29.4			33.9	
Approach LOS		A			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	97.6	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	78.0%	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)	51	301	21	25	226	27	12	11	13	30	11	57
Future Volume (vph)	51	301	21	25	226	27	12	11	13	30	11	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.992			0.984			0.952			0.922	
Flt Protected		0.993		0.950				0.984			0.985	
Satd. Flow (prot)	0	1629	0	1490	1625	0	0	1151	0	0	1525	0
Flt Permitted		0.993		0.950				0.984			0.985	
Satd. Flow (perm)	0	1629	0	1490	1625	0	0	1151	0	0	1525	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		69.8			62.9			41.7			138.8	
Travel Time (s)		5.0			4.5			3.0			10.0	
Confl. Peds. (#/hr)	6		8	8		6	6		6	6		6
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%	32%	9%	4%	0%	46%	10%	58%	6%	0%	0%
Adj. Flow (vph)	55	327	23	27	246	29	13	12	14	33	12	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	405	0	27	275	0	0	39	0	0	107	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	56.7%	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)	51	301	21	25	226	27	12	11	13	30	11	57
Future Volume (Veh/h)	51	301	21	25	226	27	12	11	13	30	11	57
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)	55	327	23	27	246	29	13	12	14	33	12	62
Pedestrians		6			6			8			6	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		70			63							
pX, platoon unblocked	0.97						0.97	0.97		0.97	0.97	0.97
vC, conflicting volume	281			358			830	792	352	795	788	272
vC1, stage 1 conf vol							456	456		320	320	
vC2, stage 2 conf vol							374	335		474	468	
vCu, unblocked vol	248			358			812	772	352	776	769	239
tC, single (s)	4.1			4.2			7.6	6.6	6.8	7.2	6.5	6.2
tC, 2 stage (s)							6.6	5.6		6.2	5.5	
tF (s)	2.2			2.3			3.9	4.1	3.8	3.6	4.0	3.3
p0 queue free %	96			98			96	97	98	92	97	92
cM capacity (veh/h)	1288			1155			369	447	575	440	459	776

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	405	27	275	39	107
Volume Left	55	27	0	13	33
Volume Right	23	0	29	14	62
cSH	1288	1155	1700	451	591
Volume to Capacity	0.04	0.02	0.16	0.09	0.18
Queue Length 95th (m)	1.1	0.6	0.0	2.3	5.2
Control Delay (s)	1.4	8.2	0.0	13.7	12.4
Lane LOS	A	A		B	B
Approach Delay (s)	1.4	0.7		13.7	12.4
Approach LOS				B	B

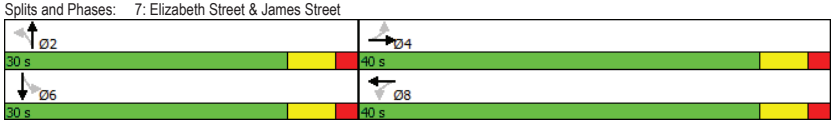
Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	56.7%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	286	37	31	251	12	11	15	42	9	23	16
Future Volume (vph)	21	286	37	31	251	12	11	15	42	9	23	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00			0.98			0.98	
Frt		0.983			0.993			0.916			0.956	
Flt Protected	0.950			0.950				0.992			0.990	
Satd. Flow (prot)	1462	1409	0	1464	1648	0	0	1430	0	0	1337	0
Flt Permitted	0.584			0.551				0.931			0.938	
Satd. Flow (perm)	888	1409	0	844	1648	0	0	1338	0	0	1264	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			5			46			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		62.9			180.3			274.6			209.7	
Travel Time (s)		4.5			13.0			19.8			15.1	
Confl. Peds. (#/hr)	14		8	8		14	11		8	8		11
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%	6%	15%	11%	3%	0%	0%	21%	3%	0%	29%	17%
Parking (#/hr)	0	0	0									
Adj. Flow (vph)	23	311	40	34	273	13	12	16	46	10	25	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	351	0	34	286	0	0	74	0	0	52	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.30	1.30	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	35.5	35.5		35.5	35.5		27.5	27.5		27.5	27.5	
Total Split (s)	40.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Total Split (%)	57.1%	57.1%		57.1%	57.1%		42.9%	42.9%		42.9%	42.9%	
Maximum Green (s)	34.0	34.0		34.0	34.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	20.0	20.0		20.0	20.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	7.0	7.0		7.0	7.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	43.5	43.5		43.5	43.5			10.3			10.3	
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.19			0.19	
v/c Ratio	0.03	0.31		0.05	0.22			0.26			0.21	
Control Delay	3.5	4.2		3.5	3.6			12.4			16.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	3.5	4.2		3.5	3.6			12.4			16.2	
LOS	A	A		A	A			B			B	
Approach Delay		4.1			3.6			12.4			16.2	
Approach LOS		A			A			B			B	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 70			
Actuated Cycle Length: 54.7			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 5.4		Intersection LOS: A	
Intersection Capacity Utilization 45.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Elizabeth Street & James Street



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	23	351	34	286	74	52
v/c Ratio	0.03	0.31	0.05	0.22	0.26	0.21
Control Delay	3.5	4.2	3.5	3.6	12.4	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	4.2	3.5	3.6	12.4	16.2
Queue Length 50th (m)	0.7	11.9	1.0	9.1	2.4	3.0
Queue Length 95th (m)	2.6	25.6	3.5	19.1	11.4	10.7
Internal Link Dist (m)		38.9		156.3	250.6	185.7
Turn Bay Length (m)	15.0		30.0			
Base Capacity (vph)	707	1124	671	1312	659	609
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.31	0.05	0.22	0.11	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	286	37	31	251	12	11	15	42	9	23	16
Future Volume (vph)	21	286	37	31	251	12	11	15	42	9	23	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
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			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.92			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1447	1409		1456	1648			1429			1336	
Flt Permitted	0.58	1.00		0.55	1.00			0.93			0.94	
Satd. Flow (perm)	891	1409		844	1648			1341			1266	
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)	23	311	40	34	273	13	12	16	46	10	25	17
RTOR Reduction (vph)	0	4	0	0	1	0	0	40	0	0	15	0
Lane Group Flow (vph)	23	347	0	34	285	0	0	34	0	0	37	0
Confl. Peds. (#/hr)	14		8	8		14	11		8	8		11
Heavy Vehicles (%)	0%	6%	15%	11%	3%	0%	0%	21%	3%	0%	29%	17%
Parking (#/hr)	0	0	0									
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)	40.0	40.0		40.0	40.0			5.2			5.2	
Effective Green, g (s)	42.0	42.0		42.0	42.0			7.2			7.2	
Actuated g/C Ratio	0.73	0.73		0.73	0.73			0.13			0.13	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	654	1034		619	1210			168			159	
v/s Ratio Prot		c0.25			0.17							
v/s Ratio Perm	0.03			0.04				0.03			c0.03	
v/c Ratio	0.04	0.34		0.05	0.24			0.20			0.23	
Uniform Delay, d1	2.1	2.7		2.1	2.4			22.4			22.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.9		0.2	0.5			0.6			0.8	
Delay (s)	2.2	3.6		2.3	2.9			23.0			23.3	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		3.5			2.8			23.0			23.3	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.32				
Actuated Cycle Length (s)	57.2	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	45.0%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	36	57	0
Future Volume (vph)	0	0	0	36	57	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)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.6			209.5	41.7	
Travel Time (s)	3.5			15.1	3.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	39	62	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	39	62	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	36	57	0
Future Volume (Veh/h)	0	0	0	36	57	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	39	62	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	101	62	62			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	101	62	62			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	898	1003	1541			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	39	62
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1541	1700
Volume to Capacity	0.00	0.00	0.04
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	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	86	15	159	190	159	12	365	73	92	441	49
Future Volume (vph)	155	86	15	159	190	159	12	365	73	92	441	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		10.0	20.0		0.0	25.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95		0.94	0.96	0.94		0.99	0.99		0.99	1.00	
Frt			0.850		0.932			0.975			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1454	1624	1489	0	1624	1603	0	1593	1634	0
Flt Permitted	0.232			0.697			0.207			0.250		
Satd. Flow (perm)	378	1710	1361	1145	1489	0	352	1603	0	416	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		52			15			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.3			80.7			104.4			184.8	
Travel Time (s)		7.4			5.8			7.5			13.3	
Confl. Peds. (#/hr)	53		20	20		53	11		11	11		11
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%	0%	0%	0%	0%	1%	0%	4%	0%	2%	3%	0%
Adj. Flow (vph)	168	93	16	173	207	173	13	397	79	100	479	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	93	16	173	380	0	13	476	0	100	532	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Detector Phase	3	4	4	4	4		2	2		1	2	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	24.0	24.0	24.0	24.0		29.0	29.0		9.0	29.0	
Total Split (s)	10.0	26.0	26.0	26.0	26.0		35.0	35.0		9.0	35.0	
Total Split (%)	12.5%	32.5%	32.5%	32.5%	32.5%		43.8%	43.8%		11.3%	43.8%	
Maximum Green (s)	7.0	20.0	20.0	20.0	20.0		29.0	29.0		6.0	29.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		0.0	-2.0	
Total Lost Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Ped	Ped	Ped	Ped		Ped	Ped		Min	Ped	
Walk Time (s)		10.0	10.0	10.0	10.0		15.0	15.0			15.0	
Flash Dont Walk (s)		8.0	8.0	8.0	8.0		8.0	8.0			8.0	
Pedestrian Calls (#/hr)		0	0	0	0		0	0			0	
Act Effct Green (s)	29.6	21.6	21.6	21.6	21.6		29.6	29.6		36.6	29.6	
Actuated g/C Ratio	0.38	0.28	0.28	0.28	0.28		0.38	0.38		0.47	0.38	
v/c Ratio	0.66	0.20	0.03	0.55	0.85		0.10	0.77		0.35	0.86	
Control Delay	30.4	23.6	0.1	32.3	42.8		18.1	31.0		13.9	37.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.4	23.6	0.1	32.3	42.8		18.1	31.0		13.9	37.5	
LOS	C	C	A	C	D		B	C		B	D	
Approach Delay		26.4			39.5			30.6			33.8	
Approach LOS		C			D			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 78.2			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 33.6		Intersection LOS: C	
Intersection Capacity Utilization 82.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Brant Street & Caroline Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	168	93	16	173	380	13	476	100	532
v/c Ratio	0.66	0.20	0.03	0.55	0.85	0.10	0.77	0.35	0.86
Control Delay	30.4	23.6	0.1	32.3	42.8	18.1	31.0	13.9	37.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	23.6	0.1	32.3	42.8	18.1	31.0	13.9	37.5
Queue Length 50th (m)	17.1	11.4	0.0	23.6	50.0	1.3	62.4	7.8	74.0
Queue Length 95th (m)	#33.1	23.1	0.0	44.1	#99.7	5.3	#104.8	15.7	#131.2
Internal Link Dist (m)		78.3			56.7		80.4		160.8
Turn Bay Length (m)	40.0		10.0	20.0		25.0		40.0	
Base Capacity (vph)	254	482	471	322	457	139	645	284	654
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.19	0.03	0.54	0.83	0.09	0.74	0.35	0.81

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	86	15	159	190	159	12	365	73	92	441	49
Future Volume (vph)	155	86	15	159	190	159	12	365	73	92	441	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	0.94		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.96	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	1710	1363	1563	1490		1615	1603		1590	1634	
Flt Permitted	0.23	1.00	1.00	0.70	1.00		0.21	1.00		0.25	1.00	
Satd. Flow (perm)	393	1710	1363	1146	1490		352	1603		419	1634	
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)	168	93	16	173	207	173	13	397	79	100	479	53
RTOR Reduction (vph)	0	0	12	0	38	0	0	9	0	0	5	0
Lane Group Flow (vph)	168	93	4	173	342	0	13	467	0	100	527	0
Confl. Peds. (#/hr)	53		20	20		53	11		11	11		11
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	4%	0%	2%	3%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)	26.6	19.6	19.6	19.6	19.6		27.5	27.5		33.5	27.5	
Effective Green, g (s)	26.6	21.6	21.6	21.6	21.6		29.5	29.5		33.5	29.5	
Actuated g/C Ratio	0.34	0.28	0.28	0.28	0.28		0.38	0.38		0.43	0.38	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	242	472	376	316	412		132	605		269	617	
v/s Ratio Prot	c0.06	0.05			c0.23			0.29		c0.03	c0.32	
v/s Ratio Perm	0.17		0.00	0.15			0.04			0.13		
v/c Ratio	0.69	0.20	0.01	0.55	0.83		0.10	0.77		0.37	0.85	
Uniform Delay, d1	19.9	21.6	20.5	24.1	26.5		15.7	21.3		14.9	22.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.3	0.2	0.0	1.9	13.3		0.3	6.0		0.9	11.1	
Delay (s)	28.3	21.8	20.5	26.0	39.8		16.0	27.4		15.8	33.4	
Level of Service	C	C	C	C	D		B	C		B	C	
Approach Delay (s)		25.7			35.5			27.1			30.6	
Approach LOS		C			D			C			C	

Intersection Summary

HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	78.1	Sum of lost time (s)	14.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	144	333	447	510	105
Future Volume (vph)	3	144	333	447	510	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868				0.977	
Flt Protected	0.999			0.979		
Satd. Flow (prot)	1483	0	0	1469	1479	0
Flt Permitted	0.999			0.979		
Satd. Flow (perm)	1483	0	0	1469	1479	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	187.1			83.2	180.0	
Travel Time (s)	16.8			6.0	13.0	
Confl. Peds. (#/hr)		35	18			18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	3%	2%	0%
Parking (#/hr)				0	0	
Adj. Flow (vph)	3	157	362	486	554	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	0	0	848	668	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.30	1.30	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization 107.1%		ICU Level of Service G	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	144	333	447	510	105
Future Volume (Veh/h)	3	144	333	447	510	105
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	157	362	486	554	114
Pedestrians	18			35		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	2			3		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				83	284	
pX, platoon unblocked	0.85	0.73	0.73			
vC, conflicting volume	1839	664	686			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1234	352	382			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	68	57			
cM capacity (veh/h)	95	485	844			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	160	848	668
Volume Left	3	362	0
Volume Right	157	0	114
cSH	450	844	1700
Volume to Capacity	0.36	0.43	0.39
Queue Length 95th (m)	12.7	17.4	0.0
Control Delay (s)	17.4	9.6	0.0
Lane LOS	C	A	
Approach Delay (s)	17.4	9.6	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	458	371	409	112	206	448
Future Volume (vph)	458	371	409	112	206	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0		8.0	20.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.91		0.94	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1608	1398	1524	1454	1593	1693
Flt Permitted	0.950				0.270	
Satd. Flow (perm)	1538	1267	1524	1374	446	1693
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		391		39		
Link Speed (k/h)	50		50			50
Link Distance (m)	69.8		76.6			83.2
Travel Time (s)	5.0		5.5			6.0
Confl. Peds. (#/hr)	25	43		25	25	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	4%	1%	0%	2%	1%
Parking (#/hr)			0			
Adj. Flow (vph)	498	403	445	122	224	487
Shared Lane Traffic (%)						
Lane Group Flow (vph)	498	403	445	122	224	487
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane	Yes					
Headway Factor	1.14	1.14	1.30	1.14	1.14	1.14
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	29.0	29.0	34.0	34.0	9.0	34.0
Total Split (s)	35.0	35.0	34.0	34.0	11.0	34.0
Total Split (%)	43.8%	43.8%	42.5%	42.5%	13.8%	42.5%
Maximum Green (s)	29.0	29.0	28.0	28.0	8.0	28.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	0.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0	8.0	20.0	20.0		20.0
Flash Dont Walk (s)	15.0	15.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	28.1	28.1	26.7	26.7	35.7	26.7
Actuated g/C Ratio	0.38	0.38	0.36	0.36	0.48	0.36
v/c Ratio	0.85	0.56	0.81	0.23	0.66	0.80
Control Delay	38.0	5.7	35.4	13.5	21.9	33.2
Queue Delay	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	5.7	35.4	13.5	21.9	33.2
LOS	D	A	D	B	C	C
Approach Delay	23.6		30.7			29.6
Approach LOS	C		C			C

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 74			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 27.4		Intersection LOS: C	
Intersection Capacity Utilization 74.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Brant Street & James Street



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	498	403	445	122	224	487
v/c Ratio	0.85	0.56	0.81	0.23	0.66	0.80
Control Delay	38.0	5.7	35.4	13.5	21.9	33.2
Queue Delay	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	5.7	35.4	13.5	21.9	33.2
Queue Length 50th (m)	70.3	1.2	61.5	8.6	18.6	66.8
Queue Length 95th (m)	#125.8	20.3	#109.6	20.5	#35.4	#115.1
Internal Link Dist (m)	45.8		52.6			59.2
Turn Bay Length (m)	15.0			8.0	20.0	
Base Capacity (vph)	656	765	629	590	342	699
Starvation Cap Reductn	7	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.53	0.71	0.21	0.65	0.70

Intersection Summary

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

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	458	371	409	112	206	448
Future Volume (vph)	458	371	409	112	206	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.91	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1544	1275	1524	1378	1587	1693
Flt Permitted	0.95	1.00	1.00	1.00	0.27	1.00
Satd. Flow (perm)	1544	1275	1524	1378	452	1693
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	498	403	445	122	224	487
RTOR Reduction (vph)	0	242	0	25	0	0
Lane Group Flow (vph)	498	161	445	97	224	487
Confl. Peds. (#/hr)	25	43		25	25	
Heavy Vehicles (%)	1%	4%	1%	0%	2%	1%
Parking (#/hr)			0			
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Actuated Green, G (s)	26.0	26.0	24.6	24.6	32.6	24.6
Effective Green, g (s)	28.0	28.0	26.6	26.6	32.6	26.6
Actuated g/C Ratio	0.38	0.38	0.36	0.36	0.44	0.36
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	587	485	550	498	323	611
v/s Ratio Prot			c0.29		c0.08	0.29
v/s Ratio Perm	c0.32	0.13		0.07	0.23	
v/c Ratio	0.85	0.33	0.81	0.19	0.69	0.80
Uniform Delay, d1	20.9	16.2	21.2	16.1	14.5	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.0	0.4	8.6	0.2	6.3	7.1
Delay (s)	31.9	16.6	29.8	16.3	20.8	28.2
Level of Service	C	B	C	B	C	C
Approach Delay (s)	25.0		26.9			25.9
Approach LOS	C		C			C

Intersection Summary

HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	73.6	Sum of lost time (s)	13.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	73	62	74	448	588	318
Future Volume (vph)	73	62	74	448	588	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			20.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.938					0.850
Flt Protected	0.974			0.993		
Satd. Flow (prot)	1548	0	0	1665	1660	1439
Flt Permitted	0.974			0.993		
Satd. Flow (perm)	1548	0	0	1665	1660	1439
Link Speed (k/h)	40			50	50	
Link Distance (m)	184.7			166.5	76.6	
Travel Time (s)	16.6			12.0	5.5	
Confl. Peds. (#/hr)	4	74	4			4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	3%	1%
Adj. Flow (vph)	79	67	80	487	639	346
Shared Lane Traffic (%)						
Lane Group Flow (vph)	146	0	0	567	639	346
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	73	62	74	448	588	318
Future Volume (Veh/h)	73	62	74	448	588	318
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	79	67	80	487	639	346
Pedestrians	4			74	4	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			6	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				166	77	
pX, platoon unblocked	0.64	0.61	0.61			
vC, conflicting volume	1294	717	989			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	978	223	667			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	48	86	86			
cM capacity (veh/h)	153	468	564			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	146	567	639	346
Volume Left	79	80	0	0
Volume Right	67	0	0	346
cSH	222	564	1700	1700
Volume to Capacity	0.66	0.14	0.38	0.20
Queue Length 95th (m)	32.4	3.9	0.0	0.0
Control Delay (s)	48.0	3.9	0.0	0.0
Lane LOS	E	A		
Approach Delay (s)	48.0	3.9	0.0	
Approach LOS	E			

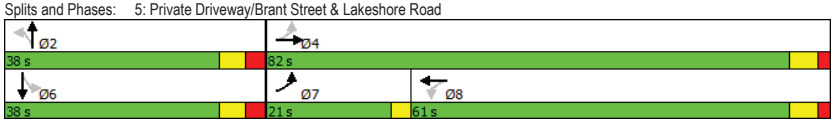
Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	850	10	6	1056	248	7	4	0	200	8	442
Future Volume (vph)	270	850	10	6	1056	248	7	4	0	200	8	442
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		0.0	0.0		0.0	0.0		15.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		0.96	0.97			0.99		0.98	0.93	
Frt		0.998			0.971						0.853	
Flt Protected	0.950			0.950				0.968		0.950		
Satd. Flow (prot)	1608	2972	0	1624	3011	0	0	1655	0	1624	1332	0
Flt Permitted	0.069			0.306				0.480		0.750		
Satd. Flow (perm)	117	2972	0	504	3011	0	0	812	0	1252	1332	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			32						291	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		84.2			131.5			34.5			166.5	
Travel Time (s)		6.1			9.5			2.5			12.0	
Confl. Peds. (#/hr)	59		62	62		59	51		21	21		51
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 (%)	1%	9%	1%	0%	2%	1%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	293	924	11	7	1148	270	8	4	0	217	9	480
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	935	0	7	1418	0	0	12	0	217	489	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.0	33.0		33.0	33.0		38.0	38.0		38.0	38.0	
Total Split (s)	21.0	82.0		61.0	61.0		38.0	38.0		38.0	38.0	
Total Split (%)	17.5%	68.3%		50.8%	50.8%		31.7%	31.7%		31.7%	31.7%	
Maximum Green (s)	18.0	76.0		55.0	55.0		31.0	31.0		31.0	31.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	-2.0		-2.0	-2.0			-3.0		-3.0	-3.0	
Total Lost Time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)		16.0		16.0	16.0		19.0	19.0		19.0	19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	79.3	78.3		57.2	57.2			28.2		28.2	28.2	
Actuated g/C Ratio	0.69	0.68		0.50	0.50			0.25		0.25	0.25	
v/c Ratio	0.93	0.46		0.03	0.93			0.06		0.70	0.89	
Control Delay	68.5	10.0		17.3	39.6			32.5		52.1	36.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	68.5	10.0		17.3	39.6			32.5		52.1	36.5	
LOS	E	B		B	D			C		D	D	
Approach Delay		24.0			39.5			32.5			41.3	
Approach LOS		C			D			C			D	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 114.5			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 34.2		Intersection LOS: C	
Intersection Capacity Utilization 103.5%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 5: Private Driveway/Brant Street & Lakeshore Road



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	293	935	7	1418	12	217	489
v/c Ratio	0.93	0.46	0.03	0.93	0.06	0.70	0.89
Control Delay	68.5	10.0	17.3	39.6	32.5	52.1	36.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.5	10.0	17.3	39.6	32.5	52.1	36.5
Queue Length 50th (m)	56.3	55.7	0.9	171.2	2.2	46.7	49.5
Queue Length 95th (m)	#114.8	72.3	3.8	#231.0	7.3	74.9	#112.8
Internal Link Dist (m)		60.2		107.5	10.5		142.5
Turn Bay Length (m)	55.0		25.0				
Base Capacity (vph)	316	2032	251	1520	242	372	601
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.46	0.03	0.93	0.05	0.58	0.81

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	850	10	6	1056	248	7	4	0	200	8	442
Future Volume (vph)	270	850	10	6	1056	248	7	4	0	200	8	442
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00		0.96	1.00			0.99		0.98	1.00	
Frt	1.00	1.00		1.00	0.97			1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1608	2973		1566	3016			1638		1587	1336	
Flt Permitted	0.07	1.00		0.31	1.00			0.48		0.75	1.00	
Satd. Flow (perm)	116	2973		504	3016			812		1253	1336	
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)	293	924	11	7	1148	270	8	4	0	217	9	480
RTOR Reduction (vph)	0	1	0	0	16	0	0	0	0	0	219	0
Lane Group Flow (vph)	293	934	0	7	1402	0	0	12	0	217	270	0
Confl. Peds. (#/hr)	59		62	62		59	51		21	21		51
Heavy Vehicles (%)	1%	9%	1%	0%	2%	1%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	76.3	76.3		55.2	55.2			25.2		25.2	25.2	
Effective Green, g (s)	76.3	78.3		57.2	57.2			28.2		28.2	28.2	
Actuated g/C Ratio	0.67	0.68		0.50	0.50			0.25		0.25	0.25	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	313	2033		251	1506			199		308	329	
v/s Ratio Prot	c0.15	0.31			0.46						c0.20	
v/s Ratio Perm	c0.47			0.01				0.01		0.17		
v/c Ratio	0.94	0.46		0.03	0.93			0.06		0.70	0.82	
Uniform Delay, d1	36.2	8.3		14.5	26.8			33.0		39.4	40.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	34.2	0.8		0.2	11.7			0.1		7.1	14.7	
Delay (s)	70.4	9.1		14.7	38.5			33.1		46.5	55.4	
Level of Service	E	A		B	D			C		D	E	
Approach Delay (s)		23.7			38.4			33.1			52.7	
Approach LOS		C			D			C			D	

Intersection Summary

HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	114.5	Sum of lost time (s)	11.0
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
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)	48	262	8	16	742	27	13	19	20	38	23	74
Future Volume (vph)	48	262	8	16	742	27	13	19	20	38	23	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.995			0.948			0.926	
Flt Protected		0.993		0.950				0.988			0.986	
Satd. Flow (prot)	0	1673	0	1354	1685	0	0	1283	0	0	1561	0
Flt Permitted		0.993		0.950				0.988			0.986	
Satd. Flow (perm)	0	1673	0	1354	1685	0	0	1283	0	0	1561	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		69.8			62.9			48.7			132.9	
Travel Time (s)		5.0			4.5			3.5			9.6	
Confl. Peds. (#/hr)	8		3	3		8	15		16	16		15
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%	0%	43%	20%	1%	0%	46%	0%	35%	0%	0%	0%
Adj. Flow (vph)	52	285	9	17	807	29	14	21	22	41	25	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	346	0	17	836	0	0	57	0	0	146	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	81.2%	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)	48	262	8	16	742	27	13	19	20	38	23	74
Future Volume (Veh/h)	48	262	8	16	742	27	13	19	20	38	23	74
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)	52	285	9	17	807	29	14	21	22	41	25	80
Pedestrians		15			16			3			8	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		70			63							
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	844			297			1345	1274	308	1306	1264	844
vC1, stage 1 conf vol							396	396		864	864	
vC2, stage 2 conf vol							948	878		442	401	
vCu, unblocked vol	614			297			1291	1195	308	1237	1182	615
tC, single (s)	4.1			4.3			7.6	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)							6.6	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.9	4.0	3.6	3.5	4.0	3.3
p0 queue free %	93			99			88	92	97	86	92	78
cM capacity (veh/h)	717			1165			121	264	650	285	303	360

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	346	17	836	57	146
Volume Left	52	17	0	14	41
Volume Right	9	0	29	22	80
cSH	717	1165	1700	248	325
Volume to Capacity	0.07	0.01	0.49	0.23	0.45
Queue Length 95th (m)	1.9	0.4	0.0	6.9	17.8
Control Delay (s)	2.3	8.1	0.0	23.8	24.8
Lane LOS	A	A		C	C
Approach Delay (s)	2.3	0.2		23.8	24.8
Approach LOS				C	C

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	81.2%	ICU Level of Service	D	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	251	46	80	702	15	52	45	68	21	22	31
Future Volume (vph)	23	251	46	80	702	15	52	45	68	21	22	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	1.00			0.98			0.97	
Frt		0.977			0.997			0.944			0.943	
Flt Protected	0.950			0.950				0.984			0.986	
Satd. Flow (prot)	1462	1448	0	1562	1671	0	0	1547	0	0	1553	0
Flt Permitted	0.280			0.553				0.893			0.883	
Satd. Flow (perm)	430	1448	0	902	1671	0	0	1390	0	0	1388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			2			39			34	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		62.9			180.3			274.6			209.7	
Travel Time (s)		4.5			13.0			19.8			15.1	
Confl. Peds. (#/hr)	8		8	8		8	16		5	5		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	4%	2%	0%	0%	2%	2%	0%	0%	0%
Parking (#/hr)	0	0	0									
Adj. Flow (vph)	25	273	50	87	763	16	57	49	74	23	24	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	323	0	87	779	0	0	180	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.30	1.30	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	35.5	35.5		35.5	35.5		27.5	27.5		27.5	27.5	
Total Split (s)	61.0	61.0		61.0	61.0		29.0	29.0		29.0	29.0	
Total Split (%)	67.8%	67.8%		67.8%	67.8%		32.2%	32.2%		32.2%	32.2%	
Maximum Green (s)	55.0	55.0		55.0	55.0		23.0	23.0		23.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	20.0	20.0		20.0	20.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	7.0	7.0		7.0	7.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	58.1	58.1		58.1	58.1			15.9			15.9	
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.19			0.19	
v/c Ratio	0.08	0.31		0.14	0.66			0.60			0.27	
Control Delay	5.8	5.9		5.6	11.0			31.4			19.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	5.8	5.9		5.6	11.0			31.4			19.6	
LOS	A	A		A	B			C			B	
Approach Delay		5.9			10.5			31.4			19.6	
Approach LOS		A			B			C			B	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 90			
Actuated Cycle Length: 82			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 73.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 7: Elizabeth Street & James Street



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	25	323	87	779	180	81
v/c Ratio	0.08	0.31	0.14	0.66	0.60	0.27
Control Delay	5.8	5.9	5.6	11.0	31.4	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	5.9	5.6	11.0	31.4	19.6
Queue Length 50th (m)	1.1	15.0	3.8	56.9	20.6	6.4
Queue Length 95th (m)	4.7	36.2	11.6	128.9	40.8	17.9
Internal Link Dist (m)		38.9		156.3	250.6	185.7
Turn Bay Length (m)	15.0		30.0			
Base Capacity (vph)	304	1030	638	1183	451	447
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.31	0.14	0.66	0.40	0.18

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	251	46	80	702	15	52	45	68	21	22	31
Future Volume (vph)	23	251	46	80	702	15	52	45	68	21	22	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
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			0.99			0.98	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.94			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1458	1448		1550	1671			1536			1553	
Flt Permitted	0.28	1.00		0.55	1.00			0.89			0.88	
Satd. Flow (perm)	429	1448		903	1671			1392			1391	
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)	25	273	50	87	763	16	57	49	74	23	24	34
RTOR Reduction (vph)	0	6	0	0	1	0	0	31	0	0	27	0
Lane Group Flow (vph)	25	317	0	87	778	0	0	149	0	0	54	0
Confl. Peds. (#/hr)	8		8	8		8	16		5	5		16
Heavy Vehicles (%)	0%	3%	5%	4%	2%	0%	0%	2%	2%	0%	0%	0%
Parking (#/hr)	0	0	0									
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)	56.1	56.1		56.1	56.1			13.9			13.9	
Effective Green, g (s)	58.1	58.1		58.1	58.1			15.9			15.9	
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.19			0.19	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	303	1025		639	1183			269			269	
v/s Ratio Prot		0.22			c0.47							
v/s Ratio Perm	0.06			0.10				c0.11			0.04	
v/c Ratio	0.08	0.31		0.14	0.66			0.55			0.20	
Uniform Delay, d1	3.7	4.5		3.9	6.5			29.8			27.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	0.8		0.4	2.9			2.4			0.4	
Delay (s)	4.2	5.2		4.3	9.4			32.3			28.1	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		5.2			8.9			32.3			28.1	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.63				
Actuated Cycle Length (s)	82.0	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	73.7%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	52	47	0
Future Volume (vph)	0	0	0	52	47	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)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.6			202.5	48.7	
Travel Time (s)	3.5			14.6	3.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	57	51	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	57	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	52	47	0
Future Volume (Veh/h)	0	0	0	52	47	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	57	51	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	108	51	51			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	108	51	51			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	889	1017	1555			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	57	51
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1555	1700
Volume to Capacity	0.00	0.00	0.03
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	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix G

2026 Total Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	94	30	67	60	126	12	328	129	143	430	62
Future Volume (vph)	141	94	30	67	60	126	12	328	129	143	430	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		10.0	20.0		0.0	25.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.93		0.91	0.94	0.92		0.99	0.98		0.98	1.00	
Frt			0.850		0.898			0.958			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1593	1644	1454	1624	1378	0	1624	1539	0	1593	1592	0
Flt Permitted	0.518			0.691			0.235			0.257		
Satd. Flow (perm)	805	1644	1326	1111	1378	0	399	1539	0	424	1592	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		126			31			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.3			80.7			104.4			184.8	
Travel Time (s)		7.4			5.8			7.5			13.3	
Confl. Peds. (#/hr)	48		31	31		48	11		27	27		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	0%	0%	3%	0%	5%	3%	2%	5%	4%
Adj. Flow (vph)	153	102	33	73	65	137	13	357	140	155	467	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	153	102	33	73	202	0	13	497	0	155	534	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Detector Phase	3	4	4	4	4		2	2		1	2	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	24.0	24.0	24.0	24.0		29.0	29.0		9.0	29.0	
Total Split (s)	9.0	24.0	24.0	24.0	24.0		38.0	38.0		9.0	38.0	
Total Split (%)	11.3%	30.0%	30.0%	30.0%	30.0%		47.5%	47.5%		11.3%	47.5%	
Maximum Green (s)	6.0	18.0	18.0	18.0	18.0		32.0	32.0		6.0	32.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		0.0	-2.0	
Total Lost Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Ped	Ped	Ped	Ped		Ped	Ped		Min	Ped	
Walk Time (s)		10.0	10.0	10.0	10.0		15.0	15.0			15.0	
Flash Dont Walk (s)		8.0	8.0	8.0	8.0		8.0	8.0			8.0	
Pedestrian Calls (#/hr)		0	0	0	0		0	0			0	
Act Effct Green (s)	27.1	20.1	20.1	20.1	20.1		31.1	31.1		38.1	31.1	
Actuated g/C Ratio	0.35	0.26	0.26	0.26	0.26		0.40	0.40		0.49	0.40	
v/c Ratio	0.45	0.24	0.08	0.25	0.45		0.08	0.78		0.52	0.83	
Control Delay	22.1	25.5	0.3	26.7	13.9		15.4	28.6		16.0	32.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.1	25.5	0.3	26.7	13.9		15.4	28.6		16.0	32.6	
LOS	C	C	A	C	B		B	C		B	C	
Approach Delay		20.8			17.3			28.2			28.9	
Approach LOS		C			B			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 77.2			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 25.6		Intersection LOS: C	
Intersection Capacity Utilization 74.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Brant Street & Caroline Street



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	153	102	33	73	202	13	497	155	534
v/c Ratio	0.45	0.24	0.08	0.25	0.45	0.08	0.78	0.52	0.83
Control Delay	22.1	25.5	0.3	26.7	13.9	15.4	28.6	16.0	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	25.5	0.3	26.7	13.9	15.4	28.6	16.0	32.6
Queue Length 50th (m)	16.6	13.1	0.0	9.4	9.7	1.2	60.6	11.5	69.8
Queue Length 95th (m)	30.4	26.1	0.0	20.8	28.7	4.9	99.8	21.0	#123.7
Internal Link Dist (m)		78.3			56.7		80.4		160.8
Turn Bay Length (m)	40.0		10.0	20.0		25.0		40.0	
Base Capacity (vph)	343	427	435	288	451	176	696	299	708
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.24	0.08	0.25	0.45	0.07	0.71	0.52	0.75

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	94	30	67	60	126	12	328	129	143	430	62
Future Volume (vph)	141	94	30	67	60	126	12	328	129	143	430	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.91	1.00	0.92		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	0.97	1.00	1.00	0.94	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.90		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1537	1644	1330	1531	1382		1615	1540		1587	1592	
Flt Permitted	0.52	1.00	1.00	0.69	1.00		0.23	1.00		0.26	1.00	
Satd. Flow (perm)	839	1644	1330	1114	1382		399	1540		430	1592	
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)	153	102	33	73	65	137	13	357	140	155	467	67
RTOR Reduction (vph)	0	0	24	0	93	0	0	18	0	0	7	0
Lane Group Flow (vph)	153	102	9	73	109	0	13	479	0	155	527	0
Confl. Peds. (#/hr)	48		31	31		48	11		27	27		11
Heavy Vehicles (%)	2%	4%	0%	0%	0%	3%	0%	5%	3%	2%	5%	4%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)	24.0	18.0	18.0	18.0	18.0		29.1	29.1		35.1	29.1	
Effective Green, g (s)	24.0	20.0	20.0	20.0	20.0		31.1	31.1		35.1	31.1	
Actuated g/C Ratio	0.31	0.26	0.26	0.26	0.26		0.40	0.40		0.46	0.40	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	315	426	345	288	358		160	621		285	642	
v/s Ratio Prot	c0.04	0.06			0.08			0.31		c0.04	c0.33	
v/s Ratio Perm	c0.11		0.01	0.07			0.03			0.20		
v/c Ratio	0.49	0.24	0.02	0.25	0.30		0.08	0.77		0.54	0.82	
Uniform Delay, d1	20.4	22.5	21.3	22.6	23.0		14.2	19.9		14.2	20.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.3	0.0	0.5	0.5		0.2	5.9		2.1	8.3	
Delay (s)	21.6	22.8	21.3	23.1	23.4		14.4	25.8		16.3	28.9	
Level of Service	C	C	C	C	C		B	C		B	C	
Approach Delay (s)		22.0			23.3			25.5			26.0	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	77.1	Sum of lost time (s)	14.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	140	75	468	474	54
Future Volume (vph)	2	140	75	468	474	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.867				0.986	
Flt Protected	0.999			0.993		
Satd. Flow (prot)	1452	0	0	1449	1465	0
Flt Permitted	0.999			0.993		
Satd. Flow (perm)	1452	0	0	1449	1465	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	187.1			83.2	180.0	
Travel Time (s)	16.8			6.0	13.0	
Confl. Peds. (#/hr)		21	8			8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	6%	4%	0%
Parking (#/hr)				0	0	
Adj. Flow (vph)	2	152	82	509	515	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	154	0	0	591	574	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.30	1.30	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	140	75	468	474	54
Future Volume (Veh/h)	2	140	75	468	474	54
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	152	82	509	515	59
Pedestrians	8			21		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			2		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				83	284	
pX, platoon unblocked	0.87	0.76	0.76			
vC, conflicting volume	1226	574	582			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	638	282	294			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	73	91			
cM capacity (veh/h)	349	562	958			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	154	591	574
Volume Left	2	82	0
Volume Right	152	0	59
cSH	557	958	1700
Volume to Capacity	0.28	0.09	0.34
Queue Length 95th (m)	9.0	2.2	0.0
Control Delay (s)	13.9	2.2	0.0
Lane LOS	B	A	
Approach Delay (s)	13.9	2.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	151	164	380	153	229	385
Future Volume (vph)	151	164	380	153	229	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0		8.0	20.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.93	0.88		0.92	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1593	1358	1480	1439	1533	1660
Flt Permitted	0.950				0.369	
Satd. Flow (perm)	1476	1199	1480	1326	587	1660
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		178		62		
Link Speed (k/h)	50		50			50
Link Distance (m)	69.8		76.6			83.2
Travel Time (s)	5.0		5.5			6.0
Confl. Peds. (#/hr)	42	57		42	21	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	7%	4%	1%	6%	3%
Parking (#/hr)			0			
Adj. Flow (vph)	164	178	413	166	249	418
Shared Lane Traffic (%)						
Lane Group Flow (vph)	164	178	413	166	249	418
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane	Yes					
Headway Factor	1.14	1.14	1.30	1.14	1.14	1.14
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	29.0	29.0	34.0	34.0	9.0	34.0
Total Split (s)	29.0	29.0	37.0	37.0	14.0	37.0
Total Split (%)	36.3%	36.3%	46.3%	46.3%	17.5%	46.3%
Maximum Green (s)	23.0	23.0	31.0	31.0	11.0	31.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	0.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0	8.0	20.0	20.0		20.0
Flash Dont Walk (s)	15.0	15.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	14.8	14.8	24.3	24.3	34.8	24.3
Actuated g/C Ratio	0.25	0.25	0.40	0.40	0.58	0.40
v/c Ratio	0.45	0.42	0.69	0.29	0.51	0.62
Control Delay	26.0	7.4	22.2	9.8	9.2	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	7.4	22.2	9.8	9.2	19.4
LOS	C	A	C	A	A	B
Approach Delay	16.3		18.6			15.6
Approach LOS	B		B			B

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 60.1			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 64.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Brant Street & James Street



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	164	178	413	166	249	418
v/c Ratio	0.45	0.42	0.69	0.29	0.51	0.62
Control Delay	26.0	7.4	22.2	9.8	9.2	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	7.4	22.2	9.8	9.2	19.4
Queue Length 50th (m)	16.5	0.0	37.0	7.3	10.2	36.2
Queue Length 95th (m)	37.3	14.3	78.3	21.8	25.1	74.2
Internal Link Dist (m)	45.8		52.6			59.2
Turn Bay Length (m)	15.0			8.0	20.0	
Base Capacity (vph)	644	623	852	790	539	956
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.29	0.48	0.21	0.46	0.44

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	151	164	380	153	229	385
Future Volume (vph)	151	164	380	153	229	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.91	1.00	0.94	1.00	1.00
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1506	1233	1480	1348	1527	1660
Flt Permitted	0.95	1.00	1.00	1.00	0.37	1.00
Satd. Flow (perm)	1506	1233	1480	1348	593	1660
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	164	178	413	166	249	418
RTOR Reduction (vph)	0	134	0	37	0	0
Lane Group Flow (vph)	164	44	413	129	249	418
Confl. Peds. (#/hr)	42	57		42	21	
Heavy Vehicles (%)	2%	7%	4%	1%	6%	3%
Parking (#/hr)			0			
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Actuated Green, G (s)	12.7	12.7	22.2	22.2	31.6	22.2
Effective Green, g (s)	14.7	14.7	24.2	24.2	31.6	24.2
Actuated g/C Ratio	0.25	0.25	0.41	0.41	0.53	0.41
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	373	305	603	550	464	677
v/s Ratio Prot			c0.28		c0.09	0.25
v/s Ratio Perm	c0.11	0.04		0.10	0.20	
v/c Ratio	0.44	0.14	0.68	0.24	0.54	0.62
Uniform Delay, d1	18.8	17.4	14.4	11.5	8.2	13.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.2	3.2	0.2	1.2	1.7
Delay (s)	19.7	17.6	17.6	11.7	9.4	15.6
Level of Service	B	B	B	B	A	B
Approach Delay (s)	18.6		15.9			13.3
Approach LOS	B		B			B

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	115	38	16	417	389	147
Future Volume (vph)	115	38	16	417	389	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			20.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.967					0.850
Flt Protected	0.964			0.998		
Satd. Flow (prot)	1548	0	0	1654	1644	1384
Flt Permitted	0.964			0.998		
Satd. Flow (perm)	1548	0	0	1654	1644	1384
Link Speed (k/h)	40			50	50	
Link Distance (m)	184.7			166.5	76.6	
Travel Time (s)	16.6			12.0	5.5	
Confl. Peds. (#/hr)	69	47	4			4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	8%	3%	4%	5%
Adj. Flow (vph)	125	41	17	453	423	160
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	0	0	470	423	160
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	38	16	417	389	147
Future Volume (Veh/h)	115	38	16	417	389	147
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	41	17	453	423	160
Pedestrians	4			47	69	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			4	6	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				166	77	
pX, platoon unblocked	0.86	0.83	0.83			
vC, conflicting volume	983	474	587			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	771	268	404			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	57	93	98			
cM capacity (veh/h)	290	613	932			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	166	470	423	160
Volume Left	125	17	0	0
Volume Right	41	0	0	160
cSH	333	932	1700	1700
Volume to Capacity	0.50	0.02	0.25	0.09
Queue Length 95th (m)	21.1	0.4	0.0	0.0
Control Delay (s)	26.1	0.5	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	26.1	0.5	0.0	
Approach LOS	D			

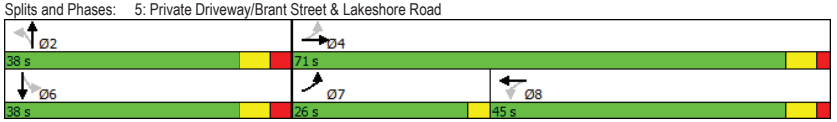
Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	264	882	18	4	714	168	8	1	2	163	1	263
Future Volume (vph)	264	882	18	4	714	168	8	1	2	163	1	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		0.0	0.0		0.0	0.0		15.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		0.99	0.99			0.98		1.00	0.96	
Frt		0.997			0.971			0.977			0.851	
Flt Protected	0.950			0.950				0.964		0.950		
Satd. Flow (prot)	1518	3142	0	1300	3046	0	0	1483	0	1562	1324	0
Flt Permitted	0.187			0.293				0.756		0.750		
Satd. Flow (perm)	298	3142	0	395	3046	0	0	1146	0	1228	1324	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			30			2			286	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		84.2			131.5			34.5			166.5	
Travel Time (s)		6.1			9.5			2.5			12.0	
Confl. Peds. (#/hr)	14		28	28		14	32		4	4		32
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%	3%	0%	25%	3%	1%	0%	100%	0%	4%	0%	5%
Adj. Flow (vph)	287	959	20	4	776	183	9	1	2	177	1	286
Shared Lane Traffic (%)												
Lane Group Flow (vph)	287	979	0	4	959	0	0	12	0	177	287	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.0	33.0		33.0	33.0		38.0	38.0		38.0	38.0	
Total Split (s)	26.0	71.0		45.0	45.0		38.0	38.0		38.0	38.0	
Total Split (%)	23.9%	65.1%		41.3%	41.3%		34.9%	34.9%		34.9%	34.9%	
Maximum Green (s)	23.0	65.0		39.0	39.0		31.0	31.0		31.0	31.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	-2.0		-2.0	-2.0			-3.0		-3.0	-3.0	
Total Lost Time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)		16.0		16.0	16.0		19.0	19.0		19.0	19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	68.3	67.3		48.0	48.0			22.3		22.3	22.3	
Actuated g/C Ratio	0.70	0.69		0.49	0.49			0.23		0.23	0.23	
v/c Ratio	0.70	0.45		0.02	0.63			0.05		0.63	0.55	
Control Delay	19.6	8.5		19.5	22.8			25.5		44.2	7.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	19.6	8.5		19.5	22.8			25.5		44.2	7.9	
LOS	B	A		B	C			C		D	A	
Approach Delay		11.0			22.8			25.5			21.7	
Approach LOS		B			C			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 109			
Actuated Cycle Length: 97.6			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 17.1		Intersection LOS: B	
Intersection Capacity Utilization 78.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Private Driveway/Brant Street & Lakeshore Road



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	287	979	4	959	12	177	287
v/c Ratio	0.70	0.45	0.02	0.63	0.05	0.63	0.55
Control Delay	19.6	8.5	19.5	22.8	25.5	44.2	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	8.5	19.5	22.8	25.5	44.2	7.9
Queue Length 50th (m)	18.1	39.7	0.4	69.7	1.5	31.7	0.2
Queue Length 95th (m)	55.4	73.4	3.0	123.6	6.2	54.1	20.4
Internal Link Dist (m)		60.2		107.5	10.5		142.5
Turn Bay Length (m)	55.0		25.0				
Base Capacity (vph)	497	2166	194	1512	402	429	649
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.45	0.02	0.63	0.03	0.41	0.44

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	264	882	18	4	714	168	8	1	2	163	1	263
Future Volume (vph)	264	882	18	4	714	168	8	1	2	163	1	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99		1.00	1.00	
Frt	1.00	1.00		1.00	0.97			0.98		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1517	3142		1283	3049			1464		1556	1328	
Flt Permitted	0.19	1.00		0.29	1.00			0.76		0.75	1.00	
Satd. Flow (perm)	298	3142		395	3049			1149		1228	1328	
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)	287	959	20	4	776	183	9	1	2	177	1	286
RTOR Reduction (vph)	0	1	0	0	15	0	0	2	0	0	221	0
Lane Group Flow (vph)	287	978	0	4	944	0	0	10	0	177	66	0
Confl. Peds. (#/hr)	14		28	28		14	32		4	4		32
Heavy Vehicles (%)	7%	3%	0%	25%	3%	1%	0%	100%	0%	4%	0%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	65.3	65.3		46.0	46.0			19.3		19.3	19.3	
Effective Green, g (s)	65.3	67.3		48.0	48.0			22.3		22.3	22.3	
Actuated g/C Ratio	0.67	0.69		0.49	0.49			0.23		0.23	0.23	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	402	2166		194	1499			262		280	303	
v/s Ratio Prot	c0.12	0.31			0.31						0.05	
v/s Ratio Perm	c0.36			0.01				0.01		c0.14		
v/c Ratio	0.71	0.45		0.02	0.63			0.04		0.63	0.22	
Uniform Delay, d1	10.9	6.8		12.7	18.3			29.3		34.0	30.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.7		0.2	2.0			0.1		4.6	0.4	
Delay (s)	16.8	7.5		12.9	20.3			29.4		38.6	30.9	
Level of Service	B	A		B	C			C		D	C	
Approach Delay (s)		9.6			20.2			29.4			33.8	
Approach LOS		A			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	97.6	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	78.6%	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)	51	301	30	27	226	27	32	11	18	30	11	57
Future Volume (vph)	51	301	30	27	226	27	32	11	18	30	11	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.984			0.960			0.922	
Flt Protected		0.993		0.950				0.975			0.985	
Satd. Flow (prot)	0	1613	0	1490	1625	0	0	1118	0	0	1525	0
Flt Permitted		0.993		0.950				0.975			0.985	
Satd. Flow (perm)	0	1613	0	1490	1625	0	0	1118	0	0	1525	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		69.8			62.9			41.7			138.8	
Travel Time (s)		5.0			4.5			3.0			10.0	
Confl. Peds. (#/hr)	6		8	8		6	6		6	6		6
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%	32%	9%	4%	0%	46%	10%	58%	6%	0%	0%
Adj. Flow (vph)	55	327	33	29	246	29	35	12	20	33	12	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	415	0	29	275	0	0	67	0	0	107	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	CBD		
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)	51	301	30	27	226	27	32	11	18	30	11	57
Future Volume (Veh/h)	51	301	30	27	226	27	32	11	18	30	11	57
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)	55	327	33	29	246	29	35	12	20	33	12	62
Pedestrians		6			6			8			6	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		70			63							
pX, platoon unblocked	0.97						0.97	0.97		0.97	0.97	0.97
vC, conflicting volume	281			368			840	800	358	810	802	272
vC1, stage 1 conf vol							462	462		324	324	
vC2, stage 2 conf vol							378	339		486	478	
vCu, unblocked vol	248			368			821	781	358	791	783	239
tC, single (s)	4.1			4.2			7.6	6.6	6.8	7.2	6.5	6.2
tC, 2 stage (s)							6.6	5.6		6.2	5.5	
tF (s)	2.2			2.3			3.9	4.1	3.8	3.6	4.0	3.3
p0 queue free %	96			97			90	97	96	92	97	92
cM capacity (veh/h)	1288			1145			366	443	571	428	452	776

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	415	29	275	67	107
Volume Left	55	29	0	35	33
Volume Right	33	0	29	20	62
cSH	1288	1145	1700	424	583
Volume to Capacity	0.04	0.03	0.16	0.16	0.18
Queue Length 95th (m)	1.1	0.6	0.0	4.4	5.3
Control Delay (s)	1.4	8.2	0.0	15.1	12.6
Lane LOS	A	A		C	B
Approach Delay (s)	1.4	0.8		15.1	12.6
Approach LOS				C	B

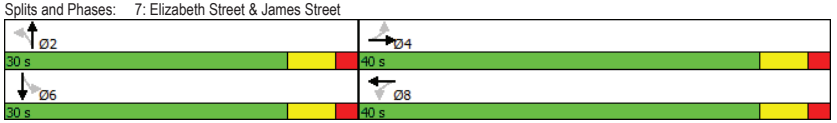
Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	56.3%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	291	37	31	253	12	11	15	42	9	23	16
Future Volume (vph)	21	291	37	31	253	12	11	15	42	9	23	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00			0.98			0.98	
Frt		0.983			0.993			0.916			0.956	
Flt Protected	0.950			0.950				0.992			0.990	
Satd. Flow (prot)	1462	1409	0	1464	1648	0	0	1430	0	0	1337	0
Flt Permitted	0.583			0.548				0.931			0.938	
Satd. Flow (perm)	887	1409	0	839	1648	0	0	1338	0	0	1264	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			5			46			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		62.9			180.3			274.6			209.7	
Travel Time (s)		4.5			13.0			19.8			15.1	
Confl. Peds. (#/hr)	14		8	8		14	11		8	8		11
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%	6%	15%	11%	3%	0%	0%	21%	3%	0%	29%	17%
Parking (#/hr)	0	0	0									
Adj. Flow (vph)	23	316	40	34	275	13	12	16	46	10	25	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	356	0	34	288	0	0	74	0	0	52	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.30	1.30	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	35.5	35.5		35.5	35.5		27.5	27.5		27.5	27.5	
Total Split (s)	40.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Total Split (%)	57.1%	57.1%		57.1%	57.1%		42.9%	42.9%		42.9%	42.9%	
Maximum Green (s)	34.0	34.0		34.0	34.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	20.0	20.0		20.0	20.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	7.0	7.0		7.0	7.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	43.5	43.5		43.5	43.5			10.3			10.3	
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.19			0.19	
v/c Ratio	0.03	0.32		0.05	0.22			0.26			0.21	
Control Delay	3.5	4.2		3.5	3.6			12.4			16.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	3.5	4.2		3.5	3.6			12.4			16.2	
LOS	A	A		A	A			B			B	
Approach Delay		4.2			3.6			12.4			16.2	
Approach LOS		A			A			B			B	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 70			
Actuated Cycle Length: 54.7			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.32			
Intersection Signal Delay: 5.4		Intersection LOS: A	
Intersection Capacity Utilization 45.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Elizabeth Street & James Street



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	23	356	34	288	74	52
v/c Ratio	0.03	0.32	0.05	0.22	0.26	0.21
Control Delay	3.5	4.2	3.5	3.6	12.4	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	4.2	3.5	3.6	12.4	16.2
Queue Length 50th (m)	0.7	12.1	1.0	9.2	2.4	3.0
Queue Length 95th (m)	2.6	26.1	3.5	19.2	11.4	10.7
Internal Link Dist (m)		38.9		156.3	250.6	185.7
Turn Bay Length (m)	15.0		30.0			
Base Capacity (vph)	706	1124	668	1312	659	609
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.32	0.05	0.22	0.11	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	291	37	31	253	12	11	15	42	9	23	16
Future Volume (vph)	21	291	37	31	253	12	11	15	42	9	23	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
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			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.92			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1448	1409		1456	1649			1429			1336	
Flt Permitted	0.58	1.00		0.55	1.00			0.93			0.94	
Satd. Flow (perm)	889	1409		840	1649			1341			1266	
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)	23	316	40	34	275	13	12	16	46	10	25	17
RTOR Reduction (vph)	0	3	0	0	1	0	0	40	0	0	15	0
Lane Group Flow (vph)	23	353	0	34	287	0	0	34	0	0	37	0
Confl. Peds. (#/hr)	14		8	8		14	11		8	8		11
Heavy Vehicles (%)	0%	6%	15%	11%	3%	0%	0%	21%	3%	0%	29%	17%
Parking (#/hr)	0	0	0									
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)	40.0	40.0		40.0	40.0			5.2			5.2	
Effective Green, g (s)	42.0	42.0		42.0	42.0			7.2			7.2	
Actuated g/C Ratio	0.73	0.73		0.73	0.73			0.13			0.13	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	652	1034		616	1210			168			159	
v/s Ratio Prot		c0.25			0.17							
v/s Ratio Perm	0.03			0.04				0.03			c0.03	
v/c Ratio	0.04	0.34		0.06	0.24			0.20			0.23	
Uniform Delay, d1	2.1	2.7		2.1	2.4			22.4			22.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.9		0.2	0.5			0.6			0.8	
Delay (s)	2.2	3.6		2.3	2.9			23.0			23.3	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		3.5			2.8			23.0			23.3	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	57.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	24	7	36	57	11
Future Volume (vph)	25	24	7	36	57	11
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	0.934				0.978	
Flt Protected	0.975			0.992		
Satd. Flow (prot)	1696	0	0	1848	1822	0
Flt Permitted	0.975			0.992		
Satd. Flow (perm)	1696	0	0	1848	1822	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.6			209.5	41.7	
Travel Time (s)	3.5			15.1	3.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	26	8	39	62	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	53	0	0	47	74	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	24	7	36	57	11
Future Volume (Veh/h)	25	24	7	36	57	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	26	8	39	62	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	123	68	74			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	123	68	74			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	97	99			
cM capacity (veh/h)	868	995	1526			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	53	47	74
Volume Left	27	8	0
Volume Right	26	0	12
cSH	926	1526	1700
Volume to Capacity	0.06	0.01	0.04
Queue Length 95th (m)	1.5	0.1	0.0
Control Delay (s)	9.1	1.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	1.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	86	17	162	190	159	13	371	75	92	449	49
Future Volume (vph)	155	86	17	162	190	159	13	371	75	92	449	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		10.0	20.0		0.0	25.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95		0.94	0.96	0.94		0.99	0.99		0.99	1.00	
Frt			0.850		0.932			0.975			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1454	1624	1489	0	1624	1603	0	1593	1634	0
Flt Permitted	0.235			0.697			0.210			0.252		
Satd. Flow (perm)	383	1710	1361	1145	1489	0	357	1603	0	420	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		52			15			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.3			80.7			104.4			184.8	
Travel Time (s)		7.4			5.8			7.5			13.3	
Confl. Peds. (#/hr)	53		20	20		53	11		11	11		11
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%	0%	0%	0%	0%	1%	0%	4%	0%	2%	3%	0%
Adj. Flow (vph)	168	93	18	176	207	173	14	403	82	100	488	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	93	18	176	380	0	14	485	0	100	541	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Detector Phase	3	4	4	4	4		2	2		1	2	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	24.0	24.0	24.0	24.0		29.0	29.0		9.0	29.0	
Total Split (s)	9.0	26.0	26.0	26.0	26.0		36.0	36.0		9.0	36.0	
Total Split (%)	11.3%	32.5%	32.5%	32.5%	32.5%		45.0%	45.0%		11.3%	45.0%	
Maximum Green (s)	6.0	20.0	20.0	20.0	20.0		30.0	30.0		6.0	30.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		0.0	-2.0	
Total Lost Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Ped	Ped	Ped	Ped		Ped	Ped		Min	Ped	
Walk Time (s)		10.0	10.0	10.0	10.0		15.0	15.0			15.0	
Flash Dont Walk (s)		8.0	8.0	8.0	8.0		8.0	8.0			8.0	
Pedestrian Calls (#/hr)		0	0	0	0		0	0			0	
Act Effct Green (s)	28.6	21.6	21.6	21.6	21.6		30.1	30.1		37.2	30.1	
Actuated g/C Ratio	0.37	0.28	0.28	0.28	0.28		0.39	0.39		0.48	0.39	
v/c Ratio	0.71	0.20	0.04	0.56	0.84		0.10	0.77		0.34	0.85	
Control Delay	36.2	23.5	0.2	32.4	42.3		17.5	29.9		13.2	36.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.2	23.5	0.2	32.4	42.3		17.5	29.9		13.2	36.1	
LOS	D	C	A	C	D		B	C		B	D	
Approach Delay		29.7			39.2			29.5			32.5	
Approach LOS		C			D			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 77.8			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 33.2		Intersection LOS: C	
Intersection Capacity Utilization 83.0%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Brant Street & Caroline Street



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	168	93	18	176	380	14	485	100	541
v/c Ratio	0.71	0.20	0.04	0.56	0.84	0.10	0.77	0.34	0.85
Control Delay	36.2	23.5	0.2	32.4	42.3	17.5	29.9	13.2	36.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	23.5	0.2	32.4	42.3	17.5	29.9	13.2	36.1
Queue Length 50th (m)	17.5	11.4	0.0	24.0	50.0	1.4	62.6	7.6	74.4
Queue Length 95th (m)	#35.9	23.1	0.0	44.9	#99.7	5.4	#102.3	15.3	#131.1
Internal Link Dist (m)		78.3			56.7		80.4		160.8
Turn Bay Length (m)	40.0		10.0	20.0		25.0		40.0	
Base Capacity (vph)	236	484	473	324	459	146	669	291	678
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.19	0.04	0.54	0.83	0.10	0.72	0.34	0.80

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	86	17	162	190	159	13	371	75	92	449	49
Future Volume (vph)	155	86	17	162	190	159	13	371	75	92	449	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	0.94		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.96	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	1710	1363	1563	1491		1615	1603		1590	1634	
Flt Permitted	0.23	1.00	1.00	0.70	1.00		0.21	1.00		0.25	1.00	
Satd. Flow (perm)	398	1710	1363	1146	1491		356	1603		422	1634	
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)	168	93	18	176	207	173	14	403	82	100	488	53
RTOR Reduction (vph)	0	0	13	0	38	0	0	9	0	0	5	0
Lane Group Flow (vph)	168	93	5	176	342	0	14	476	0	100	536	0
Confl. Peds. (#/hr)	53		20	20		53	11		11	11		11
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	4%	0%	2%	3%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)	25.6	19.6	19.6	19.6	19.6		28.1	28.1		34.1	28.1	
Effective Green, g (s)	25.6	21.6	21.6	21.6	21.6		30.1	30.1		34.1	30.1	
Actuated g/C Ratio	0.33	0.28	0.28	0.28	0.28		0.39	0.39		0.44	0.39	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	224	475	378	318	414		137	620		275	632	
v/s Ratio Prot	c0.06	0.05			c0.23			0.30		c0.03	c0.33	
v/s Ratio Perm	0.19		0.00	0.15			0.04			0.13		
v/c Ratio	0.75	0.20	0.01	0.55	0.83		0.10	0.77		0.36	0.85	
Uniform Delay, d1	20.6	21.4	20.3	23.9	26.3		15.2	20.7		14.4	21.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.2	0.2	0.0	2.1	12.7		0.3	5.7		0.8	10.3	
Delay (s)	33.7	21.6	20.3	26.0	39.0		15.5	26.4		15.2	32.0	
Level of Service	C	C	C	C	D		B	C		B	C	
Approach Delay (s)		28.8			34.9			26.1			29.4	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	30.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	77.7	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	83.0%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	146	335	456	523	105
Future Volume (vph)	3	146	335	456	523	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.867				0.977	
Flt Protected	0.999			0.979		
Satd. Flow (prot)	1481	0	0	1469	1479	0
Flt Permitted	0.999			0.979		
Satd. Flow (perm)	1481	0	0	1469	1479	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	187.1			83.2	180.0	
Travel Time (s)	16.8			6.0	13.0	
Confl. Peds. (#/hr)		35	18			18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	3%	2%	0%
Parking (#/hr)				0	0	
Adj. Flow (vph)	3	159	364	496	568	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	0	0	860	682	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.30	1.30	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization 108.5%		ICU Level of Service G	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	146	335	456	523	105
Future Volume (Veh/h)	3	146	335	456	523	105
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	159	364	496	568	114
Pedestrians	18			35		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	2			3		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				83	284	
pX, platoon unblocked	0.85	0.72	0.72			
vC, conflicting volume	1867	678	700			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1269	363	393			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	66	56			
cM capacity (veh/h)	88	475	830			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	162	860	682
Volume Left	3	364	0
Volume Right	159	0	114
cSH	439	830	1700
Volume to Capacity	0.37	0.44	0.40
Queue Length 95th (m)	13.4	18.1	0.0
Control Delay (s)	17.9	9.9	0.0
Lane LOS	C	A	
Approach Delay (s)	17.9	9.9	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	108.5%	ICU Level of Service	G
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	462	382	409	122	222	448
Future Volume (vph)	462	382	409	122	222	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0		8.0	20.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.91		0.94	0.98	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1608	1398	1524	1454	1593	1693
Flt Permitted	0.950				0.274	
Satd. Flow (perm)	1538	1267	1524	1374	452	1693
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		395		44		
Link Speed (k/h)	50		50			50
Link Distance (m)	69.8		76.6			83.2
Travel Time (s)	5.0		5.5			6.0
Confl. Peds. (#/hr)	25	43		25	25	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	4%	1%	0%	2%	1%
Parking (#/hr)			0			
Adj. Flow (vph)	502	415	445	133	241	487
Shared Lane Traffic (%)						
Lane Group Flow (vph)	502	415	445	133	241	487
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane	Yes					
Headway Factor	1.14	1.14	1.30	1.14	1.14	1.14
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	29.0	29.0	34.0	34.0	9.0	34.0
Total Split (s)	34.0	34.0	35.0	35.0	11.0	35.0
Total Split (%)	42.5%	42.5%	43.8%	43.8%	13.8%	43.8%
Maximum Green (s)	28.0	28.0	29.0	29.0	8.0	29.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	0.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0	8.0	20.0	20.0		20.0
Flash Dont Walk (s)	15.0	15.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	28.0	28.0	27.2	27.2	36.3	27.2
Actuated g/C Ratio	0.38	0.38	0.37	0.37	0.49	0.37
v/c Ratio	0.87	0.57	0.80	0.25	0.70	0.79
Control Delay	40.4	6.2	34.0	13.0	23.7	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	6.2	34.0	13.0	23.7	31.9
LOS	D	A	C	B	C	C
Approach Delay	24.9		29.2			29.2
Approach LOS	C		C			C

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 74.5			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 27.4		Intersection LOS: C	
Intersection Capacity Utilization 76.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Brant Street & James Street





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	502	415	445	133	241	487
v/c Ratio	0.87	0.57	0.80	0.25	0.70	0.79
Control Delay	40.4	6.2	34.0	13.0	23.7	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	6.2	34.0	13.0	23.7	31.9
Queue Length 50th (m)	72.9	2.0	60.1	9.1	19.6	65.3
Queue Length 95th (m)	#130.4	22.9	#106.4	21.2	#39.4	#103.5
Internal Link Dist (m)	45.8		52.6			59.2
Turn Bay Length (m)	15.0			8.0	20.0	
Base Capacity (vph)	629	752	644	606	345	716
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.55	0.69	0.22	0.70	0.68

Intersection Summary

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



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	462	382	409	122	222	448
Future Volume (vph)	462	382	409	122	222	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.91	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1544	1275	1524	1377	1587	1693
Flt Permitted	0.95	1.00	1.00	1.00	0.27	1.00
Satd. Flow (perm)	1544	1275	1524	1377	458	1693
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	502	415	445	133	241	487
RTOR Reduction (vph)	0	246	0	28	0	0
Lane Group Flow (vph)	502	169	445	105	241	487
Confl. Peds. (#/hr)	25	43		25	25	
Heavy Vehicles (%)	1%	4%	1%	0%	2%	1%
Parking (#/hr)			0			
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Actuated Green, G (s)	26.0	26.0	25.1	25.1	33.2	25.1
Effective Green, g (s)	28.0	28.0	27.1	27.1	33.2	27.1
Actuated g/C Ratio	0.38	0.38	0.37	0.37	0.45	0.37
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	582	481	556	502	328	618
v/s Ratio Prot			c0.29		c0.08	0.29
v/s Ratio Perm	c0.33	0.13		0.08	0.25	
v/c Ratio	0.86	0.35	0.80	0.21	0.73	0.79
Uniform Delay, d1	21.3	16.6	21.1	16.2	14.6	21.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.5	0.4	8.1	0.2	8.3	6.6
Delay (s)	33.8	17.0	29.2	16.4	22.9	27.6
Level of Service	C	B	C	B	C	C
Approach Delay (s)	26.2		26.3			26.0
Approach LOS	C		C			C

Intersection Summary

HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	75	62	74	456	590	320
Future Volume (vph)	75	62	74	456	590	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			20.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					0.850
Flt Protected	0.973			0.993		
Satd. Flow (prot)	1548	0	0	1665	1660	1439
Flt Permitted	0.973			0.993		
Satd. Flow (perm)	1548	0	0	1665	1660	1439
Link Speed (k/h)	40			50	50	
Link Distance (m)	184.7			166.5	76.6	
Travel Time (s)	16.6			12.0	5.5	
Confl. Peds. (#/hr)	4	74	4			4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	3%	1%
Adj. Flow (vph)	82	67	80	496	641	348
Shared Lane Traffic (%)						
Lane Group Flow (vph)	149	0	0	576	641	348
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	75	62	74	456	590	320
Future Volume (Veh/h)	75	62	74	456	590	320
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	67	80	496	641	348
Pedestrians	4			74	4	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			6	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				166	77	
pX, platoon unblocked	0.64	0.61	0.61			
vC, conflicting volume	1305	719	993			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	984	219	669			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	46	86	86			
cM capacity (veh/h)	151	468	560			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	149	576	641	348
Volume Left	82	80	0	0
Volume Right	67	0	0	348
cSH	217	560	1700	1700
Volume to Capacity	0.69	0.14	0.38	0.20
Queue Length 95th (m)	34.7	4.0	0.0	0.0
Control Delay (s)	51.3	3.9	0.0	0.0
Lane LOS	F	A		
Approach Delay (s)	51.3	3.9	0.0	
Approach LOS	F			

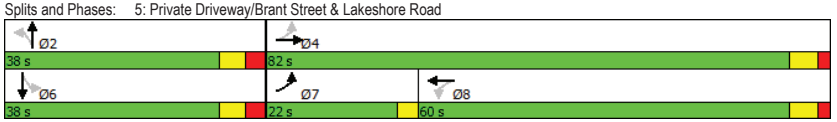
Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	858	10	6	1065	248	7	4	0	200	8	444
Future Volume (vph)	278	858	10	6	1065	248	7	4	0	200	8	444
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		0.0	0.0		0.0	0.0		15.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		0.96	0.97			0.99		0.98	0.93	
Frt		0.998			0.972						0.853	
Flt Protected	0.950			0.950				0.968		0.950		
Satd. Flow (prot)	1608	2972	0	1624	3015	0	0	1655	0	1624	1332	0
Flt Permitted	0.069			0.303				0.477		0.750		
Satd. Flow (perm)	117	2972	0	499	3015	0	0	807	0	1252	1332	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			32						304	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		84.2			131.5			34.5			166.5	
Travel Time (s)		6.1			9.5			2.5			12.0	
Confl. Peds. (#/hr)	59		62	62		59	51		21	21		51
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 (%)	1%	9%	1%	0%	2%	1%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	302	933	11	7	1158	270	8	4	0	217	9	483
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	944	0	7	1428	0	0	12	0	217	492	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.0	33.0		33.0	33.0		38.0	38.0		38.0	38.0	
Total Split (s)	22.0	82.0		60.0	60.0		38.0	38.0		38.0	38.0	
Total Split (%)	18.3%	68.3%		50.0%	50.0%		31.7%	31.7%		31.7%	31.7%	
Maximum Green (s)	19.0	76.0		54.0	54.0		31.0	31.0		31.0	31.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	-2.0		-2.0	-2.0			-3.0		-3.0	-3.0	
Total Lost Time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)		16.0		16.0	16.0		19.0	19.0		19.0	19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	79.2	78.2		56.5	56.5			27.8		27.8	27.8	
Actuated g/C Ratio	0.69	0.69		0.50	0.50			0.24		0.24	0.24	
v/c Ratio	0.93	0.46		0.03	0.95			0.06		0.71	0.89	
Control Delay	67.8	9.9		17.8	41.9			32.6		52.8	34.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	67.8	9.9		17.8	41.9			32.6		52.8	34.5	
LOS	E	A		B	D			C		D	C	
Approach Delay		23.9			41.7			32.6			40.1	
Approach LOS		C			D			C			D	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 114.1			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 34.8		Intersection LOS: C	
Intersection Capacity Utilization 104.4%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 5: Private Driveway/Brant Street & Lakeshore Road



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	302	944	7	1428	12	217	492
v/c Ratio	0.93	0.46	0.03	0.95	0.06	0.71	0.89
Control Delay	67.8	9.9	17.8	41.9	32.6	52.8	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	9.9	17.8	41.9	32.6	52.8	34.5
Queue Length 50th (m)	57.5	54.5	0.9	172.6	2.2	46.7	46.6
Queue Length 95th (m)	#117.6	73.2	3.8	#237.0	7.3	74.9	#110.0
Internal Link Dist (m)		60.2		107.5	10.5		142.5
Turn Bay Length (m)	55.0		25.0				
Base Capacity (vph)	330	2038	246	1509	241	374	611
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.46	0.03	0.95	0.05	0.58	0.81

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	858	10	6	1065	248	7	4	0	200	8	444
Future Volume (vph)	278	858	10	6	1065	248	7	4	0	200	8	444
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00		0.96	1.00			0.99		0.98	1.00	
Frt	1.00	1.00		1.00	0.97			1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1608	2973		1567	3017			1638		1587	1336	
Flt Permitted	0.07	1.00		0.30	1.00			0.48		0.75	1.00	
Satd. Flow (perm)	118	2973		500	3017			807		1253	1336	
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)	302	933	11	7	1158	270	8	4	0	217	9	483
RTOR Reduction (vph)	0	1	0	0	16	0	0	0	0	0	230	0
Lane Group Flow (vph)	302	943	0	7	1412	0	0	12	0	217	262	0
Confl. Peds. (#/hr)	59		62	62		59	51		21	21		51
Heavy Vehicles (%)	1%	9%	1%	0%	2%	1%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	76.3	76.3		54.6	54.6			24.8		24.8	24.8	
Effective Green, g (s)	76.3	78.3		56.6	56.6			27.8		27.8	27.8	
Actuated g/C Ratio	0.67	0.69		0.50	0.50			0.24		0.24	0.24	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	323	2040		248	1496			196		305	325	
v/s Ratio Prot	c0.15	0.32			c0.47						c0.20	
v/s Ratio Perm	0.47			0.01				0.01		0.17		
v/c Ratio	0.93	0.46		0.03	0.94			0.06		0.71	0.81	
Uniform Delay, d1	36.1	8.2		14.7	27.2			33.1		39.5	40.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	33.3	0.8		0.2	13.3			0.1		7.6	13.6	
Delay (s)	69.4	9.0		14.9	40.5			33.3		47.1	54.2	
Level of Service	E	A		B	D			C		D	D	
Approach Delay (s)		23.6			40.4			33.3			52.0	
Approach LOS		C			D			C			D	

Intersection Summary				
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	114.1	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	104.4%	ICU Level of Service	G	
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)	48	262	34	21	742	27	28	19	24	38	23	74
Future Volume (vph)	48	262	34	21	742	27	28	19	24	38	23	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.995			0.954			0.926	
Flt Protected		0.993		0.950				0.981			0.986	
Satd. Flow (prot)	0	1608	0	1354	1685	0	0	1233	0	0	1561	0
Flt Permitted		0.993		0.950				0.981			0.986	
Satd. Flow (perm)	0	1608	0	1354	1685	0	0	1233	0	0	1561	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		69.8			62.9			48.7			132.9	
Travel Time (s)		5.0			4.5			3.5			9.6	
Confl. Peds. (#/hr)	8		3	3		8	15		16	16		15
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%	0%	43%	20%	1%	0%	46%	0%	35%	0%	0%	0%
Adj. Flow (vph)	52	285	37	23	807	29	30	21	26	41	25	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	374	0	23	836	0	0	77	0	0	146	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	82.1%	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)	48	262	34	21	742	27	28	19	24	38	23	74
Future Volume (Veh/h)	48	262	34	21	742	27	28	19	24	38	23	74
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)	52	285	37	23	807	29	30	21	26	41	25	80
Pedestrians		15			16			3			8	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		70			63							
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	844			325			1371	1300	322	1336	1304	844
vC1, stage 1 conf vol							410	410		876	876	
vC2, stage 2 conf vol							960	890		460	429	
vCu, unblocked vol	611			325			1325	1230	322	1277	1235	611
tC, single (s)	4.1			4.3			7.6	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)							6.6	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.9	4.0	3.6	3.5	4.0	3.3
p0 queue free %	93			98			74	92	96	85	91	78
cM capacity (veh/h)	717			1137			116	256	638	275	293	360

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	374	23	836	77	146
Volume Left	52	23	0	30	41
Volume Right	37	0	29	26	80
cSH	717	1137	1700	201	320
Volume to Capacity	0.07	0.02	0.49	0.38	0.46
Queue Length 95th (m)	1.9	0.5	0.0	13.4	18.2
Control Delay (s)	2.3	8.2	0.0	33.5	25.4
Lane LOS	A	A		D	D
Approach Delay (s)	2.3	0.2		33.5	25.4
Approach LOS				D	D

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	82.1%	ICU Level of Service	E	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	255	46	80	707	15	52	45	68	21	22	31
Future Volume (vph)	23	255	46	80	707	15	52	45	68	21	22	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	1.00			0.98			0.97	
Frt		0.977			0.997			0.944			0.943	
Flt Protected	0.950			0.950				0.984			0.986	
Satd. Flow (prot)	1462	1448	0	1562	1671	0	0	1547	0	0	1553	0
Flt Permitted	0.277			0.550				0.893			0.883	
Satd. Flow (perm)	425	1448	0	897	1671	0	0	1390	0	0	1388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			2			39			34	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		62.9			180.3			274.6			209.7	
Travel Time (s)		4.5			13.0			19.8			15.1	
Confl. Peds. (#/hr)	8		8	8		8	16		5	5		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	4%	2%	0%	0%	2%	2%	0%	0%	0%
Parking (#/hr)	0	0	0									
Adj. Flow (vph)	25	277	50	87	768	16	57	49	74	23	24	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	327	0	87	784	0	0	180	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.30	1.30	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	35.5	35.5		35.5	35.5		27.5	27.5		27.5	27.5	
Total Split (s)	61.0	61.0		61.0	61.0		29.0	29.0		29.0	29.0	
Total Split (%)	67.8%	67.8%		67.8%	67.8%		32.2%	32.2%		32.2%	32.2%	
Maximum Green (s)	55.0	55.0		55.0	55.0		23.0	23.0		23.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	20.0	20.0		20.0	20.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	7.0	7.0		7.0	7.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	58.1	58.1		58.1	58.1			15.9			15.9	
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.19			0.19	
v/c Ratio	0.08	0.32		0.14	0.66			0.60			0.27	
Control Delay	5.9	5.9		5.6	11.1			31.4			19.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	5.9	5.9		5.6	11.1			31.4			19.6	
LOS	A	A		A	B			C			B	
Approach Delay		5.9			10.6			31.4			19.6	
Approach LOS		A			B			C			B	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 90			
Actuated Cycle Length: 82			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 74.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 7: Elizabeth Street & James Street



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	25	327	87	784	180	81
v/c Ratio	0.08	0.32	0.14	0.66	0.60	0.27
Control Delay	5.9	5.9	5.6	11.1	31.4	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	5.9	5.6	11.1	31.4	19.6
Queue Length 50th (m)	1.1	15.3	3.8	57.7	20.6	6.4
Queue Length 95th (m)	4.7	36.7	11.6	130.2	40.8	17.9
Internal Link Dist (m)		38.9		156.3	250.6	185.7
Turn Bay Length (m)	15.0		30.0			
Base Capacity (vph)	301	1030	635	1183	451	447
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.32	0.14	0.66	0.40	0.18

Intersection Summary

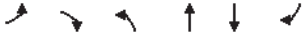
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	255	46	80	707	15	52	45	68	21	22	31
Future Volume (vph)	23	255	46	80	707	15	52	45	68	21	22	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
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			0.99			0.98	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.94			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1458	1448		1550	1671			1536			1553	
Flt Permitted	0.28	1.00		0.55	1.00			0.89			0.88	
Satd. Flow (perm)	425	1448		898	1671			1392			1391	
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)	25	277	50	87	768	16	57	49	74	23	24	34
RTOR Reduction (vph)	0	6	0	0	1	0	0	31	0	0	27	0
Lane Group Flow (vph)	25	321	0	87	783	0	0	149	0	0	54	0
Confl. Peds. (#/hr)	8		8	8		8	16		5	5		16
Heavy Vehicles (%)	0%	3%	5%	4%	2%	0%	0%	2%	2%	0%	0%	0%
Parking (#/hr)	0	0	0									
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)	56.1	56.1		56.1	56.1			13.9			13.9	
Effective Green, g (s)	58.1	58.1		58.1	58.1			15.9			15.9	
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.19			0.19	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	301	1025		636	1183			269			269	
v/s Ratio Prot		0.22			c0.47							
v/s Ratio Perm	0.06			0.10				c0.11			0.04	
v/c Ratio	0.08	0.31		0.14	0.66			0.55			0.20	
Uniform Delay, d1	3.7	4.5		3.9	6.6			29.8			27.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	0.8		0.4	2.9			2.4			0.4	
Delay (s)	4.2	5.3		4.3	9.5			32.3			28.1	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		5.2			9.0			32.3			28.1	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	19	18	21	52	47	31
Future Volume (vph)	19	18	21	52	47	31
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	0.934				0.946	
Flt Protected	0.975			0.986		
Satd. Flow (prot)	1696	0	0	1837	1762	0
Flt Permitted	0.975			0.986		
Satd. Flow (perm)	1696	0	0	1837	1762	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.6			202.5	48.7	
Travel Time (s)	3.5			14.6	3.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	20	23	57	51	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	0	0	80	85	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		



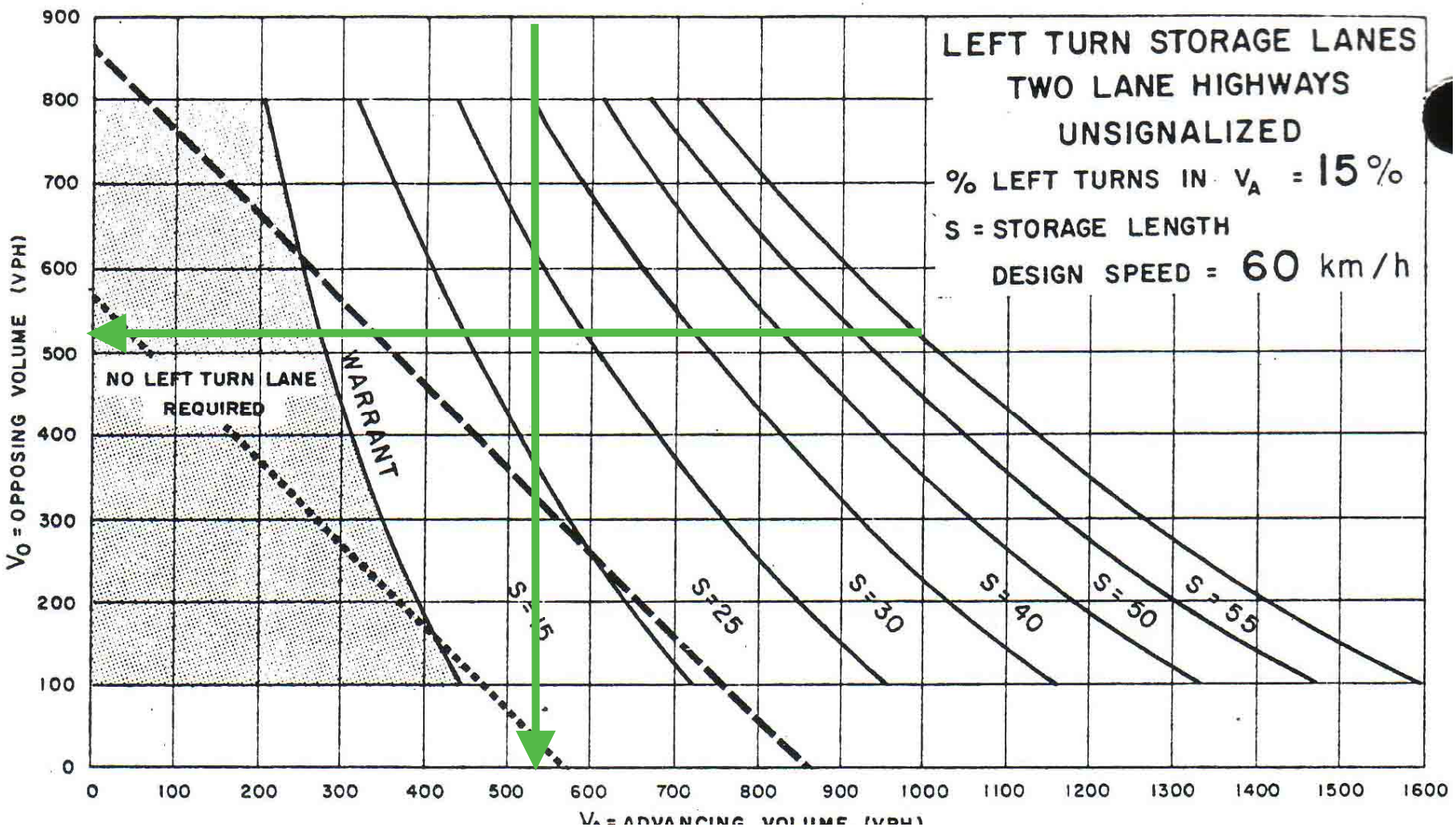
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	18	21	52	47	31
Future Volume (Veh/h)	19	18	21	52	47	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	20	23	57	51	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	171	68	85			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	171	68	85			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	98	98			
cM capacity (veh/h)	807	995	1512			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	41	80	85
Volume Left	21	23	0
Volume Right	20	0	34
cSH	889	1512	1700
Volume to Capacity	0.05	0.02	0.05
Queue Length 95th (m)	1.2	0.4	0.0
Control Delay (s)	9.2	2.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	2.2	0.0
Approach LOS	A		

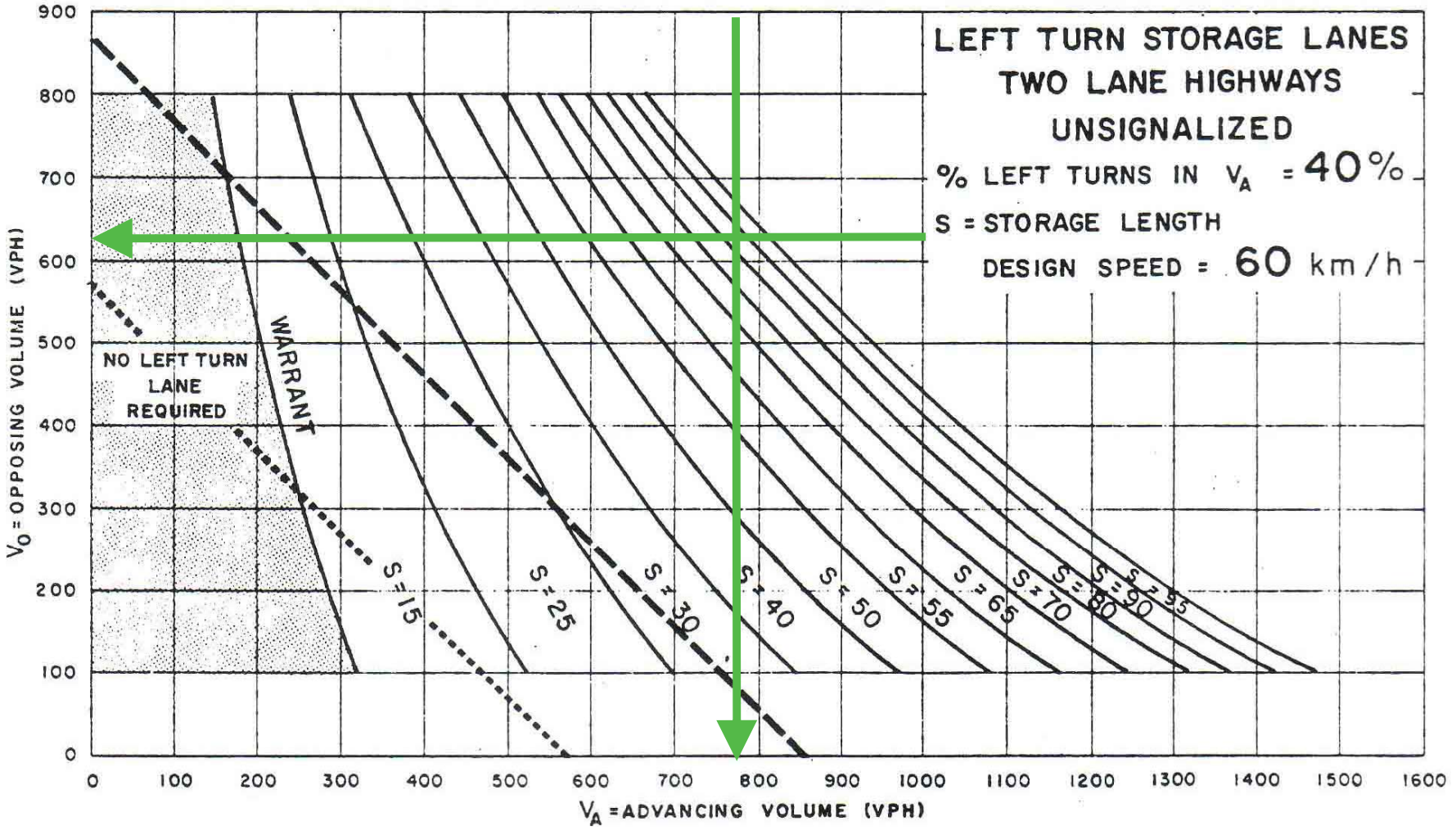
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix H

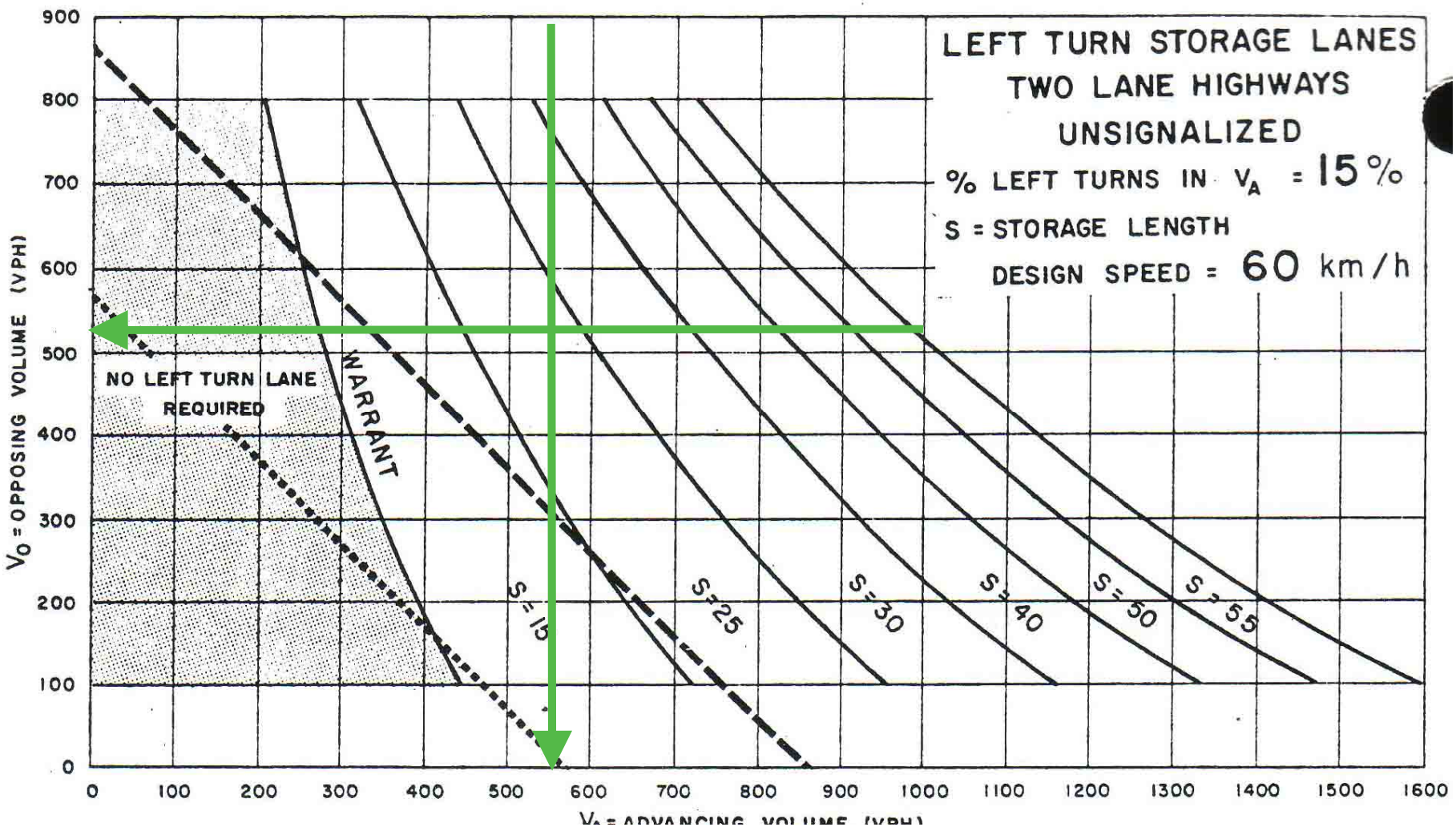
Left-Turn Lane Warrant Nomographs



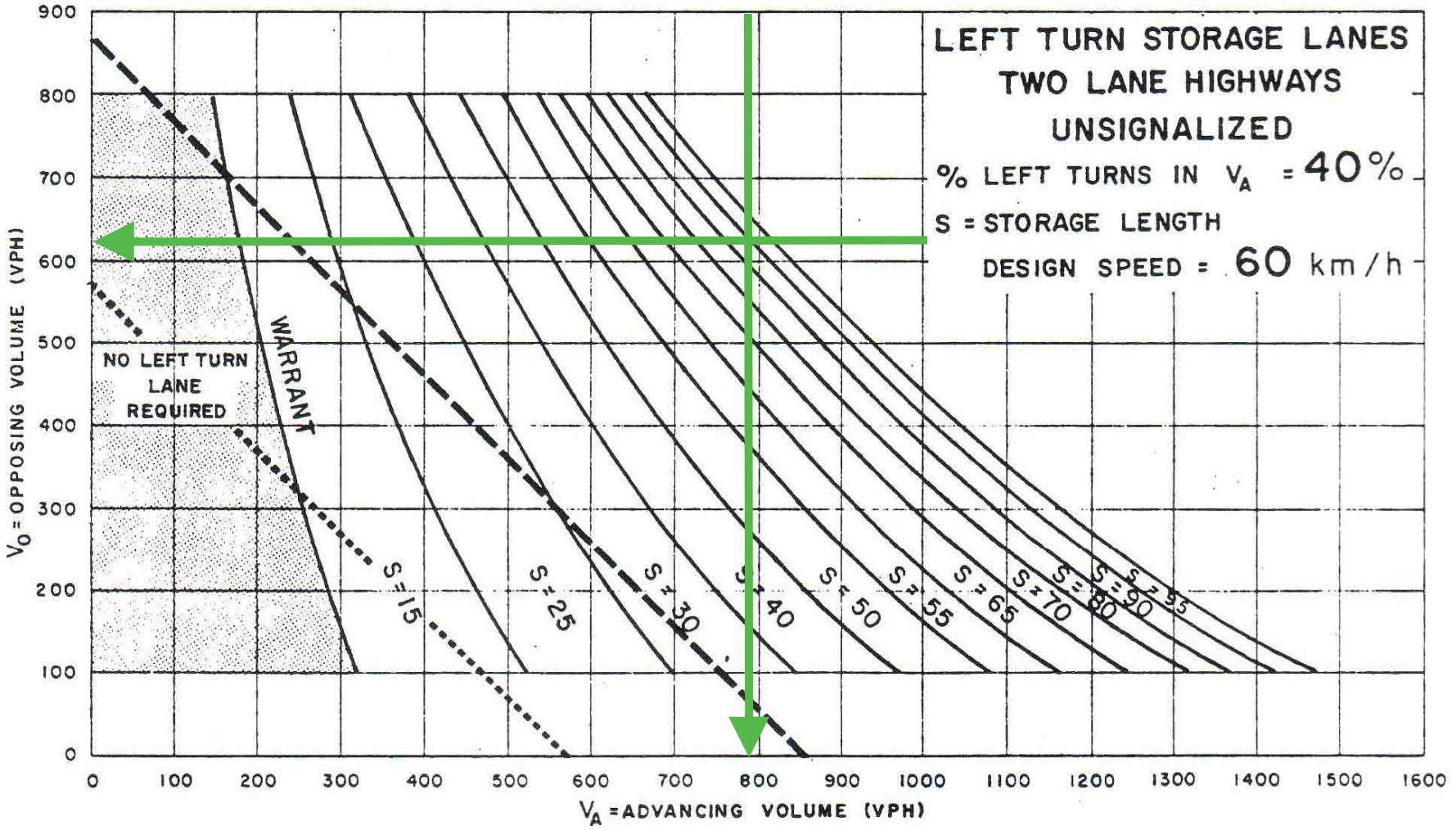
Brant Street & Ontario Street
Northbound Left Turn Lane Warrant
2026 Background AM Peak Hour



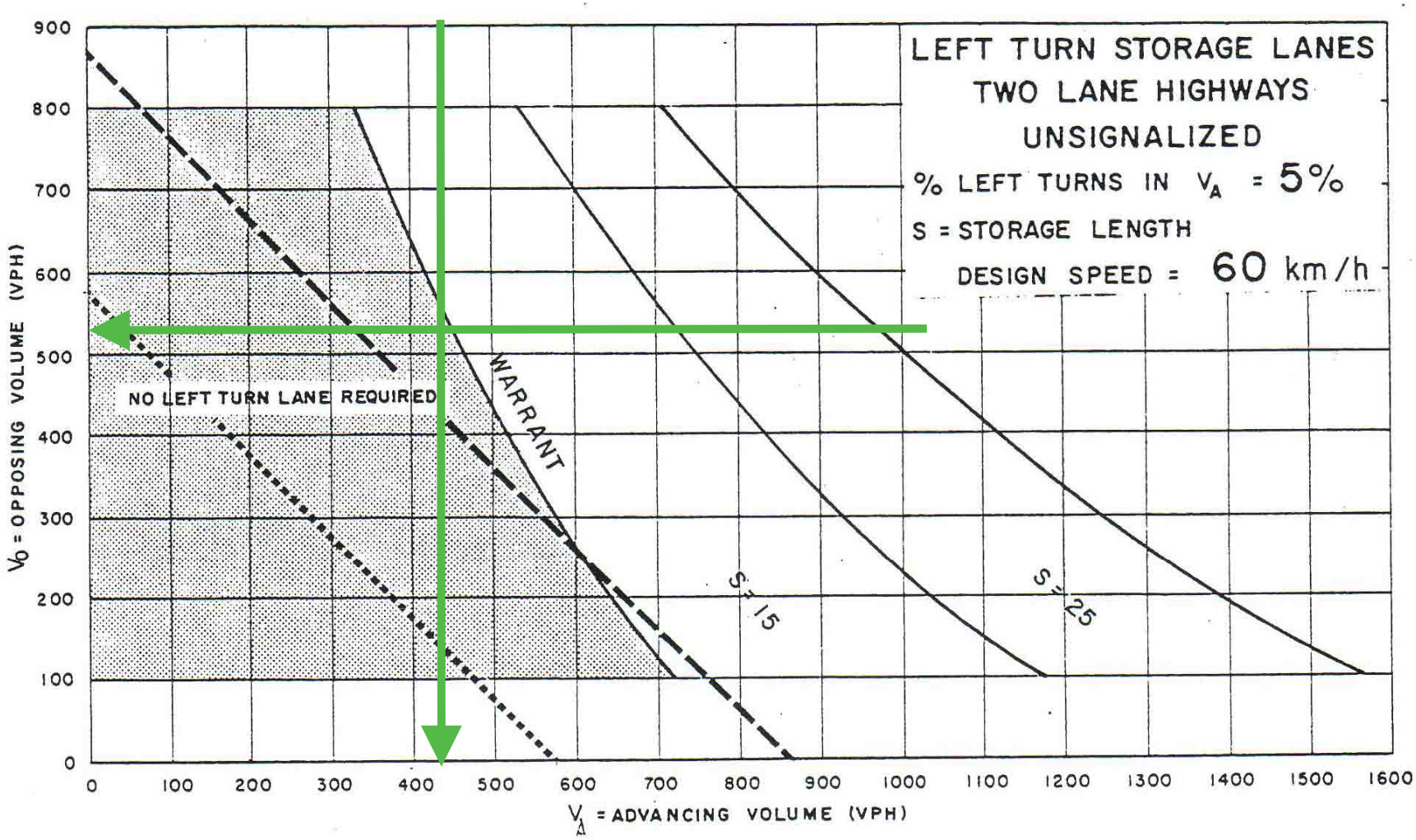
Brant Street & Ontario Street
Northbound Left Turn Lane Warrant
2026 Background PM Peak Hour



Brant Street & Ontario Street
Northbound Left Turn Lane Warrant
2026 Total AM Peak Hour

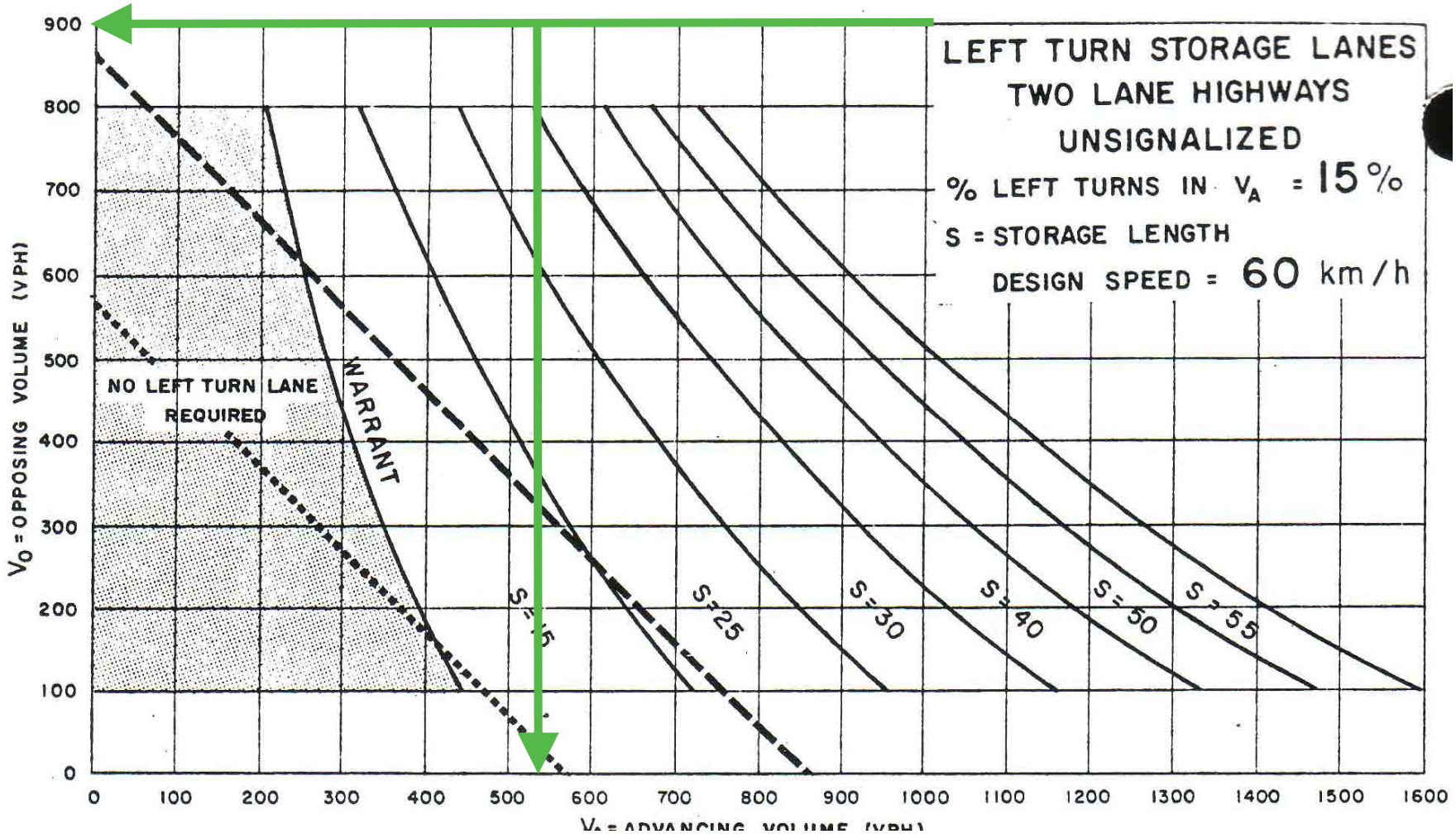


Brant Street & Ontario Street
Northbound Left Turn Lane Warrant
2026 Total PM Peak Hour

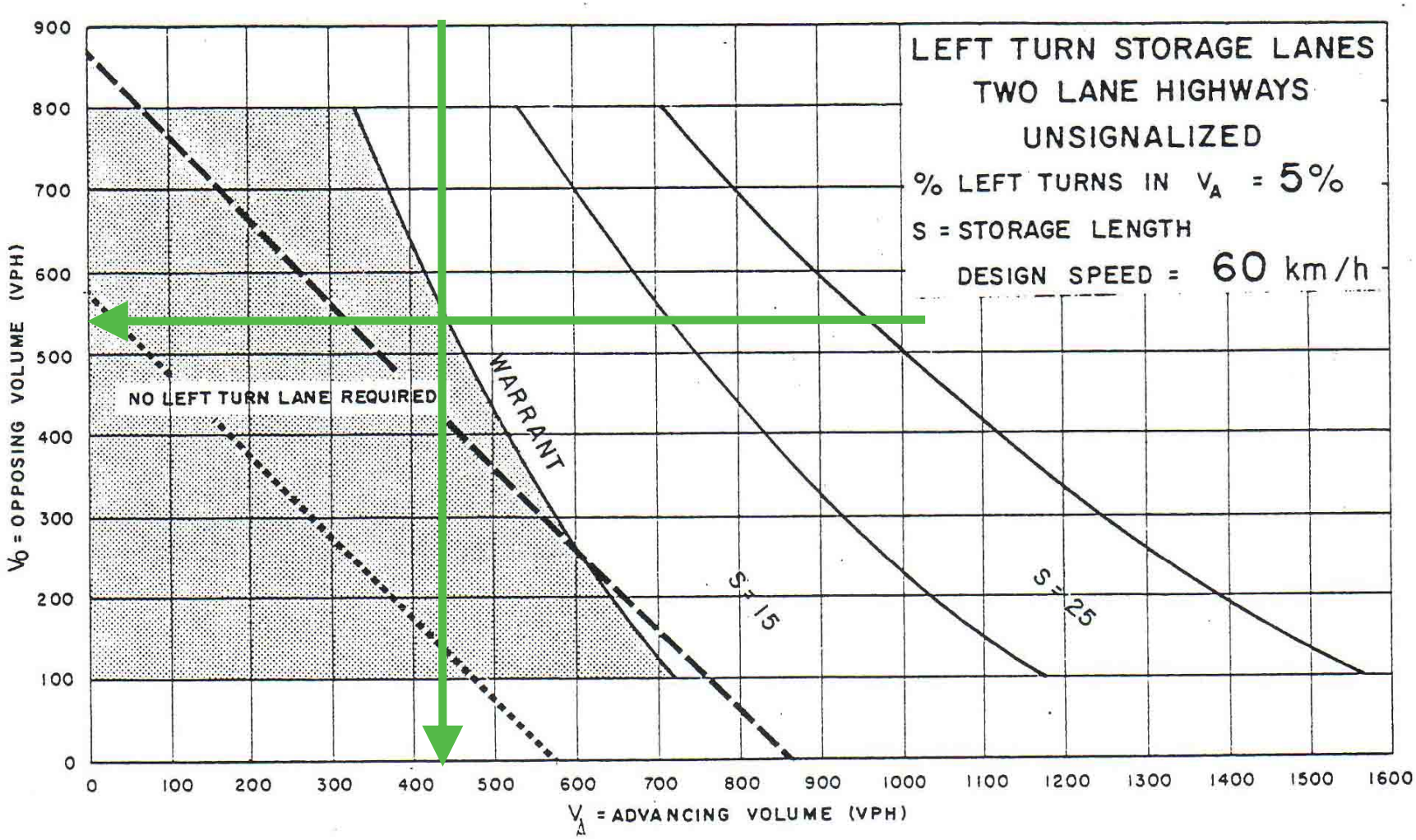


Brant Street & Elgin Street
Northbound Left Turn Lane Warrant
2026 Background AM Peak Hour

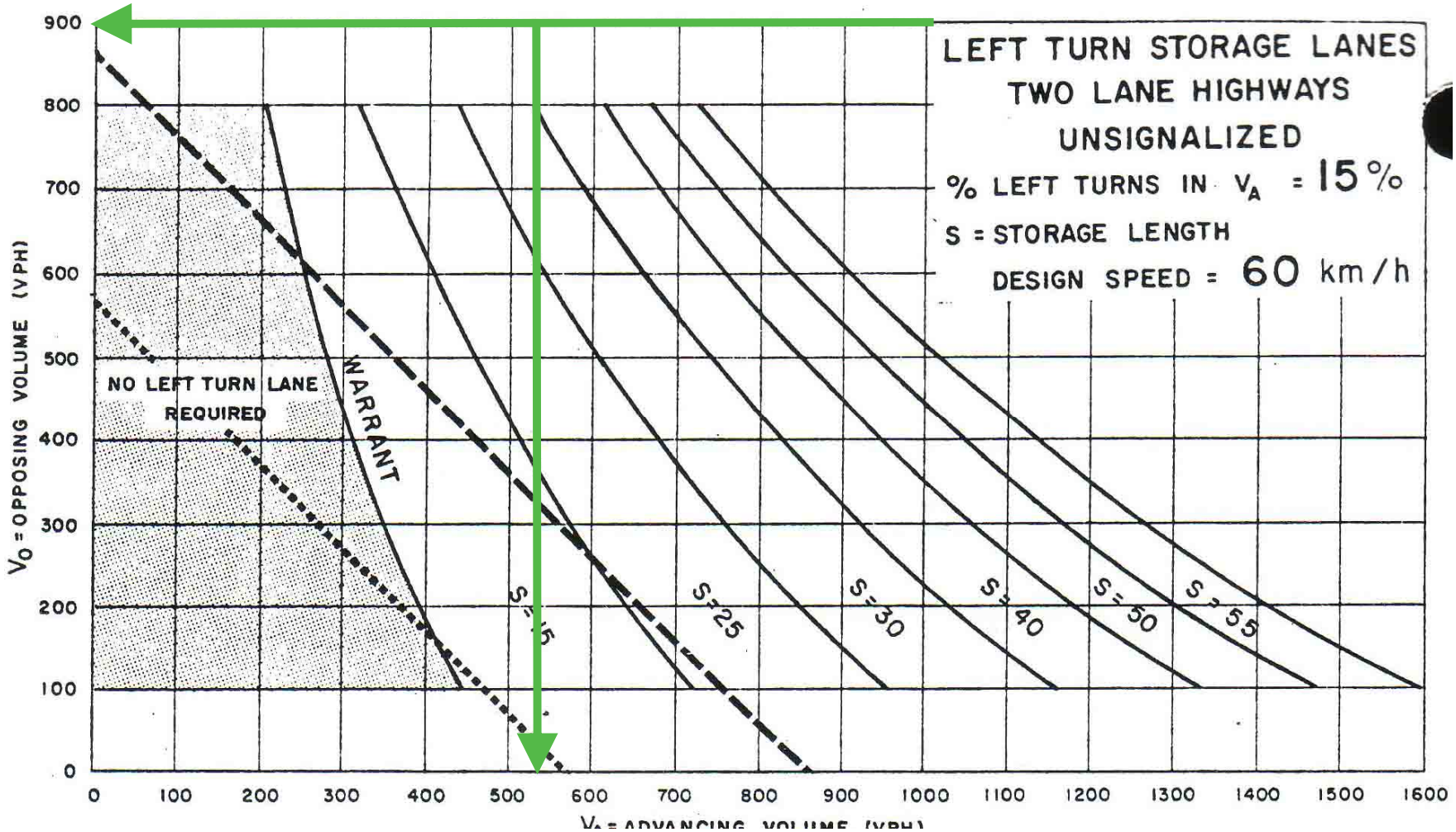
Figure H.5



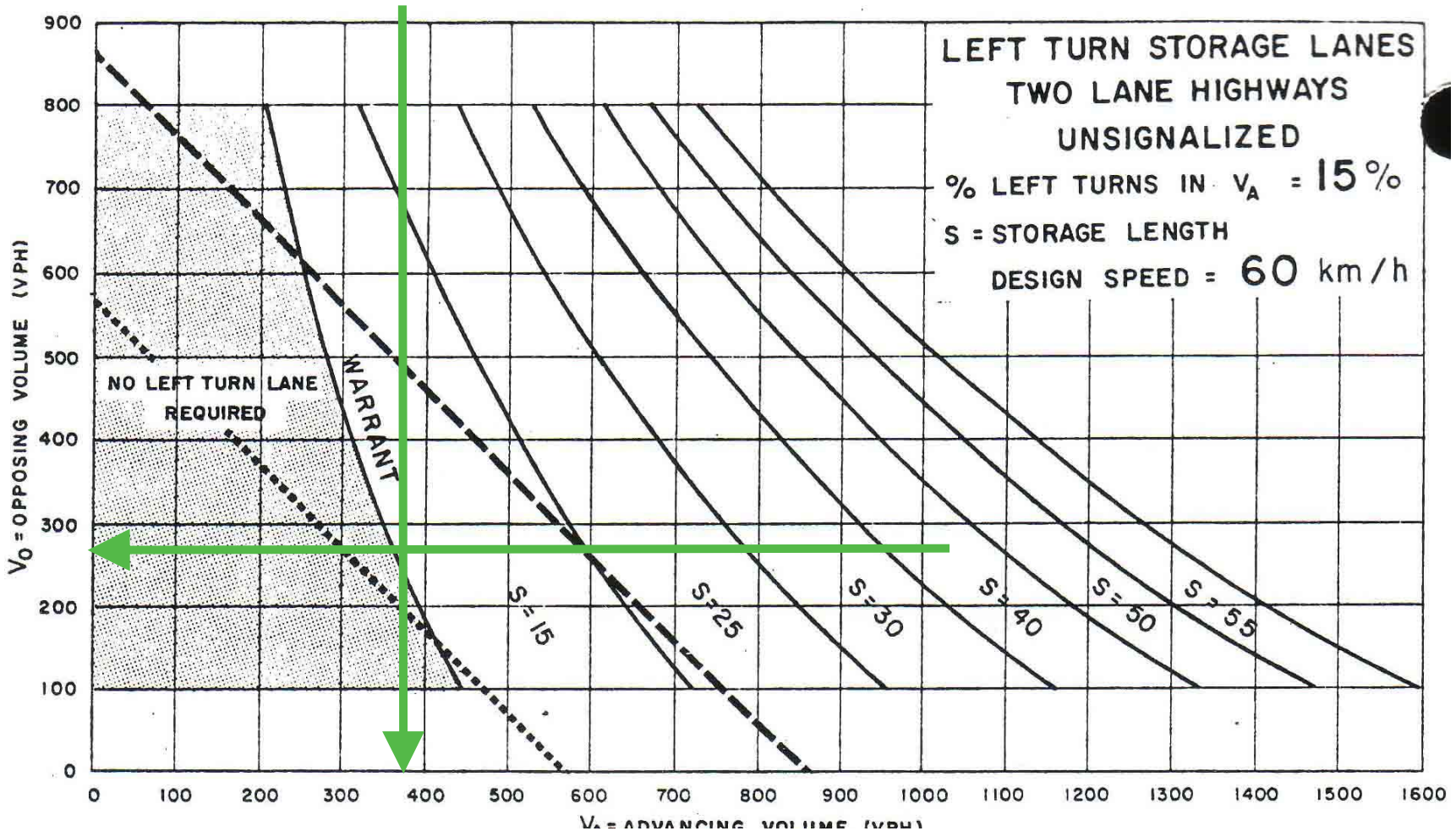
Brant Street & Elgin Street
Northbound Left Turn Lane Warrant
2026 Background PM Peak Hour



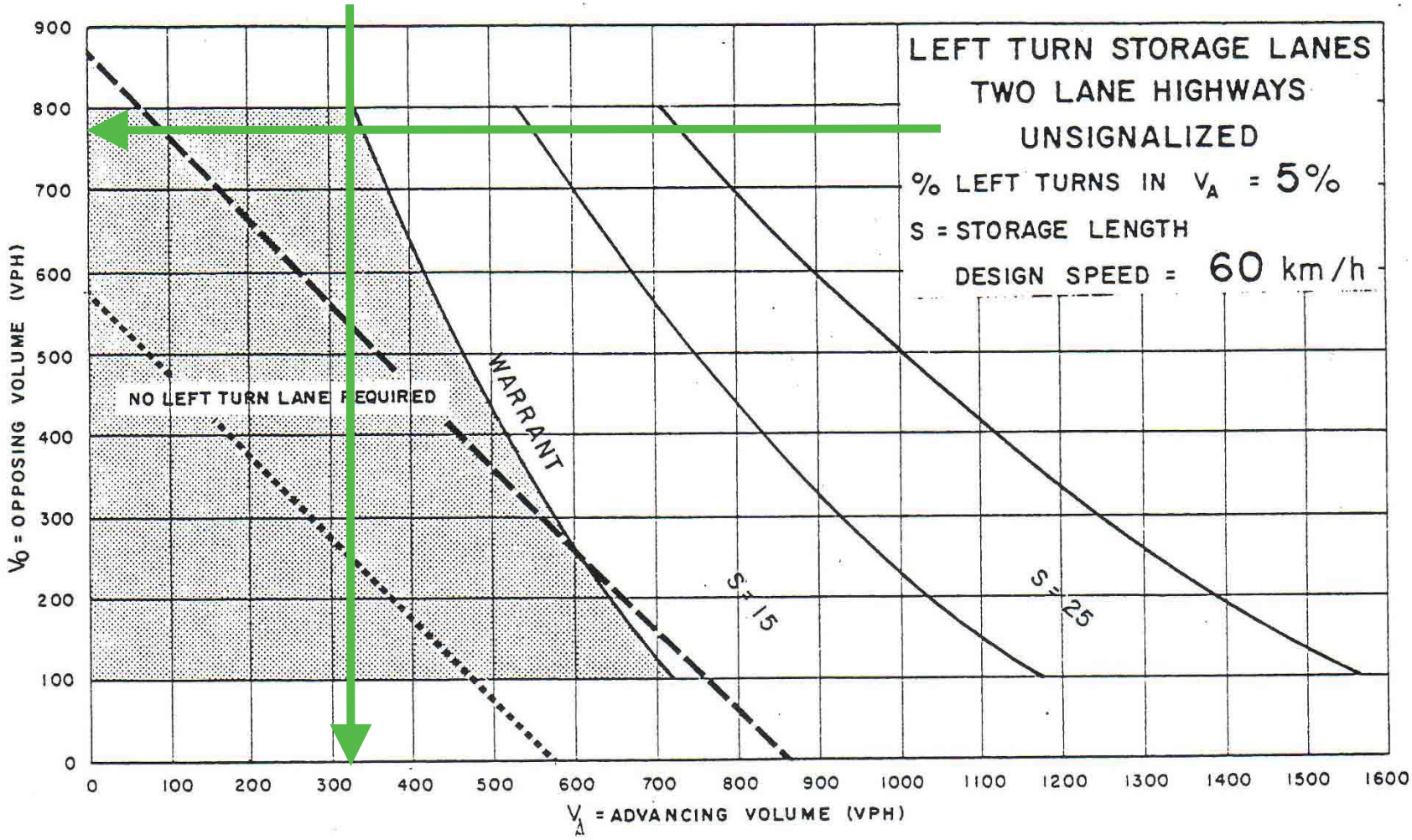
Brant Street & Elgin Street
Northbound Left Turn Lane Warrant
2026 Total AM Peak Hour



Brant Street & Elgin Street
Northbound Left Turn Lane Warrant
2026 Total PM Peak Hour

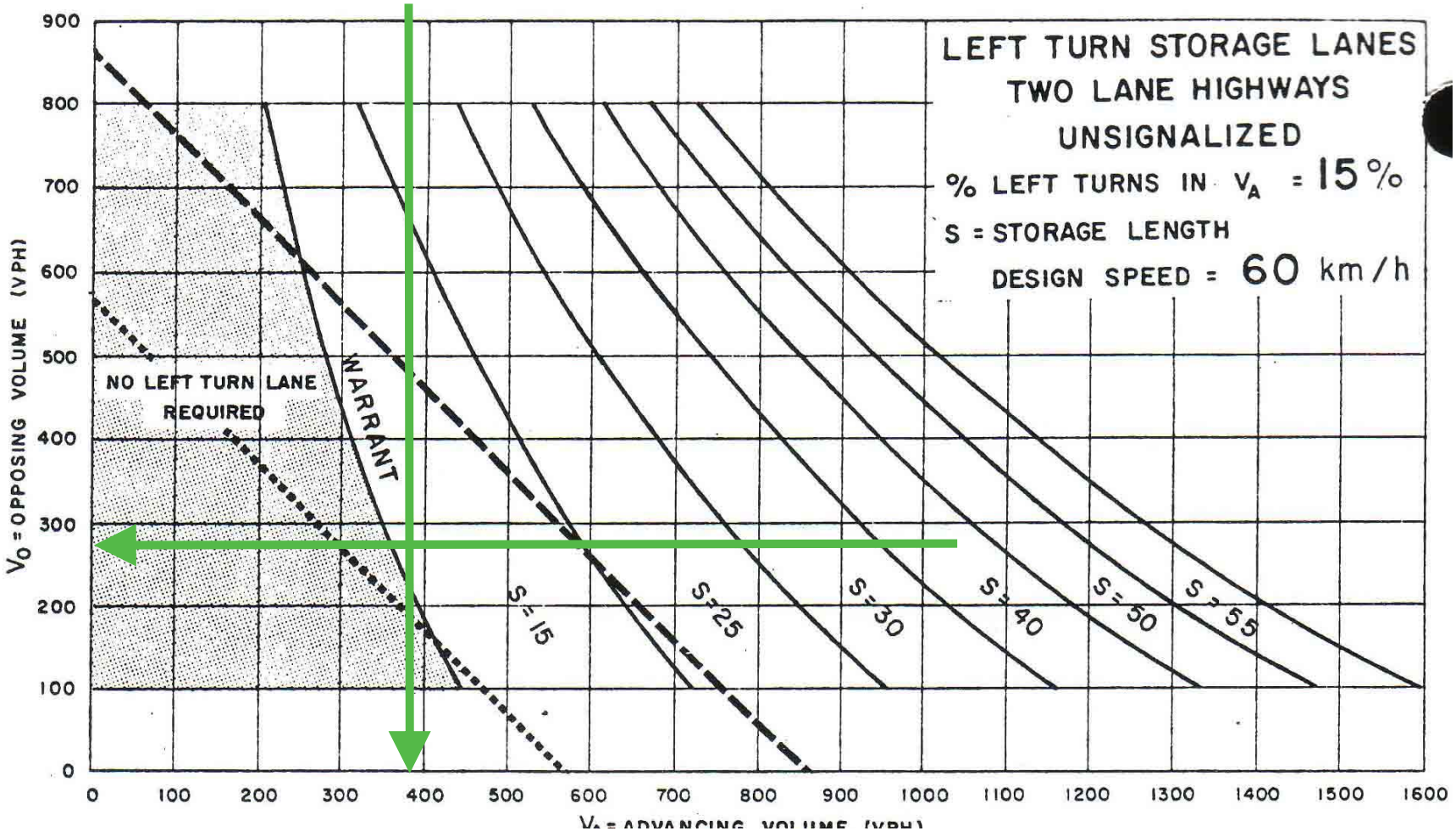


John Street & James Street
Eastbound Left Turn Lane Warrant
2026 Background AM Peak Hour

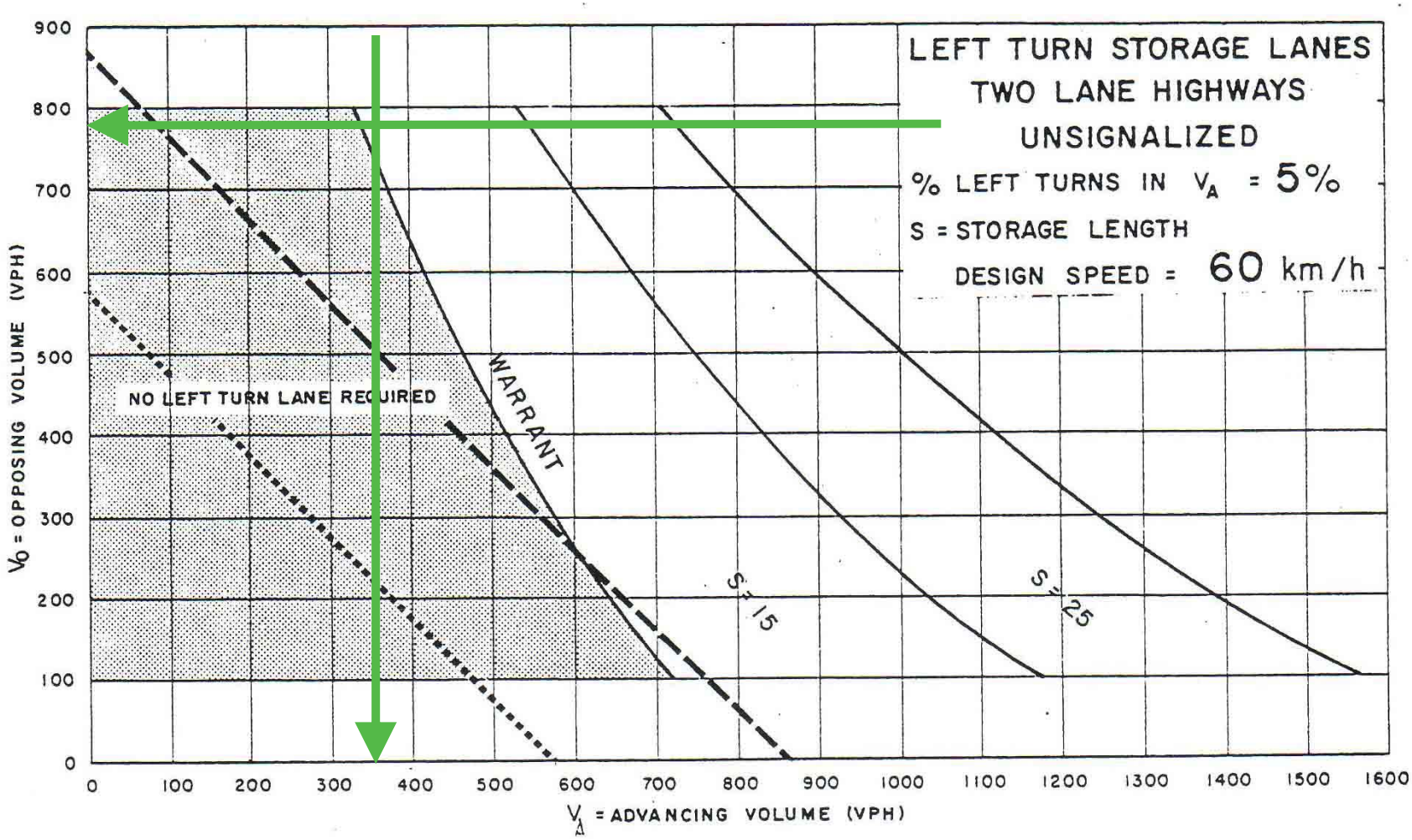


John Street & James Street
Eastbound Left Turn Lane Warrant
2026 Background PM Peak Hour

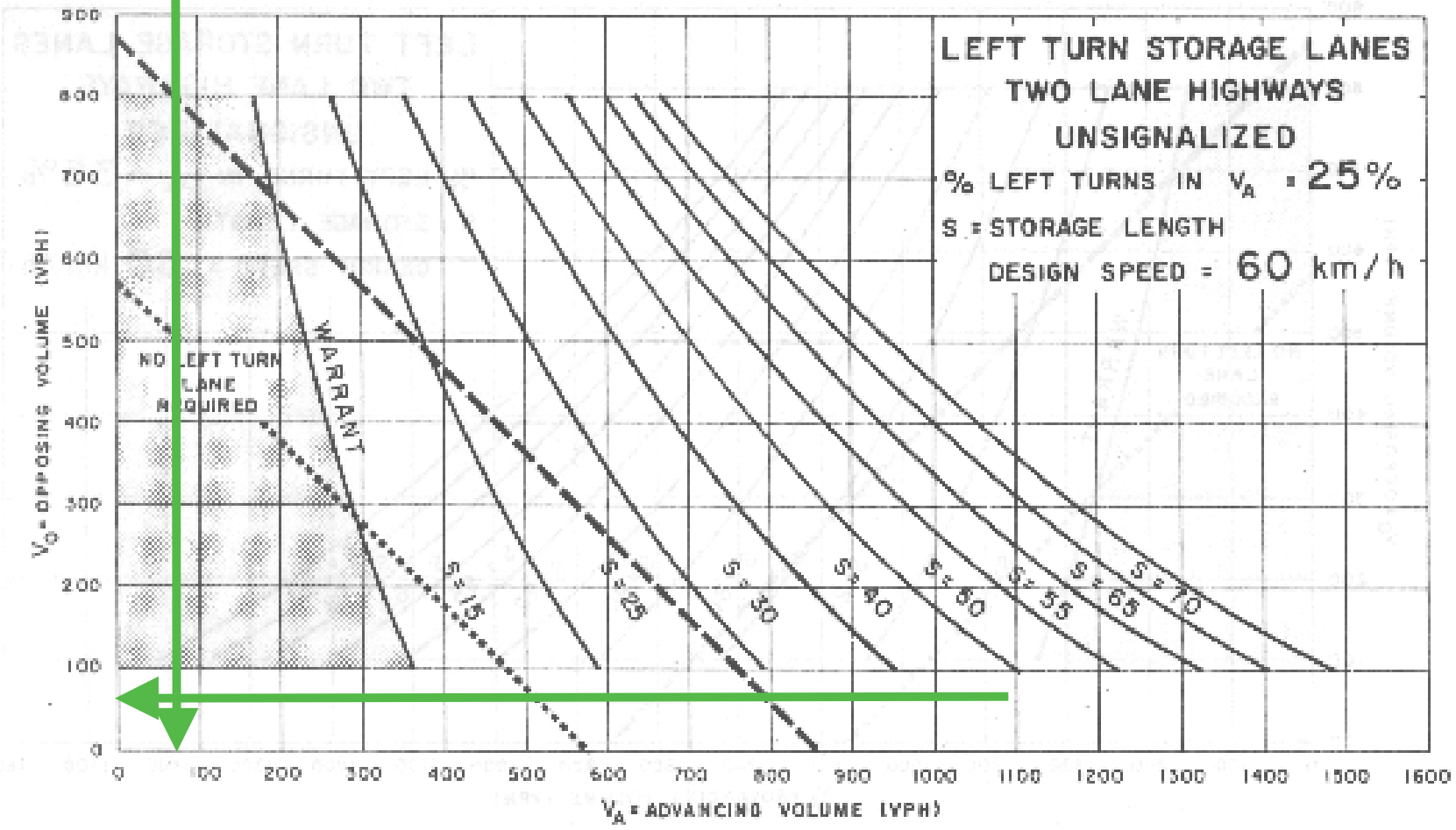
Figure H.10



John Street & James Street
Eastbound Left Turn Lane Warrant
2026 Total AM Peak Hour

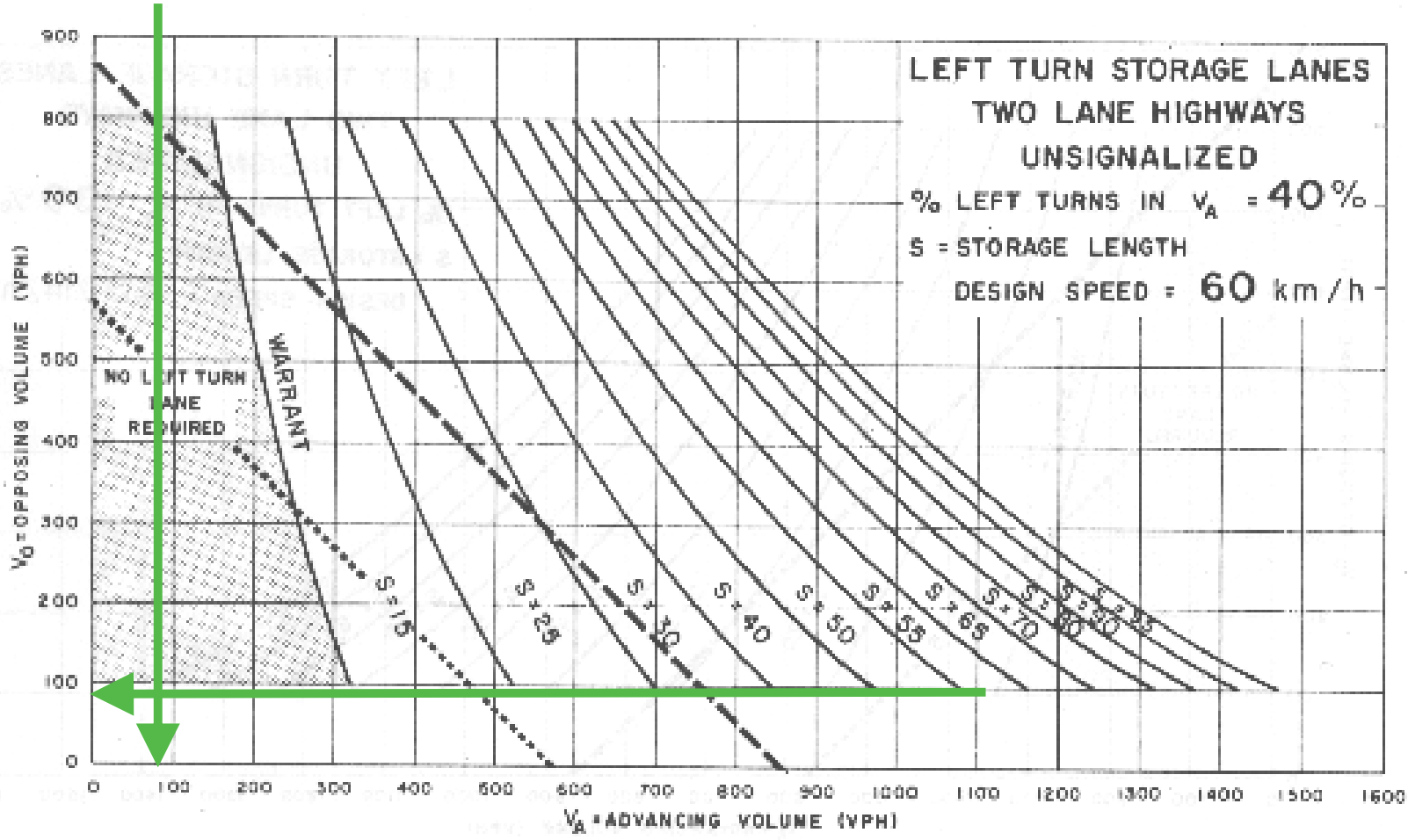


John Street & James Street
Eastbound Left Turn Lane Warrant
2026 Total PM Peak Hour



paradigm TRANSPORTATION SOLUTIONS LIMITED

John Street & Driveway A
Northbound Left Turn Lane Warrant
2026 Total AM Peak Hour



John Street & Driveway A
Northbound Left Turn Lane Warrant
2026 Total PM Peak Hour

Appendix I

Sensitivity Analysis Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	103	17	162	190	159	13	314	75	92	449	49
Future Volume (vph)	214	103	17	162	190	159	13	314	75	92	449	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		10.0	20.0		0.0	25.0		0.0	40.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95		0.94	0.96	0.94		0.99	0.99		0.99	1.00	
Frt			0.850		0.932			0.971			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1710	1454	1624	1489	0	1624	1596	0	1593	1634	0
Flt Permitted	0.222			0.685			0.207			0.318		
Satd. Flow (perm)	362	1710	1361	1127	1489	0	352	1596	0	529	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		50			18			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.3			80.7			104.4			184.8	
Travel Time (s)		7.4			5.8			7.5			13.3	
Confl. Peds. (#/hr)	53		20	20		53	11		11	11		11
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%	0%	0%	0%	0%	1%	0%	4%	0%	2%	3%	0%
Adj. Flow (vph)	233	112	18	176	207	173	14	341	82	100	488	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	112	18	176	380	0	14	423	0	100	541	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Detector Phase	3	4	4	4	4		2	2		1	2	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	24.0	24.0	24.0	24.0		29.0	29.0		9.0	29.0	
Total Split (s)	11.0	24.0	24.0	24.0	24.0		36.0	36.0		9.0	36.0	
Total Split (%)	13.8%	30.0%	30.0%	30.0%	30.0%		45.0%	45.0%		11.3%	45.0%	
Maximum Green (s)	8.0	18.0	18.0	18.0	18.0		30.0	30.0		6.0	30.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		0.0	-2.0	
Total Lost Time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lag	Lag		Lag	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Ped	Ped	Ped	Ped		Ped	Ped		Min	Ped	
Walk Time (s)		10.0	10.0	10.0	10.0		15.0	15.0			15.0	
Flash Dont Walk (s)		8.0	8.0	8.0	8.0		8.0	8.0			8.0	
Pedestrian Calls (#/hr)		0	0	0	0		0	0			0	
Act Effct Green (s)	29.0	20.0	20.0	20.0	20.0		30.1	30.1		37.1	30.1	
Actuated g/C Ratio	0.37	0.26	0.26	0.26	0.26		0.38	0.38		0.47	0.38	
v/c Ratio	0.89	0.26	0.04	0.61	0.91		0.10	0.68		0.30	0.85	
Control Delay	54.4	25.8	0.2	37.0	53.8		17.5	25.3		12.3	36.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	54.4	25.8	0.2	37.0	53.8		17.5	25.3		12.3	36.6	
LOS	D	C	A	D	D		B	C		B	D	
Approach Delay		42.9			48.5			25.1			32.8	
Approach LOS		D			D			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 78.2			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 37.3		Intersection LOS: D	
Intersection Capacity Utilization 86.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Brant Street & Caroline Street



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	233	112	18	176	380	14	423	100	541
v/c Ratio	0.89	0.26	0.04	0.61	0.91	0.10	0.68	0.30	0.85
Control Delay	54.4	25.8	0.2	37.0	53.8	17.5	25.3	12.3	36.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.4	25.8	0.2	37.0	53.8	17.5	25.3	12.3	36.6
Queue Length 50th (m)	25.4	14.4	0.0	25.1	52.3	1.4	51.2	7.6	74.4
Queue Length 95th (m)	#61.1	28.1	0.0	#50.4	#106.4	5.5	83.3	15.3	#131.1
Internal Link Dist (m)		78.3			56.7		80.4		160.8
Turn Bay Length (m)	40.0		10.0	20.0		25.0		40.0	
Base Capacity (vph)	263	437	440	288	418	144	664	332	674
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.26	0.04	0.61	0.91	0.10	0.64	0.30	0.80

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	103	17	162	190	159	13	314	75	92	449	49
Future Volume (vph)	214	103	17	162	190	159	13	314	75	92	449	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	4.0	4.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	0.94		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.96	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1611	1710	1363	1564	1490		1615	1596		1589	1634	
Flt Permitted	0.22	1.00	1.00	0.68	1.00		0.21	1.00		0.32	1.00	
Satd. Flow (perm)	377	1710	1363	1128	1490		352	1596		533	1634	
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)	233	112	18	176	207	173	14	341	82	100	488	53
RTOR Reduction (vph)	0	0	13	0	37	0	0	11	0	0	5	0
Lane Group Flow (vph)	233	112	5	176	343	0	14	412	0	100	536	0
Confl. Peds. (#/hr)	53		20	20		53	11		11	11		11
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	4%	0%	2%	3%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	4			4			2		1	2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)	26.0	18.0	18.0	18.0	18.0		28.1	28.1		34.1	28.1	
Effective Green, g (s)	26.0	20.0	20.0	20.0	20.0		30.1	30.1		34.1	30.1	
Actuated g/C Ratio	0.33	0.26	0.26	0.26	0.26		0.39	0.39		0.44	0.39	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	437	349	288	381		135	615		313	629	
v/s Ratio Prot	c0.09	0.07			c0.23			0.26		c0.02	c0.33	
v/s Ratio Perm	0.21		0.00	0.16			0.04			0.11		
v/c Ratio	0.93	0.26	0.01	0.61	0.90		0.10	0.67		0.32	0.85	
Uniform Delay, d1	22.3	23.1	21.7	25.6	28.1		15.4	19.9		14.1	22.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	37.5	0.3	0.0	3.8	23.1		0.3	2.8		0.6	10.8	
Delay (s)	59.8	23.4	21.7	29.4	51.2		15.7	22.7		14.7	32.8	
Level of Service	E	C	C	C	D		B	C		B	C	
Approach Delay (s)		46.7			44.3			22.4			29.9	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	35.3	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	78.1	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	86.6%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	146	335	401	523	105
Future Volume (vph)	3	146	335	401	523	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.867				0.977	
Flt Protected	0.999			0.978		
Satd. Flow (prot)	1481	0	0	1468	1479	0
Flt Permitted	0.999			0.978		
Satd. Flow (perm)	1481	0	0	1468	1479	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	187.1			83.2	180.0	
Travel Time (s)	16.8			6.0	13.0	
Confl. Peds. (#/hr)		35	18			18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	3%	2%	0%
Parking (#/hr)				0	0	
Adj. Flow (vph)	3	159	364	436	568	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	0	0	800	682	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.30	1.30	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization 105.3%		ICU Level of Service G	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	146	335	401	523	105
Future Volume (Veh/h)	3	146	335	401	523	105
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	159	364	436	568	114
Pedestrians	18			35		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	2			3		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				83	284	
pX, platoon unblocked	0.81	0.72	0.72			
vC, conflicting volume	1807	678	700			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1338	353	383			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	67	56			
cM capacity (veh/h)	77	477	829			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	162	800	682
Volume Left	3	364	0
Volume Right	159	0	114
cSH	435	829	1700
Volume to Capacity	0.37	0.44	0.40
Queue Length 95th (m)	13.6	18.1	0.0
Control Delay (s)	18.1	9.9	0.0
Lane LOS	C	A	
Approach Delay (s)	18.1	9.9	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	105.3%	ICU Level of Service	G
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	462	382	350	109	222	448
Future Volume (vph)	462	382	350	109	222	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0		8.0	20.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.91		0.94	0.98	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1608	1398	1524	1454	1593	1693
Flt Permitted	0.950				0.360	
Satd. Flow (perm)	1538	1267	1524	1374	593	1693
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		415		47		
Link Speed (k/h)	50		50			50
Link Distance (m)	69.8		76.6			83.2
Travel Time (s)	5.0		5.5			6.0
Confl. Peds. (#/hr)	25	43		25	25	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	4%	1%	0%	2%	1%
Parking (#/hr)			0			
Adj. Flow (vph)	502	415	380	118	241	487
Shared Lane Traffic (%)						
Lane Group Flow (vph)	502	415	380	118	241	487
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane	Yes					
Headway Factor	1.14	1.14	1.30	1.14	1.14	1.14
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	29.0	29.0	34.0	34.0	9.0	34.0
Total Split (s)	34.0	34.0	36.0	36.0	10.0	36.0
Total Split (%)	42.5%	42.5%	45.0%	45.0%	12.5%	45.0%
Maximum Green (s)	28.0	28.0	30.0	30.0	7.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	0.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0	8.0	20.0	20.0		20.0
Flash Dont Walk (s)	15.0	15.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	27.8	27.8	27.1	27.1	35.3	27.1
Actuated g/C Ratio	0.38	0.38	0.37	0.37	0.48	0.37
v/c Ratio	0.86	0.56	0.67	0.22	0.63	0.78
Control Delay	39.1	5.4	26.4	11.4	19.3	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	5.4	26.4	11.4	19.3	30.3
LOS	D	A	C	B	B	C
Approach Delay	23.9		22.8			26.6
Approach LOS	C		C			C

Intersection Summary			
Area Type:	CBD		
Cycle Length: 80			
Actuated Cycle Length: 73.2			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 24.6		Intersection LOS: C	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Brant Street & James Street



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	502	415	380	118	241	487
v/c Ratio	0.86	0.56	0.67	0.22	0.63	0.78
Control Delay	39.1	5.4	26.4	11.4	19.3	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	5.4	26.4	11.4	19.3	30.3
Queue Length 50th (m)	70.7	0.0	47.2	7.0	19.6	63.8
Queue Length 95th (m)	#130.4	18.9	77.3	17.8	33.4	100.5
Internal Link Dist (m)	45.8		52.6			59.2
Turn Bay Length (m)	15.0			8.0	20.0	
Base Capacity (vph)	641	770	678	637	383	753
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.54	0.56	0.19	0.63	0.65

Intersection Summary

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

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	462	382	350	109	222	448
Future Volume (vph)	462	382	350	109	222	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.91	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1545	1276	1524	1378	1584	1693
Flt Permitted	0.95	1.00	1.00	1.00	0.36	1.00
Satd. Flow (perm)	1545	1276	1524	1378	600	1693
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	502	415	380	118	241	487
RTOR Reduction (vph)	0	257	0	30	0	0
Lane Group Flow (vph)	502	158	380	88	241	487
Confl. Peds. (#/hr)	25	43		25	25	
Heavy Vehicles (%)	1%	4%	1%	0%	2%	1%
Parking (#/hr)			0			
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	2
Permitted Phases	4	4		2	2	
Actuated Green, G (s)	25.7	25.7	25.1	25.1	32.2	25.1
Effective Green, g (s)	27.7	27.7	27.1	27.1	32.2	27.1
Actuated g/C Ratio	0.38	0.38	0.37	0.37	0.44	0.37
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	587	484	566	512	360	629
v/s Ratio Prot			0.25		c0.07	c0.29
v/s Ratio Perm	c0.32	0.12		0.06	0.23	
v/c Ratio	0.86	0.33	0.67	0.17	0.67	0.77
Uniform Delay, d1	20.8	16.0	19.2	15.4	14.2	20.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.7	0.4	3.1	0.2	4.7	5.9
Delay (s)	32.4	16.4	22.3	15.5	18.9	26.1
Level of Service	C	B	C	B	B	C
Approach Delay (s)	25.2		20.7			23.7
Approach LOS	C		C			C

Intersection Summary

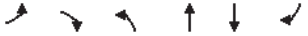
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	72.9	Sum of lost time (s)	13.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	62	74	456	590	320
Future Volume (vph)	0	62	74	456	590	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			20.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					0.850
Flt Protected				0.993		
Satd. Flow (prot)	1450	0	0	1665	1660	1439
Flt Permitted				0.993		
Satd. Flow (perm)	1450	0	0	1665	1660	1439
Link Speed (k/h)	40			50	50	
Link Distance (m)	184.7			166.5	76.6	
Travel Time (s)	16.6			12.0	5.5	
Confl. Peds. (#/hr)	4	74	4			4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	3%	1%
Adj. Flow (vph)	0	67	80	496	641	348
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	0	0	576	641	348
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	62	74	456	590	320
Future Volume (Veh/h)	0	62	74	456	590	320
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	67	80	496	641	348
Pedestrians	4			74	4	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			6	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				166	77	
pX, platoon unblocked	0.65	0.62	0.62			
vC, conflicting volume	1305	719	993			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	990	233	677			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	86	86			
cM capacity (veh/h)	152	465	562			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	67	576	641	348
Volume Left	0	80	0	0
Volume Right	67	0	0	348
cSH	465	562	1700	1700
Volume to Capacity	0.14	0.14	0.38	0.20
Queue Length 95th (m)	4.0	4.0	0.0	0.0
Control Delay (s)	14.0	3.9	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	14.0	3.9	0.0	
Approach LOS	B			

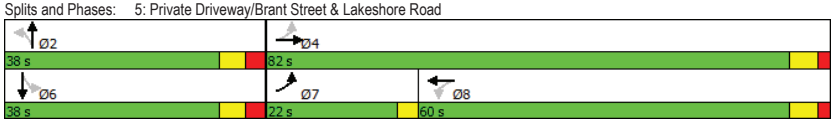
Intersection Summary				
Average Delay		2.0		
Intersection Capacity Utilization		88.7%	ICU Level of Service	E
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	858	10	6	1065	248	7	4	0	200	8	444
Future Volume (vph)	278	858	10	6	1065	248	7	4	0	200	8	444
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		0.0	0.0		0.0	0.0		15.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		0.96	0.97			0.99		0.98	0.93	
Frt		0.998			0.972						0.853	
Flt Protected	0.950			0.950				0.968		0.950		
Satd. Flow (prot)	1608	2972	0	1624	3015	0	0	1655	0	1624	1332	0
Flt Permitted	0.069			0.303				0.477		0.750		
Satd. Flow (perm)	117	2972	0	499	3015	0	0	807	0	1252	1332	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			32						304	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		84.2			131.5			34.5			166.5	
Travel Time (s)		6.1			9.5			2.5			12.0	
Confl. Peds. (#/hr)	59		62	62		59	51		21	21		51
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 (%)	1%	9%	1%	0%	2%	1%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	302	933	11	7	1158	270	8	4	0	217	9	483
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	944	0	7	1428	0	0	12	0	217	492	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.0	33.0		33.0	33.0		38.0	38.0		38.0	38.0	
Total Split (s)	22.0	82.0		60.0	60.0		38.0	38.0		38.0	38.0	
Total Split (%)	18.3%	68.3%		50.0%	50.0%		31.7%	31.7%		31.7%	31.7%	
Maximum Green (s)	19.0	76.0		54.0	54.0		31.0	31.0		31.0	31.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	-2.0		-2.0	-2.0			-3.0		-3.0	-3.0	
Total Lost Time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)		16.0		16.0	16.0		19.0	19.0		19.0	19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	79.2	78.2		56.5	56.5			27.8		27.8	27.8	
Actuated g/C Ratio	0.69	0.69		0.50	0.50			0.24		0.24	0.24	
v/c Ratio	0.93	0.46		0.03	0.95			0.06		0.71	0.89	
Control Delay	67.8	9.9		17.8	41.9			32.6		52.8	34.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	67.8	9.9		17.8	41.9			32.6		52.8	34.5	
LOS	E	A		B	D			C		D	C	
Approach Delay		23.9			41.7			32.6			40.1	
Approach LOS		C			D			C			D	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 114.1			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 34.8		Intersection LOS: C	
Intersection Capacity Utilization 104.4%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 5: Private Driveway/Brant Street & Lakeshore Road



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	302	944	7	1428	12	217	492
v/c Ratio	0.93	0.46	0.03	0.95	0.06	0.71	0.89
Control Delay	67.8	9.9	17.8	41.9	32.6	52.8	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	9.9	17.8	41.9	32.6	52.8	34.5
Queue Length 50th (m)	57.5	54.5	0.9	172.6	2.2	46.7	46.6
Queue Length 95th (m)	#117.6	73.2	3.8	#237.0	7.3	74.9	#110.0
Internal Link Dist (m)		60.2		107.5	10.5		142.5
Turn Bay Length (m)	55.0		25.0				
Base Capacity (vph)	330	2038	246	1509	241	374	611
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.46	0.03	0.95	0.05	0.58	0.81

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	858	10	6	1065	248	7	4	0	200	8	444
Future Volume (vph)	278	858	10	6	1065	248	7	4	0	200	8	444
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00		0.96	1.00			0.99		0.98	1.00	
Frt	1.00	1.00		1.00	0.97			1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1608	2973		1567	3017			1638		1587	1336	
Flt Permitted	0.07	1.00		0.30	1.00			0.48		0.75	1.00	
Satd. Flow (perm)	118	2973		500	3017			807		1253	1336	
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)	302	933	11	7	1158	270	8	4	0	217	9	483
RTOR Reduction (vph)	0	1	0	0	16	0	0	0	0	0	230	0
Lane Group Flow (vph)	302	943	0	7	1412	0	0	12	0	217	262	0
Confl. Peds. (#/hr)	59		62	62		59	51		21	21		51
Heavy Vehicles (%)	1%	9%	1%	0%	2%	1%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	76.3	76.3		54.6	54.6			24.8		24.8	24.8	
Effective Green, g (s)	76.3	78.3		56.6	56.6			27.8		27.8	27.8	
Actuated g/C Ratio	0.67	0.69		0.50	0.50			0.24		0.24	0.24	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	323	2040		248	1496			196		305	325	
v/s Ratio Prot	c0.15	0.32			c0.47						c0.20	
v/s Ratio Perm	0.47			0.01				0.01		0.17		
v/c Ratio	0.93	0.46		0.03	0.94			0.06		0.71	0.81	
Uniform Delay, d1	36.1	8.2		14.7	27.2			33.1		39.5	40.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	33.3	0.8		0.2	13.3			0.1		7.6	13.6	
Delay (s)	69.4	9.0		14.9	40.5			33.3		47.1	54.2	
Level of Service	E	A		B	D			C		D	D	
Approach Delay (s)		23.6			40.4			33.3			52.0	
Approach LOS		C			D			C			D	

Intersection Summary				
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	114.1	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	104.4%	ICU Level of Service	G	
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)	48	245	34	21	742	27	28	19	24	38	23	74
Future Volume (vph)	48	245	34	21	742	27	28	19	24	38	23	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.986			0.995			0.954			0.926	
Flt Protected		0.993		0.950				0.981			0.986	
Satd. Flow (prot)	0	1602	0	1354	1685	0	0	1233	0	0	1561	0
Flt Permitted		0.993		0.950				0.981			0.986	
Satd. Flow (perm)	0	1602	0	1354	1685	0	0	1233	0	0	1561	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		69.8			62.9			48.7			132.9	
Travel Time (s)		5.0			4.5			3.5			9.6	
Confl. Peds. (#/hr)	8		3	3		8	15		16	16		15
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%	0%	43%	20%	1%	0%	46%	0%	35%	0%	0%	0%
Adj. Flow (vph)	52	266	37	23	807	29	30	21	26	41	25	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	355	0	23	836	0	0	77	0	0	146	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	81.2%	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)	48	245	34	21	742	27	28	19	24	38	23	74
Future Volume (Veh/h)	48	245	34	21	742	27	28	19	24	38	23	74
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)	52	266	37	23	807	29	30	21	26	41	25	80
Pedestrians		15			16			3			8	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			1	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		70			63							
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	844			306			1352	1282	304	1316	1286	844
vC1, stage 1 conf vol							392	392		876	876	
vC2, stage 2 conf vol							960	890		441	410	
vCu, unblocked vol	611			306			1299	1204	304	1251	1209	611
tC, single (s)	4.1			4.3			7.6	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)							6.6	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.9	4.0	3.6	3.5	4.0	3.3
p0 queue free %	93			98			74	92	96	85	92	78
cM capacity (veh/h)	717			1156			116	257	655	278	296	360

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	355	23	836	77	146
Volume Left	52	23	0	30	41
Volume Right	37	0	29	26	80
cSH	717	1156	1700	203	321
Volume to Capacity	0.07	0.02	0.49	0.38	0.45
Queue Length 95th (m)	1.9	0.5	0.0	13.3	18.1
Control Delay (s)	2.3	8.2	0.0	33.3	25.2
Lane LOS	A	A		D	D
Approach Delay (s)	2.3	0.2		33.3	25.2
Approach LOS				D	D

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	81.2%	ICU Level of Service	D	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	240	46	80	707	15	52	45	68	21	22	31
Future Volume (vph)	23	240	46	80	707	15	52	45	68	21	22	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	1.00			0.98			0.97	
Frt		0.976			0.997			0.944			0.943	
Flt Protected	0.950			0.950				0.984			0.986	
Satd. Flow (prot)	1462	1446	0	1562	1671	0	0	1547	0	0	1553	0
Flt Permitted	0.277			0.562				0.893			0.883	
Satd. Flow (perm)	425	1446	0	916	1671	0	0	1390	0	0	1388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			2			39			34	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		62.9			180.3			274.6			209.7	
Travel Time (s)		4.5			13.0			19.8			15.1	
Confl. Peds. (#/hr)	8		8	8		8	16		5	5		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	4%	2%	0%	0%	2%	2%	0%	0%	0%
Parking (#/hr)	0	0	0									
Adj. Flow (vph)	25	261	50	87	768	16	57	49	74	23	24	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	311	0	87	784	0	0	180	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.30	1.30	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	35.5	35.5		35.5	35.5		27.5	27.5		27.5	27.5	
Total Split (s)	61.0	61.0		61.0	61.0		29.0	29.0		29.0	29.0	
Total Split (%)	67.8%	67.8%		67.8%	67.8%		32.2%	32.2%		32.2%	32.2%	
Maximum Green (s)	55.0	55.0		55.0	55.0		23.0	23.0		23.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	20.0	20.0		20.0	20.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	7.0	7.0		7.0	7.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	58.1	58.1		58.1	58.1			15.9			15.9	
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.19			0.19	
v/c Ratio	0.08	0.30		0.13	0.66			0.60			0.27	
Control Delay	5.9	5.8		5.5	11.1			31.4			19.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	5.9	5.8		5.5	11.1			31.4			19.6	
LOS	A	A		A	B			C			B	
Approach Delay		5.8			10.6			31.4			19.6	
Approach LOS		A			B			C			B	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 90			
Actuated Cycle Length: 82			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 74.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 7: Elizabeth Street & James Street



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	25	311	87	784	180	81
v/c Ratio	0.08	0.30	0.13	0.66	0.60	0.27
Control Delay	5.9	5.8	5.5	11.1	31.4	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	5.8	5.5	11.1	31.4	19.6
Queue Length 50th (m)	1.1	14.2	3.8	57.7	20.6	6.4
Queue Length 95th (m)	4.7	34.3	11.6	130.2	40.8	17.9
Internal Link Dist (m)		38.9		156.3	250.6	185.7
Turn Bay Length (m)	15.0		30.0			
Base Capacity (vph)	301	1029	648	1183	451	447
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.30	0.13	0.66	0.40	0.18

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	240	46	80	707	15	52	45	68	21	22	31
Future Volume (vph)	23	240	46	80	707	15	52	45	68	21	22	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.99			0.98	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.94			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1458	1446		1550	1671			1536			1553	
Flt Permitted	0.28	1.00		0.56	1.00			0.89			0.88	
Satd. Flow (perm)	425	1446		916	1671			1392			1391	
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)	25	261	50	87	768	16	57	49	74	23	24	34
RTOR Reduction (vph)	0	6	0	0	1	0	0	31	0	0	27	0
Lane Group Flow (vph)	25	305	0	87	783	0	0	149	0	0	54	0
Confl. Peds. (#/hr)	8		8	8		8	16		5	5		16
Heavy Vehicles (%)	0%	3%	5%	4%	2%	0%	0%	2%	2%	0%	0%	0%
Parking (#/hr)	0	0	0									
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)	56.1	56.1		56.1	56.1			13.9			13.9	
Effective Green, g (s)	58.1	58.1		58.1	58.1			15.9			15.9	
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.19			0.19	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	301	1024		649	1183			269			269	
v/s Ratio Prot		0.21			c0.47							
v/s Ratio Perm	0.06			0.09				c0.11			0.04	
v/c Ratio	0.08	0.30		0.13	0.66			0.55			0.20	
Uniform Delay, d1	3.7	4.4		3.8	6.6			29.8			27.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	0.7		0.4	2.9			2.4			0.4	
Delay (s)	4.2	5.2		4.3	9.5			32.3			28.1	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		5.1			9.0			32.3			28.1	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.64				
Actuated Cycle Length (s)	82.0	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	74.0%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	19	18	21	52	47	31
Future Volume (vph)	19	18	21	52	47	31
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	0.934				0.946	
Flt Protected	0.975			0.986		
Satd. Flow (prot)	1696	0	0	1837	1762	0
Flt Permitted	0.975			0.986		
Satd. Flow (perm)	1696	0	0	1837	1762	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.6			202.5	48.7	
Travel Time (s)	3.5			14.6	3.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	20	23	57	51	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	0	0	80	85	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	18	21	52	47	31
Future Volume (Veh/h)	19	18	21	52	47	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	20	23	57	51	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	171	68	85			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	171	68	85			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	98	98			
cM capacity (veh/h)	807	995	1512			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	41	80	85
Volume Left	21	23	0
Volume Right	20	0	34
cSH	889	1512	1700
Volume to Capacity	0.05	0.02	0.05
Queue Length 95th (m)	1.2	0.4	0.0
Control Delay (s)	9.2	2.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	2.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix J

SimTraffic Simulation Results

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:50	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4145	4217	4149	4123	4150	4099	4153
Vehs Exited	4129	4225	4107	4157	4135	4110	4179
Starting Vehs	92	85	84	114	61	101	94
Ending Vehs	108	77	126	80	76	90	68
Travel Distance (km)	1754	1802	1750	1757	1734	1766	1746
Travel Time (hr)	103.4	96.7	90.3	92.7	81.4	87.7	84.9
Total Delay (hr)	62.9	55.3	50.0	52.3	41.4	47.1	44.6
Total Stops	5332	5419	5220	5351	5011	5299	5172
Fuel Used (l)	225.7	224.2	215.5	218.7	206.1	213.6	210.0

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4326	4289	4172	4186
Vehs Exited	4319	4253	4145	4179
Starting Vehs	88	71	67	79
Ending Vehs	95	107	94	86
Travel Distance (km)	1788	1800	1770	1767
Travel Time (hr)	88.4	95.0	108.4	92.9
Total Delay (hr)	47.3	53.7	67.7	52.2
Total Stops	5397	5654	5318	5315
Fuel Used (l)	218.7	222.9	232.0	218.7

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	4145	4217	4149	4123	4150	4099	4153
Vehs Exited	4129	4225	4107	4157	4135	4110	4179
Starting Vehs	92	85	84	114	61	101	94
Ending Vehs	108	77	126	80	76	90	68
Travel Distance (km)	1754	1802	1750	1757	1734	1766	1746
Travel Time (hr)	103.4	96.7	90.3	92.7	81.4	87.7	84.9
Total Delay (hr)	62.9	55.3	50.0	52.3	41.4	47.1	44.6
Total Stops	5332	5419	5220	5351	5011	5299	5172
Fuel Used (l)	225.7	224.2	215.5	218.7	206.1	213.6	210.0

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	4326	4289	4172	4186
Vehs Exited	4319	4253	4145	4179
Starting Vehs	88	71	67	79
Ending Vehs	95	107	94	86
Travel Distance (km)	1788	1800	1770	1767
Travel Time (hr)	88.4	95.0	108.4	92.9
Total Delay (hr)	47.3	53.7	67.7	52.2
Total Stops	5397	5654	5318	5315
Fuel Used (l)	218.7	222.9	232.0	218.7

Intersection: 6: John Street & James Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (m)	30.7	14.0	23.8	24.4	23.6
Average Queue (m)	6.3	2.7	2.0	12.9	10.9
95th Queue (m)	20.2	10.2	12.4	24.3	18.6
Link Distance (m)	47.4		46.1	21.4	128.6
Upstream Blk Time (%)	0			2	
Queuing Penalty (veh)	0			1	
Storage Bay Dist (m)		15.0			
Storage Blk Time (%)		0	1		
Queuing Penalty (veh)		1	0		

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:50	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4996	5029	4955	4977	4929	4919	5008
Vehs Exited	4920	4904	4881	4831	4863	4830	4927
Starting Vehs	172	180	179	141	161	190	196
Ending Vehs	248	305	253	287	227	279	277
Travel Distance (km)	2009	2026	2017	2013	2015	2035	2051
Travel Time (hr)	477.1	489.4	486.8	489.5	434.4	547.5	512.9
Total Delay (hr)	431.1	442.9	440.6	443.3	388.2	500.8	465.8
Total Stops	7591	7665	7756	7830	7380	7935	8160
Fuel Used (l)	568.1	576.6	576.3	579.4	533.7	629.3	603.4

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4885	4982	5053	4974
Vehs Exited	4795	4846	4967	4876
Starting Vehs	189	169	148	169
Ending Vehs	279	305	234	265
Travel Distance (km)	2000	1990	2067	2022
Travel Time (hr)	593.2	478.8	466.5	497.6
Total Delay (hr)	547.2	433.3	418.9	451.2
Total Stops	7928	7916	7825	7798
Fuel Used (l)	665.7	569.4	564.1	586.6

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	4996	5029	4955	4977	4929	4919	5008
Vehs Exited	4920	4904	4881	4831	4863	4830	4927
Starting Vehs	172	180	179	141	161	190	196
Ending Vehs	248	305	253	287	227	279	277
Travel Distance (km)	2009	2026	2017	2013	2015	2035	2051
Travel Time (hr)	477.1	489.4	486.8	489.5	434.4	547.5	512.9
Total Delay (hr)	431.1	442.9	440.6	443.3	388.2	500.8	465.8
Total Stops	7591	7665	7756	7830	7380	7935	8160
Fuel Used (l)	568.1	576.6	576.3	579.4	533.7	629.3	603.4

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	4885	4982	5053	4974
Vehs Exited	4795	4846	4967	4876
Starting Vehs	189	169	148	169
Ending Vehs	279	305	234	265
Travel Distance (km)	2000	1990	2067	2022
Travel Time (hr)	593.2	478.8	466.5	497.6
Total Delay (hr)	547.2	433.3	418.9	451.2
Total Stops	7928	7916	7825	7798
Fuel Used (l)	665.7	569.4	564.1	586.6

Intersection: 6: John Street & James Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (m)	36.0	22.3	51.5	39.6	127.2
Average Queue (m)	8.1	3.6	49.0	29.1	122.4
95th Queue (m)	25.9	16.3	51.0	34.7	138.4
Link Distance (m)	47.4		46.1	28.4	122.6
Upstream Blk Time (%)	0		41	91	93
Queuing Penalty (veh)	0		327	63	0
Storage Bay Dist (m)		15.0			
Storage Blk Time (%)		0	65		
Queuing Penalty (veh)		1	13		

Appendix K

Zoning By-law 2020

(c) A decorative finish shall be applied to all exterior walls facing a street or residential zone.

(d) Overhead doors are not permitted in a building elevation facing Brant Street and Lakeshore Road.

4.6 LANDSCAPE AREA AND BUFFER

Landscape Area:

Abutting a creek block or 03 zone	3 m
For a parking lot as a principal use:	3 m abutting a street
Abutting a PC or P zone:	3 m

Landscape Buffer:

Abutting a Residential or DRL Zone:	3 m

4.7 PARKING

(a) Parking shall be provided in accordance with Part 1, Subsection 2.25 “Off Street Parking and Loading Requirements" except as amended by the following:

Apartment Dwelling Units: 1.25 spaces per unit

(b) Parking is not permitted in a front yard between the street line and the building elevation facing the street.

(c) Surface parking is not permitted in a DC, DW, DL-A or DL-B zone; temporary parking for drop off or delivery excepted.

(d) Parking of trucks and trailers is prohibited except when:
- the truck or trailer is being loaded and unloaded
- the truck or trailer is for customer use
- the truck or trailer belongs to a property owner or tenant
- the truck or trailer is being used for charitable purposes

4.8 OUTSIDE STORAGE

(a) Only merchandise displayed for retail sale may be stored outside, provided the merchandise is not stored in a truck, trailer or other vehicle.

(b) Perishable waste must be kept in refrigerated storage within a building. Alternatively, perishable waste may be stored outside if a deep collection waste disposal system, comprised of a sealed container with a lockable lid located primarily below grade, is used.

Appendix L

New Direction Policy

Transportation Plan – Policy Directions

Title	Description	Subject Site
1. Align Land Use & Transportation	Land-use decisions including density, mix of uses and quality of urban design contribute to a fabric that supports walking, biking and public transit. Fully integrate land-use and transportation decision-making at every level including policy-making and budgeting to ensure that future decisions facilitate a transportation network that supports intensification.	▶ Quality urban design ▶ Opportunities for high quality landscaping around site and in central park ▶ Direct connections between existing bicycle/transit network ▶ Reduced minimum parking requirements
2. Rethink Streets	Abandon the “old” way of thinking, replace the term “road” with “street” and recognize that streets do more than just move automobiles, they are “people-places” and have the potential to be key assets in the civic life of our city.	▶ Internal streets designed to minimum width – 6.0 metres with sidewalks ▶ Raised drop-off/pick-up area at Condo entry ▶ Short-term bicycle parking in close proximity to building entrances ▶ Reduced minimum parking requirements
3. Reprioritize Mobility Choices	Reprioritize decision-making in order to support intensification and allow active & sustainable mobility choices to “catch-up” to the auto and reach an ambitious level of attractiveness in order to realize a true multi-modal city.	▶ Sustainable mobility choices are encouraged by reducing on-site parking supply ▶ Provisions of short-term and long-term bicycle parking areas. ▶ Adjacent to existing Burlington Transit routes ▶ Direct connections between existing bicycle/transit network ▶ Raised drop-off/pick-up area at Condo entry

Transportation Plan – Policy Directions

4. No New Car Capacity	Intensification with further car-oriented design will only result in continued auto-dependency, expensive infrastructure and an overall failure. Confirm that through the intensification strategy, mobility will be facilitated not through increased auto capacity, but by allocating existing space and budget for walking, biking and public transit. Strategic reallocation of existing car capacity for active and sustainable mobility choices.	▶ Limited on-site parking due to proximity to transit. ▶ Provisions of short-term and long-term bicycle parking areas ▶ Direct connections between existing bicycle/transit network.
5. Make Walking Delightful	Change the culture, decision-making, policy and budget to make the city rapidly more walkable – achieve the strategic goal of becoming a leader in walkability.	▶ Urban design focus on sustainability mobility choices ▶ Opportunities for high quality landscaping around site and in central park ▶ Supports walking biking and public transit – connectivity between adjacent bicycle/transit network and connects directly to existing sidewalk facilities
6. Make Biking Delightful	Move in a timely way to create a minimum network of safe, connected bike infrastructure with continued network expansion over time. Emphasis on initiatives to build an urban biking culture and achieve the “Gold Standard” for cycling.	▶ Connectivity to adjacent bicycle network. ▶ Cycling supportive design enhanced through short-term and long-term bicycle parking areas.
7. Make Transit Delightful	Support significant and strategic improvement of transit coverage, service and experience in order improve the branding of public transit as an attractive mobility option. Develop policy to support levels of density that will translate to increased ridership.	▶ Adjacent to existing Burlington Transit routes
8. “Walk the Talk”	Dedicate energy and attention to ensuring that the plan is followed-through. Strategically position the city for successful implementation of the Plan and align budget allocations to the new mode hierarchy.	▶ Site plan details to be finalized during site plan approval

Appendix M

Off-Site - Parking Survey Data

Time	# Stalls	9:00		9:20		9:40		10:00		10:20		10:40		11:00		11:20		11:40	
Lot 5 Brant St Lot	60	10	17%	16	27%	22	37%	29	48%	29	48%	27	45%	29	48%	37	62%	34	57%
John St west side between Pine & Lot 5	3	0	0%	2	67%	0	0%	1	33%	1	33%	0	0%	0	0%	1	33%	2	67%
John St west side between Lakeshore & Pine	5	0	0%	0	0%	1	20%	2	40%	3	60%	2	40%	4	80%	4	80%	4	80%
John St east side between Lakehsore & Pine	6	0	0%	0	0%	1	17%	3	50%	3	50%	3	50%	5	83%	4	67%	4	67%
Brant St east side between Lakeshore & Pine	2	1	50%	1	50%	0	0%	2	100%	3	150%	2	100%	3	150%	3	150%	3	150%
Brant St west side between Lakeshore & Elgin	8	7	88%	8	100%	6	75%	6	75%	8	100%	8	100%	9	113%	6	75%	10	125%
Pine St north side between Brant & John	3	2	67%	1	33%	1	33%	1	33%	1	33%	2	67%	2	67%	2	67%	1	33%
Brant St east side between Pine & Elgin/Lot 5	8	3	38%	3	38%	3	38%	6	75%	7	88%	6	75%	8	100%	8	100%	6	75%
Lakeshore Rd south side between Elizabeth & Pearl	7	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	2	29%	2	29%	2	29%
Elizabeth St west side between Pine & Lot 4	6	0	0%	3	50%	3	50%	4	67%	4	67%	3	50%	5	83%	5	83%	7	117%
Lot 4 Elizabeth St Lot	97	42	43%	46	47%	59	61%	74	76%	75	77%	73	75%	72	74%	75	77%	75	77%
Lot 1 Pearl St Lot	39	19	49%	14	36%	17	44%	22	56%	26	67%	27	69%	30	77%	31	79%	29	74%
Pearl St west side between Pine & Lot 1	8	3	38%	3	38%	3	38%	4	50%	6	75%	6	75%	4	50%	7	88%	5	63%
Pine St north side between Elizabeth & Pearl	9	9	100%	9	100%	9	100%	7	78%	8	89%	6	67%	4	44%	4	44%	8	89%
Pine St north side between Pearl & Martha	4	2	50%	3	75%	3	75%	6	150%	6	150%	6	150%	6	150%	4	100%	5	125%
Lot 4 Martha St Lot	11	0	0%	2	18%	3	27%	4	36%	4	36%	5	45%	5	45%	5	45%	5	45%
Martha St west side between Lakeshore & Pine	6	0	0%	0	0%	1	17%	4	67%	3	50%	2	33%	3	50%	2	33%	2	33%
Old Lakeshore Rd south side between Lakeshore & Lakeshore	12	1	8%	3	25%	4	33%	4	33%	3	25%	3	25%	3	25%	2	17%	2	17%
Pearl St east side between Lakeshore & Pine	7	1	14%	3	43%	7	100%	7	100%	7	100%	2	29%	5	71%	3	43%	4	57%

Time	# Stalls	12:00		12:20		12:40		13:00		13:20		13:40		14:00		14:20		14:40	
Lot 5 Brant St Lot	60	37	62%	35	58%	39	65%	47	78%	56	93%	50	83%	51	85%	43	72%	34	57%
John St west side between Pine & Lot 5	3	3	100%	3	100%	3	100%	3	100%	0	0%	2	67%	2	67%	3	100%	3	100%
John St west side between Lakeshore & Pine	5	5	100%	5	100%	5	100%	5	100%	4	80%	4	80%	5	100%	5	100%	5	100%
John St east side between Lakehsore & Pine	6	5	83%	5	83%	6	100%	6	100%	6	100%	5	83%	6	100%	5	83%	2	33%
Brant St east side between Lakeshore & Pine	2	3	150%	2	100%	2	100%	3	150%	1	50%	1	50%	2	100%	1	50%	1	50%
Brant St west side between Lakeshore & Elgin	8	10	125%	8	100%	10	125%	8	100%	7	88%	7	88%	7	88%	8	100%	8	100%
Pine St north side between Brant & John	3	3	100%	3	100%	3	100%	3	100%	2	67%	3	100%	3	100%	3	100%	2	67%
Brant St east side between Pine & Elgin/Lot 5	8	7	88%	7	88%	8	100%	7	88%	8	100%	8	100%	6	75%	7	88%	6	75%
Lakeshore Rd south side between Elizabeth & Pearl	7	2	29%	2	29%	2	29%	5	71%	3	43%	4	57%	3	43%	3	43%	1	14%
Elizabeth St west side between Pine & Lot 4	6	7	117%	5	83%	5	83%	6	100%	5	83%	6	100%	6	100%	5	83%	4	67%
Lot 4 Elizabeth St Lot	97	79	81%	81	84%	80	82%	83	86%	72	74%	73	75%	70	72%	67	69%	64	66%
Lot 1 Pearl St Lot	39	33	85%	31	79%	33	85%	30	77%	29	74%	31	79%	30	77%	29	74%	31	79%
Pearl St west side between Pine & Lot 1	8	7	88%	7	88%	6	75%	7	88%	7	88%	6	75%	7	88%	8	100%	8	100%
Pine St north side between Elizabeth & Pearl	9	9	100%	9	100%	7	78%	7	78%	9	100%	8	89%	9	100%	9	100%	9	100%
Pine St north side between Pearl & Martha	4	5	125%	3	75%	4	100%	2	50%	2	50%	3	75%	4	100%	5	125%	5	125%
Lot 4 Martha St Lot	11	5	45%	5	45%	7	64%	5	45%	4	36%	4	36%	4	36%	4	36%	5	45%
Martha St west side between Lakeshore & Pine	6	4	67%	4	67%	1	17%	2	33%	2	33%	3	50%	1	17%	1	17%	2	33%
Old Lakeshore Rd south side between Lakeshore & Lakeshore	12	2	17%	1	8%	1	8%	1	8%	2	17%	2	17%	2	17%	1	8%	2	17%
Pearl St east side between Lakeshore & Pine	7	5	71%	4	57%	7	100%	7	100%	5	71%	7	100%	6	86%	7	100%	8	114%

Time	# Stalls	15:00		15:20		15:40		16:00		16:20		16:40		17:00		17:20		17:40	
Lot 5 Brant St Lot	60	36	60%	35	58%	32	53%	32	53%	34	57%	31	52%	31	52%	22	37%	26	43%
John St west side between Pine & Lot 5	3	3	100%	2	67%	0	0%	0	0%	0	0%	0	0%	1	33%	3	100%	0	0%
John St west side between Lakeshore & Pine	5	2	40%	3	60%	3	60%	5	100%	3	60%	3	60%	4	80%	5	100%	5	100%
John St east side between Lakehsore & Pine	6	2	33%	0	0%	1	17%	2	33%	3	50%	5	83%	5	83%	6	100%	6	100%
Brant St east side between Lakeshore & Pine	2	3	150%	3	150%	3	150%	3	150%	3	150%	2	100%	3	150%	3	150%	3	150%
Brant St west side between Lakeshore & Elgin	8	6	75%	9	113%	5	63%	8	100%	5	63%	6	75%	7	88%	8	100%	8	100%
Pine St north side between Brant & John	3	1	33%	2	67%	1	33%	2	67%	3	100%	1	33%	3	100%	3	100%	3	100%
Brant St east side between Pine & Elgin/Lot 5	8	5	63%	6	75%	6	75%	3	38%	4	50%	7	88%	7	88%	8	100%	8	100%
Lakeshore Rd south side between Elizabeth & Pearl	7	1	14%	1	14%	1	14%	2	29%	1	14%	1	14%	2	29%	2	29%	2	29%
Elizabeth St west side between Pine & Lot 4	6	4	67%	3	50%	5	83%	3	50%	3	50%	5	83%	6	100%	14	233%	6	100%
Lot 4 Elizabeth St Lot	97	63	65%	57	59%	58	60%	58	60%	53	55%	53	55%	52	54%	57	59%	59	61%
Lot 1 Pearl St Lot	39	32	82%	31	79%	33	85%	38	97%	36	92%	37	95%	37	95%	26	67%	36	92%
Pearl St west side between Pine & Lot 1	8	8	100%	7	88%	6	75%	7	88%	6	75%	8	100%	8	100%	7	88%	7	88%
Pine St north side between Elizabeth & Pearl	9	6	67%	8	89%	9	100%	6	67%	6	67%	7	78%	9	100%	9	100%	9	100%
Pine St north side between Pearl & Martha	4	6	150%	6	150%	6	150%	4	100%	6	150%	6	150%	5	125%	5	125%	5	125%
Lot 4 Martha St Lot	11	5	45%	5	45%	5	45%	5	45%	5	45%	5	45%	5	45%	5	45%	5	45%
Martha St west side between Lakeshore & Pine	6	2	33%	2	33%	2	33%	1	17%	2	33%	1	17%	0	0%	0	0%	0	0%
Old Lakeshore Rd south side between Lakeshore & Lakeshore	12	3	25%	4	33%	4	33%	5	42%	4	33%	4	33%	5	42%	7	58%	10	83%
Pearl St east side between Lakeshore & Pine	7	7	100%	7	100%	6	86%	6	86%	5	71%	4	57%	4	57%	7	100%	7	100%

Time	# Stalls	18:00		18:20		18:40		19:00		19:20		19:40		20:00		20:20		20:40		Max
Lot 5 Brant St Lot	60	28	47%	40	67%	41	68%	42	70%	41	68%	38	63%	34	57%	35	58%	33	55%	**93%**
John St west side between Pine & Lot 5	3	2	67%	2	67%	3	100%	3	100%	3	100%	1	33%	1	33%	0	0%	1	33%	**100%**
John St west side between Lakeshore & Pine	5	5	100%	5	100%	5	100%	5	100%	5	100%	4	80%	3	60%	3	60%	1	20%	**100%**
John St east side between Lakehsore & Pine	6	6	100%	6	100%	6	100%	6	100%	3	50%	3	50%	2	33%	1	17%	1	17%	**100%**
Brant St east side between Lakeshore & Pine	2	3	150%	3	150%	3	150%	3	150%	2	100%	2	100%	2	100%	2	100%	2	100%	**150%**
Brant St west side between Lakeshore & Elgin	8	8	100%	8	100%	9	113%	10	125%	10	125%	10	125%	9	113%	9	113%	5	63%	**125%**
Pine St north side between Brant & John	3	3	100%	2	67%	3	100%	3	100%	3	100%	3	100%	4	133%	4	133%	3	100%	**133%**
Brant St east side between Pine & Elgin/Lot 5	8	9	113%	9	113%	9	113%	9	113%	7	88%	8	100%	8	100%	7	88%	6	75%	**113%**
Lakeshore Rd south side between Elizabeth & Pearl	7	1	14%	2	29%	4	57%	3	43%	5	71%	4	57%	4	57%	3	43%	2	29%	**71%**
Elizabeth St west side between Pine & Lot 4	6	6	100%	5	83%	6	100%	6	100%	6	100%	6	100%	6	100%	5	83%	6	100%	**233%**
Lot 4 Elizabeth St Lot	97	71	73%	73	75%	74	76%	73	75%	70	72%	69	71%	57	59%	58	60%	54	56%	**86%**
Lot 1 Pearl St Lot	39	38	97%	39	100%	38	97%	39	100%	37	95%	34	87%	35	90%	34	87%	36	92%	**100%**
Pearl St west side between Pine & Lot 1	8	8	100%	8	100%	7	88%	8	100%	8	100%	7	88%	5	63%	3	38%	3	38%	**100%**
Pine St north side between Elizabeth & Pearl	9	9	100%	9	100%	9	100%	9	100%	9	100%	7	78%	9	100%	7	78%	9	100%	**100%**
Pine St north side between Pearl & Martha	4	6	150%	6	150%	6	150%	6	150%	4	100%	4	100%	4	100%	3	75%	2	50%	**150%**
Lot 4 Martha St Lot	11	5	45%	4	36%	4	36%	4	36%	4	36%	4	36%	4	36%	3	27%	3	27%	**64%**
Martha St west side between Lakeshore & Pine	6	0	0%	0	0%	0	0%	2	33%	2	33%	1	17%	2	33%	1	17%	0	0%	**67%**
Old Lakeshore Rd south side between Lakeshore & Lakeshore	12	11	92%	11	92%	12	100%	12	100%	12	100%	11	92%	11	92%	12	100%	10	83%	**100%**
Pearl St east side between Lakeshore & Pine	7	7	100%	6	86%	8	114%	8	114%	8	114%	8	114%	4	57%	3	43%	1	14%	**114%**

Time	# Stalls	Avg
Lot 5 Brant St Lot	60	57%
John St west side between Pine & Lot 5	3	50%
John St west side between Lakeshore & Pine	5	73%
John St east side between Lakehsore & Pine	6	62%
Brant St east side between Lakeshore & Pine	2	114%
Brant St west side between Lakeshore & Elgin	8	98%
Pine St north side between Brant & John	3	79%
Brant St east side between Pine & Elgin/Lot 5	8	83%
Lakeshore Rd south side between Elizabeth & Pearl	7	29%
Elizabeth St west side between Pine & Lot 4	6	85%
Lot 4 Elizabeth St Lot	97	68%
Lot 1 Pearl St Lot	39	80%
Pearl St west side between Pine & Lot 1	8	78%
Pine St north side between Elizabeth & Pearl	9	88%
Pine St north side between Pearl & Martha	4	114%
Lot 4 Martha St Lot	11	39%
Martha St west side between Lakeshore & Pine	6	25%
Old Lakeshore Rd south side between Lakeshore & Lakeshore	12	43%
Pearl St east side between Lakeshore & Pine	7	80%

Appendix N

Comparable Sites - Parking Survey Data

551 Maple Avenue - Residential Parking Utilization Survey (186 Units)

Time Ending	Thursday November 1, 2016			Wednesday November 2, 2016			Tuesday November 8, 2016			Wednesday November 9, 2016			Four Day Average		
	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate
4:15	60	181	0.32	43	198	0.23	52	189	0.28	58	183	0.31	57	184	0.30
4:30	56	185	0.30	39	202	0.21	53	188	0.28	60	181	0.32	56	185	0.30
4:45	57	184	0.31	47	194	0.25	60	181	0.32	60	181	0.32	59	182	0.32
5:00	60	181	0.32	52	189	0.28	61	180	0.33	63	178	0.34	61	180	0.33
5:15	68	173	0.37	56	185	0.30	60	181	0.32	65	176	0.35	64	177	0.35
5:30	80	161	0.43	60	181	0.32	76	165	0.41	68	173	0.37	75	166	0.40
5:45	82	159	0.44	78	163	0.42	84	157	0.45	69	172	0.37	78	163	0.42
6:00	84	157	0.45	89	152	0.48	84	157	0.45	72	169	0.39	80	161	0.43
6:15	93	148	0.50	90	151	0.48	88	153	0.47	88	153	0.47	90	151	0.48
6:30	96	145	0.52	101	140	0.54	93	148	0.50	95	146	0.51	95	146	0.51
6:45	93	148	0.50	102	139	0.55	96	145	0.52	103	138	0.55	97	144	0.52
7:00	103	138	0.55	110	131	0.59	98	143	0.53	108	133	0.58	103	138	0.55
7:15	112	129	0.60	118	123	0.63	104	137	0.56	111	130	0.60	109	132	0.59
7:30	110	131	0.59	130	111	0.70	110	131	0.59	115	126	0.62	112	129	0.60
7:45	120	121	0.65	129	112	0.69	118	123	0.63	122	119	0.66	120	121	0.65
8:00	132	109	0.71	133	108	0.72	125	116	0.67	128	113	0.69	128	113	0.69
8:15	134	107	0.72	131	110	0.70	132	109	0.71	130	111	0.70	132	109	0.71
8:30	133	108	0.72	146	95	0.78	138	103	0.74	138	103	0.74	136	105	0.73
8:45	134	107	0.72	149	92	0.80	142	99	0.76	135	106	0.73	137	104	0.74
9:00	140	101	0.75	155	86	0.83	147	94	0.79	132	109	0.71	140	101	0.75
9:15	141	100	0.76	154	87	0.83	145	96	0.78	132	109	0.71	139	102	0.75
9:30	143	98	0.77	154	87	0.83	150	91	0.81	145	96	0.78	146	95	0.78
9:45	146	95	0.78	153	88	0.82	151	90	0.81	148	93	0.80	148	93	0.80
10:00	146	95	0.78	153	88	0.82	154	87	0.83	148	93	0.80	149	92	0.80
Maximum Observed	**146**	**185**	**0.78**	**155**	**202**	**0.83**	**154**	**189**	**0.83**	**148**	**183**	**0.80**	**149**	**185**	**0.80**
Minimum Observed	**56**	**95**	**0.30**	**39**	**86**	**0.21**	**52**	**87**	**0.28**	**58**	**93**	**0.31**	**56**	**92**	**0.30**
Average Observed	**105**	**136**	**0.57**	**107**	**134**	**0.58**	**105**	**136**	**0.56**	**104**	**137**	**0.56**	**105**	**136**	**0.56**

551 Maple Avenue - Visitor Parking Utilization Survey (186 Units)

Time Ending	Thursday November 1, 2016			Wednesday November 2, 2016			Tuesday November 8, 2016			Wednesday November 9, 2016			Four Day Average		
	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate
4:15	12	35	0.06	9	38	0.05	15	32	0.08	12	35	0.06	13	34	0.07
4:30	8	39	0.04	7	40	0.04	15	32	0.08	9	38	0.05	11	36	0.06
4:45	12	35	0.06	11	36	0.06	15	32	0.08	13	34	0.07	13	34	0.07
5:00	13	34	0.07	13	34	0.07	12	35	0.06	13	34	0.07	13	34	0.07
5:15	13	34	0.07	13	34	0.07	15	32	0.08	13	34	0.07	14	33	0.07
5:30	15	32	0.08	13	34	0.07	11	36	0.06	12	35	0.06	13	34	0.07
5:45	12	35	0.06	15	32	0.08	12	35	0.06	12	35	0.06	12	35	0.06
6:00	19	28	0.10	13	34	0.07	11	36	0.06	13	34	0.07	14	33	0.08
6:15	17	30	0.09	15	32	0.08	15	32	0.08	16	31	0.09	16	31	0.09
6:30	15	32	0.08	15	32	0.08	12	35	0.06	15	32	0.08	14	33	0.08
6:45	13	34	0.07	16	31	0.09	13	34	0.07	15	32	0.08	14	33	0.07
7:00	15	32	0.08	20	27	0.11	15	32	0.08	16	31	0.09	15	32	0.08
7:15	15	32	0.08	21	26	0.11	19	28	0.10	19	28	0.10	18	29	0.09
7:30	15	32	0.08	22	25	0.12	22	25	0.12	19	28	0.10	19	28	0.10
7:45	15	32	0.08	24	23	0.13	17	30	0.09	19	28	0.10	17	30	0.09
8:00	15	32	0.08	25	22	0.13	15	32	0.08	19	28	0.10	16	31	0.09
8:15	16	31	0.09	23	24	0.12	17	30	0.09	19	28	0.10	17	30	0.09
8:30	16	31	0.09	20	27	0.11	15	32	0.08	17	30	0.09	16	31	0.09
8:45	15	32	0.08	23	24	0.12	13	34	0.07	16	31	0.09	15	32	0.08
9:00	15	32	0.08	23	24	0.12	13	34	0.07	17	30	0.09	15	32	0.08
9:15	16	31	0.09	20	27	0.11	15	32	0.08	17	30	0.09	16	31	0.09
9:30	16	31	0.09	16	31	0.09	13	34	0.07	15	32	0.08	15	32	0.08
9:45	16	31	0.09	16	31	0.09	16	31	0.09	16	31	0.09	16	31	0.09
10:00	15	32	0.08	16	31	0.09	16	31	0.09	16	31	0.09	16	31	0.08
Maximum Observed	**19**	**39**	**0.10**	**25**	**40**	**0.13**	**22**	**36**	**0.12**	**19**	**38**	**0.10**	**19**	**36**	**0.10**
Minimum Observed	**8**	**28**	**0.04**	**7**	**22**	**0.04**	**11**	**25**	**0.06**	**9**	**28**	**0.05**	**11**	**28**	**0.06**
Average Observed	**15**	**32**	**0.08**	**17**	**30**	**0.09**	**15**	**32**	**0.08**	**15**	**32**	**0.08**	**15**	**32**	**0.08**

360 Pearl Street - Residential Parking Utilization Survey (75 Units)

Time Ending	Thursday November 1, 2016			Wednesday November 2, 2016			Tuesday November 8, 2016			Wednesday November 9, 2016			Four Day Average		
	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate
4:15	13	101	0.17	21	93	0.28	18	96	0.24	18	96	0.24	16	225	0.22
4:30	12	102	0.16	20	94	0.27	17	97	0.23	18	96	0.24	16	225	0.21
4:45	15	99	0.20	20	94	0.27	19	95	0.25	21	93	0.28	18	223	0.24
5:00	17	97	0.23	21	93	0.28	20	94	0.27	22	92	0.29	20	221	0.26
5:15	19	95	0.25	24	90	0.32	22	92	0.29	21	93	0.28	21	220	0.28
5:30	20	94	0.27	29	85	0.39	26	88	0.35	28	86	0.37	25	216	0.33
5:45	28	86	0.37	30	84	0.40	30	84	0.40	31	83	0.41	30	211	0.40
6:00	32	82	0.43	31	83	0.41	31	83	0.41	31	83	0.41	31	210	0.42
6:15	33	81	0.44	35	79	0.47	33	81	0.44	32	82	0.43	33	208	0.44
6:30	37	77	0.49	36	78	0.48	36	78	0.48	35	79	0.47	36	205	0.48
6:45	38	76	0.51	36	78	0.48	37	77	0.49	36	78	0.48	37	204	0.49
7:00	41	73	0.55	40	74	0.53	39	75	0.52	37	77	0.49	39	202	0.52
7:15	44	70	0.59	42	72	0.56	42	72	0.56	39	75	0.52	42	199	0.56
7:30	49	65	0.65	41	73	0.55	44	70	0.59	41	73	0.55	45	196	0.60
7:45	48	66	0.64	45	69	0.60	46	68	0.61	45	69	0.60	46	195	0.62
8:00	50	64	0.67	50	64	0.67	50	64	0.67	47	67	0.63	49	192	0.65
8:15	53	61	0.71	51	63	0.68	52	62	0.69	50	64	0.67	52	189	0.69
8:30	55	59	0.73	51	63	0.68	53	61	0.71	53	61	0.71	54	187	0.72
8:45	56	58	0.75	51	63	0.68	54	60	0.72	54	60	0.72	55	186	0.73
9:00	56	58	0.75	53	61	0.71	56	58	0.75	56	58	0.75	56	185	0.75
9:15	58	56	0.77	54	60	0.72	56	58	0.75	55	59	0.73	56	185	0.75
9:30	58	56	0.77	55	59	0.73	57	57	0.76	55	59	0.73	57	184	0.76
9:45	58	56	0.77	56	58	0.75	57	57	0.76	55	59	0.73	57	184	0.76
10:00	58	56	0.77	58	56	0.77	57	57	0.76	55	59	0.73	57	184	0.76
Maximum Observed	**58**	**102**	**0.77**	**58**	**94**	**0.77**	**57**	**97**	**0.76**	**56**	**96**	**0.75**	**57**	**225**	**0.76**
Minimum Observed	**12**	**56**	**0.16**	**20**	**56**	**0.27**	**17**	**57**	**0.23**	**18**	**58**	**0.24**	**16**	**184**	**0.21**
Average Observed	**40**	**75**	**0.53**	**40**	**74**	**0.53**	**40**	**74**	**0.53**	**39**	**75**	**0.52**	**39**	**202**	**0.53**

360 Pearl Street - Visitor Parking Utilization Survey (75 Units)

Time Ending	Thursday November 1, 2016			Wednesday November 2, 2016			Tuesday November 8, 2016			Wednesday November 9, 2016			Four Day Average		
	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate	Occupied	Unoccupied	Rate
4:15	7	5	0.09	7	5	0.09	9	3	0.12	5	7	0.07	7	40	0.09
4:30	6	6	0.08	7	5	0.09	10	2	0.13	5	7	0.07	7	40	0.09
4:45	6	6	0.08	7	5	0.09	8	4	0.11	4	8	0.05	6	41	0.08
5:00	7	5	0.09	6	6	0.08	8	4	0.11	6	6	0.08	7	40	0.09
5:15	7	5	0.09	7	5	0.09	8	4	0.11	6	6	0.08	7	40	0.09
5:30	8	4	0.11	6	6	0.08	8	4	0.11	6	6	0.08	7	40	0.10
5:45	6	6	0.08	8	4	0.11	8	4	0.11	6	6	0.08	7	40	0.09
6:00	5	7	0.07	7	5	0.09	8	4	0.11	6	6	0.08	6	41	0.08
6:15	6	6	0.08	6	6	0.08	8	4	0.11	6	6	0.08	7	40	0.09
6:30	7	5	0.09	7	5	0.09	7	5	0.09	5	7	0.07	6	41	0.08
6:45	7	5	0.09	7	5	0.09	7	5	0.09	6	6	0.08	7	40	0.09
7:00	7	5	0.09	7	5	0.09	8	4	0.11	6	6	0.08	7	40	0.09
7:15	5	7	0.07	8	4	0.11	8	4	0.11	6	6	0.08	6	41	0.08
7:30	5	7	0.07	8	4	0.11	7	5	0.09	5	7	0.07	6	41	0.08
7:45	5	7	0.07	7	5	0.09	6	6	0.08	5	7	0.07	5	42	0.07
8:00	6	6	0.08	8	4	0.11	6	6	0.08	4	8	0.05	5	42	0.07
8:15	6	6	0.08	7	5	0.09	5	7	0.07	4	8	0.05	5	42	0.07
8:30	6	6	0.08	7	5	0.09	5	7	0.07	4	8	0.05	5	42	0.07
8:45	5	7	0.07	6	6	0.08	4	8	0.05	3	9	0.04	4	43	0.05
9:00	5	7	0.07	5	7	0.07	4	8	0.05	3	9	0.04	4	43	0.05
9:15	5	7	0.07	5	7	0.07	3	9	0.04	2	10	0.03	3	44	0.04
9:30	4	8	0.05	5	7	0.07	3	9	0.04	3	9	0.04	3	44	0.04
9:45	4	8	0.05	5	7	0.07	3	9	0.04	4	8	0.05	4	43	0.05
10:00	4	8	0.05	2	10	0.03	3	9	0.04	4	8	0.05	4	43	0.05
Maximum Observed	**8**	**8**	**0.11**	**8**	**10**	**0.11**	**10**	**9**	**0.13**	**6**	**10**	**0.08**	**7**	**44**	**0.10**
Minimum Observed	**4**	**4**	**0.05**	**2**	**4**	**0.03**	**3**	**2**	**0.04**	**2**	**6**	**0.03**	**3**	**40**	**0.04**
Average Observed	**6**	**6**	**0.08**	**6**	**6**	**0.09**	**6**	**6**	**0.09**	**5**	**7**	**0.06**	**6**	**41**	**0.08**