



**6 Regina Street North,
24, 28 and 34 Erb Street East
Mixed-Use Development**

**Transportation Impact Study,
Parking Study,
Transportation Demand
Management, and
Access and Circulation Review**

Paradigm Transportation Solutions Limited

March 2022
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Project Summary



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6 Regina Street North, 24, 28 and 34 Erb Street East, Mixed-Use Development Transportation Impact Study, Parking Study, Transportation Demand Management, and Access and Circulation Review



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Executive Summary

Content

Urban Legend Developments Ltd. retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS), Parking Study (PS), Transportation Demand Management (TDM) Study and Access and Circulation Review (ACR) for a proposed mixed-use development located at 6 Regina Street North, 24, 28 and 34 Erb Street East in Waterloo, Ontario.

The impact assessment includes an analysis of existing traffic conditions, describes the proposed development, traffic forecasts for five years from the date of the TIS (2027), and recommendations to improve future traffic conditions. The PS assesses the required parking as per the City of Waterloo Zoning By-law 2018-050 (ZBL) and compares that to the proposed development parking rates. The TDM assesses the proposed TDM measures, providing the parking reductions achieved from them and recommends further TDM measures if the reduction achieved is not sufficient. The ACR assesses the turning movements for a TAC heavy single unit (HSU) truck and TAC medium single unit (MSU) truck, replicating the movements of typical waste collections vehicles and moving trucks, respectively.

Development Description

The proposed development consists of the following:

- ▶ **Residential:** 218 high-rise units;
- ▶ **Office:** approximately 18,400 ft² of office space;
- ▶ **Commercial:** approximately 5,300 ft² of office space; and
- ▶ **Parking:** 122 vehicle spaces, and 146 Type A/B bicycle spaces.

Access to the proposed development is provided via:

- ▶ an all-moves access to Regina Street North; and
- ▶ a left-in/left-out access to Erb Street East.

Conclusions

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



► **Transportation Impact Study:**

- **Existing Traffic Conditions:** All study area intersections are currently operating within acceptable levels of service except for critical movements at the intersection of **Erb Street East and Peppler Street**;
- **Proposed Development:** The full build-out of the site is forecast to generate 65 and 62 trips during weekday AM and PM peak hours, respectively;
- **2027 Background Traffic Conditions:** All study area intersections are forecast to operate at acceptable levels of service under the 2027 Background conditions with the same intersections with critical movements as the existing conditions plus critical movements at the intersection of **King Street North and Erb Street East**;
- **2027 Total Traffic Conditions:** The 2027 total traffic conditions are forecast to operate similarly to the 2027 background conditions with the same intersections with critical movements intersections;
- **Remedial Measures:**
 - **Traffic Signal Control Justification:** Traffic signal control is not justified at **Erb Street East and Peppler Street**;
 - **Left-Turn Lane Warrants:** It was found that a left-turn lane is unwarranted on **Regina Street North at North Driveway**; and
 - **Additional Intersection Improvements:** No additional improvements were justified by the additional traffic from the subject development, but the City and Region should continue to regularly monitor traffic operations at this intersection regardless of whether the development proceeds.

► **Parking Study:**

- 122 on-site vehicle parking are proposed to be provided by the subject development which requires a 34% parking reduction; and
- 146 Type A/B bicycle spaces have been proposed, meeting the minimum requirement.

► **Transportation Demand Management:**

- Under the current site plan, the subject development qualifies for a reduction of 84 parking spaces (44%) based



on the Region of Waterloo TDM worksheet. This results in the proposed parking supply meeting minimum requirements.

► **Access Review:**

- The Heavy Single Unit truck was unable to move through the proposed development without impediment;
- The Medium Single Unit truck was able to move through the proposed development without impediment.

Recommendations

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

- The proposed development be constructed with no further intersection improvements required;
- The parking reduction be approved with the inclusion of the proposed transportation demand management measures; and
- The site plan only allow the use of vehicles sized up to a TAC MSU (10.0 metres in length).



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1 Introduction

1.1 Overview

Urban Legend Developments Ltd. retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS), Parking Study (PS), Transportation Demand Management (TDM) Study and Access and Circulation Review (ACR) for a proposed mixed-use development located at 24, 28 and 34 Erb Street East in Waterloo, Ontario.

Figure 1.1 details the location of the subject development.

The scope of the study includes:

- ▶ assessment of the current traffic and site conditions within the study area;
- ▶ traffic forecasts for an assumed a horizon of five years from the date of the TIS (2027);
- ▶ estimates of additional traffic generated by the subject site;
- ▶ analyses of the impact of the future traffic on the surrounding road network;
- ▶ analyses of the location of the proposed road connections;
- ▶ recommendations necessary to mitigate the site generated traffic in a satisfactory manner;
- ▶ an analysis of the required parking and parking space dimensions as per the ZBL compared that to the proposed development parking rates and proposed parking stall dimensions;
- ▶ an analysis of the proposed TDM measures, providing the parking reductions achieved from them and recommends further TDM measures if the reduction achieved is not sufficient; and
- ▶ an analysis of the turning movements for a TAC heavy single unit (HSU) truck and TAC medium single unit (MSU) truck.

The impact assessment will focus on the following study area intersections:

- ▶ Dupont Street East and Regina Street North (unsignalized);
- ▶ King Street North and Erb Street East (signalized);
- ▶ Erb Street East and Regina Street North (signalized);
- ▶ Erb Street East and Peppler Street (unsignalized);



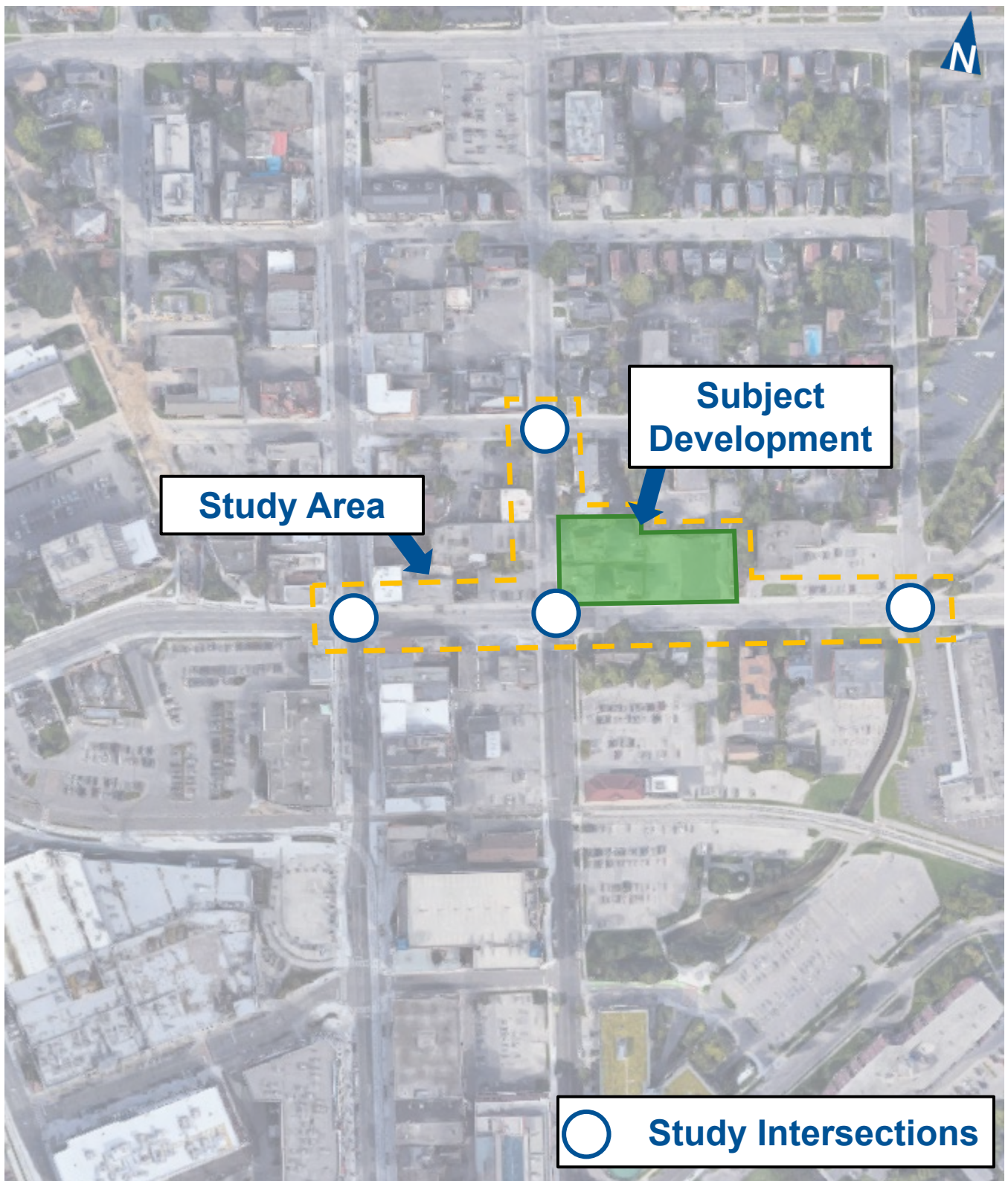
- ▶ North Driveway and Regina Street North (proposed unsignalized); and
- ▶ Erb Street East and East Driveway (proposed unsignalized).

This study has been prepared in consultation with the City of Waterloo (the City) and the Region of Waterloo (the Region) staff, and in accordance with the requirements of the Region TIS Guidelines¹.

Appendix A contains the Region's pre-study conference form.

¹ Transportation Impact Study Guidelines, Region of Waterloo, 22 July 2014





2 Existing Conditions

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

2.1 Road Network

The study area roadways include:

- ▶ **Erb Street (RR 9)** is a 2-lane regional road with an assumed speed limit of 50 km/h, and is a one-way road, travelling west to east;
- ▶ **King Street (RR 8)** is a 2-lane regional road with an assumed speed limit of 50 km/h;
- ▶ **Regina Street** is a 2-lane minor collector road with an assumed speed limit of 50 km/h;
- ▶ **Peppler Avenue** is a 2-lane local street with a speed limit of 50 km/h; and
- ▶ **Dupont Street** is a 2-lane local street with a speed limit of 50 km/h.

The study area is primarily bordered by residential and commercial land uses.

Figure 2.1 displays the existing lane configuration and traffic controls of intersections within the study area.

2.2 Transit Network

Transit service in the study area is substantial, with the proposed development being located within the Uptown Waterloo core and within 800 metres from an ION Rapid Transit Station at Waterloo Public Square. The transit routes which operate within walking distance of the development include:

- ▶ **Route 5** services Waterloo through the western and eastern residential areas along Erb Street, with major stops at The Boardwalk and Waterloo Town Square. This route operates on 30-minute headways from Monday-Saturday and 45-minute headways on Sunday/Holidays;



- ▶ **Routes 7-C, D and E** services Waterloo and Kitchener along King Street, with major stops at Conestoga Mall, Waterloo Town Square, Grand River Hospital, and Fairview Mall. This route operates on 15-minute headways from Monday-Saturday, and Sunday/Holiday service operates on 15-30 minute headways;
- ▶ **Route 16** services Waterloo and Kitchener along Belmont Avenue, Strasburg Road and Homer Watson Boulevard, with major stops at Waterloo Public Square, Grand River Hospital Station and Conestoga College Doon Campus. This route operates on 15-30 minute headways from Monday-Friday, and 30-minute headways on Saturday and Sunday/Holidays; and
- ▶ **ION Rapid Transit** services are available at the Waterloo Public Square, travelling to Conestoga Mall, and Willis Way, travelling south, approximately 275 and 550 meters from the site, respectively. This route operates on 10-15 minute headways from Monday-Friday and 15-30 minute headways on Saturday and Sunday/Holidays.

Figure 2.2 illustrates the Grand River Transit Route.

2.3 Cycling and Pedestrian Facilities

Sidewalks are provided on both sides of all roads within the study area. Access to Laurel Trail is provided approximately 100 metres from the proposed development location. This trail travels from Uptown Waterloo to University Avenue at Marsland Drive and connects to both the Spur Line and Hillside trails. Additionally, the pedestrian signal on Erb Street East at Peppler Street provides safe crossing to pedestrians and encourages usage by cyclists.

As a part of the Region's separated cycle lane project, bollards separate the bicycle lanes from the vehicular traffic on Erb Street to the west of Peppler Street.

Buffered bicycle lanes are also present on both sides of King Street, Permanent bollards and on-street parking lanes provide the buffer.

Figure 2.3 illustrates the City of Waterloo trails map.

2.4 Traffic Volumes

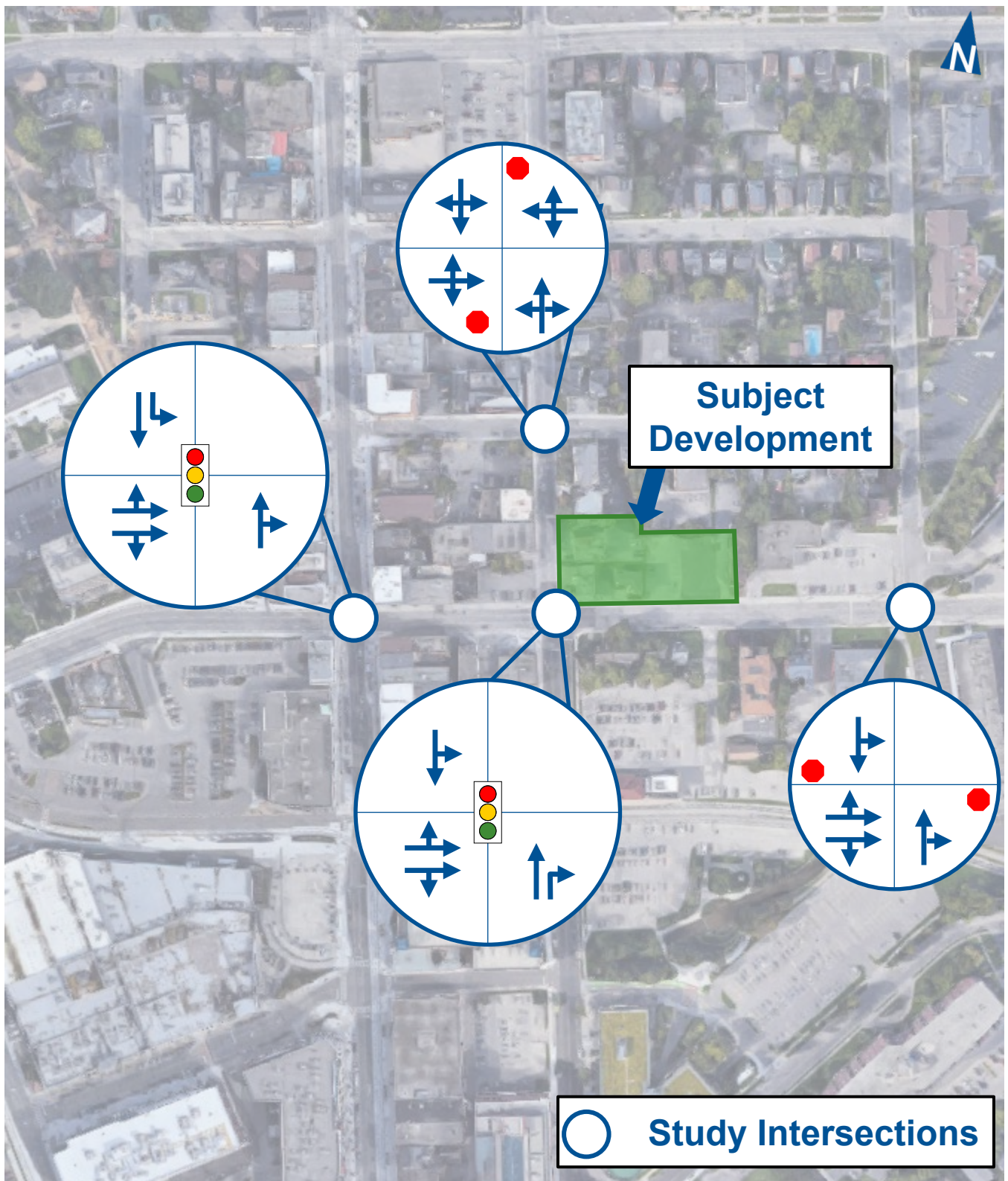
Traffic counts were collected by Paradigm in June 2018. Current signal timings were collected from the Region in December 2021.

Figure 2.4 and **Figure 2.5** summarizes the existing AM and PM peak hour traffic volumes, respectively.



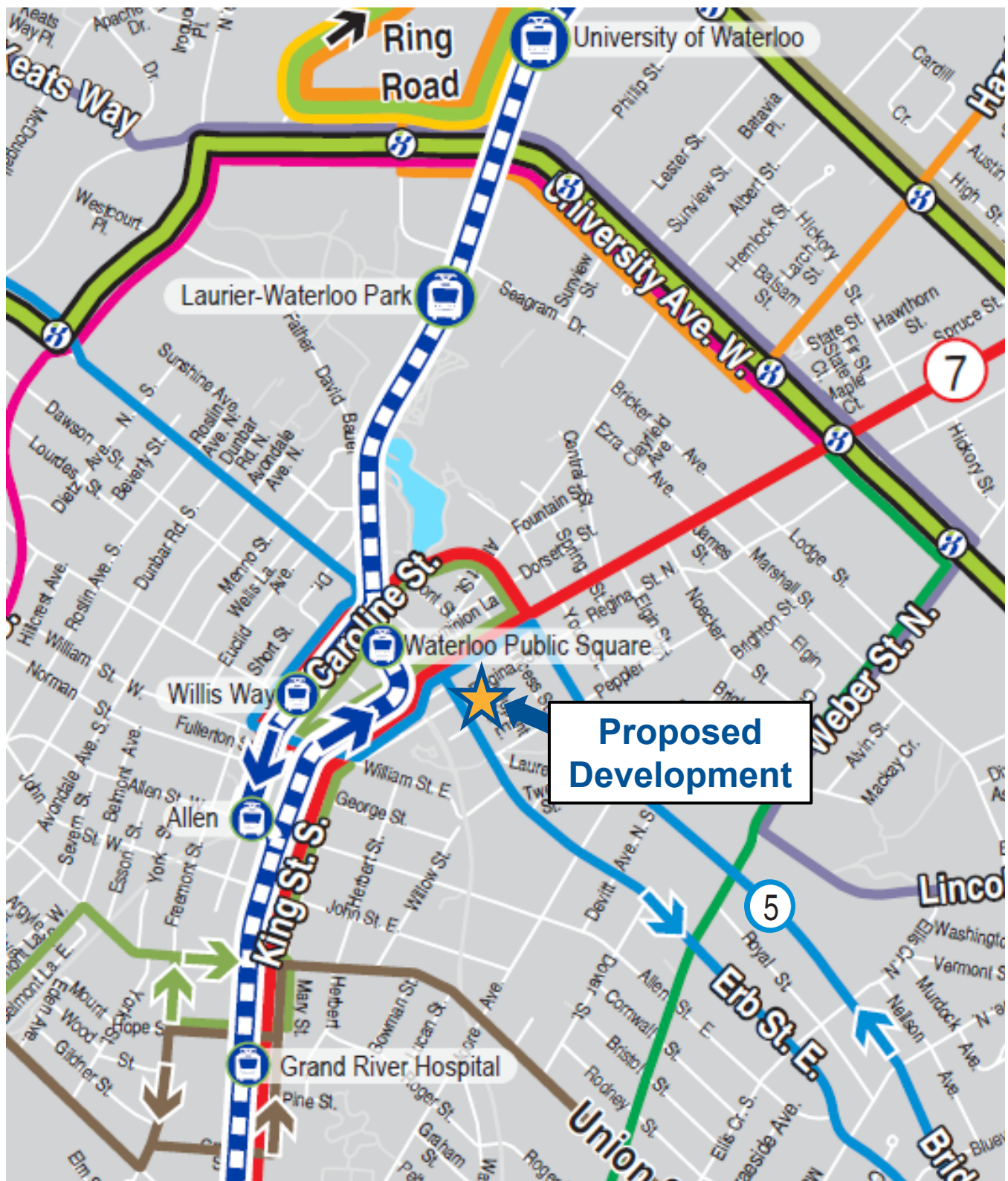
Appendix B contains the existing count data and signal timings.





Uptown Waterloo









2.5 Traffic Operations

The operations of the intersections in the study area were evaluated using the existing lane configurations, traffic controls and the existing traffic peak volumes.

Intersection level of service (LOS) is a recognized method of quantifying the efficiency of traffic flow at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows. The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (50 seconds at unsignalized intersections), the movement is considered to have a LOS F and remedial measures are usually implemented, if they are feasible.

The level of service conditions on the existing road network have been assessed using Synchro 10. The criteria, as defined by the Region, for identifying “critical” intersections are:

The criteria for identifying “critical” intersections are:

- ▶ overall Level of Service E or F (i.e. average control delay per vehicle greater than 55 seconds) for signalized intersections; and
- ▶ overall Level of Service E or F (i.e. average control delay per vehicle greater than 35 seconds) for unsignalized intersections.

The criteria for identifying “critical” movements are:

- ▶ the average control delay for individual movements is greater than 55 seconds;
- ▶ estimated 95th percentile queue length for an exclusive movement exceeds the available storage space;
- ▶ estimated 95th percentile queue length for an individual movement will block an existing access;
- ▶ exclusive turning lanes are inaccessible because of queue lengths in adjacent through lanes; and
- ▶ poor quality of service for non-auto.

Table 2.1 summarizes the level of service and other performance results. The analyses indicate that all intersections and individual



movements within the study area are currently operating at acceptable levels of service except for southbound through-left movements at **Erb Street East and Peppler Street** which operates at a LOS E.

Appendix C contains the detailed Synchro reports.



TABLE 2.1: EXISTING TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Regina Street N & Dupont Street E	TWSC	LOS Delay V/C Q	< < < <	B 13 >	> 13 >	B 13	< < < <	B 13 >	> 13 >	B 13	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0	
	King Street N & Erb Street E	TCS	LOS Delay V/C Q	D 52 0.96 58	A 0 0.00 0	D 38 >	D 45	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	A 0 0.00 0	C 26 0.58 16	C 26	B 16 0.37 3	B 16 0.44 8	A 0 0.00 0	B 16	C 35
	Regina Street N & Erb Street E	TCS	LOS Delay V/C Q	B 15 0.39 5	A 0 0.00 0	B 14 >	B 15	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	C 25 0.26 8	C 24 0.17 4	C 25	A 0 0.00 0	C 23 0.55 15	A 0 0.00 0	C 23	B 19
	Erb Street E & Peppler Street	TWSC	LOS Delay V/C Q	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0						B 11 0.01 0	> > >	B 11	< < <	B 13 0.24 7		B 13	
PM Peak Hour	Regina Street N & Dupont Street E	TWSC	LOS Delay V/C Q	< < < <	B 15 >	> 15 >	B 15	< < < <	B 15 >	> 15 >	B 15	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0	
	King Street N & Erb Street E	TCS	LOS Delay V/C Q	D 40 0.91 57	A 0 0.00 0	C 33 >	D 37	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	A 0 0.00 0	C 33 0.65 27	C 33	C 20 0.37 4	C 21 0.46 17	A 0 0.00 0	C 21	C 33
	Regina Street N & Erb Street E	TCS	LOS Delay V/C Q	B 20 0.57 13	A 0 0.00 0	B 19 >	B 19	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	C 29 0.41 13	C 32 0.60 17	C 29	A 0 0.00 0	B 19 0.39 8	A 0 0.00 0	B 19	C 22
	Erb Street E & Peppler Street	TWSC	LOS Delay V/C Q	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0						C 17 0.15 4	> > >	C 17	< < <	E 44 0.72 38		E 44	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

</> - Shared with through movement



3 Development Concept

3.1 Development Description

The proposed development consists of the following:

- ▶ **Residential:** 218 high-rise units;
- ▶ **Office:** approximately 18,400 ft² of office space;
- ▶ **Commercial:** approximately 5,300 ft² of commercial space; and
- ▶ **Parking:** 122 vehicle spaces, and 146 Type A/B bicycle spaces.

Access to the proposed development is provided via:

- ▶ an all-moves access to Regina Street North; and
- ▶ a left-in/left-out access to Erb Street East.

Figure 3.1 shows the proposed site plan.





3.2 Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation² rates and equations were used to estimate the peak hour site-generate traffic volumes. Land Use Codes (LUC) 222 (Multifamily Housing (High-Rise)), LUC 710 (General Office Building), and 822 (Strip Retail Plaza (<40k)) were used in this study. This results in 108 and 137 new trips forecast to be generated in the AM and PM peaks, respectively.

- ▶ **LUC 222 (Multifamily Housing (High-Rise)):** High-rise multifamily housing includes apartments, townhouses, and condominiums that have more than 10 levels (floors). They are likely to have one or more elevators;
- ▶ **LUC 710 (General Office Building):** A general office building houses multiple tenants; it is a location where affairs of businesses, commercial or industrial organizations, or professional persons or firms are conducted. An office building or buildings may contain a mixture of tenants including professional services, insurance companies, investment brokers, and tenant services, such as a bank or savings and loan institution, a restaurant, or cafeteria and service retail facilities; and
- ▶ **LUC 822 (Strip Retail Plaza (<40k)):** A strip retail plaza is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has less than 40,000 square feet of gross leasable area (GLA). Because a strip retail plaza is open-air, the GLA is the same as the gross floor area of the building.

3.2.1 Mode Share

Due to the proposed development location in Uptown Waterloo and the City's / Region's encouragement of non-auto transportation use, there is a high potential for the use of active and transit modes including:

- ▶ the Erb Street and King Street protected cycle lanes;
- ▶ the Laurel Creek trail;
- ▶ ample sidewalks and high-order pedestrian crossing facilities;
- ▶ access to the ION LRT for both north and south travel provided within 800 metres of the proposed development; and
- ▶ access to multiple high-priority transit routes with 15-minute headways.

² Trip Generation Manual, 11th Edition, Institute of Transportation Engineers, 2021.



With substantial access to additional modes of travel and guidance from the City and Region, mode shares of 25% and 10% have been assumed for transit and active transportation modes, respectively.

3.2.2 ITE Trip Reductions

ITE Internal Capture calculations were used to determine the internal capture rates between all uses and a mode share reduction was applied.

The estimated trip generation assumes a 34% pass-by trip reduction (for PM peak hour only for the retail land use) as per ITE.

3.2.3 Net Trip Generation

With the reductions from the mode share, the ITE internal capture and pass-by trips, the estimated net trip generation for this development is 66 and 62 trips during the AM and PM peak hours, respectively. **Table 3.1** summarizes the total trip generation for the site including the above-described reductions. A slightly higher GFA for office space was used in the calculation compared to the proposed GFA. As the GFA is higher in the calculation, the analysis can be considered conservative.

TABLE 3.1: TRIP GENERATION

Land Use Code	Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
222: Multifamily Housing (High-Rise) Close to Rail	218 Units	(1)	5	41	46	(2)	25	16	41
710: General Office Building	21.1 x1000 Sq. ft	(3)	39	5	44	(4)	8	38	46
822: Strip Retail Plaza (<40K)	5.4 x1000 Sq. ft	(5)	11	8	19	(6)	25	25	50
Total Trips			55	54	109		58	79	137
<i>ITE Internal Capture</i>		-	4	4	8	-	15	15	30
<i>Mode Share - Active</i>		10%	5	5	10	10%	4	6	10
<i>Mode Share - Transit</i>		25%	13	13	26	25%	11	16	27
<i>Pass-By Trips (ITE 820)</i>		0%	0	0	0	34%	4	4	8
Net Total Trips			33	32	65		24	38	62

(1) $\ln(T) = 0.93\ln(X) - 1.17$

(2) $\ln(T) = 0.87\ln(X) - 0.96$

(3) $\ln(T) = 0.86\ln(X) + 1.16$

(4) $\ln(T) = 0.83\ln(X) + 1.29$

(5) $\ln(T) = 0.66\ln(X) + 1.84$

(6) $\ln(T) = 0.71\ln(X) + 2.72$

3.3 Trip Distribution and Assignment

Table 3.2 displays the breakdown of directional trip distribution and trip assignment used in this study.



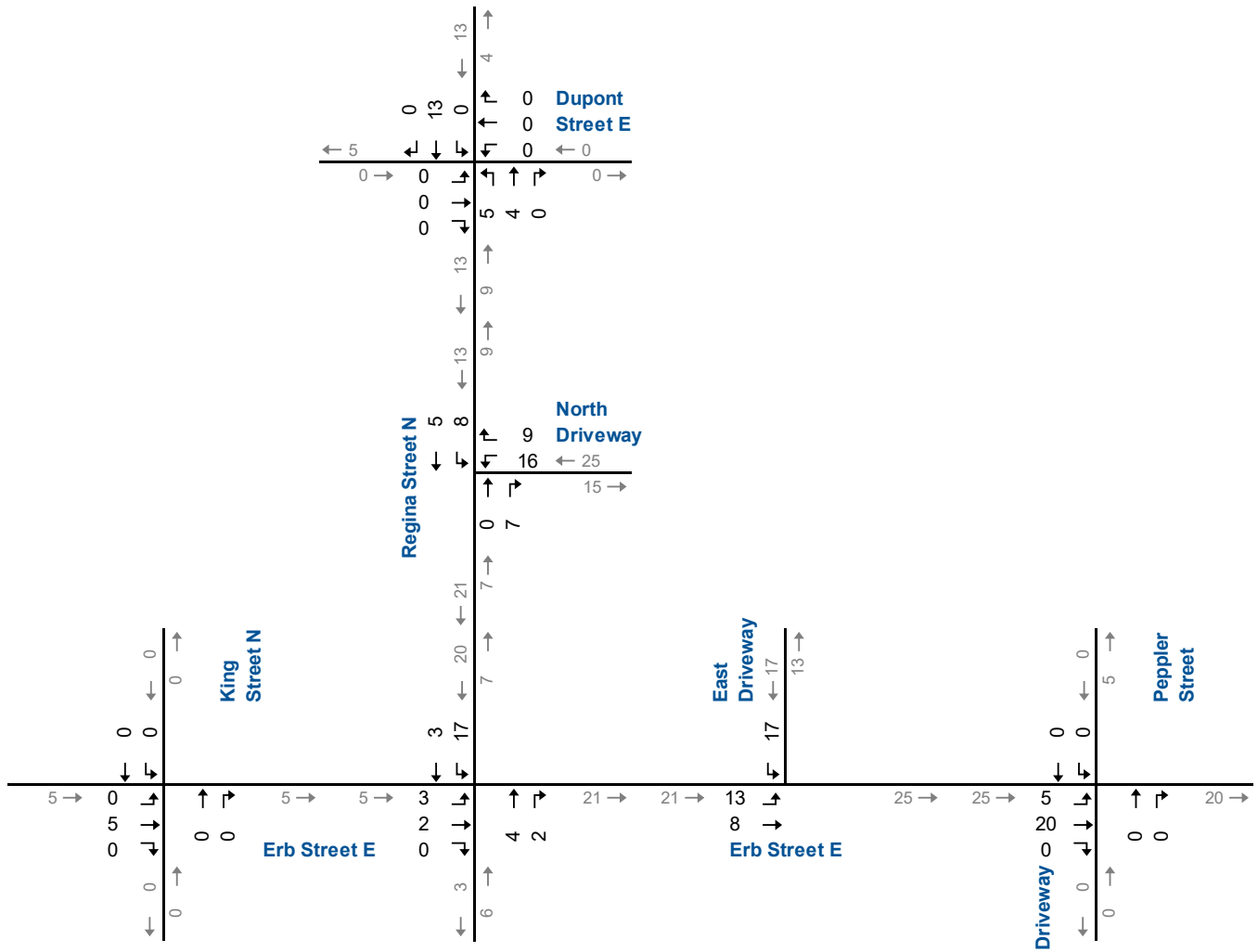
The trip distribution was determined based on travel to and from the TTS Zones (zone 7101, 7105, 7106, and 7108 was used), which includes the subject site, and all site uses.

TABLE 3.2: TRIP DISTRIBUTION

Direction	Residential	Office	Commercial
North Via Regina	30%	10%	25%
South via Regina	20%	10%	15%
East via Erb	20%	55%	30%
South via Erb	10%	5%	10%
West via Erb	20%	20%	20%
Total	100%	100%	100%

Figure 3.2 and **Figure 3.3** show the trip assignment for the trips forecast to be generated by the subject development.





NTS



Site Generated Traffic Volumes PM Peak Hour

6 Regina Street North, 24, 28 & 34 Erb Street East TIS, PS, TDM and ACR
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Figure 3.3

3.4 Access and Circulation Review

The proposed site plan was reviewed for the movement of a medium single unit truck, a heavy single unit truck, and parking space review.

3.4.1 Medium Single Unit Truck

A TAC Medium Single Unit (MSU) truck was used as a design vehicle to simulate a delivery vehicle or moving truck. A typical MSU has a length of 10.0 metres.

Figure 3.4 illustrates the on-site circulation of the MSU.

The swept path analysis indicates that the service entrance is appropriately designed to accommodate a delivery vehicle or moving truck.

3.4.2 Heavy Single Unit Truck

While it is not intended that larger trucks use the garage, A TAC Heavy Single Unit (HSU) truck³ was used as a design vehicle to simulate a large moving truck. A typical HSU has a length of 11.5 metres.

Figure 3.5 illustrates the on-site circulation of the HSU.

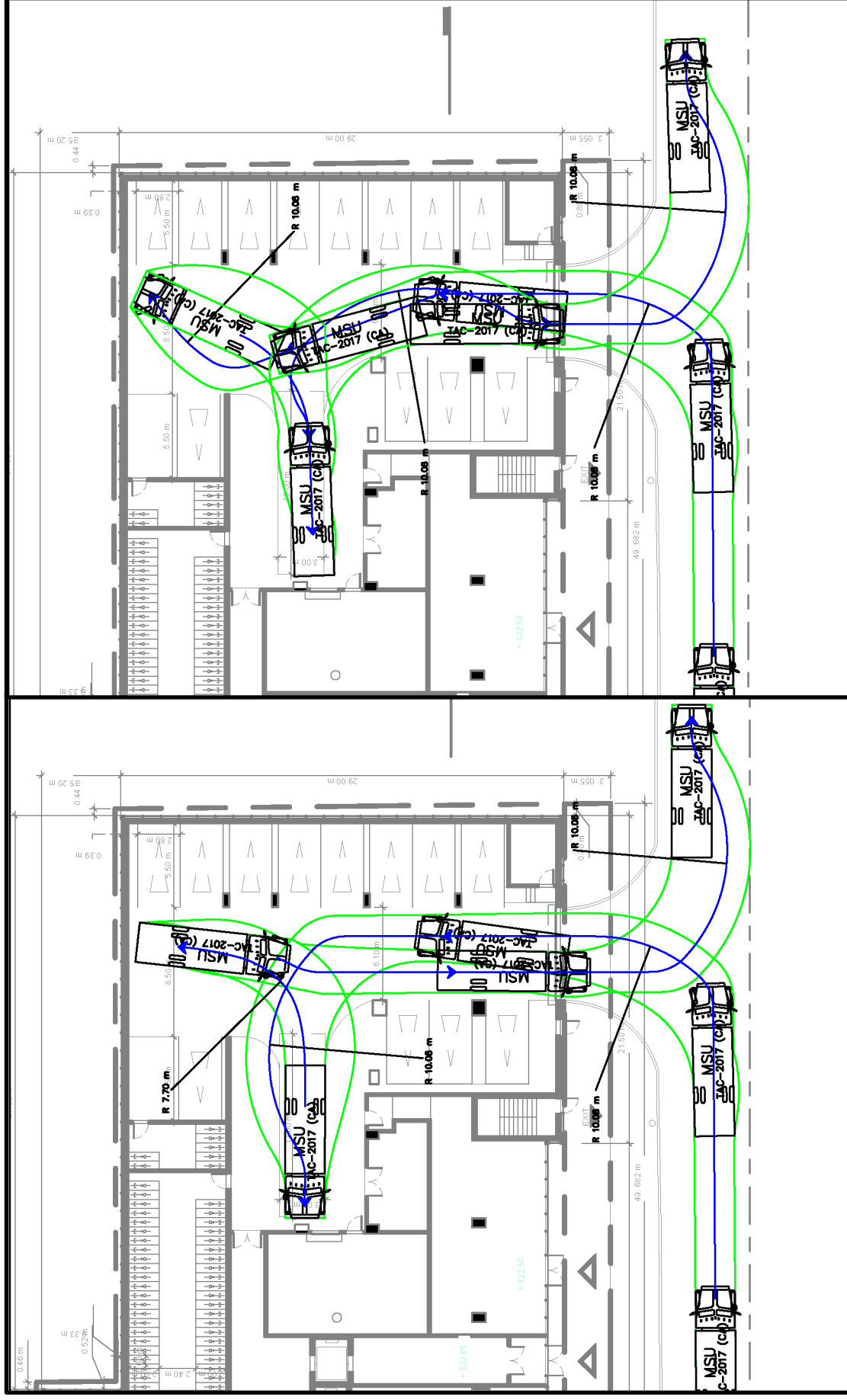
The swept path analysis indicates that proposed site plan can not accommodate a HSU to enter and exit the development without impacting either the wall south of the loading zone, or the parking spaces opposite it. As such, this development cannot accommodate a vehicle of this size in the proposed loading area and should only allow Medium Single Unit trucks.

3.4.3 Parking Space Review

The ZBL requires a 90-degree parking space to have a width of 2.8 metres or 3.0 metres when one side abuts a wall or column, and a length of 5.5 metres. The parking spaces shown in the proposed site plan conform to these dimensions.

³ Table 2.4.2 – Geometric Design Guide for Canadian Roads





Medium Single Unit Truck Diagram

4 Evaluation of Future Traffic Conditions

Future traffic conditions assessed include estimates of future background and total traffic analysis for the 2027 horizon. The future traffic volumes near the development will likely consist of increased non-site traffic volumes (background traffic), and the traffic forecast to be generated by the proposed development.

4.0.1 Background Growth Rate

The growth rate for the generalized traffic near the site was assumed to be 1.0% for both local and regional roads, established by City and Regional staff.

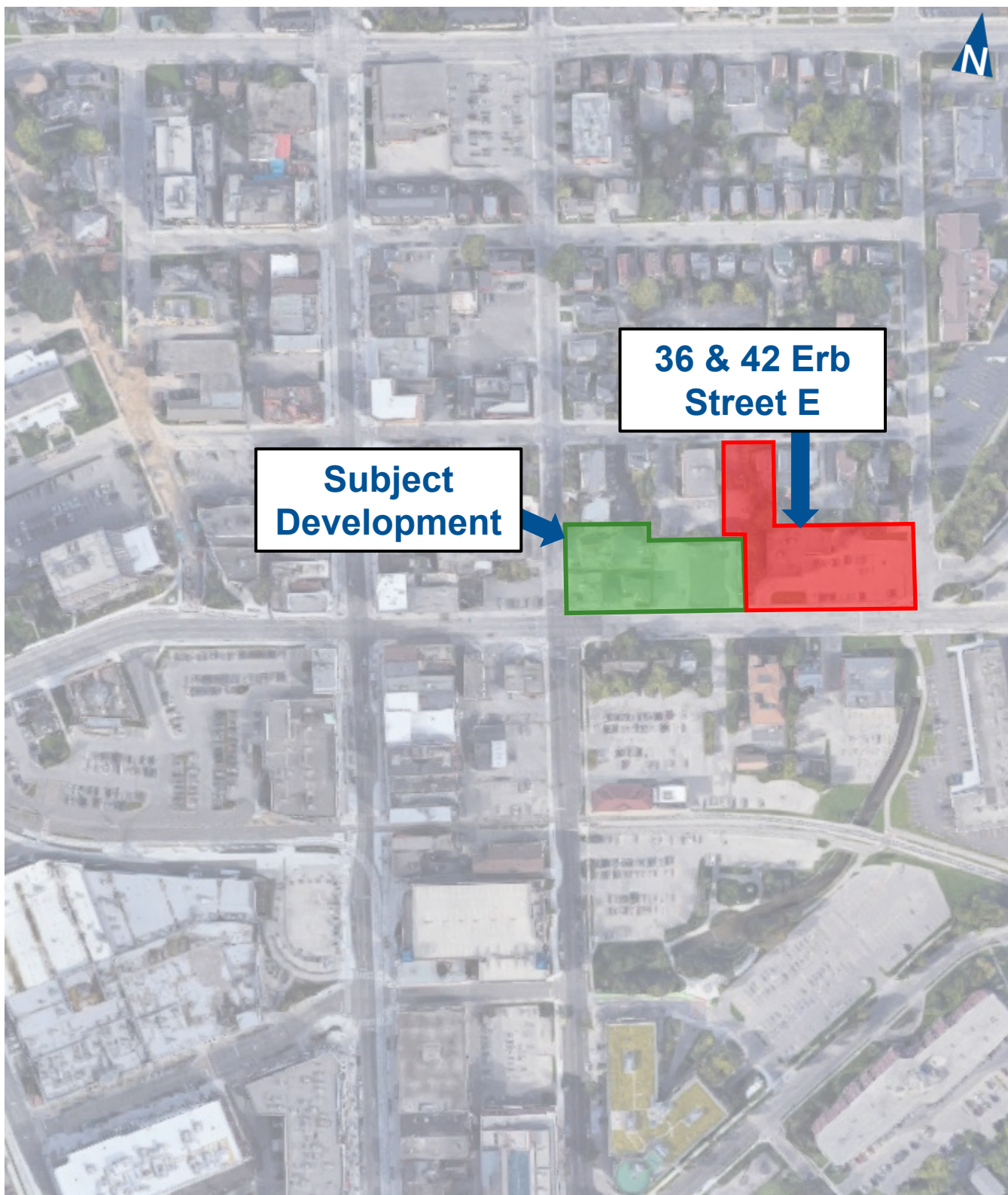
4.0.2 Other Planned Developments

A mixed-use development is planned at 36 and 42 Erb Street East. The traffic forecasts for this development were taken from its TIS⁴ and were included in the background traffic forecasts.

Figure 4.1 illustrates the location of the other development with respect to the subject development.

⁴ 36 and 42 Erb Street East and 39 Dupont Street Transportation Impact Study, *Paradigm Transportation Solutions Limited*, August 2018.





4.1 2027 Horizon

4.1.1 Background Traffic Operations

Based on the estimated 2027 background traffic volumes, Level of Service analyses have been conducted using Synchro 10, for the weekday AM and PM peak hour conditions for the intersections in the study area.

Figure 4.2 and **Figure 4.3** displays the 2027 background traffic volumes for the weekday AM and PM peak hours, respectively.

Table 4.1 summarizes the analysis results, indicating the levels of service (LOS), volume to capacity ratios (V/C) and 95th percentile queues experienced at the study area intersections.

All observed intersections have acceptable operational values except for:

► **King Street North and Erb Street East:**

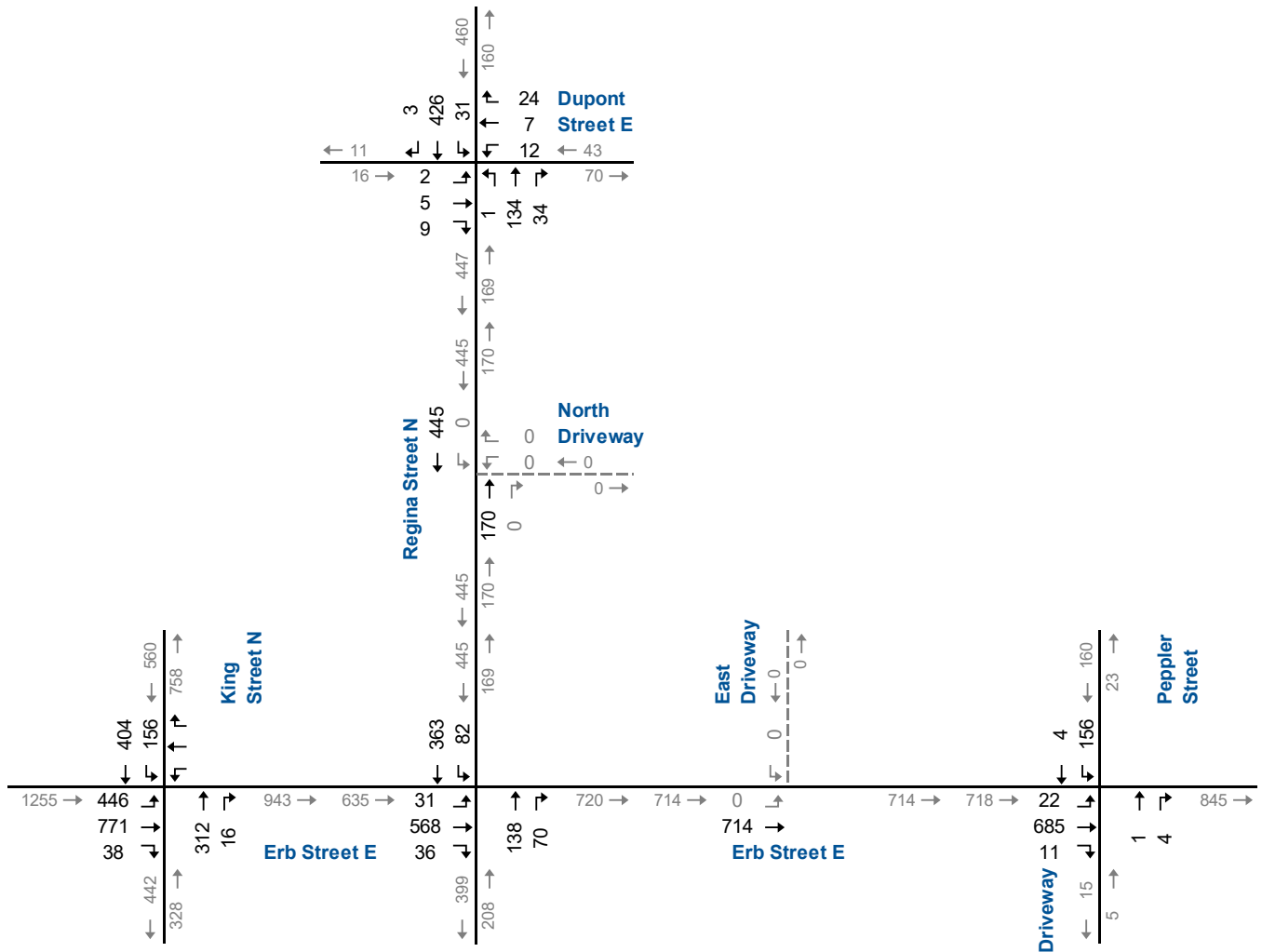
- The eastbound left-turn movement is forecast to operate at a LOS F and LOS E during the AM and PM peak hour, respectively, and with a v/c greater than 1.0 during both peak hours; and
- The eastbound right-turn movement is forecast to operate at a LOS E during the AM peak hour.

► **Erb Street East and Pepler Street:**

- Southbound through-left movement is forecast to operate at a LOS F with a v/c greater than 1.0 during the PM peak hour.

Appendix D includes the detailed Synchro 10 reports.





NTS



2027 Background Traffic Volumes AM Peak Hour

6 Regina Street North, 24, 28 & 34 Erb Street East TIS, PS, TDM and ACR
210574

Figure 4.2

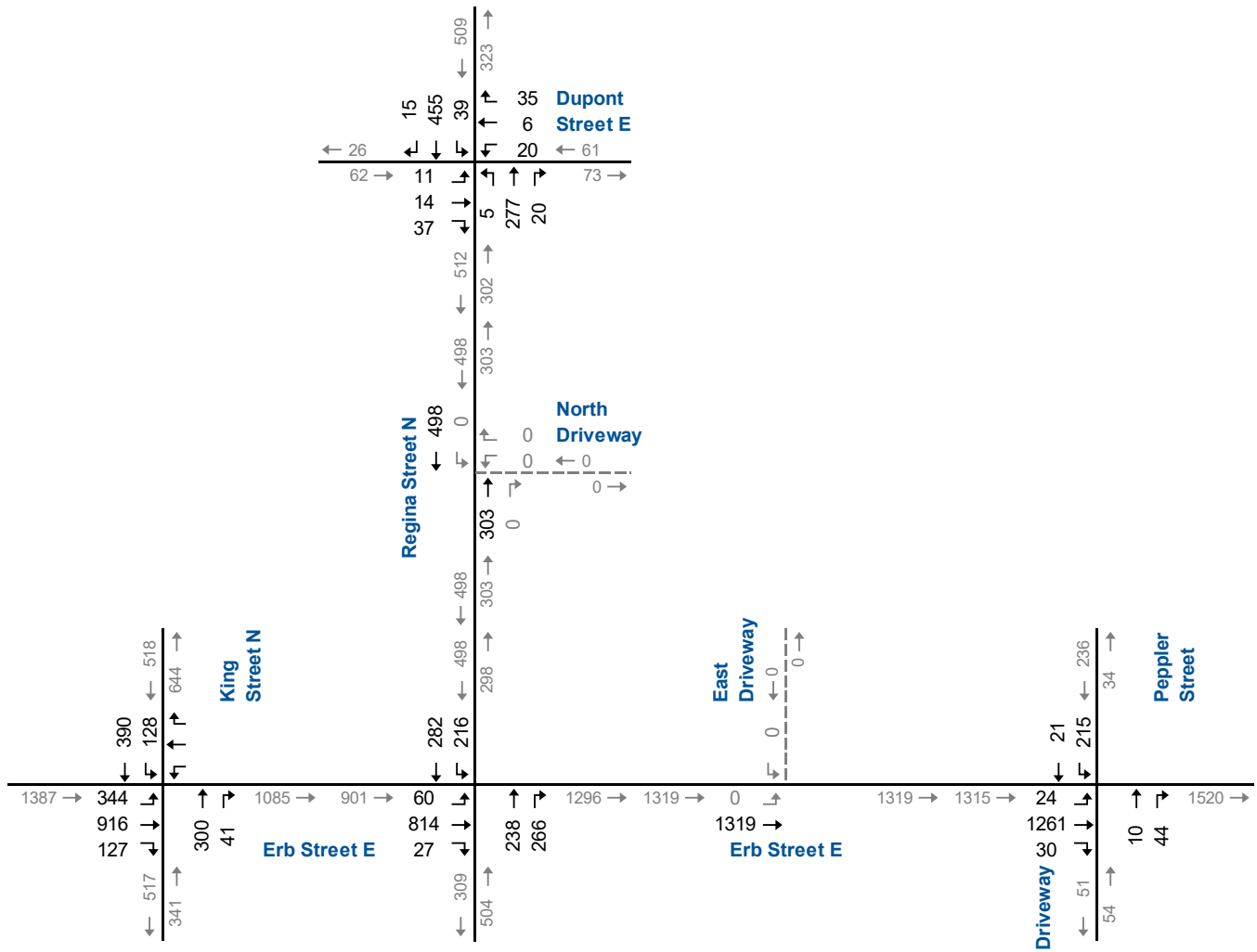


TABLE 4.1: 2027 BACKGROUND TRAFFIC OPERATION

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	Regina Street N & Dupont Street E	TWSC	LOS Delay V/C Q	< < < <	B 14 >	> > > >	B 14	< < < <	B 13 >	> > > >	B 13	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0	
	King Street N & Erb Street E	TCS	LOS Delay V/C Q	F 85 1.08 102	A 0 0.00 0	E 56 0.98 65	E 71	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	A 0 0.00 0	C 28 0.65 20	C 28	B 17 0.45 3	B 17 0.50 9	A 0 0.00 0	B 17	D 50
	Regina Street N & Erb Street E	TCS	LOS Delay V/C Q	B 16 0.44 7	A 0 0.00 0	B 15 0.40 5	B 15	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	C 26 0.30 8	C 25 0.20 4	C 25	A 0 0.00 0	C 25 0.61 18	A 0 0.00 0	C 25	B 20
	Erb Street E & Peppler Street	TWSC	LOS Delay V/C Q	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0						B 12 0.01 0	> > > >	B 12	< < < <	C 16 0.33 10		C 16	
PM Peak Hour	Regina Street N & Dupont Street E	TWSC	LOS Delay V/C Q	< < < <	C 17 >	> > > >	C 17	< < < <	C 17 >	> > > >	C 17	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.03 1	A 0 0.00 0	A 0 0.00 0	A 1	
	King Street N & Erb Street E	TCS	LOS Delay V/C Q	E 64 1.02 96	A 0 0.00 0	D 45 0.93 63	D 55	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	A 0 0.00 0	D 37 0.73 33	D 37	C 22 0.45 6	C 22 0.52 20	A 0 0.00 0	C 22	D 44
	Regina Street N & Erb Street E	TCS	LOS Delay V/C Q	C 22 0.65 16	A 0 0.00 0	B 20 0.59 14	C 21	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	C 27 0.47 15	D 36 0.69 22	C 32	A 0 0.00 0	B 19 0.44 10	A 0 0.00 0	B 19	C 24
	Erb Street E & Peppler Street	TWSC	LOS Delay V/C Q	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0						C 20 0.19 5	> > > >	C 20	< < < <	F 122 1.06 79		F 122	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

</> - Shared with through movement



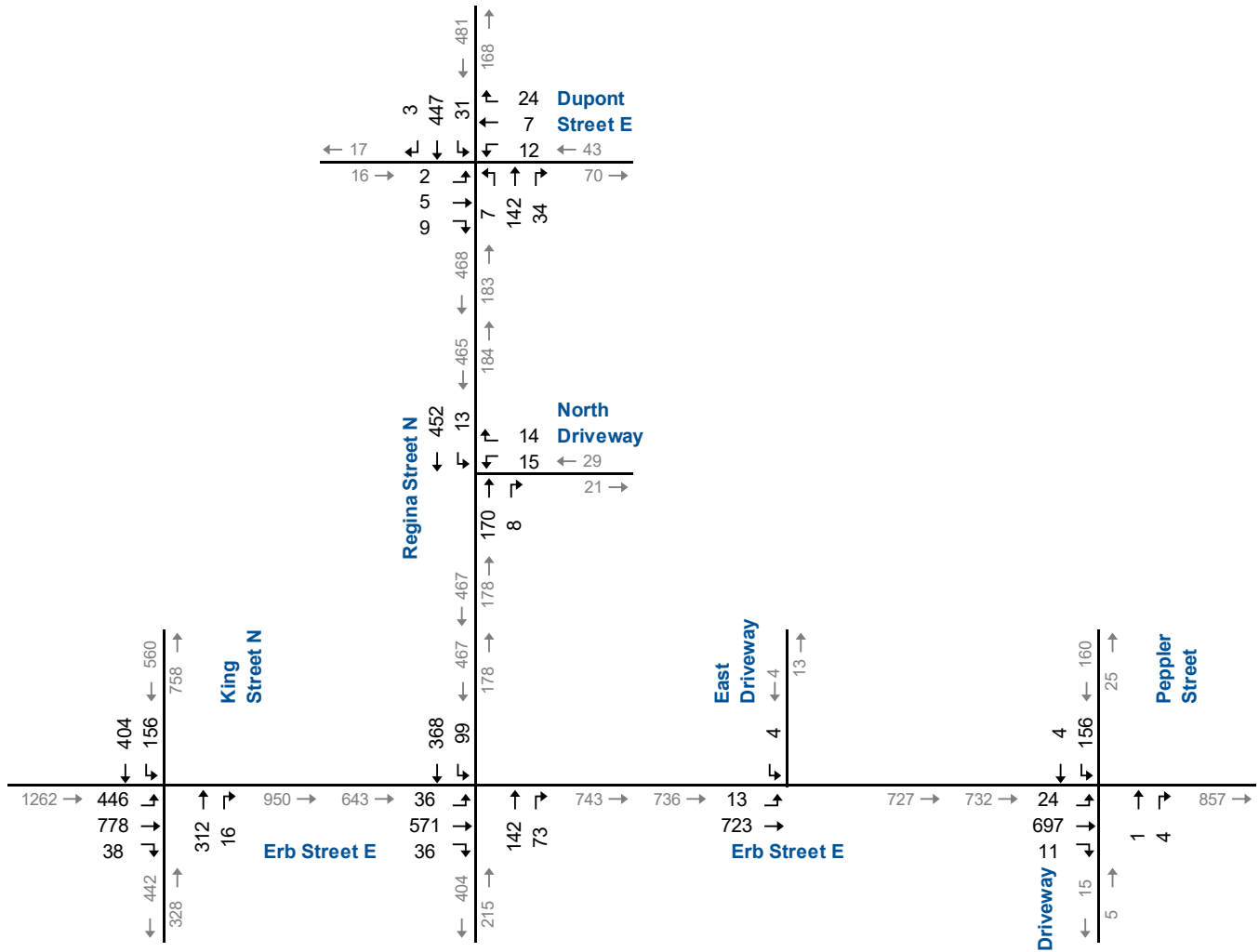
4.1.2 Total Traffic Operations

Figure 4.4 and **Figure 4.5** illustrate the forecast 2027 total traffic volumes, including both background traffic and development traffic, for the AM and PM peaks, respectively.

Table 4.2 summarizes the Level of Service analysis for the 2027 total traffic conditions. All intersections in the study area forecast to have acceptable operational values with the same exceptions as under background conditions, listed in **Section 4.1.1**.

Appendix E includes the detailed Synchro 10 reports.





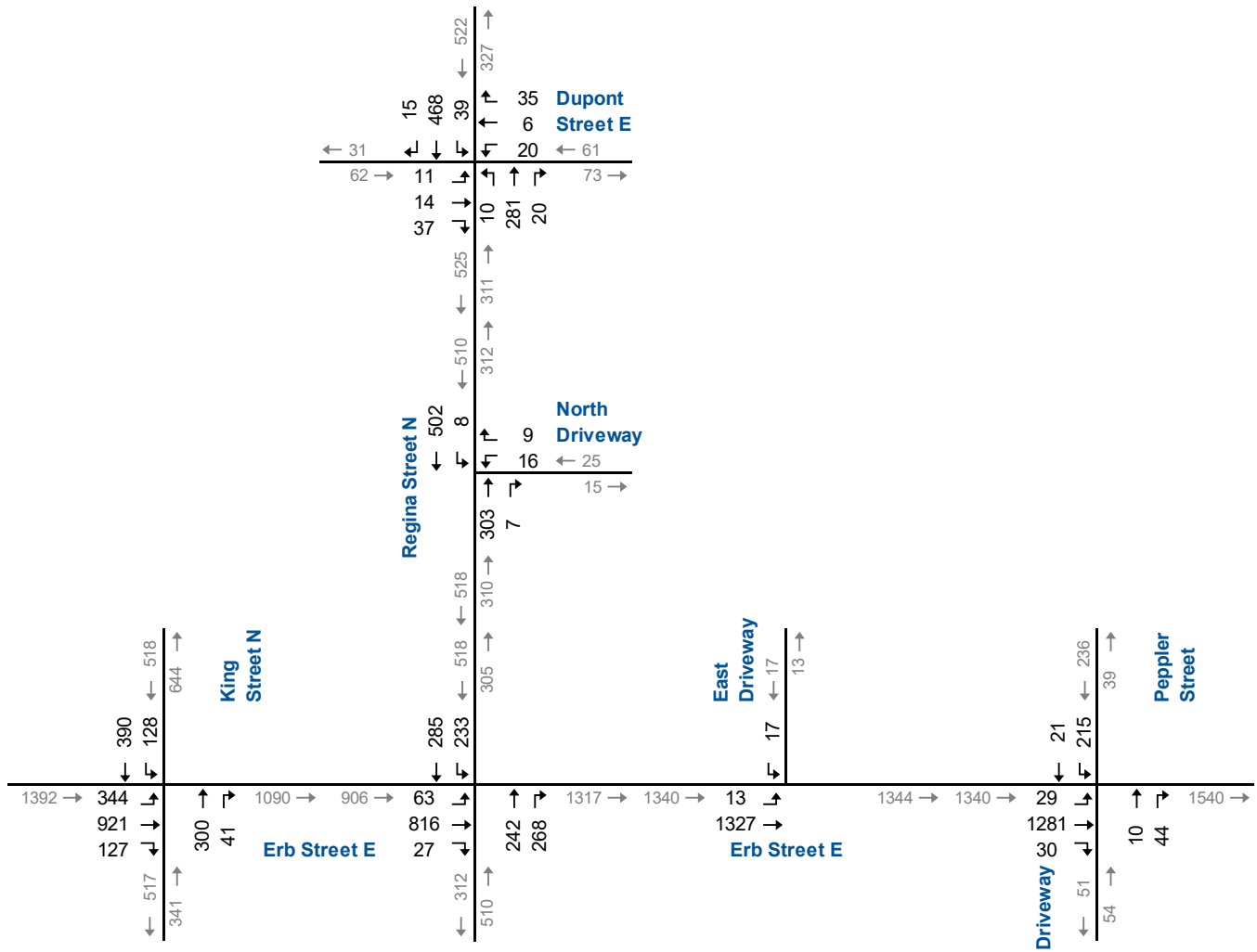


TABLE 4.2: 2027 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Regina Street N & Dupont Street E	TWSC	LOS Delay V/C Q	< < < <	B 14 0.04 1	> > > >	B 14	< < < <	B 13 0.09 2	> > > >	B 13	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0	
	King Street N & Erb Street E	TCS	LOS Delay V/C Q	F 87 1.09 105	A 0 0.00 0	E 57 0.99 68	E 73	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	A 0 0.00 0	C 28 0.65 20	C 28	B 17 0.45 3	B 17 0.50 9	A 0 0.00 0	B 17	D 51
	Regina Street N & Erb Street E	TCS	LOS Delay V/C Q	B 16 0.44 7	A 0 0.00 0	B 15 0.40 6	B 16	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	C 26 0.31 9	C 25 0.20 4	C 25	A 0 0.00 0	C 25 0.62 18	A 0 0.00 0	C 25	C 20
	Erb Street E & Peppler Street	TWSC	LOS Delay V/C Q	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0						B 12 0.01 0	> > > >	B 12	< < < <	C 16 0.33 10		C 16	
	Regina Street N & North Driveway	TWSC	LOS Delay V/C Q					B 12 0.06 2		> > > >	B 12		A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.01 0	A 0 0.00 0		A 0	
	Erb Street E & East Driveway	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0		A 0										B 11 0.01 0			B 11.4
PM Peak Hour	Regina Street N & Dupont Street E	TWSC	LOS Delay V/C Q	< < < <	C 17 0.18 4	> > > >	C 17	< < < <	C 18 0.18 4	> > > >	C 18	A 8 0.01 0	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.03 1	A 0 0.00 0	A 0 0.00 0	A 1	
	King Street N & Erb Street E	TCS	LOS Delay V/C Q	E 65 1.02 98	A 0 0.00 0	D 45 0.94 64	E 56	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	A 0 0.00 0	D 37 0.73 33	D 37	C 22 0.45 6	C 22 0.52 20	A 0 0.00 0	C 22	D 45
	Regina Street N & Erb Street E	TCS	LOS Delay V/C Q	C 22 0.65 16	A 0 0.00 0	C 20 0.59 14	C 21	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0		A 0 0.00 0	C 27 0.48 16	D 36 0.70 22	C 32	A 0 0.00 0	B 20 0.45 10	A 0 0.00 0	B 20	C 24
	Erb Street E & Peppler Street	TWSC	LOS Delay V/C Q	A 7 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0						C 21 0.20 5	> > > >	C 21	< < < <	F 138 1.10 83		F 138	
	Regina Street N & North Driveway	TWSC	LOS Delay V/C Q					C 16 0.09 2		> > > >	C 16		A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.01 0	A 0 0.00 0		A 0	
	Erb Street E & East Driveway	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0		A 0										C 16 0.03 1			C 0

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

</> - Shared with through movement



5 Remedial Measures

5.1 Traffic Signal Control Justification

OTM Book 12 Justification 7⁵ analyses reveal that under the 2036 total traffic conditions at **Erb Street East and Peppler Street**. Traffic signal control is not justified as Warrant 1 is met to 66.9% and Warrant 2 to 57.6%. Under Justification 7 existing intersections require either Warrant to be fulfilled to 120% to justify traffic signal control.

Appendix F includes signal warrant worksheets.

5.2 Left-Turn Lane Warrants

The need for designated left-turning lanes at unsignalized intersections within the study area was assessed using MTO procedures detailed in the Geometric Design Manual⁶. With the posted speed limit of 50 km/h, standard practice in the Region of Waterloo considers a design speed of 60 km/h considering the urban characteristics of the immediate area and the restricted flow of traffic.

Turn lane warrants were assessed for the southbound left on **Regina Street North at North Driveway** under 2026 Total traffic conditions. It was found that a left-turn lane is not forecast to be warranted.

Figure 5.1 illustrates the left-turn lane warrant.

5.3 Additional Intersection Improvements

Owing to background traffic increases alone, the following intersections are forecast to have movements with poor operations under the 2026 background conditions:

- ▶ King Street North and Erb Street East; and
- ▶ Erb Street East and Peppler Street.

The impact of the traffic forecast to be generated by the subject development was investigated.

5.3.1 King Street North and Erb Street East

As noted in **Section 4.1** this intersection has critical movements under 2026 Background conditions, regardless of whether this development

⁵ OTM Book 12: Traffic Signals, *Ministry of Transportation of Ontario*, 2012

⁶ Geometric Design Standards For Ontario Highways, *Ministry of Transportation of Ontario*, 1986



is approved. The additional traffic related to the subject development has very little impact on the conditions at this intersection under the 2026 Total horizon as it represents about 0.3% of the total traffic.

Additionally, with an increased focus on the use of transit and active modes planned by the City and Region leaving the intersections as is may encourage auto users to modify their travel habits

The City and Region should continue to regularly monitor traffic operations at this intersection regardless of whether the development proceeds.

5.3.2 Erb Street East and Peppler Street

As noted in **Section 2.5** this intersection has critical movements under existing conditions, regardless of whether this development is approved. The additional traffic related to the subject development has very little impact on the conditions at this intersection under the 2026 Total horizon as it represents about 0.8 – 1.5% of the total traffic.

Additionally, with an increased focus on the use of transit and active modes planned by the City and Region leaving the intersections as is may encourage auto users to modify their travel habits.

The City and Region should continue to regularly monitor traffic operations at this intersection regardless of whether the development proceeds.

5.4 Impacts on Non-Auto Transportation Operations

In addition to the forecast future traffic operations, the impacts to the surrounding non-auto modes have been assessed, including:

- ▶ Transit routes and infrastructure;
- ▶ Pedestrian facilities; and
- ▶ Cycling facilities.

5.4.1 Transit Routes and Infrastructure

There are several routes operating near the proposed development location, including Route 5 which passes by the development. From the traffic analysis it is seen that the signal delays and increase to traffic that would impact this route caused by the proposed development are insignificant.



Additionally, the increase to ridership to these routes may have little impact as these routes operate on 10 – 15 minute headways, which provide ample capacity.

5.4.2 Pedestrian Facilities

As the cycle lengths and split timings of the signalized intersections in the study area are coordinated, they have not been affected by the proposed development, causing no impact to pedestrians. Additionally, there are adequate pedestrian crossing facilities provided in the area to prevent unprotected mid block crossings.

5.4.3 Cycling Facilities

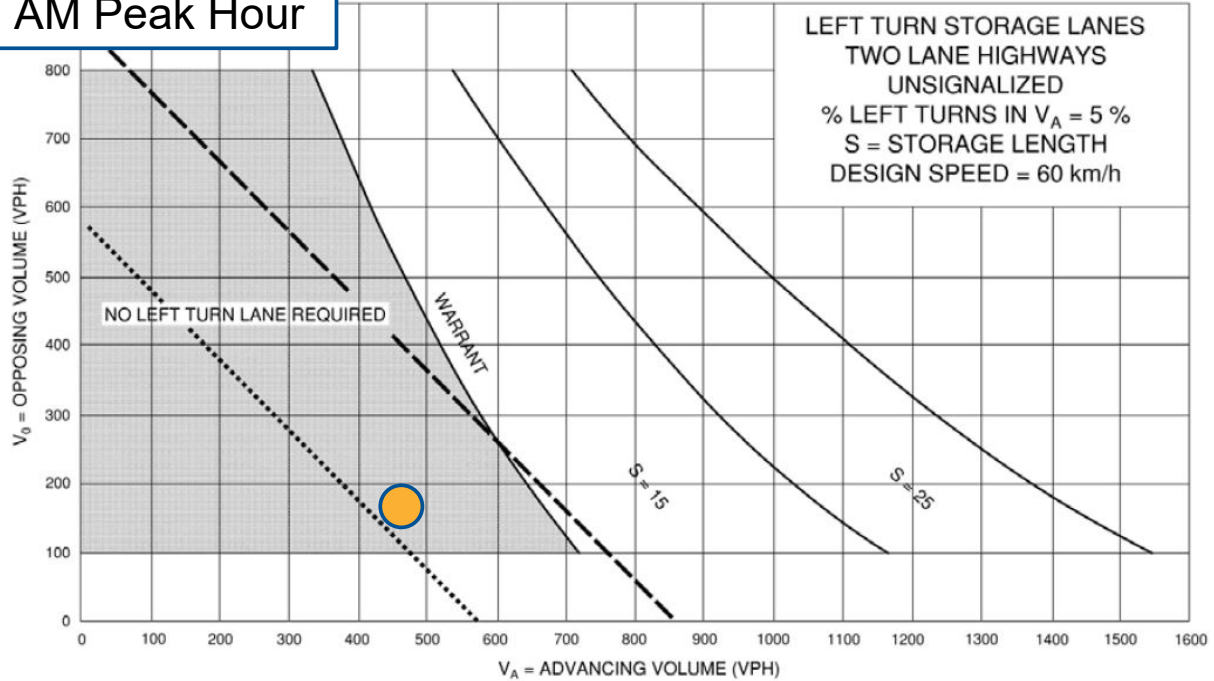
Similar to the pedestrian crossing facilities, since the cycle lengths and split timings of the signalized intersections are not affected, the travel of the protected cycle lanes are not impacted by the proposed development.

5.4.4 Impacts of Improvements

As no geometric improvements are warranted, there are no impact on pedestrian or cycling modes caused by widened roadways or changes in traffic control.



AM Peak Hour



Southbound Left-turn Lane Warrant on Regina Street N at North Driveway

6 Regina Street North, 24, 28 & 34 Erb Street East TIS, PS, TDM and ACR
210574

Figure 5.1

6 Parking Study and Transportation Demand Management

This parking study and transportation demand management will review the following:

- ▶ Vehicle and bicycle parking requirements as per ZBL compared to the proposed parking supply. The parking requirement determined by the:
 - Zone Type as per Schedule A; and
 - Parking Area as per Schedule A1.
- ▶ Parking reductions achieved by the transportation demand management measures proposed by the development.

6.1 Zoning By-Law Requirements

The ZBL bases its requirements of the zone type and parking area, as shown in Schedule A and A1, respectively. As this zone is in U1-60 and parking area A the City ZBL then requires the following parking based on site uses:

- ▶ **Residential:**
 - **Resident:** 0.60 spaces per dwelling unit = 131 spaces; and
 - **Visitor:** 0.10 spaces per dwelling unit = 22 spaces.
- ▶ **Office:** 1.50 spaces per 100m² = 26 spaces; and
- ▶ **Commercial:** 1.50 spaces per 100m² = 7 spaces.

Additionally, 0.3 Type A and 0.3 Type B bicycle spaces are required per residential unit and bicycle parking must be provided at a rate of 40% of the required vehicle parking spaces for commercial and office use, which may be satisfied as Type A and/or Type B spaces. This results in the following bicycle space requirements:

- ▶ **Residential:** 66 Type A and 66 Type B spaces for residential use; and
- ▶ **Office/Commercial:** 14 spaces of either Type A or Type B.

Type B space requirements may be satisfied with Type A spaces.

Overall, there is a total vehicle parking requirement of 186 spaces. The proposed vehicle parking supply is seeking a reduction of 64 spaces,



34%, between all uses. The bicycle parking is proposed to be supplied as per ZBL requirements.

6.2 Transportation Demand Management

Transportation Demand Management (TDM) are measures that developments can undertake to support and encourage non-auto forms of transportation. The Region of Waterloo has developed a TDM Checklist and Parking Management Worksheet that uses TDM strategies and transit-related factors to determine if a development is TDM supportive and to calculate parking reductions.

The following TDM measures listed in the Region's TDM worksheet are applicable to the subject site:

- ▶ Development incorporates functional building entrances that are oriented to public space or to locations where pedestrians and transit users arrive from such as a street, square, park or plaza;
- ▶ Non-Residential: Development provides secure bike storage for 4% of the building occupants;
- ▶ Provision of active uses at-grade along street frontages;
- ▶ Located in an Urban Growth Centre (UGC) or within 800 m of a future Rapid Transit Station;
- ▶ Implements paid parking system on all or part of the site (e.g. parking permits, paid parking zones near main entrances);
- ▶ 75% of parking or more is located underground or in a structure; and
- ▶ The building owner/occupant agrees to charge for parking as a separate cost to occupants.

Based on the TDM Checklist and Parking Management Worksheet, the site qualifies as being a TDM supportive development and calculates a parking reduction of 44%.

In addition, it is noted that it is intended that the parking spaces will be shared between residential and commercial uses. As residential, office and retail uses have different temporal demand profiles, this will contribute to a lower overall peak demand on the site.

Table 6.1 summarizes the parking requirements after the use of the above TDM measures.

Appendix H contains the completed Region of Waterloo TDM Checklist and Parking Management Worksheet.



TABLE 6.1: TDM PARKING REDUCTION SUMMARY

Source	# of Spaces
City of Waterloo Parking Requirements	186
Parking Reduction from TDM Measures	84
Total Parking Requirement after TDM Reduction	102

Therefore, with the reductions provided in the Region's Parking Management Worksheet, the proposed parking supply is achievable with the appropriate TDM measures as noted in the worksheet.



7 Conclusions and Recommendations

7.1 Conclusions

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

► **Transportation Impact Study:**

- **Existing Traffic Conditions:** All study area intersections are currently operating within acceptable levels of service except for critical movements at the intersection of **Erb Street East and Pepler Street**;
- **Proposed Development:** The full build-out of the site is forecast to generate 65 and 62 trips during weekday AM and PM peak hours, respectively;
- **2027 Background Traffic Conditions:** All study area intersections are forecast to operate at acceptable levels of service under the 2027 Background conditions with the same intersections with critical movements as the existing conditions plus critical movements at the intersection of **King Street North and Erb Street East**;
- **2027 Total Traffic Conditions:** The 2027 total traffic conditions are forecast to operate similarly to the 2027 background conditions with the same intersections with critical movements intersections;
- **Remedial Measures:**
 - **Traffic Signal Control Justification:** Traffic signal control is not justified at **Erb Street East and Pepler Street**;
 - **Left-Turn Lane Warrants:** It was found that a left-turn lane is unwarranted on **Regina Street North at North Driveway**; and
 - **Additional Intersection Improvements:** No additional improvements were justified by the additional traffic from the subject development, but the City and Region should continue to regularly monitor traffic operations at this intersection regardless of whether the development proceeds.

► **Parking Study:**

- 122 on-site vehicle parking are proposed to be provided by the subject development which requires a 34% parking reduction; and



- 146 Type A/B bicycle spaces have been proposed, meeting the minimum requirement.
- ▶ **Transportation Demand Management:**
 - Under the current site plan, the subject development qualifies for a reduction of 84 parking spaces (44%) based on the Region of Waterloo TDM worksheet. This results in the proposed parking supply meeting minimum requirements.
- ▶ **Access Review:**
 - The Heavy Single Unit truck was unable to move through the proposed development without impediment;
 - The Medium Single Unit truck was able to move through the proposed development without impediment.

7.2 Recommendations

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

- ▶ The proposed development be constructed with no further intersection improvements required;
- ▶ The parking reduction be approved with the inclusion of the proposed transportation demand management measures; and
- ▶ The site plan only allow the use of vehicles sized up to a TAC MSU (10.0 metres in length).



Appendix A

Pre-Study Conference Notes



(210574) 24, 28 & 34 Erb
PRE-STUDY CONFERENCE FORM

Item	Description	Details
ISSUES		
1	List any issues expected that may impact the content or recommendations of the subject Transportation Impact Study.	
INTRODUCTION		
2	Nature of application (Attach a drawing)	- Official Plan Amendment - Zoning Amendment ~~Site Plan Control Application~~ ~~Plan of Subdivision~~ ~~Community Plan~~ - Other
3	TIS process, and relevant policies, procedures and approvals	- Guidelines for the preparation of Transportation Impact - Studies in Support of Development Applications - Transportation Impact Studies Requirements for Capacity - Analysis, Roundabouts, Turn Lanes - Safety Analysis Checklist
4	Public Meeting	- Required - Not Required
CONTEXT		
5	Study intersections (Intersections to be analyzed) Note: the consultant is responsible to identify any further intersections impacted as the study progresses.	Erb Street East and Regina Street (signalized);
		Dupont Street and Regina Street (unsignalized);
		Erb Street East and Peppler Street (unsignalized); and
		King Street and Erb Street (signalized)
		Up to two site driveways
6	Size and number of phases of development	218 High-Rise units; - Office Space (1,860 m²); and - Retail Space (530 m²).
7	Approved and pending approval development applications	34 and 37 Erb 36 – 42 Erb St
8	Planned transportation system improvements	- New separated cycling facility, current buildout is in the pilot stage so the future will have a more robust future - Looking to have a further east cycling lane – increased mode share
TRAVEL DEMAND		
9	Horizon years	- Region of Waterloo Guidelines 5 years from the date the study is commissioned

Item	Description	Details
10	Peak hour determination	- o AM weekday peak hour of adjacent roadway - o PM weekday peak hour of adjacent roadway
11	Background	• Background Growth Rate: - o 1% (City Roads) - o 1% (Region Roads) • ROW travel demand forecasts • Approved and pending approval development applications • Other...
12	Trip generation	• ITE fitted equation, if appropriate. Otherwise, average rates
13	Trip reductions (TDM, internal, pass-by)	• Internal Capture and Pass-by reductions • TDM Plan to be discussed - o Provide committed client TDM measures • 25% reduction for transit – close to LRT and busses • 10% reduction for active modes • Assumed as permanent res and not student • Need to highlight the proximity to the LRT station
14	Trip distribution	• 2016 Transportation Tomorrow Survey
15	Trip assignment	- o Local traffic pattern - o Site layout and access design - o Existing turning movements - o Other...
EVALUATION OF IMPACTS		
16	Traffic impact analysis (Use approved software)	- o Unsignalized intersections - o left turn warrant analysis - o signal warrant analysis - o Signalized intersections - o LOS, v/c, delay, queuing - o ROW saturation flow rates - o Existing signal timings for existing conditions - o Optimize signal timings for future conditions - o Use existing cycle length to respect coordinated corridor - o Queuing analysis - o Roundabouts - o Other...

Item	Description	Details
17	Roundabout feasibility (Use approved software)	○ Initial screening ○ Intersection control study (10-year horizon)
18	Transit assessment	○ Frequency and hours of service ○ Presence of bus stops ○ Reliability of service ○ Passenger loads ○ Travel time ○ Other
19	Pedestrian assessment	● Presence, connectivity, and width of sidewalks ● Barriers and buffers from traffic ● Crossing opportunities at intersections ● Delay at intersections ● Number of driveways and traffic volumes at the driveways ● Presence of illumination ● Future needs (desire lines / policy / accessibility / demand) ● Other
20	Cycling assessment	● Presence of a dedicated facility ● Network connectivity ● Number and width of travel lanes adjacent to the route ● Volume and speed of traffic ● Percentage of trucks and buses encountered ● Pavement condition ● Presence of parking /showers/change rooms ● Future needs (desire lines / policy / demand) ● Other <u>Notes:</u> ● Look at the respective TMPs for the Region and the City for their ultimate plans ● Check to see if there are any programs in place that have not been implemented ● For the remedial measures and mitigation there needs to be a discussion around the additional modes and their impacts with the improvements to SOVs ● Try and improve the conditions for all modes
21	Safety analysis	○ Road safety review ○ Collision risk analysis ○ Access conflict evaluation
22	Site access and circulation	○ Review sight distances at all new access points ○ Access and Circulation Review ○ Loading facilities and access ○ Service/maintenance vehicle access ○ Emergency vehicle access
23	Submission format	○ No need for the hard copies ○ Electronic copy of complete report and all appendices ○ Electronic copy of operational analysis files (e.g. Synchro, Arcady) ○ Electronic copy of all signal warrant calculation files ○ Other

Appendix B

Traffic Count and Signal Timing Data





Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Dupont Street East & Regina
Street North
Site Code:
Start Date: 06/27/2018
Page No: 1

Turning Movement Data

Start Time	Dupont Street East Eastbound						Dupont Street East Westbound						Regina Street North Northbound						Regina Street North 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	
7:00 AM	0	1	2	0	0	3	0	1	1	0	2	2	0	8	0	0	0	8	1	25	1	0	0	27	40
7:15 AM	0	2	1	0	1	3	1	1	0	0	1	2	0	16	0	0	0	16	1	30	1	0	0	32	53
7:30 AM	0	0	3	0	2	3	1	1	0	0	1	2	0	15	1	0	0	16	3	52	1	0	0	56	77
7:45 AM	1	0	0	0	0	1	0	1	1	0	3	2	1	28	1	0	1	30	3	71	0	0	0	74	107
Hourly Total	1	3	6	0	3	10	2	4	2	0	7	8	1	67	2	0	1	70	8	178	3	0	0	189	277
8:00 AM	0	2	1	0	4	3	5	2	3	0	5	10	0	32	6	0	0	38	3	92	0	0	2	95	146
8:15 AM	1	2	0	0	3	3	1	2	1	0	2	4	1	42	10	0	2	53	3	112	0	0	0	115	175
8:30 AM	1	1	3	0	4	5	4	0	1	0	3	5	0	24	7	0	1	31	2	89	0	0	2	91	132
8:45 AM	0	0	4	0	2	4	0	2	3	0	1	5	0	26	7	0	1	33	15	99	3	0	0	117	159
Hourly Total	2	5	8	0	13	15	10	6	8	0	11	24	1	124	30	0	4	155	23	392	3	0	4	418	612
9:00 AM	0	3	1	0	4	4	3	1	3	0	3	7	2	27	12	0	0	41	7	68	3	0	0	78	130
9:15 AM	1	2	2	0	2	5	2	3	1	0	5	6	2	29	5	0	1	36	9	62	3	0	1	74	121
9:30 AM	0	3	3	0	0	6	0	3	6	0	5	9	2	33	8	0	0	43	5	49	2	0	0	56	114
9:45 AM	2	2	0	0	1	4	4	2	5	0	3	11	4	35	8	0	3	47	6	78	1	0	3	85	147
Hourly Total	3	10	6	0	7	19	9	9	15	0	16	33	10	124	33	0	4	167	27	257	9	0	4	293	512
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
11:30 AM	1	1	1	0	3	3	2	1	4	0	5	7	0	33	3	0	0	36	3	71	1	0	1	75	121
11:45 AM	1	6	6	0	4	13	5	2	9	0	3	16	2	43	6	0	4	51	10	68	1	0	2	79	159
Hourly Total	2	7	7	0	7	16	7	3	13	0	8	23	2	76	9	0	4	87	13	139	2	0	3	154	280
12:00 PM	3	3	5	0	6	11	4	1	6	0	5	11	2	52	3	0	6	57	6	63	1	0	2	70	149
12:15 PM	5	3	5	0	4	13	3	5	4	0	6	12	5	45	2	0	2	52	5	87	2	0	5	94	171
12:30 PM	6	3	4	0	8	13	6	2	3	0	2	11	1	38	2	0	7	41	8	79	4	0	3	91	156
12:45 PM	1	1	5	0	5	7	7	3	8	0	3	18	2	39	2	0	6	43	4	81	0	0	5	85	153
Hourly Total	15	10	19	0	23	44	20	11	21	0	16	52	10	174	9	0	21	193	23	310	7	0	15	340	629
1:00 PM	4	4	7	0	8	15	6	5	2	0	7	13	1	36	5	0	9	42	5	78	0	0	5	83	153
1:15 PM	0	0	2	0	9	2	3	2	5	0	12	10	2	47	4	0	5	53	5	76	2	0	2	83	148
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	4	4	9	0	17	17	9	7	7	0	19	23	3	83	9	0	14	95	10	154	2	0	7	166	301
3:00 PM	4	4	5	0	8	13	5	2	5	0	6	12	2	40	6	0	4	48	3	92	5	0	3	100	173
3:15 PM	0	1	3	0	6	4	6	2	3	0	5	11	4	23	5	0	2	32	4	77	0	0	1	81	128
3:30 PM	0	2	3	0	5	5	6	3	4	0	3	13	1	35	2	0	4	38	5	66	0	0	2	71	127
3:45 PM	1	1	3	0	1	5	2	2	2	0	1	6	2	47	5	0	3	54	6	80	2	0	2	88	153
Hourly Total	5	8	14	0	20	27	19	9	14	0	15	42	9	145	18	0	13	172	18	315	7	0	8	340	581
4:00 PM	2	1	4	0	4	7	7	3	2	0	6	12	3	49	7	0	3	59	4	76	3	0	3	83	161
4:15 PM	3	6	4	0	3	13	8	1	5	0	10	14	0	45	4	0	0	49	2	85	1	0	2	88	164

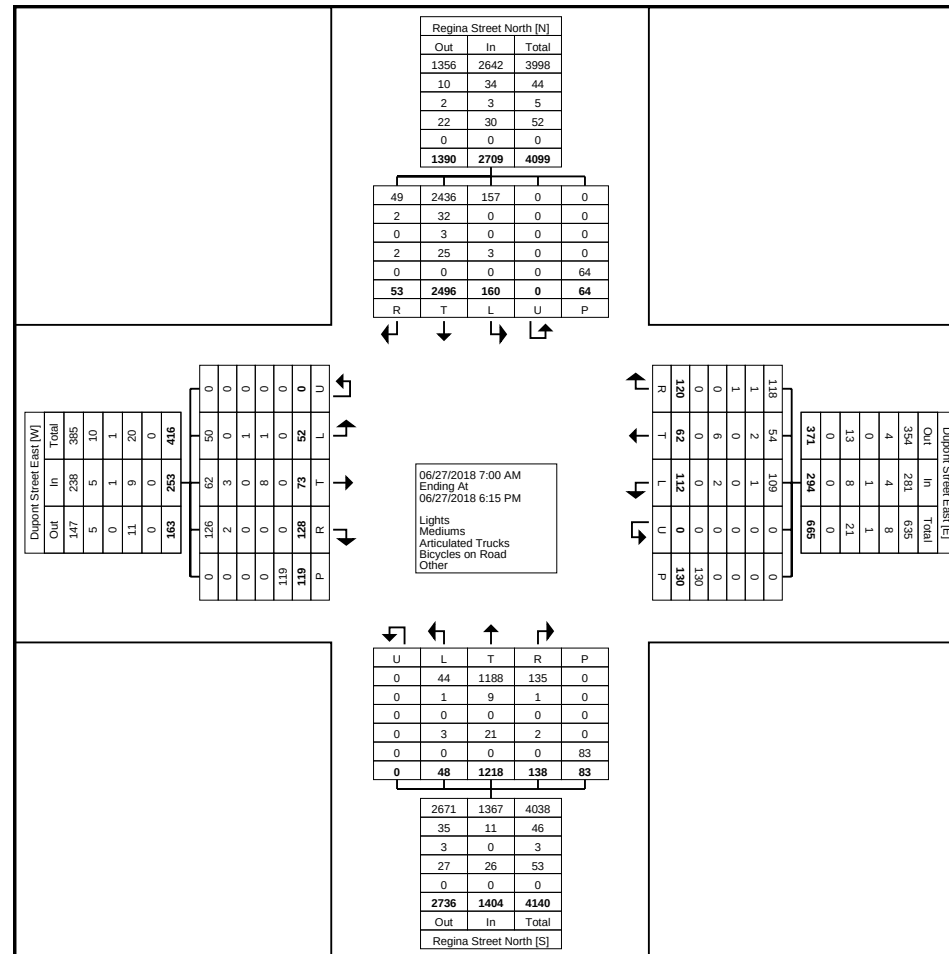
4:30 PM	1	2	9	0	3	12	6	1	5	0	0	12	2	63	3	0	1	68	10	94	4	0	5	108	200
4:45 PM	1	2	12	0	5	15	1	3	2	0	4	6	0	65	2	0	1	67	10	106	6	0	1	122	210
Hourly Total	7	11	29	0	15	47	22	8	14	0	20	44	5	222	16	0	5	243	26	361	14	0	11	401	735
5:00 PM	3	4	7	0	6	14	5	2	7	0	5	14	0	68	5	0	7	73	0	107	3	0	4	110	211
5:15 PM	5	5	6	0	3	16	5	0	8	0	5	13	3	60	1	0	0	64	2	109	1	0	5	112	205
5:30 PM	1	1	10	0	4	12	3	1	1	0	3	5	3	37	3	0	6	43	3	96	1	0	1	100	160
5:45 PM	4	5	7	0	1	16	1	2	10	0	5	13	1	38	3	0	4	42	7	78	1	0	2	86	157
Hourly Total	13	15	30	0	14	58	14	5	26	0	18	45	7	203	12	0	17	222	12	390	6	0	12	408	733
6:00 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	52	73	128	0	119	253	112	62	120	0	130	294	48	1218	138	0	83	1404	160	2496	53	0	64	2709	4660
Approach %	20.6	28.9	50.6	0.0	-	-	38.1	21.1	40.8	0.0	-	-	3.4	86.8	9.8	0.0	-	-	5.9	92.1	2.0	0.0	-	-	-
Total %	1.1	1.6	2.7	0.0	-	5.4	2.4	1.3	2.6	0.0	-	6.3	1.0	26.1	3.0	0.0	-	30.1	3.4	53.6	1.1	0.0	-	58.1	-
Lights	50	62	126	0	-	238	109	54	118	0	-	281	44	1188	135	0	-	1367	157	2436	49	0	-	2642	4528
% Lights	96.2	84.9	98.4	-	-	94.1	97.3	87.1	98.3	-	-	95.6	91.7	97.5	97.8	-	-	97.4	98.1	97.6	92.5	-	-	97.5	97.2
Mediums	0	3	2	0	-	5	1	2	1	0	-	4	1	9	1	0	-	11	0	32	2	0	-	34	54
% Mediums	0.0	4.1	1.6	-	-	2.0	0.9	3.2	0.8	-	-	1.4	2.1	0.7	0.7	-	-	0.8	0.0	1.3	3.8	-	-	1.3	1.2
Articulated Trucks	1	0	0	0	-	1	0	0	1	0	-	1	0	0	0	0	-	0	0	3	0	0	-	3	5
% Articulated Trucks	1.9	0.0	0.0	-	-	0.4	0.0	0.0	0.8	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	0.1
Bicycles on Road	1	8	0	0	-	9	2	6	0	0	-	8	3	21	2	0	-	26	3	25	2	0	-	30	73
% Bicycles on Road	1.9	11.0	0.0	-	-	3.6	1.8	9.7	0.0	-	-	2.7	6.3	1.7	1.4	-	-	1.9	1.9	1.0	3.8	-	-	1.1	1.6
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	1.7	-	-	-	-	-	4.6	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	117	-	-	-	-	-	124	-	-	-	-	-	83	-	-	-	-	-	64	-	-
% Pedestrians	-	-	-	-	98.3	-	-	-	-	-	95.4	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Count Name: Dupont Street East & Regina Street North
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Turning Movement Peak Hour Data (8:00 AM)

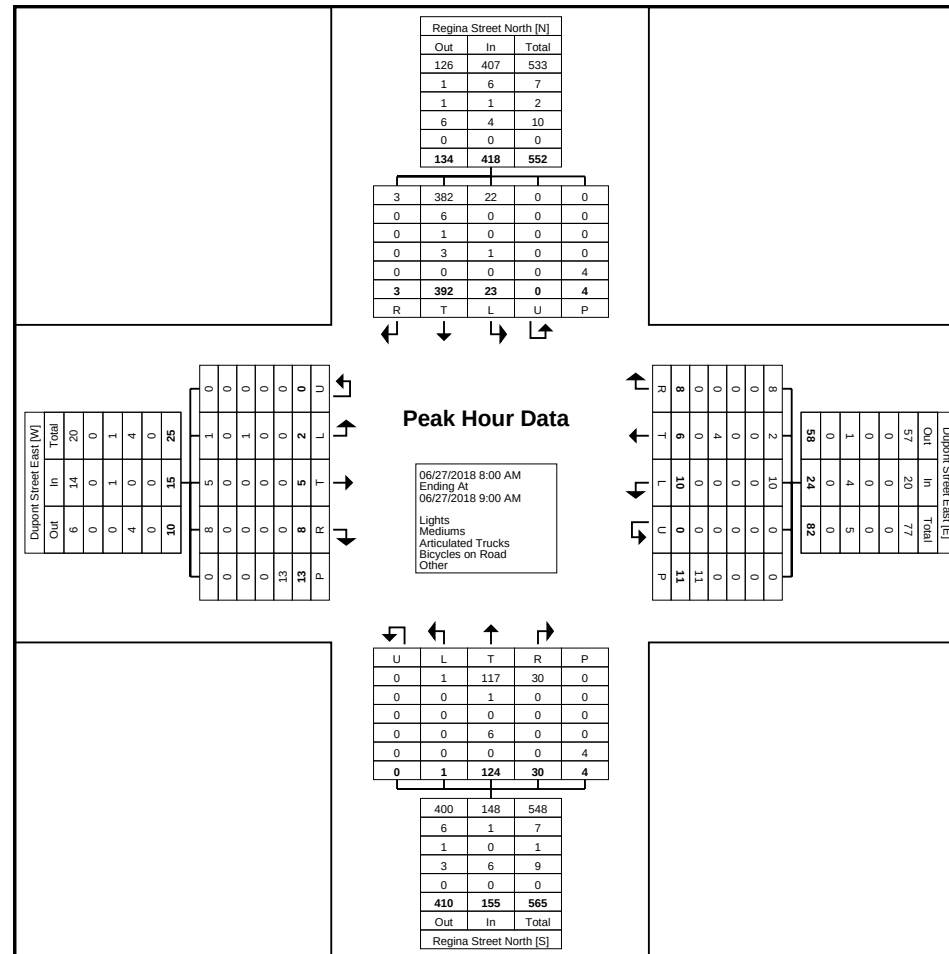
Start Time	Dupont Street East Eastbound						Dupont Street East Westbound						Regina Street North Northbound						Regina Street North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	0	2	1	0	4	3	5	2	3	0	5	10	0	32	6	0	0	38	3	92	0	0	2	95	146
8:15 AM	1	2	0	0	3	3	1	2	1	0	2	4	1	42	10	0	2	53	3	112	0	0	0	115	175
8:30 AM	1	1	3	0	4	5	4	0	1	0	3	5	0	24	7	0	1	31	2	89	0	0	2	91	132
8:45 AM	0	0	4	0	2	4	0	2	3	0	1	5	0	26	7	0	1	33	15	99	3	0	0	117	159
Total	2	5	8	0	13	15	10	6	8	0	11	24	1	124	30	0	4	155	23	392	3	0	4	418	612
Approach %	13.3	33.3	53.3	0.0	-	-	41.7	25.0	33.3	0.0	-	-	0.6	80.0	19.4	0.0	-	-	5.5	93.8	0.7	0.0	-	-	-
Total %	0.3	0.8	1.3	0.0	-	2.5	1.6	1.0	1.3	0.0	-	3.9	0.2	20.3	4.9	0.0	-	25.3	3.8	64.1	0.5	0.0	-	68.3	-
PHF	0.500	0.625	0.500	0.000	-	0.750	0.500	0.750	0.667	0.000	-	0.600	0.250	0.738	0.750	0.000	-	0.731	0.383	0.875	0.250	0.000	-	0.893	0.874
Lights	1	5	8	0	-	14	10	2	8	0	-	20	1	117	30	0	-	148	22	382	3	0	-	407	589
% Lights	50.0	100.0	100.0	-	-	93.3	100.0	33.3	100.0	-	-	83.3	100.0	94.4	100.0	-	-	95.5	95.7	97.4	100.0	-	-	97.4	96.2
Mediums	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	6	0	0	-	6	7
% Mediums	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.6	0.0	1.5	0.0	-	-	1.4	1.1
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	2
% Articulated Trucks	50.0	0.0	0.0	-	-	6.7	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.2	0.3
Bicycles on Road	0	0	0	0	-	0	0	4	0	0	-	4	0	6	0	0	-	6	1	3	0	0	-	4	14
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	66.7	0.0	-	-	16.7	0.0	4.8	0.0	-	-	3.9	4.3	0.8	0.0	-	-	1.0	2.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	11	-	-	-	-	-	4	-	-	-	-	-	4	-	-
% 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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Count Name: Dupont Street East & Regina
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Turning Movement Peak Hour Data (11:45 AM)

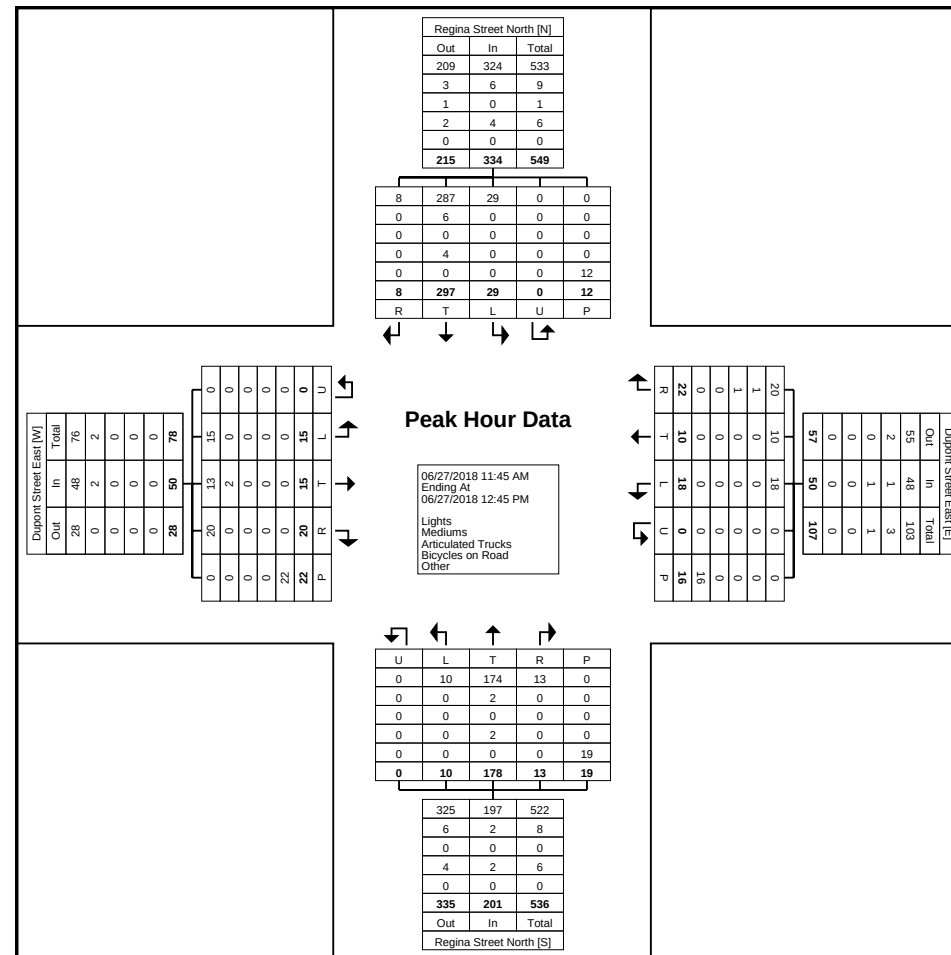
Start Time	Dupont Street East Eastbound						Dupont Street East Westbound						Regina Street North Northbound						Regina Street North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:45 AM	1	6	6	0	4	13	5	2	9	0	3	16	2	43	6	0	4	51	10	68	1	0	2	79	159
12:00 PM	3	3	5	0	6	11	4	1	6	0	5	11	2	52	3	0	6	57	6	63	1	0	2	70	149
12:15 PM	5	3	5	0	4	13	3	5	4	0	6	12	5	45	2	0	2	52	5	87	2	0	5	94	171
12:30 PM	6	3	4	0	8	13	6	2	3	0	2	11	1	38	2	0	7	41	8	79	4	0	3	91	156
Total	15	15	20	0	22	50	18	10	22	0	16	50	10	178	13	0	19	201	29	297	8	0	12	334	635
Approach %	30.0	30.0	40.0	0.0	-	-	36.0	20.0	44.0	0.0	-	-	5.0	88.6	6.5	0.0	-	-	8.7	88.9	2.4	0.0	-	-	-
Total %	2.4	2.4	3.1	0.0	-	7.9	2.8	1.6	3.5	0.0	-	7.9	1.6	28.0	2.0	0.0	-	31.7	4.6	46.8	1.3	0.0	-	52.6	-
PHF	0.625	0.625	0.833	0.000	-	0.962	0.750	0.500	0.611	0.000	-	0.781	0.500	0.856	0.542	0.000	-	0.882	0.725	0.853	0.500	0.000	-	0.888	0.928
Lights	15	13	20	0	-	48	18	10	20	0	-	48	10	174	13	0	-	197	29	287	8	0	-	324	617
% Lights	100.0	86.7	100.0	-	-	96.0	100.0	100.0	90.9	-	-	96.0	100.0	97.8	100.0	-	-	98.0	100.0	96.6	100.0	-	-	97.0	97.2
Mediums	0	2	0	0	-	2	0	0	1	0	-	1	0	2	0	0	-	2	0	6	0	0	-	6	11
% Mediums	0.0	13.3	0.0	-	-	4.0	0.0	0.0	4.5	-	-	2.0	0.0	1.1	0.0	-	-	1.0	0.0	2.0	0.0	-	-	1.8	1.7
Articulated Trucks	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	4.5	-	-	2.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	4	0	0	-	4	6
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.1	0.0	-	-	1.0	0.0	1.3	0.0	-	-	1.2	0.9
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	4.5	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	21	-	-	-	-	-	16	-	-	-	-	-	19	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	95.5	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Turning Movement Peak Hour Data (4:30 PM)

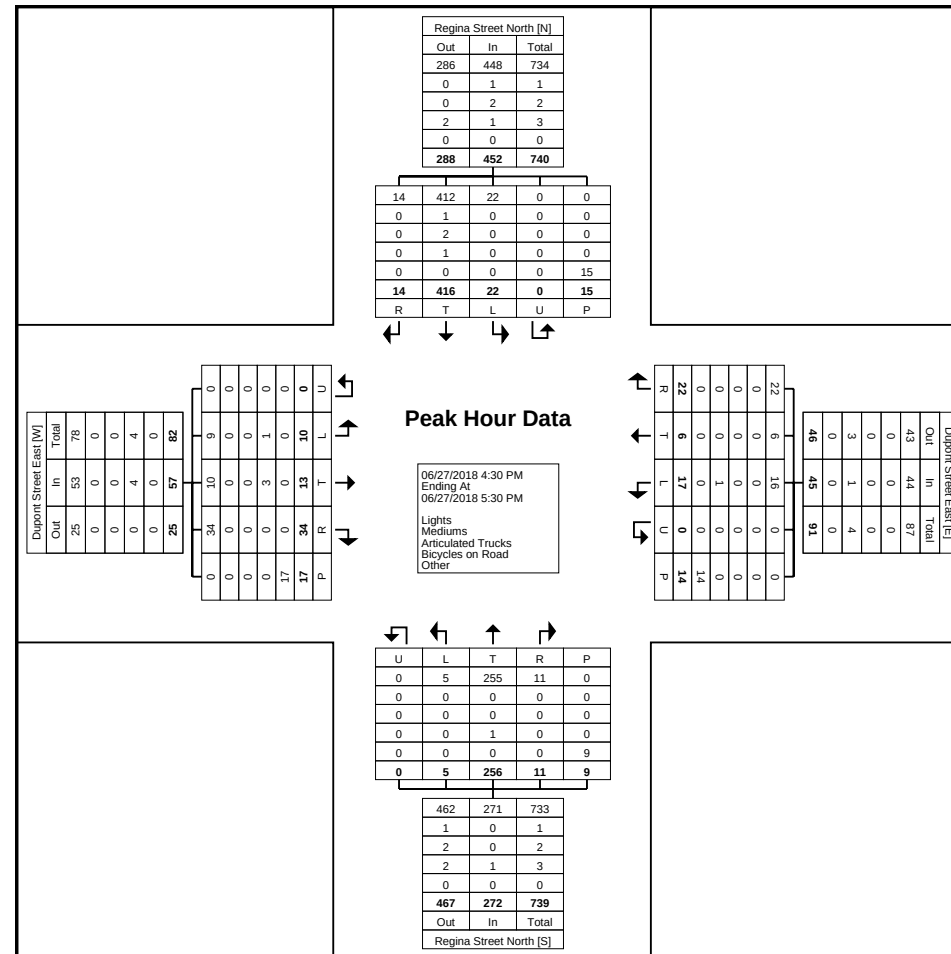
Start Time	Dupont Street East Eastbound						Dupont Street East Westbound						Regina Street North Northbound						Regina Street North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	1	2	9	0	3	12	6	1	5	0	0	12	2	63	3	0	1	68	10	94	4	0	5	108	200
4:45 PM	1	2	12	0	5	15	1	3	2	0	4	6	0	65	2	0	1	67	10	106	6	0	1	122	210
5:00 PM	3	4	7	0	6	14	5	2	7	0	5	14	0	68	5	0	7	73	0	107	3	0	4	110	211
5:15 PM	5	5	6	0	3	16	5	0	8	0	5	13	3	60	1	0	0	64	2	109	1	0	5	112	205
Total	10	13	34	0	17	57	17	6	22	0	14	45	5	256	11	0	9	272	22	416	14	0	15	452	826
Approach %	17.5	22.8	59.6	0.0	-	-	37.8	13.3	48.9	0.0	-	-	1.8	94.1	4.0	0.0	-	-	4.9	92.0	3.1	0.0	-	-	-
Total %	1.2	1.6	4.1	0.0	-	6.9	2.1	0.7	2.7	0.0	-	5.4	0.6	31.0	1.3	0.0	-	32.9	2.7	50.4	1.7	0.0	-	54.7	-
PHF	0.500	0.650	0.708	0.000	-	0.891	0.708	0.500	0.688	0.000	-	0.804	0.417	0.941	0.550	0.000	-	0.932	0.550	0.954	0.583	0.000	-	0.926	0.979
Lights	9	10	34	0	-	53	16	6	22	0	-	44	5	255	11	0	-	271	22	412	14	0	-	448	816
% Lights	90.0	76.9	100.0	-	-	93.0	94.1	100.0	100.0	-	-	97.8	100.0	99.6	100.0	-	-	99.6	100.0	99.0	100.0	-	-	99.1	98.8
Mediums	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Mediums	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	0.2	0.0	-	-	0.2	0.1
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	0.5	0.0	-	-	0.4	0.2
Bicycles on Road	1	3	0	0	-	4	1	0	0	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	7
% Bicycles on Road	10.0	23.1	0.0	-	-	7.0	5.9	0.0	0.0	-	-	2.2	0.0	0.4	0.0	-	-	0.4	0.0	0.2	0.0	-	-	0.2	0.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	7.1	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	17	-	-	-	-	-	13	-	-	-	-	-	9	-	-	-	-	-	15	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	92.9	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@pts1.com

Count Name: Dupont Street East & Regina
Street North
Site Code:
Start Date: 06/27/2018
Page No: 9



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



Paradigm Transportation Solutions Limited
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Count Name: Dupont Street East & Regina
Street North
Site Code:
Start Date: 06/27/2018
Page No: 10



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Erb Street W & King Street S
Site Code:
Start Date: 11/01/2018
Page No: 1

Turning Movement Data

Start Time	Erb Street Eastbound						Erb Street Westbound						King Street Northbound						King 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	
7:30 AM	55	121	6	0	8	182	0	0	0	0	5	0	0	55	2	0	0	57	14	59	1	0	3	74	313
7:45 AM	75	152	10	0	8	237	0	0	0	0	9	0	0	57	4	0	0	61	24	74	0	0	5	98	396
Hourly Total	130	273	16	0	16	419	0	0	0	0	14	0	0	112	6	0	0	118	38	133	1	0	8	172	709
8:00 AM	91	160	7	0	17	258	0	0	0	0	15	0	0	57	1	0	3	58	33	70	0	0	12	103	419
8:15 AM	117	214	1	0	10	332	0	0	0	0	11	0	0	72	4	0	2	76	45	110	0	0	5	155	563
8:30 AM	98	161	12	0	21	271	0	0	0	0	4	0	0	84	6	0	0	90	30	91	0	0	5	121	482
8:45 AM	106	176	15	0	18	297	0	0	0	0	12	0	0	75	4	0	8	79	36	102	0	0	14	138	514
Hourly Total	412	711	35	0	66	1158	0	0	0	0	42	0	0	288	15	0	13	303	144	373	0	0	36	517	1978
9:00 AM	86	117	7	0	17	210	0	0	0	0	5	0	0	67	5	0	2	72	27	82	0	0	8	109	391
9:15 AM	79	132	14	0	29	225	0	0	0	0	13	0	0	79	6	0	0	85	27	75	0	0	6	102	412
9:30 AM	78	124	8	0	13	210	0	0	0	0	11	0	0	71	11	0	4	82	25	60	0	0	7	85	377
9:45 AM	73	136	12	0	28	221	0	0	0	0	9	0	0	70	9	0	3	79	17	96	0	0	12	113	413
Hourly Total	316	509	41	0	87	866	0	0	0	0	38	0	0	287	31	0	9	318	96	313	0	0	33	409	1593
10:00 AM	58	111	5	0	31	174	0	0	1	0	12	1	0	73	7	0	3	80	33	79	0	0	3	112	367
10:15 AM	53	94	12	0	32	159	0	0	0	0	7	0	0	78	8	0	1	86	26	77	0	0	7	103	348
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	111	205	17	0	63	333	0	0	1	0	19	1	0	151	15	0	4	166	59	156	0	0	10	215	715
12:00 PM	79	128	16	0	34	223	0	0	0	0	24	0	0	65	17	0	4	82	30	82	0	0	20	112	417
12:15 PM	79	139	14	0	28	232	0	0	0	0	16	0	0	70	5	0	9	75	29	92	0	0	12	121	428
12:30 PM	74	118	17	0	37	209	0	0	0	0	25	0	0	78	14	0	2	92	29	91	0	0	14	120	421
12:45 PM	79	166	17	0	41	262	0	0	0	0	32	0	0	64	8	0	5	72	35	89	0	0	20	124	458
Hourly Total	311	551	64	0	140	926	0	0	0	0	97	0	0	277	44	0	20	321	123	354	0	0	66	477	1724
1:00 PM	76	153	16	0	56	245	0	0	0	0	31	0	0	63	7	0	0	70	33	80	0	0	27	113	428
1:15 PM	82	120	23	0	32	225	0	0	0	0	29	0	0	72	10	0	5	82	32	80	0	0	12	112	419
1:30 PM	85	164	13	0	31	262	0	0	0	0	20	0	0	70	7	0	0	77	38	91	0	0	13	129	468
1:45 PM	51	110	10	0	27	171	0	0	0	0	16	0	0	72	14	0	0	86	39	87	0	0	17	126	383
Hourly Total	294	547	62	0	146	903	0	0	0	0	96	0	0	277	38	0	5	315	142	338	0	0	69	480	1698
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	64	192	13	0	39	269	0	0	0	0	25	0	0	70	12	0	4	82	33	90	0	0	13	123	474
3:15 PM	67	159	12	0	24	238	0	0	0	0	19	0	0	80	10	0	1	90	27	81	0	0	15	108	436
3:30 PM	59	151	7	0	32	217	0	0	0	0	13	0	0	79	8	0	1	87	27	97	0	0	12	124	428
3:45 PM	66	191	14	0	26	271	0	0	0	0	21	0	0	88	9	0	0	97	25	102	0	0	10	127	495
Hourly Total	256	693	46	0	121	995	0	0	0	0	78	0	0	317	39	0	6	356	112	370	0	0	50	482	1833
4:00 PM	81	172	9	0	42	262	0	0	0	0	18	0	0	76	9	0	5	85	43	97	0	0	14	140	487
4:15 PM	82	198	15	0	31	295	0	0	0	0	23	0	0	74	10	0	2	84	39	95	0	0	21	134	513
4:30 PM	84	164	22	0	37	270	0	0	0	0	20	0	0	76	10	0	1	86	36	90	0	0	18	126	482
4:45 PM	81	209	18	0	32	308	0	0	0	0	16	0	0	80	5	0	4	85	29	98	0	0	14	127	520

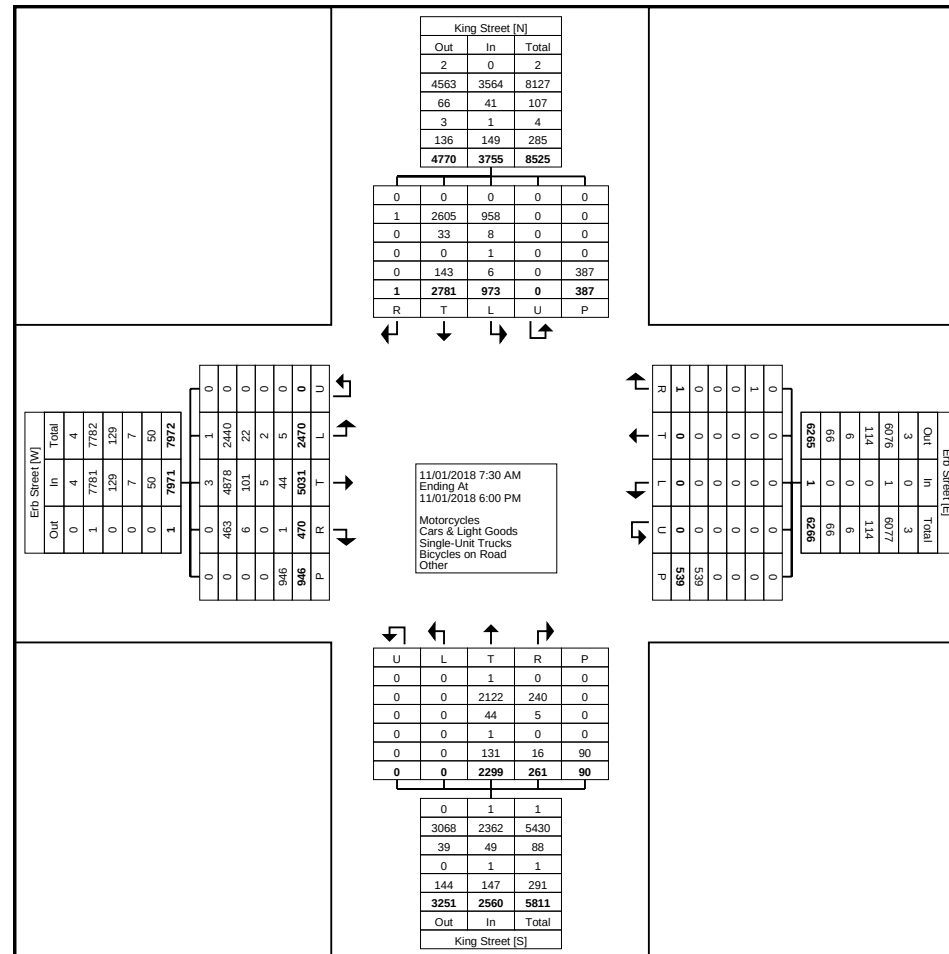
Hourly Total	328	743	64	0	142	1135	0	0	0	0	77	0	0	306	34	0	12	340	147	380	0	0	67	527	2002
5:00 PM	84	233	23	0	43	340	0	0	0	0	16	0	0	65	10	0	4	75	28	78	0	0	14	106	521
5:15 PM	78	222	40	0	36	340	0	0	0	0	14	0	0	64	12	0	2	76	39	89	0	0	13	128	544
5:30 PM	75	178	36	0	36	289	0	0	0	0	17	0	0	68	11	0	4	79	22	95	0	0	8	117	485
5:45 PM	75	166	26	0	50	267	0	0	0	0	31	0	0	87	6	0	11	93	23	102	0	0	13	125	485
Hourly Total	312	799	125	0	165	1236	0	0	0	0	78	0	0	284	39	0	21	323	112	364	0	0	48	476	2035
Grand Total	2470	5031	470	0	946	7971	0	0	1	0	539	1	0	2299	261	0	90	2560	973	2781	1	0	387	3755	14287
Approach %	31.0	63.1	5.9	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.0	89.8	10.2	0.0	-	-	25.9	74.1	0.0	0.0	-	-	-
Total %	17.3	35.2	3.3	0.0	-	55.8	0.0	0.0	0.0	0.0	-	0.0	0.0	16.1	1.8	0.0	-	17.9	6.8	19.5	0.0	0.0	-	26.3	-
Motorcycles	1	3	0	0	-	4	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	5
% Motorcycles	0.0	0.1	0.0	-	-	0.1	-	-	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	2440	4878	463	0	-	7781	0	0	1	0	-	1	0	2122	240	0	-	2362	958	2605	1	0	-	3564	13708
% Cars & Light Goods	98.8	97.0	98.5	-	-	97.6	-	-	100.0	-	-	100.0	-	92.3	92.0	-	-	92.3	98.5	93.7	100.0	-	-	94.9	95.9
Single-Unit Trucks	22	101	6	0	-	129	0	0	0	0	-	0	0	44	5	0	-	49	8	33	0	0	-	41	219
% Single-Unit Trucks	0.9	2.0	1.3	-	-	1.6	-	-	0.0	-	-	0.0	-	1.9	1.9	-	-	1.9	0.8	1.2	0.0	-	-	1.1	1.5
Bicycles on Road	2	5	0	0	-	7	0	0	0	0	-	0	0	1	0	0	-	1	1	0	0	0	-	1	9
% Bicycles on Road	0.1	0.1	0.0	-	-	0.1	-	-	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.1	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	19	-	-	-	-	-	11	-	-	-	-	-	4	-	-	-	-	-	5	-	-
% Bicycles on Crosswalk	-	-	-	-	2.0	-	-	-	-	-	2.0	-	-	-	-	-	4.4	-	-	-	-	-	1.3	-	-
Pedestrians	-	-	-	-	927	-	-	-	-	-	528	-	-	-	-	-	86	-	-	-	-	-	382	-	-
% Pedestrians	-	-	-	-	98.0	-	-	-	-	-	98.0	-	-	-	-	-	95.6	-	-	-	-	-	98.7	-	-
Articulated Trucks	5	44	1	0	-	50	0	0	0	0	-	0	0	131	16	0	-	147	6	143	0	0	-	149	346
% Articulated Trucks	0.2	0.9	0.2	-	-	0.6	-	-	0.0	-	-	0.0	-	5.7	6.1	-	-	5.7	0.6	5.1	0.0	-	-	4.0	2.4



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Count Name: Erb Street W & King Street S
Site Code:
Start Date: 11/01/2018
Page No: 3



Turning Movement Data Plot



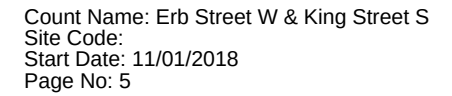
Paradigm Transportation Solutions Limited
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Count Name: Erb Street W & King Street S
Site Code:
Start Date: 11/01/2018
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Erb Street Eastbound						Erb Street Westbound						King Street Northbound						King 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	91	160	7	0	17	258	0	0	0	0	15	0	0	57	1	0	3	58	33	70	0	0	12	103	419
8:15 AM	117	214	1	0	10	332	0	0	0	0	11	0	0	72	4	0	2	76	45	110	0	0	5	155	563
8:30 AM	98	161	12	0	21	271	0	0	0	0	4	0	0	84	6	0	0	90	30	91	0	0	5	121	482
8:45 AM	106	176	15	0	18	297	0	0	0	0	12	0	0	75	4	0	8	79	36	102	0	0	14	138	514
Total	412	711	35	0	66	1158	0	0	0	0	42	0	0	288	15	0	13	303	144	373	0	0	36	517	1978
Approach %	35.6	61.4	3.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	95.0	5.0	0.0	-	-	27.9	72.1	0.0	0.0	-	-	-
Total %	20.8	35.9	1.8	0.0	-	58.5	0.0	0.0	0.0	0.0	-	0.0	0.0	14.6	0.8	0.0	-	15.3	7.3	18.9	0.0	0.0	-	26.1	-
PHF	0.880	0.831	0.583	0.000	-	0.872	0.000	0.000	0.000	0.000	-	0.000	0.000	0.857	0.625	0.000	-	0.842	0.800	0.848	0.000	0.000	-	0.834	0.878
Motorcycles	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	0.0	0.1	0.0	-	-	0.1	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.1
Cars & Light Goods	408	685	34	0	-	1127	0	0	0	0	-	0	0	262	13	0	-	275	140	352	0	0	-	492	1894
% Cars & Light Goods	99.0	96.3	97.1	-	-	97.3	-	-	-	-	-	-	-	91.0	86.7	-	-	90.8	97.2	94.4	-	-	-	95.2	95.8
Single-Unit Trucks	2	13	1	0	-	16	0	0	0	0	-	0	0	7	0	0	-	7	2	6	0	0	-	8	31
% Single-Unit Trucks	0.5	1.8	2.9	-	-	1.4	-	-	-	-	-	-	-	2.4	0.0	-	-	2.3	1.4	1.6	-	-	-	1.5	1.6
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.7	0.0	-	-	-	0.2	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	11.9	-	-	-	-	-	0.0	-	-	-	-	-	2.8	-	-
Pedestrians	-	-	-	-	66	-	-	-	-	-	37	-	-	-	-	-	13	-	-	-	-	-	35	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	88.1	-	-	-	-	-	100.0	-	-	-	-	-	97.2	-	-
Articulated Trucks	2	12	0	0	-	14	0	0	0	0	-	0	0	19	2	0	-	21	1	15	0	0	-	16	51
% Articulated Trucks	0.5	1.7	0.0	-	-	1.2	-	-	-	-	-	-	-	6.6	13.3	-	-	6.9	0.7	4.0	-	-	-	3.1	2.6





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Count Name: Erb Street W & King Street S
Site Code:
Start Date: 11/01/2018
Page No: 6

Turning Movement Peak Hour Data (12:45 PM)

Start Time	Erb Street Eastbound						Erb Street Westbound						King Street Northbound						King 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	
12:45 PM	79	166	17	0	41	262	0	0	0	0	32	0	0	64	8	0	5	72	35	89	0	0	20	124	458
1:00 PM	76	153	16	0	56	245	0	0	0	0	31	0	0	63	7	0	0	70	33	80	0	0	27	113	428
1:15 PM	82	120	23	0	32	225	0	0	0	0	29	0	0	72	10	0	5	82	32	80	0	0	12	112	419
1:30 PM	85	164	13	0	31	262	0	0	0	0	20	0	0	70	7	0	0	77	38	91	0	0	13	129	468
Total	322	603	69	0	160	994	0	0	0	0	112	0	0	269	32	0	10	301	138	340	0	0	72	478	1773
Approach %	32.4	60.7	6.9	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	89.4	10.6	0.0	-	-	28.9	71.1	0.0	0.0	-	-	-
Total %	18.2	34.0	3.9	0.0	-	56.1	0.0	0.0	0.0	0.0	-	0.0	0.0	15.2	1.8	0.0	-	17.0	7.8	19.2	0.0	0.0	-	27.0	-
PHF	0.947	0.908	0.750	0.000	-	0.948	0.000	0.000	0.000	0.000	-	0.000	0.000	0.934	0.800	0.000	-	0.918	0.908	0.934	0.000	0.000	-	0.926	0.947
Motorcycles	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	0.3	0.0	0.0	-	-	0.1	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.1
Cars & Light Goods	314	575	69	0	-	958	0	0	0	0	-	0	0	247	28	0	-	275	136	314	0	0	-	450	1683
% Cars & Light Goods	97.5	95.4	100.0	-	-	96.4	-	-	-	-	-	-	-	91.8	87.5	-	-	91.4	98.6	92.4	-	-	-	94.1	94.9
Single-Unit Trucks	7	18	0	0	-	25	0	0	0	0	-	0	0	7	2	0	-	9	2	8	0	0	-	10	44
% Single-Unit Trucks	2.2	3.0	0.0	-	-	2.5	-	-	-	-	-	-	-	2.6	6.3	-	-	3.0	1.4	2.4	-	-	-	2.1	2.5
Bicycles on Road	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.3	0.0	-	-	0.2	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.6	-	-	-	-	-	2.7	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	159	-	-	-	-	-	109	-	-	-	-	-	10	-	-	-	-	-	72	-	-
% Pedestrians	-	-	-	-	99.4	-	-	-	-	-	97.3	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-
Articulated Trucks	0	8	0	0	-	8	0	0	0	0	-	0	0	15	2	0	-	17	0	18	0	0	-	18	43
% Articulated Trucks	0.0	1.3	0.0	-	-	0.8	-	-	-	-	-	-	-	5.6	6.3	-	-	5.6	0.0	5.3	-	-	-	3.8	2.4

Turning Movement Peak Hour Data Plot (12:45 PM)



Paradigm Transportation Solutions Limited
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Count Name: Erb Street W & King Street S
Site Code:
Start Date: 11/01/2018
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Turning Movement Peak Hour Data (4:45 PM)

Start Time	Erb Street Eastbound						Erb Street Westbound						King Street Northbound						King 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	
4:45 PM	81	209	18	0	32	308	0	0	0	0	16	0	0	80	5	0	4	85	29	98	0	0	14	127	520
5:00 PM	84	233	23	0	43	340	0	0	0	0	16	0	0	65	10	0	4	75	28	78	0	0	14	106	521
5:15 PM	78	222	40	0	36	340	0	0	0	0	14	0	0	64	12	0	2	76	39	89	0	0	13	128	544
5:30 PM	75	178	36	0	36	289	0	0	0	0	17	0	0	68	11	0	4	79	22	95	0	0	8	117	485
Total	318	842	117	0	147	1277	0	0	0	0	63	0	0	277	38	0	14	315	118	360	0	0	49	478	2070
Approach %	24.9	65.9	9.2	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	87.9	12.1	0.0	-	-	24.7	75.3	0.0	0.0	-	-	-
Total %	15.4	40.7	5.7	0.0	-	61.7	0.0	0.0	0.0	0.0	-	0.0	0.0	13.4	1.8	0.0	-	15.2	5.7	17.4	0.0	0.0	-	23.1	-
PHF	0.946	0.903	0.731	0.000	-	0.939	0.000	0.000	0.000	0.000	-	0.000	0.000	0.866	0.792	0.000	-	0.926	0.756	0.918	0.000	0.000	-	0.934	0.951
Motorcycles	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	0.0	0.1	0.0	-	-	0.1	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0
Cars & Light Goods	318	834	116	0	-	1268	0	0	0	0	-	0	0	258	37	0	-	295	117	341	0	0	-	458	2021
% Cars & Light Goods	100.0	99.0	99.1	-	-	99.3	-	-	-	-	-	-	-	93.1	97.4	-	-	93.7	99.2	94.7	-	-	-	95.8	97.6
Single-Unit Trucks	0	4	1	0	-	5	0	0	0	0	-	0	0	4	0	0	-	4	0	0	0	0	-	0	9
% Single-Unit Trucks	0.0	0.5	0.9	-	-	0.4	-	-	-	-	-	-	-	1.4	0.0	-	-	1.3	0.0	0.0	-	-	-	0.0	0.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	1.4	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	145	-	-	-	-	-	63	-	-	-	-	-	14	-	-	-	-	-	49	-	-
% Pedestrians	-	-	-	-	98.6	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-
Articulated Trucks	0	3	0	0	-	3	0	0	0	0	-	0	0	15	1	0	-	16	1	19	0	0	-	20	39
% Articulated Trucks	0.0	0.4	0.0	-	-	0.2	-	-	-	-	-	-	-	5.4	2.6	-	-	5.1	0.8	5.3	-	-	-	4.2	1.9

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



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Erb Street W & King Street S
Site Code:
Start Date: 11/01/2018
Page No: 10



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Erb Street East & Regina Street
North
Site Code:
Start Date: 06/27/2018
Page No: 1

Turning Movement Data

Start Time	Erb Street East Eastbound						Westbound Approach Westbound						Regina Street North Northbound						Regina Street North 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	
7:00 AM	3	57	2	0	0	62	0	0	0	0	1	0	0	7	8	0	1	15	5	21	0	0	0	26	103
7:15 AM	4	80	3	0	1	87	0	0	0	0	0	0	0	10	7	0	0	17	7	24	0	0	0	31	135
7:30 AM	1	113	6	0	2	120	0	0	0	0	3	0	0	14	11	0	2	25	11	42	0	0	0	53	198
7:45 AM	3	133	3	0	0	139	0	0	0	0	4	0	0	27	8	0	1	35	12	55	0	0	1	67	241
Hourly Total	11	383	14	0	3	408	0	0	0	0	8	0	0	58	34	0	4	92	35	142	0	0	1	177	677
8:00 AM	8	119	7	0	3	134	0	0	0	0	7	0	0	30	13	0	5	43	14	86	0	0	4	100	277
8:15 AM	6	135	10	0	4	151	0	0	0	0	2	0	0	46	18	0	1	64	17	97	0	0	2	114	329
8:30 AM	8	134	11	0	1	153	0	0	0	0	4	0	0	22	20	0	8	42	22	75	0	0	3	97	292
8:45 AM	7	136	5	0	5	148	0	0	0	0	3	0	0	28	12	0	8	40	20	77	0	0	3	97	285
Hourly Total	29	524	33	0	13	586	0	0	0	0	16	0	0	126	63	0	22	189	73	335	0	0	12	408	1183
9:00 AM	15	107	12	0	4	134	0	0	0	0	5	0	0	26	15	0	3	41	17	56	0	0	4	73	248
9:15 AM	7	111	9	0	2	127	0	0	0	0	5	0	0	30	12	0	9	42	19	47	0	0	2	66	235
9:30 AM	12	108	8	0	1	128	0	0	0	0	8	0	0	31	18	0	7	49	15	32	0	0	3	47	224
9:45 AM	11	126	7	0	4	144	0	0	0	0	3	0	0	29	26	0	3	55	18	66	0	0	5	84	283
Hourly Total	45	452	36	0	11	533	0	0	0	0	21	0	0	116	71	0	22	187	69	201	0	0	14	270	990
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
11:30 AM	9	119	9	0	1	137	0	0	0	0	10	0	0	28	22	0	8	50	25	51	0	0	4	76	263
11:45 AM	14	104	14	0	5	132	0	0	0	0	8	0	0	37	26	0	11	63	30	45	1	0	8	76	271
Hourly Total	23	223	23	0	6	269	0	0	0	0	18	0	0	65	48	0	19	113	55	96	1	0	12	152	534
12:00 PM	6	139	11	0	8	156	0	0	0	0	13	0	0	47	37	0	17	84	24	50	0	0	13	74	314
12:15 PM	8	141	9	0	13	158	0	0	0	0	10	0	0	41	24	0	11	65	20	71	0	0	15	91	314
12:30 PM	13	124	11	0	4	148	0	0	0	0	10	0	0	27	24	0	14	51	21	59	0	0	5	80	279
12:45 PM	9	134	8	0	12	151	0	0	0	0	5	0	0	36	20	0	27	56	34	56	0	0	11	90	297
Hourly Total	36	538	39	0	37	613	0	0	0	0	38	0	0	151	105	0	69	256	99	236	0	0	44	335	1204
1:00 PM	9	151	6	0	11	166	0	0	0	0	1	0	0	29	20	0	5	49	24	59	0	0	12	83	298
1:15 PM	7	132	11	0	2	150	0	0	0	0	9	0	0	40	29	0	12	69	26	58	0	0	5	84	303
1:30 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
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	16	283	17	0	13	316	0	0	0	0	10	0	0	69	49	0	17	118	50	117	0	0	17	167	601
3:00 PM	8	147	13	0	5	168	0	0	0	0	7	0	0	32	23	0	5	55	32	63	0	0	7	95	318
3:15 PM	5	140	9	0	6	154	0	0	0	0	13	0	0	29	28	0	13	57	30	54	0	0	11	84	295
3:30 PM	10	136	9	0	6	155	0	0	0	0	1	0	0	23	24	0	4	47	38	39	0	0	6	77	279
3:45 PM	10	144	6	0	2	160	0	0	0	0	1	0	0	42	31	0	8	73	33	50	0	0	4	83	316
Hourly Total	33	567	37	0	19	637	0	0	0	0	22	0	0	126	106	0	30	232	133	206	0	0	28	339	1208
4:00 PM	17	172	4	0	7	193	0	0	0	0	4	0	0	40	45	0	8	85	37	47	0	0	11	84	362

4:15 PM	17	159	8	0	5	184	0	0	0	0	5	0	0	34	56	0	8	90	48	49	0	0	9	97	371
4:30 PM	12	172	6	0	7	190	0	0	0	0	3	0	0	55	91	0	12	146	44	61	0	0	3	105	441
4:45 PM	18	195	9	0	7	222	0	0	0	0	1	0	0	50	52	0	10	102	51	66	0	0	10	117	441
Hourly Total	64	698	27	0	26	789	0	0	0	0	13	0	0	179	244	0	38	423	180	223	0	0	33	403	1615
5:00 PM	14	185	3	0	8	202	0	0	0	0	4	0	0	54	60	0	17	114	45	69	0	0	11	114	430
5:15 PM	11	197	6	0	6	214	0	0	0	0	6	0	0	54	38	0	15	92	53	64	0	0	5	117	423
5:30 PM	9	167	14	0	6	190	0	0	0	0	5	0	0	28	32	0	6	60	64	46	0	0	8	110	360
5:45 PM	13	187	9	0	5	209	0	0	0	0	3	0	0	28	24	0	19	52	36	43	0	0	11	79	340
Hourly Total	47	736	32	0	25	815	0	0	0	0	18	0	0	164	154	0	57	318	198	222	0	0	35	420	1553
6:00 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	304	4404	258	0	153	4966	0	0	0	0	164	0	0	1054	874	0	278	1928	892	1778	1	0	196	2671	9565
Approach %	6.1	88.7	5.2	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	54.7	45.3	0.0	-	-	33.4	66.6	0.0	0.0	-	-	-
Total %	3.2	46.0	2.7	0.0	-	51.9	0.0	0.0	0.0	0.0	-	0.0	0.0	11.0	9.1	0.0	-	20.2	9.3	18.6	0.0	0.0	-	27.9	-
Lights	302	4283	246	0	-	4831	0	0	0	0	-	0	0	1020	856	0	-	1876	880	1727	1	0	-	2608	9315
% Lights	99.3	97.3	95.3	-	-	97.3	-	-	-	-	-	-	-	96.8	97.9	-	-	97.3	98.7	97.1	100.0	-	-	97.6	97.4
Mediums	1	106	10	0	-	117	0	0	0	0	-	0	0	9	12	0	-	21	10	22	0	0	-	32	170
% Mediums	0.3	2.4	3.9	-	-	2.4	-	-	-	-	-	-	-	0.9	1.4	-	-	1.1	1.1	1.2	0.0	-	-	1.2	1.8
Articulated Trucks	0	9	1	0	-	10	0	0	0	0	-	0	0	0	1	0	-	1	1	3	0	0	-	4	15
% Articulated Trucks	0.0	0.2	0.4	-	-	0.2	-	-	-	-	-	-	-	0.0	0.1	-	-	0.1	0.1	0.2	0.0	-	-	0.1	0.2
Bicycles on Road	1	6	1	0	-	8	0	0	0	0	-	0	0	25	5	0	-	30	1	26	0	0	-	27	65
% Bicycles on Road	0.3	0.1	0.4	-	-	0.2	-	-	-	-	-	-	-	2.4	0.6	-	-	1.6	0.1	1.5	0.0	-	-	1.0	0.7
Bicycles on Crosswalk	-	-	-	-	6	-	-	-	-	-	9	-	-	-	-	-	7	-	-	-	-	-	13	-	-
% Bicycles on Crosswalk	-	-	-	-	3.9	-	-	-	-	-	5.5	-	-	-	-	-	2.5	-	-	-	-	-	6.6	-	-
Pedestrians	-	-	-	-	147	-	-	-	-	-	155	-	-	-	-	-	271	-	-	-	-	-	183	-	-
% Pedestrians	-	-	-	-	96.1	-	-	-	-	-	94.5	-	-	-	-	-	97.5	-	-	-	-	-	93.4	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Erb Street East & Regina Street North
Site Code:
Start Date: 06/27/2018
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Erb Street East Eastbound						Westbound Approach Westbound						Regina Street North Northbound						Regina Street North 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	8	119	7	0	3	134	0	0	0	0	7	0	0	30	13	0	5	43	14	86	0	0	4	100	277
8:15 AM	6	135	10	0	4	151	0	0	0	0	2	0	0	46	18	0	1	64	17	97	0	0	2	114	329
8:30 AM	8	134	11	0	1	153	0	0	0	0	4	0	0	22	20	0	8	42	22	75	0	0	3	97	292
8:45 AM	7	136	5	0	5	148	0	0	0	0	3	0	0	28	12	0	8	40	20	77	0	0	3	97	285
Total	29	524	33	0	13	586	0	0	0	0	16	0	0	126	63	0	22	189	73	335	0	0	12	408	1183
Approach %	4.9	89.4	5.6	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	66.7	33.3	0.0	-	-	17.9	82.1	0.0	0.0	-	-	-
Total %	2.5	44.3	2.8	0.0	-	49.5	0.0	0.0	0.0	0.0	-	0.0	0.0	10.7	5.3	0.0	-	16.0	6.2	28.3	0.0	0.0	-	34.5	-
PHF	0.906	0.963	0.750	0.000	-	0.958	0.000	0.000	0.000	0.000	-	0.000	0.000	0.685	0.788	0.000	-	0.738	0.830	0.863	0.000	0.000	-	0.895	0.899
Lights	28	503	31	0	-	562	0	0	0	0	-	0	0	120	62	0	-	182	71	329	0	0	-	400	1144
% Lights	96.6	96.0	93.9	-	-	95.9	-	-	-	-	-	-	-	95.2	98.4	-	-	96.3	97.3	98.2	-	-	-	98.0	96.7
Mediums	0	20	1	0	-	21	0	0	0	0	-	0	0	1	1	0	-	2	2	2	0	0	-	4	27
% Mediums	0.0	3.8	3.0	-	-	3.6	-	-	-	-	-	-	-	0.8	1.6	-	-	1.1	2.7	0.6	-	-	-	1.0	2.3
Articulated Trucks	0	1	1	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	4
% Articulated Trucks	0.0	0.2	3.0	-	-	0.3	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.6	-	-	-	0.5	0.3
Bicycles on Road	1	0	0	0	-	1	0	0	0	0	-	0	0	5	0	0	-	5	0	2	0	0	-	2	8
% Bicycles on Road	3.4	0.0	0.0	-	-	0.2	-	-	-	-	-	-	-	4.0	0.0	-	-	2.6	0.0	0.6	-	-	-	0.5	0.7
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	7.7	-	-	-	-	-	6.3	-	-	-	-	-	9.1	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	12	-	-	-	-	-	15	-	-	-	-	-	20	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	92.3	-	-	-	-	-	93.8	-	-	-	-	-	90.9	-	-	-	-	-	100.0	-	-

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: Erb Street East & Regina Street
North
Site Code:
Start Date: 06/27/2018
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Erb Street East Eastbound						Westbound Approach Westbound						Regina Street North Northbound						Regina Street North 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	
12:00 PM	6	139	11	0	8	156	0	0	0	0	13	0	0	47	37	0	17	84	24	50	0	0	13	74	314
12:15 PM	8	141	9	0	13	158	0	0	0	0	10	0	0	41	24	0	11	65	20	71	0	0	15	91	314
12:30 PM	13	124	11	0	4	148	0	0	0	0	10	0	0	27	24	0	14	51	21	59	0	0	5	80	279
12:45 PM	9	134	8	0	12	151	0	0	0	0	5	0	0	36	20	0	27	56	34	56	0	0	11	90	297
Total	36	538	39	0	37	613	0	0	0	0	38	0	0	151	105	0	69	256	99	236	0	0	44	335	1204
Approach %	5.9	87.8	6.4	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	59.0	41.0	0.0	-	-	29.6	70.4	0.0	0.0	-	-	-
Total %	3.0	44.7	3.2	0.0	-	50.9	0.0	0.0	0.0	0.0	-	0.0	0.0	12.5	8.7	0.0	-	21.3	8.2	19.6	0.0	0.0	-	27.8	-
PHF	0.692	0.954	0.886	0.000	-	0.970	0.000	0.000	0.000	0.000	-	0.000	0.000	0.803	0.709	0.000	-	0.762	0.728	0.831	0.000	0.000	-	0.920	0.959
Lights	36	524	35	0	-	595	0	0	0	0	-	0	0	147	104	0	-	251	99	228	0	0	-	327	1173
% Lights	100.0	97.4	89.7	-	-	97.1	-	-	-	-	-	-	-	97.4	99.0	-	-	98.0	100.0	96.6	-	-	-	97.6	97.4
Mediums	0	14	3	0	-	17	0	0	0	0	-	0	0	2	0	0	-	2	0	5	0	0	-	5	24
% Mediums	0.0	2.6	7.7	-	-	2.8	-	-	-	-	-	-	-	1.3	0.0	-	-	0.8	0.0	2.1	-	-	-	1.5	2.0
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
Bicycles on Road	0	0	1	0	-	1	0	0	0	0	-	0	0	2	1	0	-	3	0	3	0	0	-	3	7
% Bicycles on Road	0.0	0.0	2.6	-	-	0.2	-	-	-	-	-	-	-	1.3	1.0	-	-	1.2	0.0	1.3	-	-	-	0.9	0.6
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	5.4	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	4.5	-	-
Pedestrians	-	-	-	-	35	-	-	-	-	-	38	-	-	-	-	-	69	-	-	-	-	-	42	-	-
% Pedestrians	-	-	-	-	94.6	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	95.5	-	-

Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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

Count Name: Erb Street East & Regina Street North
Site Code:
Start Date: 06/27/2018
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Turning Movement Peak Hour Data (4:30 PM)

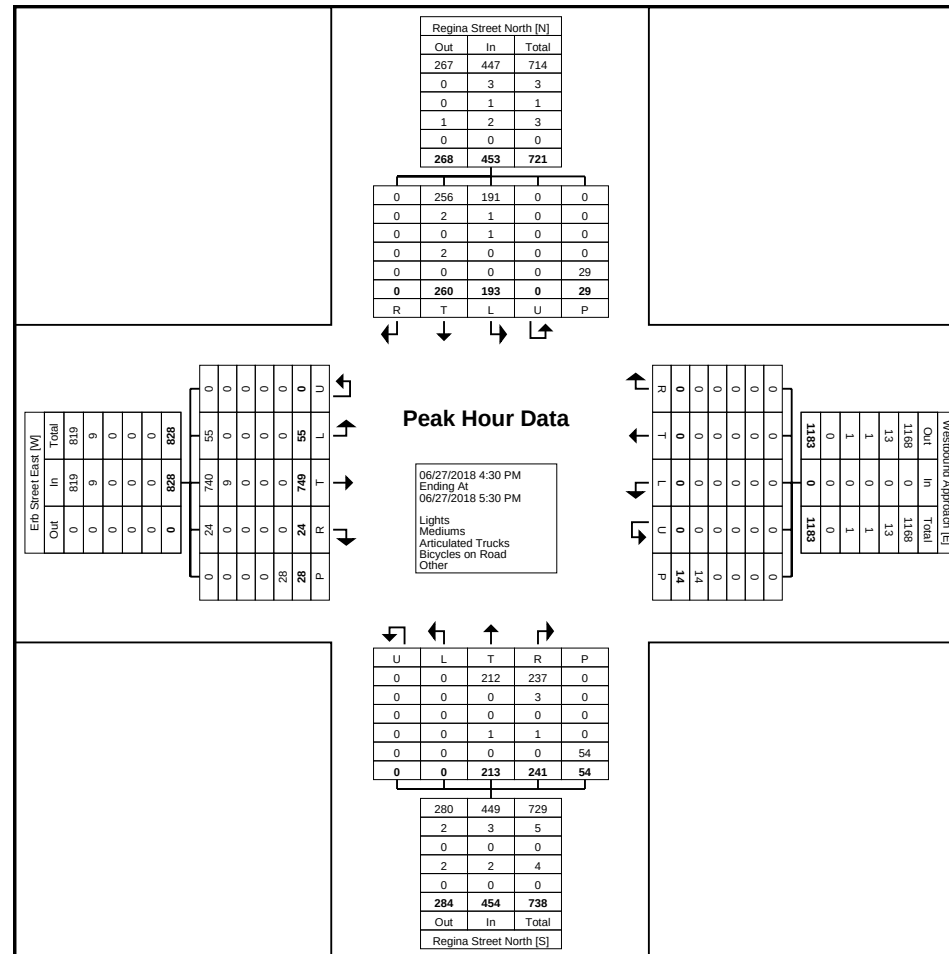
Start Time	Erb Street East Eastbound						Westbound Approach Westbound						Regina Street North Northbound						Regina Street North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	12	172	6	0	7	190	0	0	0	0	3	0	0	55	91	0	12	146	44	61	0	0	3	105	441
4:45 PM	18	195	9	0	7	222	0	0	0	0	1	0	0	50	52	0	10	102	51	66	0	0	10	117	441
5:00 PM	14	185	3	0	8	202	0	0	0	0	4	0	0	54	60	0	17	114	45	69	0	0	11	114	430
5:15 PM	11	197	6	0	6	214	0	0	0	0	6	0	0	54	38	0	15	92	53	64	0	0	5	117	423
Total	55	749	24	0	28	828	0	0	0	0	14	0	0	213	241	0	54	454	193	260	0	0	29	453	1735
Approach %	6.6	90.5	2.9	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	46.9	53.1	0.0	-	-	42.6	57.4	0.0	0.0	-	-	-
Total %	3.2	43.2	1.4	0.0	-	47.7	0.0	0.0	0.0	0.0	-	0.0	0.0	12.3	13.9	0.0	-	26.2	11.1	15.0	0.0	0.0	-	26.1	-
PHF	0.764	0.951	0.667	0.000	-	0.932	0.000	0.000	0.000	0.000	-	0.000	0.000	0.968	0.662	0.000	-	0.777	0.910	0.942	0.000	0.000	-	0.968	0.984
Lights	55	740	24	0	-	819	0	0	0	0	-	0	0	212	237	0	-	449	191	256	0	0	-	447	1715
% Lights	100.0	98.8	100.0	-	-	98.9	-	-	-	-	-	-	-	99.5	98.3	-	-	98.9	99.0	98.5	-	-	-	98.7	98.8
Mediums	0	9	0	0	-	9	0	0	0	0	-	0	0	0	3	0	-	3	1	2	0	0	-	3	15
% Mediums	0.0	1.2	0.0	-	-	1.1	-	-	-	-	-	-	-	0.0	1.2	-	-	0.7	0.5	0.8	-	-	-	0.7	0.9
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	0.5	0.0	-	-	-	0.2	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	1	0	-	2	0	2	0	0	-	2	4
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	-	-	-	-	-	-	-	0.5	0.4	-	-	0.4	0.0	0.8	-	-	-	0.4	0.2
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	3.6	-	-	-	-	-	14.3	-	-	-	-	-	3.7	-	-	-	-	-	10.3	-	-
Pedestrians	-	-	-	-	27	-	-	-	-	-	12	-	-	-	-	-	52	-	-	-	-	-	26	-	-
% Pedestrians	-	-	-	-	96.4	-	-	-	-	-	85.7	-	-	-	-	-	96.3	-	-	-	-	-	89.7	-	-



Paradigm Transportation Solutions Limited
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Count Name: Erb Street East & Regina Street
North
Site Code:
Start Date: 06/27/2018
Page No: 9



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



Paradigm Transportation Solutions Limited
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Count Name: Erb Street East & Regina Street
North
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Paradigm Transportation Solutions Limited
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Count Name: Erb Street East & Peppler Street
Site Code:
Start Date: 06/27/2018
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Turning Movement Data

Start Time	Erb Street East Eastbound						Westbound Approach Westbound						Driveway Northbound						Peppler 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	
7:00 AM	1	70	0	0	2	71	0	0	0	0	0	0	0	0	0	0	1	0	6	0	0	0	0	6	77
7:15 AM	3	88	1	0	5	92	0	0	0	0	1	0	0	0	1	0	1	1	12	0	1	0	1	13	106
7:30 AM	1	125	1	0	5	127	0	0	0	0	1	0	0	0	2	0	1	2	14	1	0	0	2	15	144
7:45 AM	5	152	2	0	4	159	0	0	1	0	1	1	0	1	6	0	1	7	21	2	0	0	4	23	190
Hourly Total	10	435	4	0	16	449	0	0	1	0	3	1	0	1	9	0	4	10	53	3	1	0	7	57	517
8:00 AM	3	145	0	0	12	148	0	0	0	0	2	0	0	1	0	0	0	1	32	0	0	0	0	32	181
8:15 AM	2	166	3	0	14	171	0	0	0	0	1	0	0	0	0	0	1	0	32	1	0	0	1	33	204
8:30 AM	8	159	2	0	12	169	0	0	0	0	0	0	0	0	3	0	2	3	25	1	0	0	2	26	198
8:45 AM	2	159	5	0	14	166	0	0	0	0	1	0	0	0	1	0	2	1	40	2	0	0	2	42	209
Hourly Total	15	629	10	0	52	654	0	0	0	0	4	0	0	1	4	0	5	5	129	4	0	0	5	133	792
9:00 AM	5	124	1	0	10	130	0	0	0	0	1	0	0	3	3	0	2	6	31	3	0	0	0	34	170
9:15 AM	6	131	5	0	3	142	0	0	0	0	2	0	0	2	5	0	3	7	22	5	0	0	0	27	176
9:30 AM	6	127	4	0	15	137	0	0	0	0	0	0	0	3	4	0	1	7	35	5	0	0	2	40	184
9:45 AM	3	164	7	0	7	174	0	0	0	0	0	0	0	1	2	0	1	3	34	9	0	0	4	43	220
Hourly Total	20	546	17	0	35	583	0	0	0	0	3	0	0	9	14	0	7	23	122	22	0	0	6	144	750
10:00 AM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:30 AM	3	162	4	0	5	169	0	0	0	0	0	0	0	3	11	0	4	14	36	7	0	0	3	43	226
11:45 AM	3	139	15	0	2	157	0	0	0	0	1	0	0	3	9	0	6	12	35	13	0	0	1	48	217
Hourly Total	6	301	19	0	7	326	0	0	0	0	1	0	0	6	20	0	10	26	71	20	0	0	4	91	443
12:00 PM	5	192	12	0	8	209	0	0	0	0	1	0	0	3	6	0	5	9	38	3	0	0	1	41	259
12:15 PM	3	184	4	0	4	191	0	0	0	0	0	0	0	4	12	0	2	16	23	1	0	0	2	24	231
12:30 PM	3	164	5	0	8	172	0	0	0	0	0	0	0	3	9	0	4	12	38	4	0	0	2	42	226
12:45 PM	7	173	1	0	12	181	0	0	0	0	1	0	0	0	11	0	4	11	38	6	0	0	2	44	236
Hourly Total	18	713	22	0	32	753	0	0	0	0	2	0	0	10	38	0	15	48	137	14	0	0	7	151	952
1:00 PM	8	189	5	0	9	202	0	0	0	0	0	0	0	2	10	0	1	12	29	5	0	0	5	34	248
1:15 PM	9	178	4	0	5	191	0	0	0	0	1	0	0	2	13	0	1	15	38	1	0	0	2	39	245
1:30 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
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	17	367	9	0	14	393	0	0	0	0	1	0	0	4	23	0	2	27	67	6	0	0	7	73	493
3:00 PM	3	191	9	0	8	203	0	0	0	0	1	0	0	1	7	0	0	8	30	3	0	0	3	33	244
3:15 PM	7	190	6	0	3	203	0	0	0	0	1	0	0	0	9	0	3	9	32	5	0	0	3	37	249
3:30 PM	4	189	7	0	4	200	0	0	0	0	0	0	0	1	7	0	0	8	29	4	0	0	2	33	241
3:45 PM	8	186	5	0	15	199	0	0	0	0	0	0	1	1	11	0	0	13	31	11	1	0	8	43	255
Hourly Total	22	756	27	0	30	805	0	0	0	0	2	0	1	3	34	0	3	38	122	23	1	0	16	146	989
4:00 PM	2	259	5	0	9	266	0	0	0	0	0	0	0	2	9	0	3	11	37	6	0	0	3	43	320

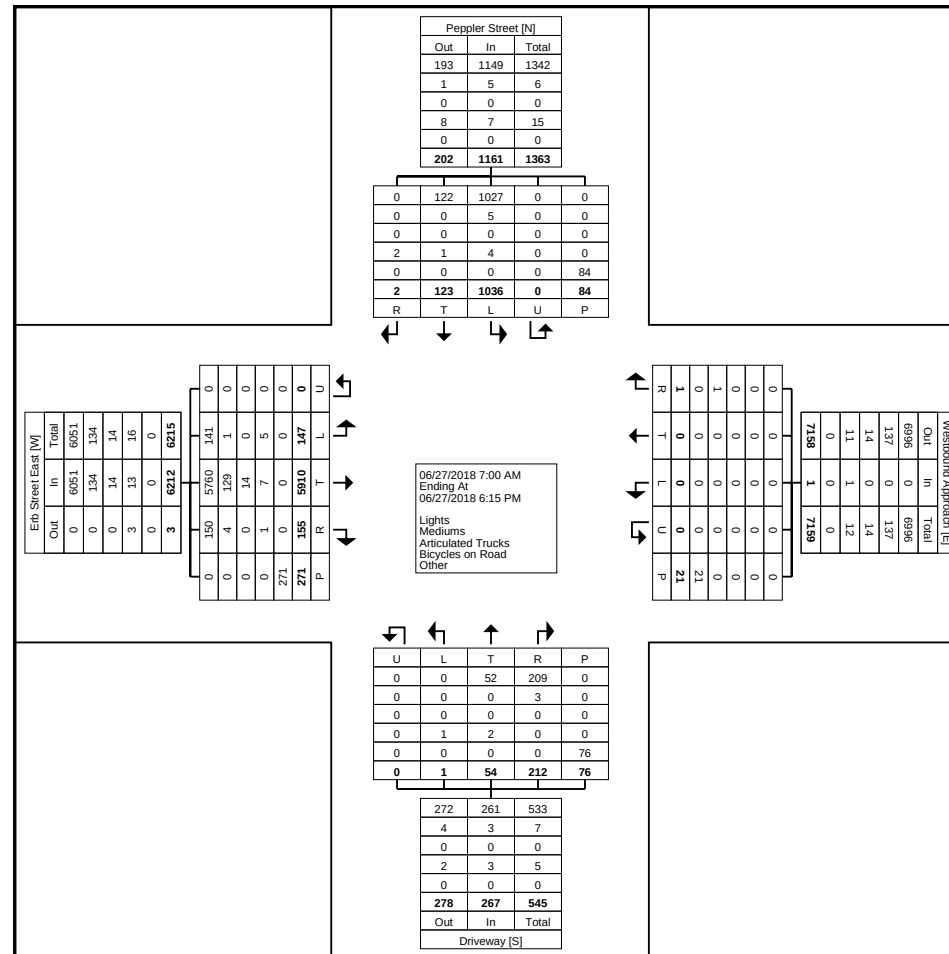
4:15 PM	8	247	5	0	7	260	0	0	0	0	1	0	0	2	9	0	5	11	33	3	0	0	10	36	307
4:30 PM	1	300	5	0	11	306	0	0	0	0	0	0	0	2	10	0	3	12	46	3	0	0	3	49	367
4:45 PM	3	276	8	0	14	287	0	0	0	0	1	0	0	1	10	0	2	11	51	6	0	0	4	57	355
Hourly Total	14	1082	23	0	41	1119	0	0	0	0	2	0	0	7	38	0	13	45	167	18	0	0	20	185	1349
5:00 PM	6	303	10	0	14	319	0	0	0	0	0	0	0	3	13	0	5	16	51	6	0	0	2	57	392
5:15 PM	5	282	5	0	9	292	0	0	0	0	1	0	0	3	8	0	3	11	40	4	0	0	5	44	347
5:30 PM	4	259	5	0	11	268	0	0	0	0	0	0	0	4	6	0	1	10	41	0	0	0	2	41	319
5:45 PM	9	236	4	0	10	249	0	0	0	0	2	0	0	3	5	0	8	8	36	3	0	0	3	39	296
Hourly Total	24	1080	24	0	44	1128	0	0	0	0	3	0	0	13	32	0	17	45	168	13	0	0	12	181	1354
6:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	147	5910	155	0	271	6212	0	0	1	0	21	1	1	54	212	0	76	267	1036	123	2	0	84	1161	7641
Approach %	2.4	95.1	2.5	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.4	20.2	79.4	0.0	-	-	89.2	10.6	0.2	0.0	-	-	-
Total %	1.9	77.3	2.0	0.0	-	81.3	0.0	0.0	0.0	0.0	-	0.0	0.0	0.7	2.8	0.0	-	3.5	13.6	1.6	0.0	0.0	-	15.2	-
Lights	141	5760	150	0	-	6051	0	0	0	0	-	0	0	52	209	0	-	261	1027	122	0	0	-	1149	7461
% Lights	95.9	97.5	96.8	-	-	97.4	-	-	0.0	-	-	0.0	0.0	96.3	98.6	-	-	97.8	99.1	99.2	0.0	-	-	99.0	97.6
Mediums	1	129	4	0	-	134	0	0	0	0	-	0	0	0	3	0	-	3	5	0	0	0	-	5	142
% Mediums	0.7	2.2	2.6	-	-	2.2	-	-	0.0	-	-	0.0	0.0	0.0	1.4	-	-	1.1	0.5	0.0	0.0	-	-	0.4	1.9
Articulated Trucks	0	14	0	0	-	14	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	14
% Articulated Trucks	0.0	0.2	0.0	-	-	0.2	-	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	5	7	1	0	-	13	0	0	1	0	-	1	1	2	0	0	-	3	4	1	2	0	-	7	24
% Bicycles on Road	3.4	0.1	0.6	-	-	0.2	-	-	100.0	-	-	100.0	100.0	3.7	0.0	-	-	1.1	0.4	0.8	100.0	-	-	0.6	0.3
Bicycles on Crosswalk	-	-	-	-	109	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	8	-	-
% Bicycles on Crosswalk	-	-	-	-	40.2	-	-	-	-	-	9.5	-	-	-	-	-	3.9	-	-	-	-	-	9.5	-	-
Pedestrians	-	-	-	-	162	-	-	-	-	-	19	-	-	-	-	-	73	-	-	-	-	-	76	-	-
% Pedestrians	-	-	-	-	59.8	-	-	-	-	-	90.5	-	-	-	-	-	96.1	-	-	-	-	-	90.5	-	-



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Count Name: Erb Street East & Pepler Street
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Start Date: 06/27/2018
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Turning Movement Data Plot



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Count Name: Erb Street East & Pepler Street
Site Code:
Start Date: 06/27/2018
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

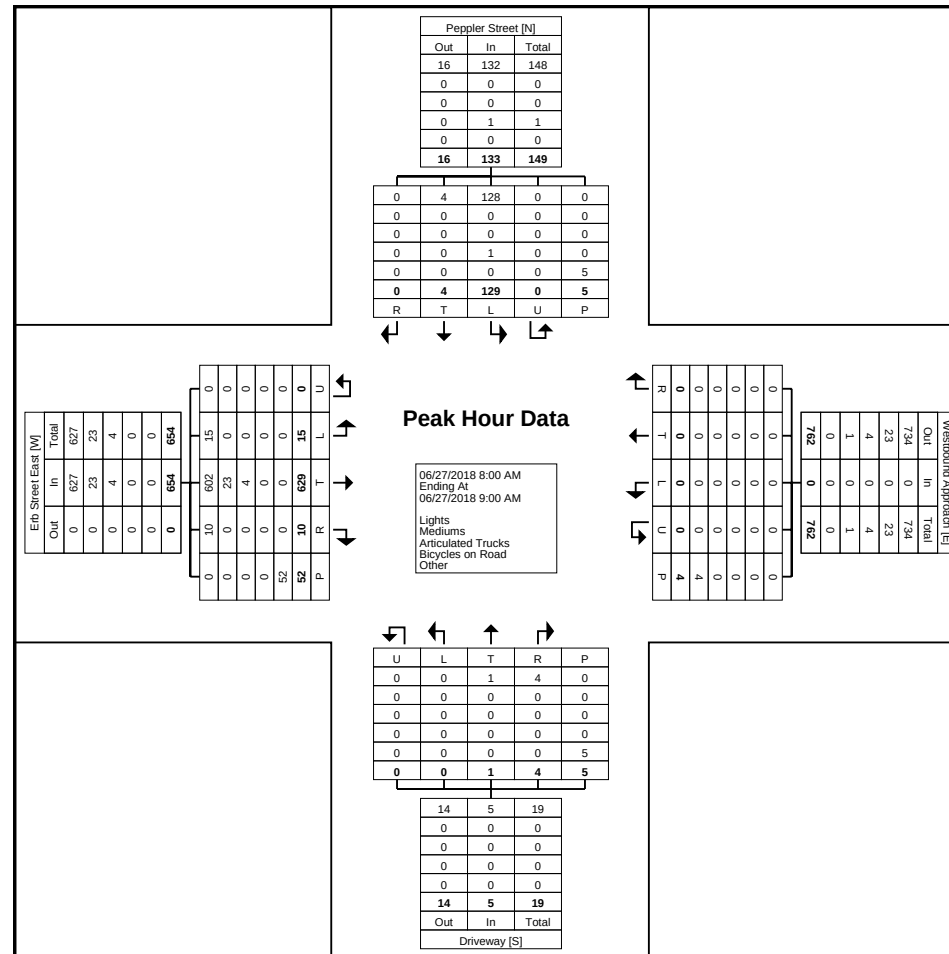
Start Time	Erb Street East Eastbound						Westbound Approach Westbound						Driveway Northbound						Pepler Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	3	145	0	0	12	148	0	0	0	0	2	0	0	1	0	0	0	1	32	0	0	0	0	32	181
8:15 AM	2	166	3	0	14	171	0	0	0	0	1	0	0	0	0	0	1	0	32	1	0	0	1	33	204
8:30 AM	8	159	2	0	12	169	0	0	0	0	0	0	0	0	3	0	2	3	25	1	0	0	2	26	198
8:45 AM	2	159	5	0	14	166	0	0	0	0	1	0	0	0	1	0	2	1	40	2	0	0	2	42	209
Total	15	629	10	0	52	654	0	0	0	0	4	0	0	1	4	0	5	5	129	4	0	0	5	133	792
Approach %	2.3	96.2	1.5	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	20.0	80.0	0.0	-	-	97.0	3.0	0.0	0.0	-	-	-
Total %	1.9	79.4	1.3	0.0	-	82.6	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.5	0.0	-	0.6	16.3	0.5	0.0	0.0	-	16.8	-
PHF	0.469	0.947	0.500	0.000	-	0.956	0.000	0.000	0.000	0.000	-	0.000	0.000	0.250	0.333	0.000	-	0.417	0.806	0.500	0.000	0.000	-	0.792	0.947
Lights	15	602	10	0	-	627	0	0	0	0	-	0	0	1	4	0	-	5	128	4	0	0	-	132	764
% Lights	100.0	95.7	100.0	-	-	95.9	-	-	-	-	-	-	-	100.0	100.0	-	-	100.0	99.2	100.0	-	-	-	99.2	96.5
Mediums	0	23	0	0	-	23	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	23
% Mediums	0.0	3.7	0.0	-	-	3.5	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	2.9
Articulated Trucks	0	4	0	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	4
% Articulated Trucks	0.0	0.6	0.0	-	-	0.6	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.8	0.0	-	-	-	0.8	0.1
Bicycles on Crosswalk	-	-	-	-	24	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	46.2	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	28	-	-	-	-	-	4	-	-	-	-	-	5	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	53.8	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: Erb Street East & Pepler Street
Site Code:
Start Date: 06/27/2018
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Turning Movement Peak Hour Data Plot (8:00 AM)



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Count Name: Erb Street East & Peppler Street
Site Code:
Start Date: 06/27/2018
Page No: 6

Turning Movement Peak Hour Data (12:30 PM)

Start Time	Erb Street East Eastbound						Westbound Approach Westbound						Driveway Northbound						Peppler 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	
12:30 PM	3	164	5	0	8	172	0	0	0	0	0	0	0	3	9	0	4	12	38	4	0	0	2	42	226
12:45 PM	7	173	1	0	12	181	0	0	0	0	1	0	0	0	11	0	4	11	38	6	0	0	2	44	236
1:00 PM	8	189	5	0	9	202	0	0	0	0	0	0	0	2	10	0	1	12	29	5	0	0	5	34	248
1:15 PM	9	178	4	0	5	191	0	0	0	0	1	0	0	2	13	0	1	15	38	1	0	0	2	39	245
Total	27	704	15	0	34	746	0	0	0	0	2	0	0	7	43	0	10	50	143	16	0	0	11	159	955
Approach %	3.6	94.4	2.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	14.0	86.0	0.0	-	-	89.9	10.1	0.0	0.0	-	-	-
Total %	2.8	73.7	1.6	0.0	-	78.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.7	4.5	0.0	-	5.2	15.0	1.7	0.0	0.0	-	16.6	-
PHF	0.750	0.931	0.750	0.000	-	0.923	0.000	0.000	0.000	0.000	-	0.000	0.000	0.583	0.827	0.000	-	0.833	0.941	0.667	0.000	0.000	-	0.903	0.963
Lights	26	687	13	0	-	726	0	0	0	0	-	0	0	6	41	0	-	47	141	16	0	0	-	157	930
% Lights	96.3	97.6	86.7	-	-	97.3	-	-	-	-	-	-	-	85.7	95.3	-	-	94.0	98.6	100.0	-	-	-	-	97.4
Mediums	0	16	2	0	-	18	0	0	0	0	-	0	0	0	2	0	-	2	2	0	0	0	-	2	22
% Mediums	0.0	2.3	13.3	-	-	2.4	-	-	-	-	-	-	-	0.0	4.7	-	-	4.0	1.4	0.0	-	-	-	1.3	2.3
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
Bicycles on Road	1	1	0	0	-	2	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	3
% Bicycles on Road	3.7	0.1	0.0	-	-	0.3	-	-	-	-	-	-	-	14.3	0.0	-	-	2.0	0.0	0.0	-	-	-	0.0	0.3
Bicycles on Crosswalk	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	17.6	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	28	-	-	-	-	-	2	-	-	-	-	-	10	-	-	-	-	-	11	-	-
% Pedestrians	-	-	-	-	82.4	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (12:30 PM)



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Count Name: Erb Street East & Pepler Street
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Turning Movement Peak Hour Data (4:30 PM)

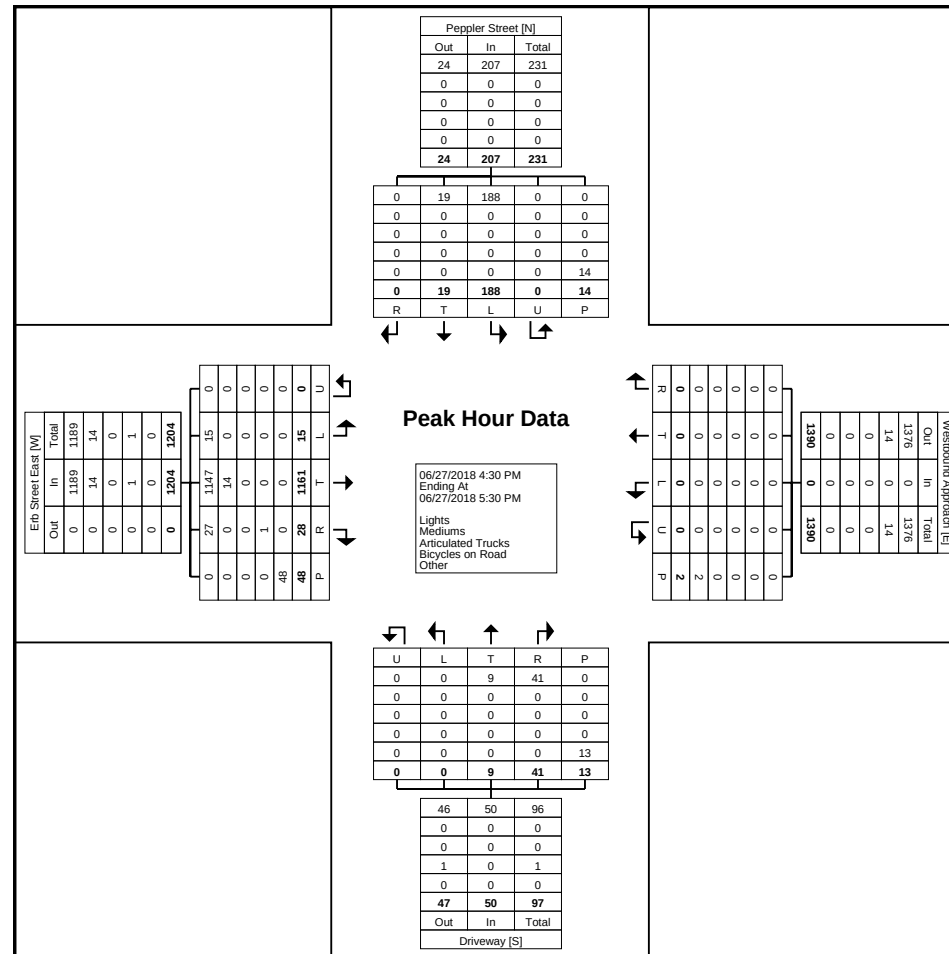
Start Time	Erb Street East Eastbound						Westbound Approach Westbound						Driveway Northbound						Pepler Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	1	300	5	0	11	306	0	0	0	0	0	0	0	2	10	0	3	12	46	3	0	0	3	49	367
4:45 PM	3	276	8	0	14	287	0	0	0	0	1	0	0	1	10	0	2	11	51	6	0	0	4	57	355
5:00 PM	6	303	10	0	14	319	0	0	0	0	0	0	0	3	13	0	5	16	51	6	0	0	2	57	392
5:15 PM	5	282	5	0	9	292	0	0	0	0	1	0	0	3	8	0	3	11	40	4	0	0	5	44	347
Total	15	1161	28	0	48	1204	0	0	0	0	2	0	0	9	41	0	13	50	188	19	0	0	14	207	1461
Approach %	1.2	96.4	2.3	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	18.0	82.0	0.0	-	-	90.8	9.2	0.0	0.0	-	-	-
Total %	1.0	79.5	1.9	0.0	-	82.4	0.0	0.0	0.0	0.0	-	0.0	0.0	0.6	2.8	0.0	-	3.4	12.9	1.3	0.0	0.0	-	14.2	-
PHF	0.625	0.958	0.700	0.000	-	0.944	0.000	0.000	0.000	0.000	-	0.000	0.000	0.750	0.788	0.000	-	0.781	0.922	0.792	0.000	0.000	-	0.908	0.932
Lights	15	1147	27	0	-	1189	0	0	0	0	-	0	0	9	41	0	-	50	188	19	0	0	-	207	1446
% Lights	100.0	98.8	96.4	-	-	98.8	-	-	-	-	-	-	-	100.0	100.0	-	-	100.0	100.0	100.0	-	-	-	100.0	99.0
Mediums	0	14	0	0	-	14	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	14
% Mediums	0.0	1.2	0.0	-	-	1.2	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	1.0
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
Bicycles on Road	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	3.6	-	-	0.1	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	15	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	31.3	-	-	-	-	-	0.0	-	-	-	-	-	7.7	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	33	-	-	-	-	-	2	-	-	-	-	-	12	-	-	-	-	-	14	-	-
% Pedestrians	-	-	-	-	68.8	-	-	-	-	-	100.0	-	-	-	-	-	92.3	-	-	-	-	-	100.0	-	-



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



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CURRENT TRAFFIC SIGNAL TIMING

INT # **64**

ERB STREET @ King Street

T08-50/ **18W**

Date Prepared: **November 23, 2021**

Mode of Control **Fixed Time**

Left Info **Actuated SB LT - King Street**

*Offsets are a percentage of the cycle length and refers to the beginning of Main Street green

Pattern 1

7:00-10:00 Monday to Friday

ERB STREET

OFFSET 68%

Green	30.8	seconds			
Amber	4.0	seconds	Walk	25.8	seconds
All Red	2.0	seconds	FDW	5.0	seconds

King Street

SBL Green Arrow	Min	5.0	seconds		
	Ext	3.0	seconds		
	Max	5.6	seconds		
SBL Amber Arrow		3.0	seconds		
All Red		1.0	seconds		
Green		27.6	seconds		
Amber		4.0	seconds	Walk	22.6 seconds
All Red		2.0	seconds	FDW	5.0 seconds
TOTAL		80.0	seconds		

Pattern 2

10:00-14:00 Monday to Friday

ERB STREET

OFFSET 81%

Green	29.2	seconds			
Amber	4.0	seconds	Walk	24.2	seconds
All Red	2.0	seconds	FDW	5.0	seconds

King Street

SBL Green Arrow	Min	5.0	seconds		
	Ext	3.0	seconds		
	Max	5.6	seconds		
SBL Amber Arrow		3.0	seconds		
All Red		1.0	seconds		
Green		29.2	seconds		
Amber		4.0	seconds	Walk	24.2 seconds
All Red		2.0	seconds	FDW	5.0 seconds
TOTAL		80.0	seconds		

Min=Minimum Time
Ext=Extension Time
Max=Maximum Time

**This signal timing cannot be
presented as evidence in a court of law.**

Pattern 3

14:00-19:00 Mon to Fri, 8:30-19:00 Sat, 11:00-18:00 Sun

ERB STREET

OFFSET 75%

Green	34.8	seconds			
Amber	4.0	seconds	Walk	29.8	seconds
All Red	2.0	seconds	FDW	5.0	seconds

King Street

SBL Green Arrow	Min	5.0	seconds		
	Ext	3.0	seconds		
	Max	5.6	seconds		
SBL Amber Arrow		3.0	seconds		
All Red		1.0	seconds		
Green		23.6	seconds		
Amber		4.0	seconds	Walk	18.6 seconds
All Red		2.0	seconds	FDW	5.0 seconds
TOTAL		80.0	seconds		

Pattern 4

All Other Times

ERB STREET

OFFSET 24%

Green	36.0	seconds			
Amber	4.0	seconds	Walk	31.0	seconds
All Red	2.0	seconds	FDW	5.0	seconds

King Street

Green	22.0	seconds			
Amber	4.0	seconds	Walk	17.0	seconds
All Red	2.0	seconds	FDW	5.0	seconds
TOTAL		70.0	seconds		

CURRENT TRAFFIC SIGNAL TIMING

INT # **63**

ERB STREET @ Regina Street

T08-50/ **21W**

Date Prepared: **November 23, 2021**

Mode of Control **Fixed Time**

Left Info **Non-actuated SB LT - Regina Street**

*Offsets are a percentage of the cycle length and refers to the beginning of Main Street green

Pattern 1

7:00-10:00 Monday to Friday

ERB STREET

OFFSET 86%

Green	38.0	seconds			
Amber	4.0	seconds	Walk	31.0	seconds
All Red	2.0	seconds	FDW	7.0	seconds

Regina Street

SBL Green Arrow	Min	5.0	seconds		
	Max	5.6	seconds		
SBL Amber Arrow		3.0	seconds		
All Red		1.0	seconds		
Green		20.4	seconds		
Amber		4.0	seconds	Walk	15.4 seconds
All Red		2.0	seconds	FDW	5.0 seconds
TOTAL		80.0	seconds		

Pattern 2

10:00-14:00, 19:00-22:00 Mon-Fr, 8:30-22:00 Sat, 9:00-18:00 Sun

ERB STREET

OFFSET 85%

Green	34.0	seconds			
Amber	4.0	seconds	Walk	27.0	seconds
All Red	2.0	seconds	FDW	7.0	seconds

Regina Street

SBL Green Arrow	Min	5.0	seconds		
	Max	6.4	seconds		
SBL Amber Arrow		3.0	seconds		
All Red		1.0	seconds		
Green		23.6	seconds		
Amber		4.0	seconds	Walk	18.6 seconds
All Red		2.0	seconds	FDW	5.0 seconds
TOTAL		80.0	seconds		

Pattern 3

14:00-19:00 Monday to Friday

ERB STREET

OFFSET 87%

Green	35.6	seconds				
Amber	4.0	seconds	Walk	28.6	seconds	
All Red	2.0	seconds	FDW	7.0	seconds	

Regina Street

SBL Green Arrow	Min	5.0	seconds			
	Max	6.4	seconds			
SBL Amber Arrow		3.0	seconds			
All Red		1.0	seconds			
Green		22.0	seconds			
Amber		4.0	seconds	Walk	17.0	seconds
All Red		2.0	seconds	FDW	5.0	seconds
TOTAL		80.0	seconds			

Pattern 4

All Other Times

ERB STREET

OFFSET 26%

Green	33.9	seconds				
Amber	4.0	seconds	Walk	26.9	seconds	
All Red	2.0	seconds	FDW	7.0	seconds	

Regina Street

Green	24.1	seconds				
Amber	4.0	seconds	Walk	19.1	seconds	
All Red	2.0	seconds	FDW	5.0	seconds	
TOTAL		70.0	seconds			



CURRENT TRAFFIC SIGNAL TIMING

INT #	622	ERB STREET @ Pepler Street (Bike Signals)	T08-50/ 78W
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Date Prepared: November 23, 2021

Mode of Control Pre-timed running SEMI-ACTUATED

*Offsets are a percentage of the cycle length and refers to the beginning of Main Street green

Max 1

ALL TIMES

ERB STREET

Green	30.0	seconds		25.0	seconds
Amber	4.0	seconds	Walk		
All Red	2.0	seconds	FDW	5.0	seconds

Pepler Street (Bike Signals)

Pedestrian Call

Green	in	10.0	seconds	Green/Walk	10.0	seconds
	xt	5.0	seconds	Green/FDW	6.0	seconds
	ix	16.0	seconds	Green/SDW	0.0	seconds
Amber		4.0	seconds	Amber	4.0	seconds
All Red		2.0	seconds	All Red	2.0	seconds
TOTAL		58.0	seconds			

Appendix C

Existing Synchro Reports



Lanes, Volumes, Timings

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

Existing AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	2	5	8	10	6	8	1	124	30	23	392	3
Future Volume (vph)	2	5	8	10	6	8	1	124	30	23	392	3
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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		0.928			0.955			0.974			0.999	
Flt Protected		0.993			0.980						0.997	
Satd. Flow (prot)	0	1339	0	0	1451	0	0	1498	0	0	1515	0
Flt Permitted		0.993			0.980						0.997	
Satd. Flow (perm)	0	1339	0	0	1451	0	0	1498	0	0	1515	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		42.7			64.4			91.2			31.3	
Travel Time (s)		3.1			4.6			6.6			2.3	
Confl. Peds. (#/hr)	4		4	4		4	13		11	11		13
Peak Hour 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
Heavy Vehicles (%)	50%	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%
Adj. Flow (vph)	2	5	8	10	6	8	1	124	30	23	392	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	0	24	0	0	155	0	0	418	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 53.7%

ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

Existing AM Peak Hour

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	2	5	8	10	6	8	1	124	30	23	392	3
Future Vol, veh/h	2	5	8	10	6	8	1	124	30	23	392	3
Conflicting Peds, #/hr	4	0	4	4	0	4	13	0	11	11	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	50	0	0	0	0	0	0	1	0	0	2	0
Mvmt Flow	2	5	8	10	6	8	1	124	30	23	392	3

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	605	620	411	602	606	154	408	0	0	165	0	0
Stage 1	453	453	-	152	152	-	-	-	-	-	-	-
Stage 2	152	167	-	450	454	-	-	-	-	-	-	-
Critical Hdwy	7.6	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.6	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.6	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.95	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	348	407	645	414	414	897	1162	-	-	1426	-	-
Stage 1	504	573	-	855	775	-	-	-	-	-	-	-
Stage 2	749	764	-	592	573	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	330	390	636	393	397	886	1149	-	-	1413	-	-
Mov Cap-2 Maneuver	330	390	-	393	397	-	-	-	-	-	-	-
Stage 1	498	555	-	846	767	-	-	-	-	-	-	-
Stage 2	733	756	-	565	555	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	12.8	0.1	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1149	-	-	477	484	1413	-	-
HCM Lane V/C Ratio	0.001	-	-	0.031	0.05	0.016	-	-
HCM Control Delay (s)	8.1	0	-	12.8	12.8	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	-	-

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing AM Peak Hour

	←	→	↙	↘	←	←	←	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Volume (vph)	412	711	35	0	0	0	0	288	15	144	373	0
Future Volume (vph)	412	711	35	0	0	0	0	288	15	144	373	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1775	1900	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			15.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98						1.00		0.98		
Frt		0.995						0.993				
Flt Protected		0.983								0.950		
Satd. Flow (prot)	0	3130	0	0	0	0	0	1497	0	1653	1792	0
Flt Permitted		0.983								0.419		
Satd. Flow (perm)	0	3078	0	0	0	0	0	1497	0	714	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4						4				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		67.6			97.6			126.2			71.9	
Travel Time (s)		4.9			7.0			9.1			5.2	
Confl. Peds. (#/hr)	36		13	13		36	66		42	42		66
Peak Hour 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
Heavy Vehicles (%)	1%	4%	3%	0%	0%	0%	0%	9%	13%	2%	6%	0%
Adj. Flow (vph)	412	711	35	0	0	0	0	288	15	144	373	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1158	0	0	0	0	0	303	0	144	373	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Detector Phase	4	4						2		1	6	
Switch Phase												
Minimum Initial (s)	30.8	30.8						27.6		5.0	27.6	
Minimum Split (s)	36.8	36.8						33.6		9.0	33.6	
Total Split (s)	36.8	36.8						33.6		9.6	43.2	
Total Split (%)	46.0%	46.0%						42.0%		12.0%	54.0%	
Maximum Green (s)	30.8	30.8						27.6		5.6	37.2	
Yellow Time (s)	4.0	4.0						4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0						2.0		1.0	2.0	
Lost Time Adjust (s)		0.0						0.0		0.0	0.0	
Total Lost Time (s)		6.0						6.0		4.0	6.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	Max	Max						Max		None	Max	
Walk Time (s)	25.8	25.8						22.6			22.6	
Flash Dont Walk (s)	5.0	5.0						5.0			5.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		30.8						27.6		39.2	37.2	
Actuated g/C Ratio		0.38						0.34		0.49	0.46	
v/c Ratio		0.98						0.58		0.35	0.45	

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing AM Peak Hour

	←	→	↙	↘	←	←	←	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		46.6						26.7		14.0	16.6	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		46.6						26.7		14.0	16.6	
LOS		D						C		B	B	
Approach Delay		46.6						26.7			15.9	
Approach LOS		D						C			B	
Queue Length 50th (m)		93.4						38.6		12.2	38.5	
Queue Length 95th (m)		#140.7						64.9		22.6	61.1	
Internal Link Dist (m)		43.6				73.6		102.2			47.9	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1187						519		415	833	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.98						0.58		0.35	0.45	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 35.5

Intersection LOS: D

Intersection Capacity Utilization 84.0%

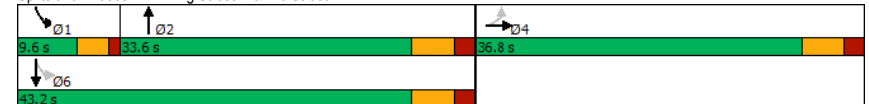
ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: King Street N & Erb Street E



HCM 6th Signalized Intersection Summary
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔		
Traffic Volume (veh/h)	412	711	35	0	0	0	0	288	15	144	373	0
Future Volume (veh/h)	412	711	35	0	0	0	0	288	15	144	373	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				1.00		0.96	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1721	1681	1694				0	1534	1483	1747	1811	0
Adj Flow Rate, veh/h	412	711	35				0	288	15	144	373	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	3				0	9	13	2	6	0
Cap, veh/h	429	794	40				0	498	26	386	842	0
Arrive On Green	0.38	0.38	0.38				0.00	0.34	0.34	0.07	0.47	0.00
Sat Flow, veh/h	1114	2063	104				0	1442	75	1664	1811	0
Grp Volume(v), veh/h	601	0	557				0	0	303	144	373	0
Grp Sat Flow(s),veh/h/ln	1625	0	1656				0	0	1517	1664	1811	0
Q Serve(g_s), s	28.9	0.0	24.9				0.0	0.0	13.1	4.2	11.1	0.0
Cycle Q Clear(g_c), s	28.9	0.0	24.9				0.0	0.0	13.1	4.2	11.1	0.0
Prop In Lane	0.69		0.06				0.00		0.05	1.00		0.00
Lane Grp Cap(c), veh/h	626	0	638				0	0	523	386	842	0
V/C Ratio(X)	0.96	0.00	0.87				0.00	0.00	0.58	0.37	0.44	0.00
Avail Cap(c_a), veh/h	626	0	638				0	0	523	386	842	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.0	0.0	22.8				0.0	0.0	21.4	15.4	14.4	0.0
Incr Delay (d2), s/veh	27.5	0.0	15.4				0.0	0.0	4.6	0.6	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	0.0	5.3				0.0	0.0	2.2	0.4	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.5	0.0	38.2				0.0	0.0	26.1	16.0	16.1	0.0
LnGrp LOS	D	A	D				A	A	C	B	B	A
Approach Vol, veh/h	1158						303			517		
Approach Delay, s/veh	45.1						26.1			16.1		
Approach LOS	D						C			B		
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.6	33.6		36.8		43.2						
Change Period (Y+Rc), s	4.0	6.0		6.0		6.0						
Max Green Setting (Gmax), s	5.6	27.6		30.8		37.2						
Max Q Clear Time (g_c+I1), s	6.2	15.1		30.9		13.1						
Green Ext Time (p_c), s	0.0	1.6		0.0		2.8						
Intersection Summary												
HCM 6th Ctrl Delay			34.6									
HCM 6th LOS			C									

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔		
Traffic Volume (vph)	29	524	33	0	0	0	0	126	63	73	335	0
Future Volume (vph)	29	524	33	0	0	0	0	126	63	73	335	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1900	1750	1650	1650	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99							0.97		1.00	
Frt		0.992							0.850			
Flt Protected		0.998									0.991	
Satd. Flow (prot)	0	3129	0	0	0	0	0	1881	1458	0	1613	0
Flt Permitted		0.998									0.896	
Satd. Flow (perm)	0	3125	0	0	0	0	0	1881	1410	0	1454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10							95			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.6			163.4			74.2			91.2	
Travel Time (s)		7.0			11.8			5.3			6.6	
Confl. Peds. (#/hr)	12		22	22		12	13		16	16		13
Peak Hour 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
Heavy Vehicles (%)	0%	4%	6%	0%	0%	0%	0%	1%	2%	3%	1%	0%
Adj. Flow (vph)	29	524	33	0	0	0	0	126	63	73	335	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	586	0	0	0	0	0	126	63	0	408	0
Turn Type	Perm	NA						NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4								2			
Minimum Split (s)	44.0	44.0						26.4	26.4	9.0	26.4	
Total Split (s)	44.0	44.0						26.4	26.4	9.6	36.0	
Total Split (%)	55.0%	55.0%						33.0%	33.0%	12.0%	45.0%	
Maximum Green (s)	38.0	38.0						20.4	20.4	5.6	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	1.0	2.0	
Lost Time Adjust (s)		0.0						0.0	0.0		0.0	
Total Lost Time (s)		6.0						6.0	6.0		6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?		Yes						Yes	Yes	Yes		
Walk Time (s)	7.0	7.0						7.0	7.0		7.0	
Flash Dont Walk (s)	11.0	11.0						11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)		38.0						20.4	20.4		3.6	
Actuated g/C Ratio		0.48						0.26	0.26		0.04	
v/c Ratio		0.39						0.26	0.15		5.67	
Control Delay		14.3						25.6	3.3		2139.8	
Queue Delay		0.7						0.0	0.0		0.0	
Total Delay		15.0						25.6	3.3		2139.8	
LOS		B						C	A		F	
Approach Delay		15.0						18.2			2139.8	

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						B			F	
Queue Length 50th (m)		29.7						16.1	0.0		~125.6	
Queue Length 95th (m)		42.3						30.4	5.0		#179.7	
Internal Link Dist (m)		73.6			139.4			50.2			67.2	
Turn Bay Length (m)								30.0				
Base Capacity (vph)		1489						479	430		72	
Starvation Cap Reductn		535						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		0.61						0.26	0.15		5.67	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 5.67

Intersection Signal Delay: 748.3

Intersection LOS: F

Intersection Capacity Utilization 88.6%

ICU Level of Service E

Analysis Period (min) 15

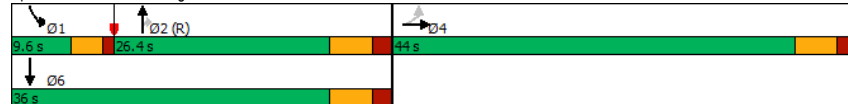
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Regina Street N & Erb Street E



HCM 6th Signalized Intersection Summary
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↑	↗		↘	
Traffic Volume (veh/h)	29	524	33	0	0	0	0	126	63	73	335	0
Future Volume (veh/h)	29	524	33	0	0	0	0	126	63	73	335	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No					No				No	
Adj Sat Flow, veh/h/ln	1735	1681	1654				0	1885	1723	1611	1637	0
Adj Flow Rate, veh/h	29	524	33				0	126	63	73	335	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	6				0	1	2	3	1	0
Cap, veh/h	75	1406	93				0	481	365	0	614	0
Arrive On Green	0.47	0.47	0.47				0.00	0.25	0.25	0.07	0.38	0.00
Sat Flow, veh/h	157	2961	196				0	1885	1432	0	1637	0
Grp Volume(v), veh/h	309	0	277				0	126	63	0	335	0
Grp Sat Flow(s),veh/h/ln	1673	0	1640				0	1885	1432	0	1637	0
Q Serve(g_s), s	9.5	0.0	8.5				0.0	4.3	2.7	0.0	12.9	0.0
Cycle Q Clear(g_c), s	9.5	0.0	8.5				0.0	4.3	2.7	0.0	12.9	0.0
Prop In Lane	0.09		0.12				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	795	0	779				0	481	365	0	614	0
V/C Ratio(X)	0.39	0.00	0.36				0.00	0.26	0.17	0.00	0.55	0.00
Avail Cap(c_a), veh/h	795	0	779				0	481	365	0	614	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	13.5	0.0	13.3				0.0	23.8	23.2	0.0	19.6	0.0
Incr Delay (d2), s/veh	1.4	0.0	1.3				0.0	1.3	1.0	0.0	3.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.6				0.0	1.0	0.5	0.0	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	14.5				0.0	25.1	24.2	0.0	23.1	0.0
LnGrp LOS	B	A	B				A	C	C	A	C	A
Approach Vol, veh/h		586						189			335	
Approach Delay, s/veh		14.8						24.8			23.1	
Approach LOS		B						C			C	
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.6	26.4		44.0		36.0						
Change Period (Y+Rc), s	4.0	6.0		6.0		6.0						
Max Green Setting (Gmax), s	5.6	20.4		38.0		30.0						
Max Q Clear Time (g_c+I1), s	0.0	6.3		11.5		14.9						
Green Ext Time (p_c), s	0.0	0.9		4.6		2.0						
Intersection Summary												
HCM 6th Ctrl Delay		19.0										
HCM 6th LOS		B										

Lanes, Volumes, Timings
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
Existing AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	629	10	0	0	0	0	1	4	129	4	0
Future Volume (vph)	15	629	10	0	0	0	0	1	4	129	4	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1650	1650	0
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998						0.892				
Flt Protected		0.999									0.954	
Satd. Flow (prot)	0	3165	0	0	0	0	0	1472	0	0	1574	0
Flt Permitted		0.999									0.954	
Satd. Flow (perm)	0	3165	0	0	0	0	0	1472	0	0	1574	0
Link Speed (k/h)		50				50		50			50	
Link Distance (m)		19.4				67.1		41.5			87.0	
Travel Time (s)		1.4				4.8		3.0			6.3	
Confl. Peds. (#/hr)	5		5	5		5	52		4	4		52
Peak Hour 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
Heavy Vehicles (%)	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	15	629	10	0	0	0	0	1	4	129	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	654	0	0	0	0	0	5	0	0	133	0
Sign Control		Free				Free		Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	45.0%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM 6th TWSC
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
Existing AM Peak Hour

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	629	10	0	0	0	0	1	4	129	4	0
Future Vol, veh/h	15	629	10	0	0	0	0	1	4	129	4	0
Conflicting Peds, #/hr	5	0	5	5	0	5	52	0	4	4	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	4	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	15	629	10	0	0	0	0	1	4	129	4	0
Major/Minor												
	Major1			Minor1			Minor2					
Conflicting Flow All	5	0	0	-	674	329	354	679	-	-	-	-
Stage 1	-	-	-	-	669	-	5	5	-	-	-	-
Stage 2	-	-	-	-	5	-	349	674	-	-	-	-
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.5	6.5	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	-	4	3.3	3.5	4	-	-	-
Pot Cap-1 Maneuver	1630	-	-	-	0	379	673	581	376	0	-	-
Stage 1	-	-	-	-	0	459	-	-	-	0	-	-
Stage 2	-	-	-	-	0	-	-	646	457	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1623	-	-	-	-	371	670	568	368	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	371	-	568	368	-	-	-
Stage 1	-	-	-	-	-	451	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	632	449	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	0.2			11.3			13.4					
HCM LOS				B			B					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR SBLn1								
Capacity (veh/h)	577	1623	-	- 559								
HCM Lane V/C Ratio	0.009	0.009	-	- 0.238								
HCM Control Delay (s)	11.3	7.2	0	- 13.4								
HCM Lane LOS	B	A	A	- B								
HCM 95th %tile Q(veh)	0	0	-	- 0.9								

Lanes, Volumes, Timings

7: Erb Street E

(210574) 24, 28 & 34 Erb

Existing AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Lane Configurations		↑↑					
Traffic Volume (vph)	0	654	0	0	0	0	
Future Volume (vph)	0	654	0	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt							
Flt Protected							
Satd. Flow (prot)	0	3539	0	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	3539	0	0	0	0	
Right Turn on Red	Yes		Yes	Yes	Yes		
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		163.4	19.4		22.3		
Travel Time (s)		11.8	1.4		1.6		
Confl. Peds. (#/hr)	5			5	4	52	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	654	0	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	654	0	0	0	0	
Turn Type		NA					
Protected Phases		4				6	
Permitted Phases							
Detector Phase		4					
Switch Phase							
Minimum Initial (s)		30.0				10.0	
Minimum Split (s)		36.0				16.0	
Total Split (s)		36.0				22.0	
Total Split (%)		62.1%				38%	
Maximum Green (s)		30.0				16.0	
Yellow Time (s)		4.0				4.0	
All-Red Time (s)		2.0				2.0	
Lost Time Adjust (s)		0.0					
Total Lost Time (s)		6.0					
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0				3.0	
Recall Mode		Max				None	
Walk Time (s)		25.0				10.0	
Flash Dont Walk (s)		5.0				6.0	
Pedestrian Calls (#/hr)		0				0	
Act Effct Green (s)		51.0					
Actuated g/C Ratio		1.00					
v/c Ratio		0.18					
Control Delay		0.1					
Queue Delay		0.0					
Total Delay		0.1					
LOS		A					

Lanes, Volumes, Timings

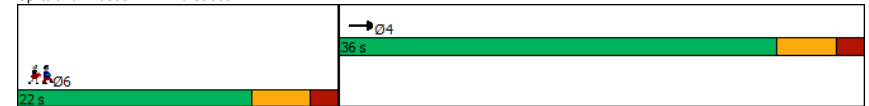
7: Erb Street E

(210574) 24, 28 & 34 Erb

Existing AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Approach Delay		0.1					
Approach LOS		A					
Queue Length 50th (m)		0.0					
Queue Length 95th (m)		0.0					
Internal Link Dist (m)		139.4	0.1		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		3539					
Starvation Cap Reductn		0					
Spillback Cap Reductn		0					
Storage Cap Reductn		0					
Reduced v/c Ratio		0.18					
Intersection Summary							
Area Type:		Other					
Cycle Length:		58					
Actuated Cycle Length:		51					
Natural Cycle:		55					
Control Type:		Semi Act-Uncoord					
Maximum v/c Ratio:		0.18					
Intersection Signal Delay:		0.1				Intersection LOS:	A
Intersection Capacity Utilization		44.9%				ICU Level of Service	A
Analysis Period (min)		15					

Splits and Phases: 7: Erb Street E



HCM 6th Edition methodology does not support exclusive ped or hold phases.

Lanes, Volumes, Timings

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

Existing PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	10	13	34	17	6	22	5	256	11	22	416	14
Future Volume (vph)	10	13	34	17	6	22	5	256	11	22	416	14
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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		0.919			0.934			0.995			0.996	
Flt Protected		0.991			0.981			0.999			0.998	
Satd. Flow (prot)	0	1412	0	0	1420	0	0	1541	0	0	1527	0
Flt Permitted		0.991			0.981			0.999			0.998	
Satd. Flow (perm)	0	1412	0	0	1420	0	0	1541	0	0	1527	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		42.7			64.4			91.2			31.3	
Travel Time (s)		3.1			4.6			6.6			2.3	
Confl. Peds. (#/hr)	15		9	9		15	17		14	14		17
Peak Hour 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
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	10	13	34	17	6	22	5	256	11	22	416	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	45	0	0	272	0	0	452	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 58.5%

ICU Level of Service B

Analysis Period (min) 15

HCM 6th TWSC

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

Existing PM Peak Hour

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	10	13	34	17	6	22	5	256	11	22	416	14
Future Vol, veh/h	10	13	34	17	6	22	5	256	11	22	416	14
Conflicting Peds, #/hr	15	0	9	9	0	15	17	0	14	14	0	17
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	1	0
Mvmt Flow	10	13	34	17	6	22	5	256	11	22	416	14

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	785	775	449	786	777	291	447	0	0	281	0	0
Stage 1	484	484	-	286	286	-	-	-	-	-	-	-
Stage 2	301	291	-	500	491	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	313	331	614	312	330	753	1124	-	-	1293	-	-
Stage 1	568	555	-	726	679	-	-	-	-	-	-	-
Stage 2	712	675	-	557	552	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	285	313	601	274	313	735	1108	-	-	1278	-	-
Mov Cap-2 Maneuver	285	313	-	274	313	-	-	-	-	-	-	-
Stage 1	557	534	-	714	667	-	-	-	-	-	-	-
Stage 2	672	664	-	497	532	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.7	15	0.2	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1108	-	-	428	405	1278	-	-
HCM Lane V/C Ratio	0.005	-	-	0.133	0.111	0.017	-	-
HCM Control Delay (s)	8.3	0	-	14.7	15	7.9	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.4	0.1	-	-

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

	←	→	↖	↗	↙	↘	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↔						↔		↔	↔			
Traffic Volume (vph)	318	842	117	0	0	0	0	277	38	118	360	0		
Future Volume (vph)	318	842	117	0	0	0	0	277	38	118	360	0		
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1775	1900	0		
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0		
Storage Lanes	0		0	0		0	0		0	1		0		
Taper Length (m)	7.5		7.5			7.5			15.0					
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor		0.98						0.99		0.96				
Frt		0.986						0.984						
Flt Protected		0.988							0.950					
Satd. Flow (prot)	0	3176	0	0	0	0	0	1509	0	1670	1810	0		
Flt Permitted		0.988							0.379					
Satd. Flow (perm)	0	3125	0	0	0	0	0	1509	0	642	1810	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		15						8						
Link Speed (k/h)		50			50			50			50			
Link Distance (m)		65.5			97.6			126.2			71.9			
Travel Time (s)		4.7			7.0			9.1			5.2			
Confl. Peds. (#/hr)	49		14	14		49	147		63	63		147		
Peak Hour 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		
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%	0%	7%	3%	1%	5%	0%		
Adj. Flow (vph)	318	842	117	0	0	0	0	277	38	118	360	0		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	1277	0	0	0	0	0	315	0	118	360	0		
Turn Type	Perm	NA						NA		pm+pt	NA			
Protected Phases		4						2		1	6			
Permitted Phases	4									6				
Detector Phase	4	4						2		1	6			
Switch Phase														
Minimum Initial (s)	34.8	34.8						23.6		5.0	23.6			
Minimum Split (s)	46.8	46.8						35.6		9.0	35.6			
Total Split (s)	46.8	46.8						35.6		9.6	39.2			
Total Split (%)	50.9%	50.9%						38.7%		10.4%	42.6%			
Maximum Green (s)	40.8	40.8						29.6		5.6	33.2			
Yellow Time (s)	4.0	4.0						4.0		3.0	4.0			
All-Red Time (s)	2.0	2.0						2.0		1.0	2.0			
Lost Time Adjust (s)		0.0						0.0		0.0	0.0			
Total Lost Time (s)		6.0						6.0		4.0	6.0			
Lead/Lag								Lag		Lead				
Lead-Lag Optimize?								Yes		Yes				
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0			
Recall Mode	Max	Max						Max		None	Max			
Walk Time (s)	29.8	29.8						18.6			18.6			
Flash Dont Walk (s)	5.0	5.0						5.0			5.0			
Pedestrian Calls (#/hr)	0	0						0			0			
Act Effct Green (s)		40.8						29.6		41.2	39.2			
Actuated g/C Ratio		0.44						0.32		0.45	0.43			
v/c Ratio		0.92						0.64		0.34	0.47			

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

	←	→	↖	↗	↙	↘	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Control Delay		35.5						33.1		18.1	21.4			
Queue Delay		0.0						0.0		0.0	0.0			
Total Delay		35.5						33.1		18.1	21.4			
LOS		D						C		B	C			
Approach Delay		35.5						33.1			20.6			
Approach LOS		D						C			C			
Queue Length 50th (m)		112.6						48.5		12.7	46.8			
Queue Length 95th (m)		#160.9						78.3		23.5	71.8			
Internal Link Dist (m)		41.5			73.6			102.2			47.9			
Turn Bay Length (m)										20.0				
Base Capacity (vph)		1394						490		350	771			
Starvation Cap Reductn		0						0		0	0			
Spillback Cap Reductn		0						0		0	0			
Storage Cap Reductn		0						0		0	0			
Reduced v/c Ratio		0.92						0.64		0.34	0.47			

Intersection Summary

Area Type: Other

Cycle Length: 92

Actuated Cycle Length: 92

Natural Cycle: 95

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 31.7

Intersection LOS: C

Intersection Capacity Utilization 83.5%

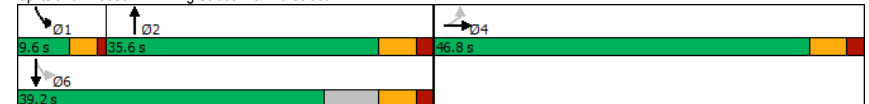
ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: King Street N & Erb Street E



HCM 6th Signalized Intersection Summary
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Volume (veh/h)	318	842	117	0	0	0	0	277	38	118	360	0
Future Volume (veh/h)	318	842	117	0	0	0	0	277	38	118	360	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		0.94	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No					No			No		
Adj Sat Flow, veh/h/ln	1735	1721	1721				0	1560	1611	1761	1826	0
Adj Flow Rate, veh/h	318	842	117				0	277	38	118	360	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1				0	7	3	1	5	0
Cap, veh/h	351	981	142				0	428	59	323	778	0
Arrive On Green	0.44	0.44	0.44				0.00	0.32	0.32	0.06	0.43	0.00
Sat Flow, veh/h	792	2213	319				0	1331	183	1677	1826	0
Grp Volume(v), veh/h	676	0	601				0	0	315	118	360	0
Grp Sat Flow(s),veh/h/ln	1682	0	1642				0	0	1514	1677	1826	0
Q Serve(g_s), s	34.4	0.0	29.6				0.0	0.0	16.4	4.1	13.0	0.0
Cycle Q Clear(g_c), s	34.4	0.0	29.6				0.0	0.0	16.4	4.1	13.0	0.0
Prop In Lane	0.47		0.19				0.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h	746	0	728				0	0	487	323	778	0
V/C Ratio(X)	0.91	0.00	0.83				0.00	0.00	0.65	0.37	0.46	0.00
Avail Cap(c_a), veh/h	746	0	728				0	0	487	323	778	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.8	0.0	22.5				0.0	0.0	26.7	19.6	18.9	0.0
Incr Delay (d2), s/veh	16.6	0.0	10.4				0.0	0.0	6.5	0.7	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	5.6				0.0	0.0	3.6	0.6	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.5	0.0	32.8				0.0	0.0	33.2	20.3	20.8	0.0
LnGrp LOS	D	A	C				A	A	C	C	C	A
Approach Vol, veh/h	1277						315			478		
Approach Delay, s/veh	36.9						33.2			20.7		
Approach LOS	D						C			C		
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.6	35.6		46.8		45.2						
Change Period (Y+Rc), s	4.0	6.0		6.0		6.0						
Max Green Setting (Gmax), s	5.6	29.6		40.8		33.2						
Max Q Clear Time (g_c+I1), s	6.1	18.4		36.4		15.0						
Green Ext Time (p_c), s	0.0	1.6		3.3		2.4						
Intersection Summary												
HCM 6th Ctrl Delay	32.6											
HCM 6th LOS	C											

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔	↔	↔	↔	
Traffic Volume (vph)	55	749	24	0	0	0	0	213	241	193	260	0
Future Volume (vph)	55	749	24	0	0	0	0	213	241	193	260	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1900	1750	1650	1650	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00							0.97		1.00	
Frt		0.996							0.850			
Flt Protected		0.997									0.979	
Satd. Flow (prot)	0	3237	0	0	0	0	0	1900	1473	0	1599	0
Flt Permitted		0.997									0.595	
Satd. Flow (perm)	0	3230	0	0	0	0	0	1900	1433	0	968	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5							95			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.6			163.4			98.3			91.2	
Travel Time (s)		7.0			11.8			7.1			6.6	
Confl. Peds. (#/hr)	29		54	54		29	28		14	14		28
Peak Hour 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
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%	0%
Adj. Flow (vph)	55	749	24	0	0	0	0	213	241	193	260	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	828	0	0	0	0	0	213	241	0	453	0
Turn Type	Perm	NA						NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4							2				
Minimum Split (s)	41.6	41.6						28.0	28.0	9.0	28.0	
Total Split (s)	41.6	41.6						28.0	28.0	10.4	38.4	
Total Split (%)	52.0%	52.0%						35.0%	35.0%	13.0%	48.0%	
Maximum Green (s)	35.6	35.6						22.0	22.0	6.4	32.4	
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	1.0	2.0	
Lost Time Adjust (s)		0.0						0.0	0.0		0.0	
Total Lost Time (s)		6.0						6.0	6.0		6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?		Yes						Yes	Yes	Yes		
Walk Time (s)	28.6	28.6						17.0	17.0		17.0	
Flash Dont Walk (s)	7.0	7.0						5.0	5.0		5.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)		35.6						22.0	22.0		4.4	
Actuated g/C Ratio		0.44						0.28	0.28		0.06	
v/c Ratio		0.57						0.41	0.52		5.21	
Control Delay		18.4						26.6	19.2		1929.1	
Queue Delay		2.2						0.0	0.0		0.0	
Total Delay		20.6						26.6	19.2		1929.1	
LOS		C						C	B		F	
Approach Delay		20.6						22.7			1929.1	

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			F	
Queue Length 50th (m)		49.7						27.8	18.8		~138.3	
Queue Length 95th (m)		67.6						47.4	41.3		#194.4	
Internal Link Dist (m)		73.6			139.4			74.3			67.2	
Turn Bay Length (m)								30.0				
Base Capacity (vph)		1440						522	462		87	
Starvation Cap Reductn		449						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		0.84						0.41	0.52		5.21	

Intersection Summary

Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	
Maximum v/c Ratio: 5.21	
Intersection Signal Delay: 519.4	Intersection LOS: F
Intersection Capacity Utilization 91.1%	ICU Level of Service F
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Regina Street N & Erb Street E

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HCM 6th Signalized Intersection Summary
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↑	↗		↖	
Traffic Volume (veh/h)	55	749	24	0	0	0	0	213	241	193	260	0
Future Volume (veh/h)	55	749	24	0	0	0	0	213	241	193	260	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No					No				No	
Adj Sat Flow, veh/h/ln	1735	1721	1735				0	1900	1736	1637	1637	0
Adj Flow Rate, veh/h	55	749	24				0	213	241	193	260	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	0				0	0	1	1	1	0
Cap, veh/h	96	1373	46				0	522	398	0	663	0
Arrive On Green	0.44	0.44	0.44				0.00	0.28	0.28	0.08	0.41	0.00
Sat Flow, veh/h	216	3086	104				0	1900	1449	0	1637	0
Grp Volume(v), veh/h	435	0	393				0	213	241	0	260	0
Grp Sat Flow(s),veh/h/ln	1711	0	1695				0	1900	1449	0	1637	0
Q Serve(g_s), s	15.2	0.0	13.4				0.0	7.3	11.6	0.0	9.0	0.0
Cycle Q Clear(g_c), s	15.2	0.0	13.4				0.0	7.3	11.6	0.0	9.0	0.0
Prop In Lane	0.13		0.06				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	761	0	754				0	523	398	0	663	0
V/C Ratio(X)	0.57	0.00	0.52				0.00	0.41	0.60	0.00	0.39	0.00
Avail Cap(c_a), veh/h	761	0	754				0	523	398	0	663	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	16.5	0.0	16.0				0.0	23.7	25.2	0.0	16.8	0.0
Incr Delay (d2), s/veh	3.1	0.0	2.6				0.0	2.4	6.7	0.0	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	1.4				0.0	1.7	2.3	0.0	1.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.6	0.0	18.6				0.0	26.0	31.9	0.0	18.6	0.0
LnGrp LOS	B	A	B				A	C	C	A	B	A
Approach Vol, veh/h	828						454				260	
Approach Delay, s/veh	19.1						29.1				18.6	
Approach LOS	B						C				B	
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	10.4	28.0		41.6			38.4					
Change Period (Y+Rc), s	4.0	6.0		6.0			6.0					
Max Green Setting (Gmax), s	6.4	22.0		35.6			32.4					
Max Q Clear Time (g_c+I1), s	0.0	13.6		17.2			11.0					
Green Ext Time (p_c), s	0.0	1.7		6.1			1.7					
Intersection Summary												
HCM 6th Ctrl Delay		22.0										
HCM 6th LOS		C										

Lanes, Volumes, Timings
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

															
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Traffic Volume (vph)	15	1161	28	0	0	0	0	9	41	188	19	0			
Future Volume (vph)	15	1161	28	0	0	0	0	9	41	188	19	0			
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1650	1650	0			
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped Bike Factor															
Frt		0.997						0.889							
Flt Protected		0.999									0.957				
Satd. Flow (prot)	0	3252	0	0	0	0	0	1467	0	0	1579	0			
Flt Permitted		0.999									0.957				
Satd. Flow (perm)	0	3252	0	0	0	0	0	1467	0	0	1579	0			
Link Speed (k/h)		50			50			50			50				
Link Distance (m)		19.4			67.1			41.5			87.0				
Travel Time (s)		1.4			4.8			3.0			6.3				
Confl. Peds. (#/hr)	14		13	13		14	48		2	2		48			
Peak Hour 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			
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Adj. Flow (vph)	15	1161	28	0	0	0	0	9	41	188	19	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	1204	0	0	0	0	0	50	0	0	207	0			
Sign Control		Free			Free			Stop			Stop				
Intersection Summary															
Area Type:	Other														
Control Type:	Unsignalized														
Intersection Capacity Utilization	66.4%														
Analysis Period (min)	15														
	ICU Level of Service C														

HCM 6th TWSC
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

Intersection												
Int Delay, s/veh	7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔			↔	
Traffic Vol, veh/h	15	1161	28	0	0	0	0	9	41	188	19	0
Future Vol, veh/h	15	1161	28	0	0	0	0	9	41	188	19	0
Conflicting Peds, #/hr	14	0	13	13	0	14	48	0	2	2	0	48
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	15	1161	28	0	0	0	0	9	41	188	19	0
Major/Minor												
	Major1			Minor1			Minor2					
Conflicting Flow All	14	0	0	-	1232	610	631	1246	-			
Stage 1	-	-	-	-	1218	-	14	14	-			
Stage 2	-	-	-	-	14	-	617	1232	-			
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.5	6.5	-			
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-			
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-			
Pot Cap-1 Maneuver	1617	-	-	-	0	179	442	370	175	0		
Stage 1	-	-	-	-	0	255	-	-	-	0		
Stage 2	-	-	-	-	0	-	-	449	252	0		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	1598	-	-	-	-	170	437	311	166	-		
Mov Cap-2 Maneuver	-	-	-	-	-	170	-	311	166	-		
Stage 1	-	-	-	-	-	245	-	-	-	-		
Stage 2	-	-	-	-	-	-	-	-	381	242		
Approach	EB			NB			SB					
HCM Control Delay, s	0.2			17.4			43.9					
HCM LOS				C			E					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR SBLn1								
Capacity (veh/h)	341	1598	-	- 288								
HCM Lane V/C Ratio	0.147	0.009	-	- 0.719								
HCM Control Delay (s)	17.4	7.3	0.1	- 43.9								
HCM Lane LOS	C	A	A	- E								
HCM 95th %tile Q(veh)	0.5	0	-	- 5.1								

Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

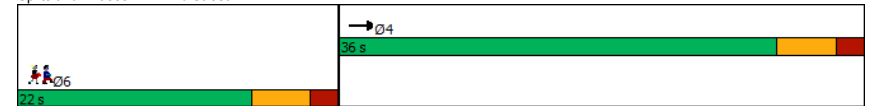
	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Lane Configurations		↑↑					
Traffic Volume (vph)	0	1204	0	0	0	0	
Future Volume (vph)	0	1204	0	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt							
Flt Protected							
Satd. Flow (prot)	0	3539	0	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	3539	0	0	0	0	
Right Turn on Red	Yes		Yes	Yes	Yes		
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		163.4	19.4		22.3		
Travel Time (s)		11.8	1.4		1.6		
Confl. Peds. (#/hr)	14			14	2	48	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	1204	0	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	1204	0	0	0	0	
Turn Type		NA					
Protected Phases		4				6	
Permitted Phases							
Detector Phase		4					
Switch Phase							
Minimum Initial (s)		30.0				10.0	
Minimum Split (s)		36.0				16.0	
Total Split (s)		36.0				22.0	
Total Split (%)		62.1%				38%	
Maximum Green (s)		30.0				16.0	
Yellow Time (s)		4.0				4.0	
All-Red Time (s)		2.0				2.0	
Lost Time Adjust (s)		0.0					
Total Lost Time (s)		6.0					
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0				3.0	
Recall Mode		Max				None	
Walk Time (s)		25.0				10.0	
Flash Dont Walk (s)		5.0				6.0	
Pedestrian Calls (#/hr)		0				0	
Act Effct Green (s)		51.0					
Actuated g/C Ratio		1.00					
v/c Ratio		0.34					
Control Delay		0.3					
Queue Delay		0.0					
Total Delay		0.3					
LOS		A					

Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
Existing PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Lane Group							
Approach Delay		0.3					
Approach LOS		A					
Queue Length 50th (m)		0.0					
Queue Length 95th (m)		0.0					
Internal Link Dist (m)		139.4	0.1		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		3539					
Starvation Cap Reductn		0					
Spillback Cap Reductn		0					
Storage Cap Reductn		0					
Reduced v/c Ratio		0.34					
Intersection Summary							
Area Type:		Other					
Cycle Length:		58					
Actuated Cycle Length:		51					
Natural Cycle:		55					
Control Type:		Semi Act-Uncoord					
Maximum v/c Ratio:		0.34					
Intersection Signal Delay:		0.3				Intersection LOS: A	
Intersection Capacity Utilization		52.9%				ICU Level of Service A	
Analysis Period (min)		15					

Splits and Phases: 7: Erb Street E



HCM 6th Edition methodology does not support exclusive ped or hold phases.

Appendix D

2027 Background Synchro Reports



Lanes, Volumes, Timings

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

2026 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	2	5	9	12	7	24	1	139	35	31	443	3
Future Volume (vph)	2	5	9	12	7	24	1	139	35	31	443	3
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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		0.924			0.925			0.973			0.999	
Flt Protected		0.994			0.986						0.997	
Satd. Flow (prot)	0	1340	0	0	1414	0	0	1496	0	0	1516	0
Flt Permitted		0.994			0.986						0.997	
Satd. Flow (perm)	0	1340	0	0	1414	0	0	1496	0	0	1516	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		42.7			64.4			91.2			31.3	
Travel Time (s)		3.1			4.6			6.6			2.3	
Confl. Peds. (#/hr)	4		4	4		4	13		11	11		13
Peak Hour 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
Heavy Vehicles (%)	50%	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%
Adj. Flow (vph)	2	5	9	12	7	24	1	139	35	31	443	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	43	0	0	175	0	0	477	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 60.2%

ICU Level of Service B

Analysis Period (min) 15

HCM 6th TWSC

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

2026 Background AM Peak Hour

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	2	5	9	12	7	24	1	139	35	31	443	3
Future Vol, veh/h	2	5	9	12	7	24	1	139	35	31	443	3
Conflicting Peds, #/hr	4	0	4	4	0	4	13	0	11	11	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	50	0	0	0	0	0	0	1	0	0	2	0
Mvmt Flow	2	5	9	12	7	24	1	139	35	31	443	3

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	698	707	462	688	691	172	459	0	0	185	0	0
Stage 1	520	520	-	170	170	-	-	-	-	-	-	-
Stage 2	178	187	-	518	521	-	-	-	-	-	-	-
Critical Hdwy	7.6	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.6	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.6	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.95	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	299	363	604	363	370	877	1113	-	-	1402	-	-
Stage 1	461	535	-	837	762	-	-	-	-	-	-	-
Stage 2	724	749	-	544	535	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	276	345	595	341	352	866	1101	-	-	1389	-	-
Mov Cap-2 Maneuver	276	345	-	341	352	-	-	-	-	-	-	-
Stage 1	455	513	-	829	754	-	-	-	-	-	-	-
Stage 2	694	742	-	513	513	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	12.6	0	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1101	-	-	434	519	1389	-	-
HCM Lane V/C Ratio	0.001	-	-	0.037	0.083	0.022	-	-
HCM Control Delay (s)	8.3	0	-	13.6	12.6	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0.1	-	-

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕		↕	↕	
Traffic Volume (vph)	464	801	39	0	0	0	0	324	16	162	420	0
Future Volume (vph)	464	801	39	0	0	0	0	324	16	162	420	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1775	1900	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5		7.5			7.5			15.0			
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98						1.00		0.98		
Frt		0.996						0.994				
Flt Protected		0.983							0.950			
Satd. Flow (prot)	0	3133	0	0	0	0	0	1499	0	1653	1792	0
Flt Permitted		0.983							0.377			
Satd. Flow (perm)	0	3081	0	0	0	0	0	1499	0	644	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4						3				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		67.6			97.6			126.2			71.9	
Travel Time (s)		4.9			7.0			9.1			5.2	
Confl. Peds. (#/hr)	36		13	13		36	66		42	42		66
Peak Hour 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
Heavy Vehicles (%)	1%	4%	3%	0%	0%	0%	0%	9%	13%	2%	6%	0%
Adj. Flow (vph)	464	801	39	0	0	0	0	324	16	162	420	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1304	0	0	0	0	0	340	0	162	420	0
Turn Type	Perm	NA						NA	pm+pt	NA		
Protected Phases		4						2		1	6	
Permitted Phases		4								6		
Detector Phase		4	4					2		1	6	
Switch Phase												
Minimum Initial (s)	30.8	30.8						27.6		5.0	27.6	
Minimum Split (s)	36.8	36.8						33.6		9.0	33.6	
Total Split (s)	36.8	36.8						33.6		9.6	43.2	
Total Split (%)	46.0%	46.0%						42.0%		12.0%	54.0%	
Maximum Green (s)	30.8	30.8						27.6		5.6	37.2	
Yellow Time (s)	4.0	4.0						4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0						2.0		1.0	2.0	
Lost Time Adjust (s)		0.0						0.0		0.0	0.0	
Total Lost Time (s)		6.0						6.0		4.0	6.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	Max	Max						Max		None	Max	
Walk Time (s)	25.8	25.8						22.6			22.6	
Flash Dont Walk (s)	5.0	5.0						5.0			5.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		30.8						27.6		39.2	37.2	
Actuated g/C Ratio		0.38						0.34		0.49	0.46	
v/c Ratio		1.10						0.66		0.42	0.50	

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		82.9						29.1		15.3	17.6	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		82.9						29.1		15.3	17.6	
LOS		F						C		B	B	
Approach Delay		82.9						29.1			17.0	
Approach LOS		F						C			B	
Queue Length 50th (m)		~126.5						44.9		13.9	45.0	
Queue Length 95th (m)		#168.1						74.4		25.2	70.4	
Internal Link Dist (m)		43.6			73.6			102.2			47.9	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1188						519		386	833	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		1.10						0.66		0.42	0.50	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 57.5

Intersection LOS: E

Intersection Capacity Utilization 89.6%

ICU Level of Service E

Analysis Period (min) 15

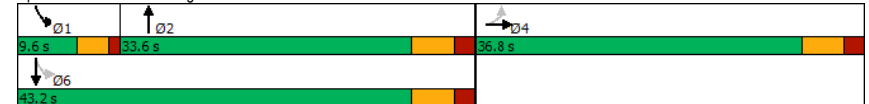
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: King Street N & Erb Street E



HCM 6th Signalized Intersection Summary
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	464	801	39	0	0	0	0	324	16	162	420	0
Future Volume (veh/h)	464	801	39	0	0	0	0	324	16	162	420	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				1.00		0.96	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1721	1681	1694				0	1534	1483	1747	1811	0
Adj Flow Rate, veh/h	464	801	39				0	324	16	162	420	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	3				0	9	13	2	6	0
Cap, veh/h	429	795	40				0	499	25	356	842	0
Arrive On Green	0.38	0.38	0.38				0.00	0.34	0.34	0.07	0.47	0.00
Sat Flow, veh/h	1113	2065	103				0	1447	71	1664	1811	0
Grp Volume(v), veh/h	677	0	627				0	0	340	162	420	0
Grp Sat Flow(s), veh/h/ln	1625	0	1656				0	0	1518	1664	1811	0
Q Serve(g_s), s	30.8	0.0	30.0				0.0	0.0	15.1	4.8	12.9	0.0
Cycle Q Clear(g_c), s	30.8	0.0	30.0				0.0	0.0	15.1	4.8	12.9	0.0
Prop In Lane	0.69		0.06				0.00		0.05	1.00		0.00
Lane Grp Cap(c), veh/h	626	0	638				0	0	524	356	842	0
V/C Ratio(X)	1.08	0.00	0.98				0.00	0.00	0.65	0.45	0.50	0.00
Avail Cap(c_a), veh/h	626	0	638				0	0	524	356	842	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.6	0.0	24.3				0.0	0.0	22.1	16.1	14.9	0.0
Incr Delay (d2), s/veh	60.3	0.0	31.7				0.0	0.0	6.1	0.9	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.6	0.0	8.7				0.0	0.0	2.6	0.4	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.9	0.0	56.0				0.0	0.0	28.2	17.0	17.0	0.0
LnGrp LOS	F	A	E				A	A	C	B	B	A
Approach Vol, veh/h	1304						340			582		
Approach Delay, s/veh	71.0						28.2			17.0		
Approach LOS	E						C			B		
Timer - Assigned Phs	1	2	4		6							
Phs Duration (G+Y+Rc), s	9.6	33.6	36.8		43.2							
Change Period (Y+Rc), s	4.0	6.0	6.0		6.0							
Max Green Setting (Gmax), s	5.6	27.6	30.8		37.2							
Max Q Clear Time (g_c+I1), s	6.8	17.1	32.8		14.9							
Green Ext Time (p_c), s	0.0	1.7	0.0		3.1							
Intersection Summary												
HCM 6th Ctrl Delay	50.4											
HCM 6th LOS	D											

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔		
Traffic Volume (vph)	32	591	37	0	0	0	0	143	72	85	377	0
Future Volume (vph)	32	591	37	0	0	0	0	143	72	85	377	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1900	1750	1650	1650	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99							0.97		1.00	
Frt		0.992							0.850			
Flt Protected		0.998									0.991	
Satd. Flow (prot)	0	3129	0	0	0	0	0	1881	1458	0	1613	0
Flt Permitted		0.998									0.848	
Satd. Flow (perm)	0	3125	0	0	0	0	0	1881	1410	0	1376	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10							95			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.6			163.4			74.2			91.2	
Travel Time (s)		7.0			11.8			5.3			6.6	
Confl. Peds. (#/hr)	12		22	22		12	13		16	16		13
Peak Hour 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
Heavy Vehicles (%)	0%	4%	6%	0%	0%	0%	0%	1%	2%	3%	1%	0%
Adj. Flow (vph)	32	591	37	0	0	0	0	143	72	85	377	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	660	0	0	0	0	0	143	72	0	462	0
Turn Type	Perm	NA						NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4								2			
Minimum Split (s)	44.0	44.0						26.4	26.4	9.0	26.4	
Total Split (s)	44.0	44.0						26.4	26.4	9.6	36.0	
Total Split (%)	55.0%	55.0%						33.0%	33.0%	12.0%	45.0%	
Maximum Green (s)	38.0	38.0						20.4	20.4	5.6	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	1.0	2.0	
Lost Time Adjust (s)		0.0						0.0	0.0		0.0	
Total Lost Time (s)		6.0						6.0	6.0		6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?		Yes						Yes	Yes	Yes		
Walk Time (s)	7.0	7.0						7.0	7.0		7.0	
Flash Dont Walk (s)	11.0	11.0						11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effect Green (s)		38.0						20.4	20.4		3.6	
Actuated g/C Ratio		0.48						0.26	0.26		0.04	
v/c Ratio		0.44						0.30	0.17		6.42	
Control Delay		14.9						26.1	4.5		2475.6	
Queue Delay		0.9						0.0	0.0		0.0	
Total Delay		15.8						26.1	4.5		2475.6	
LOS		B						C	A		F	
Approach Delay		15.8						18.9			2475.6	

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group												
Approach LOS		B						B			F	
Queue Length 50th (m)		34.5						18.4	0.0		~143.9	
Queue Length 95th (m)		48.4						34.0	6.7		#200.3	
Internal Link Dist (m)		73.6			139.4			50.2			67.2	
Turn Bay Length (m)								30.0				
Base Capacity (vph)		1489						479	430		72	
Starvation Cap Reductn		518						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		0.68						0.30	0.17		6.42	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 6.42

Intersection Signal Delay: 866.3

Intersection LOS: F

Intersection Capacity Utilization 91.9%

ICU Level of Service F

Analysis Period (min) 15

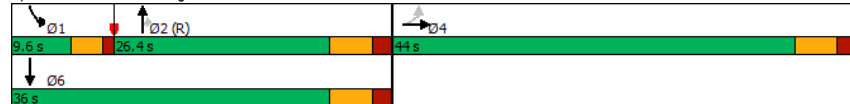
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Regina Street N & Erb Street E



HCM 6th Signalized Intersection Summary
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations		↔↔						↑	↗		↘	
Traffic Volume (veh/h)	32	591	37	0	0	0	0	143	72	85	377	0
Future Volume (veh/h)	32	591	37	0	0	0	0	143	72	85	377	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No					No				No	
Adj Sat Flow, veh/h/ln	1735	1681	1654				0	1885	1723	1611	1637	0
Adj Flow Rate, veh/h	32	591	37				0	143	72	85	377	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	6				0	1	2	3	1	0
Cap, veh/h	73	1408	93				0	481	365	0	614	0
Arrive On Green	0.47	0.47	0.47				0.00	0.25	0.25	0.07	0.38	0.00
Sat Flow, veh/h	154	2965	195				0	1885	1432	0	1637	0
Grp Volume(v), veh/h	348	0	312				0	143	72	0	377	0
Grp Sat Flow(s),veh/h/ln	1673	0	1640				0	1885	1432	0	1637	0
Q Serve(g_s), s	11.0	0.0	9.8				0.0	4.9	3.2	0.0	15.0	0.0
Cycle Q Clear(g_c), s	11.0	0.0	9.8				0.0	4.9	3.2	0.0	15.0	0.0
Prop In Lane	0.09		0.12				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	795	0	779				0	481	365	0	614	0
V/C Ratio(X)	0.44	0.00	0.40				0.00	0.30	0.20	0.00	0.61	0.00
Avail Cap(c_a), veh/h	795	0	779				0	481	365	0	614	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	13.9	0.0	13.6				0.0	24.0	23.4	0.0	20.3	0.0
Incr Delay (d2), s/veh	1.8	0.0	1.5				0.0	1.6	1.2	0.0	4.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.7				0.0	1.1	0.6	0.0	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	0.0	15.1				0.0	25.6	24.6	0.0	24.8	0.0
LnGrp LOS	B	A	B				A	C	C	A	C	A
Approach Vol, veh/h		660						215			377	
Approach Delay, s/veh		15.4						25.3			24.8	
Approach LOS		B						C			C	
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	9.6	26.4		44.0			36.0					
Change Period (Y+Rc), s	4.0	6.0		6.0			6.0					
Max Green Setting (Gmax), s	5.6	20.4		38.0			30.0					
Max Q Clear Time (g_c+I1), s	0.0	6.9		13.0			17.0					
Green Ext Time (p_c), s	0.0	1.0		5.2			2.2					
Intersection Summary												
HCM 6th Ctrl Delay		20.0										
HCM 6th LOS		B										

Lanes, Volumes, Timings
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔						↔			↔	
Traffic Volume (vph)	22	712	11	0	0	0	0	1	4	161	4	0
Future Volume (vph)	22	712	11	0	0	0	0	1	4	161	4	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1650	1650	0
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.998						0.892					
Flt Protected	0.999									0.953		
Satd. Flow (prot)	0	3166	0	0	0	0	0	1472	0	0	1572	0
Flt Permitted	0.999									0.953		
Satd. Flow (perm)	0	3166	0	0	0	0	0	1472	0	0	1572	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	19.4			67.1			41.5			87.0		
Travel Time (s)	1.4			4.8			3.0			6.3		
Confl. Peds. (#/hr)	5		5	5		5	52		4	4		52
Peak Hour 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
Heavy Vehicles (%)	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	712	11	0	0	0	0	1	4	161	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	745	0	0	0	0	0	5	0	0	165	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	49.8%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM 6th TWSC
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

Intersection													
Int Delay, s/veh	3.1												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↔						↔			↔		
Traffic Vol, veh/h	22	712	11	0	0	0	0	1	4	161	4	0	
Future Vol, veh/h	22	712	11	0	0	0	0	1	4	161	4	0	
Conflicting Peds, #/hr	5	0	5	5	0	5	52	0	4	4	0	52	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100	
Heavy Vehicles, %	0	4	0	0	0	0	0	0	0	0	0	0	
Mvmt Flow	22	712	11	0	0	0	0	1	4	161	4	0	
Major/Minor													
	Major1			Minor1			Minor2						
Conflicting Flow All	5	0	0	-	772	371	410	777	-				
Stage 1	-	-	-	-	767	-	5	5	-				
Stage 2	-	-	-	-	5	-	405	772	-				
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.5	6.5	-				
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-				
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-				
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-				
Pot Cap-1 Maneuver	1630	-	-	-	0	333	632	531	330	0			
Stage 1	-	-	-	-	0	414	-	-	-	0			
Stage 2	-	-	-	-	0	-	-	599	412	0			
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-			
Mov Cap-1 Maneuver	1623	-	-	-	-	323	629	515	320	-			
Mov Cap-2 Maneuver	-	-	-	-	-	323	-	515	320	-			
Stage 1	-	-	-	-	-	403	-	-	-	-			
Stage 2	-	-	-	-	-	-	-	580	401	-			
Approach													
	EB			NB			SB						
HCM Control Delay, s	0.3			11.9			15.5						
HCM LOS				B			C						
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR SBLn1									
Capacity (veh/h)	529	1623	-	-	508								
HCM Lane V/C Ratio	0.009	0.014	-	-	0.325								
HCM Control Delay (s)	11.9	7.2	0.1	-	15.5								
HCM Lane LOS	B	A	A	-	C								
HCM 95th %tile Q(veh)	0	0	-	-	1.4								

Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

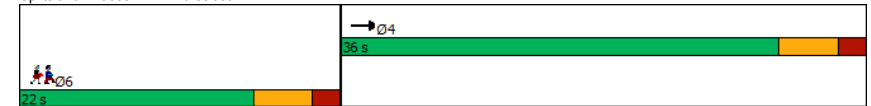
	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Lane Configurations		↑↑					
Traffic Volume (vph)	0	746	0	0	0	0	
Future Volume (vph)	0	746	0	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt							
Flt Protected							
Satd. Flow (prot)	0	3539	0	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	3539	0	0	0	0	
Right Turn on Red	Yes		Yes	Yes	Yes		
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		163.4	19.4		22.3		
Travel Time (s)		11.8	1.4		1.6		
Confl. Peds. (#/hr)	5			5	4	52	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	746	0	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	746	0	0	0	0	
Turn Type		NA					
Protected Phases		4				6	
Permitted Phases							
Detector Phase		4					
Switch Phase							
Minimum Initial (s)		30.0				10.0	
Minimum Split (s)		36.0				16.0	
Total Split (s)		36.0				22.0	
Total Split (%)		62.1%				38%	
Maximum Green (s)		30.0				16.0	
Yellow Time (s)		4.0				4.0	
All-Red Time (s)		2.0				2.0	
Lost Time Adjust (s)		0.0					
Total Lost Time (s)		6.0					
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0				3.0	
Recall Mode		Max				None	
Walk Time (s)		25.0				10.0	
Flash Dont Walk (s)		5.0				6.0	
Pedestrian Calls (#/hr)		0				0	
Act Effct Green (s)		51.0					
Actuated g/C Ratio		1.00					
v/c Ratio		0.21					
Control Delay		0.1					
Queue Delay		0.0					
Total Delay		0.1					
LOS		A					

Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Lane Group							
Approach Delay		0.1					
Approach LOS		A					
Queue Length 50th (m)		0.0					
Queue Length 95th (m)		0.0					
Internal Link Dist (m)		139.4	0.1		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		3539					
Starvation Cap Reductn		0					
Spillback Cap Reductn		0					
Storage Cap Reductn		0					
Reduced v/c Ratio		0.21					
Intersection Summary							
Area Type:		Other					
Cycle Length:		58					
Actuated Cycle Length:		51					
Natural Cycle:		55					
Control Type:		Semi Act-Uncoord					
Maximum v/c Ratio:		0.21					
Intersection Signal Delay:		0.1					
Intersection LOS:		A					
Intersection Capacity Utilization		44.9%					
ICU Level of Service		A					
Analysis Period (min)		15					

Splits and Phases: 7: Erb Street E



HCM 6th Edition methodology does not support exclusive ped or hold phases.

Lanes, Volumes, Timings

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

2026 Background PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	14	38	21	6	35	5	288	20	39	473	15
Future Volume (vph)	11	14	38	21	6	35	5	288	20	39	473	15
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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		0.919			0.924			0.991			0.996	
Flt Protected		0.991			0.983			0.999			0.996	
Satd. Flow (prot)	0	1412	0	0	1408	0	0	1535	0	0	1524	0
Flt Permitted		0.991			0.983			0.999			0.996	
Satd. Flow (perm)	0	1412	0	0	1408	0	0	1535	0	0	1524	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		42.7			64.4			91.2			31.3	
Travel Time (s)		3.1			4.6			6.6			2.3	
Confl. Peds. (#/hr)	15		9	9		15	17		14	14		17
Peak Hour 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
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	11	14	38	21	6	35	5	288	20	39	473	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	62	0	0	313	0	0	527	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 75.4%

ICU Level of Service D

Analysis Period (min) 15

HCM 6th TWSC

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

2026 Background PM Peak Hour

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	14	38	21	6	35	5	288	20	39	473	15
Future Vol, veh/h	11	14	38	21	6	35	5	288	20	39	473	15
Conflicting Peds, #/hr	15	0	9	9	0	15	17	0	14	14	0	17
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	1	0
Mvmt Flow	11	14	38	21	6	35	5	288	20	39	473	15

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	920	908	507	916	905	327	505	0	0	322	0	0
Stage 1	576	576	-	322	322	-	-	-	-	-	-	-
Stage 2	344	332	-	594	583	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	254	277	570	255	278	719	1070	-	-	1249	-	-
Stage 1	506	505	-	694	655	-	-	-	-	-	-	-
Stage 2	676	648	-	495	502	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	222	257	558	215	258	701	1055	-	-	1234	-	-
Mov Cap-2 Maneuver	222	257	-	215	258	-	-	-	-	-	-	-
Stage 1	496	477	-	682	643	-	-	-	-	-	-	-
Stage 2	624	636	-	425	474	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	16.9		16.9		0.1		0.6	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1055	-	-	366	363	1234	-	-
HCM Lane V/C Ratio	0.005	-	-	0.172	0.171	0.032	-	-
HCM Control Delay (s)	8.4	0	-	16.9	16.9	8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.6	0.1	-	-

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

	↖	→	↗	↘	←	↖	↗	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Volume (vph)	358	952	131	0	0	0	0	312	42	132	405	0
Future Volume (vph)	358	952	131	0	0	0	0	312	42	132	405	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1775	1900	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5		7.5			7.5			15.0			
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98						0.99		0.97		
Frt		0.986						0.984				
Flt Protected		0.988							0.950			
Satd. Flow (prot)	0	3176	0	0	0	0	0	1509	0	1670	1810	0
Flt Permitted		0.988							0.332			
Satd. Flow (perm)	0	3125	0	0	0	0	0	1509	0	565	1810	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15						8				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		65.5			97.6			126.2			71.9	
Travel Time (s)		4.7			7.0			9.1			5.2	
Confl. Peds. (#/hr)	49		14	14		49	147		63	63		147
Peak Hour 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
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%	0%	7%	3%	1%	5%	0%
Adj. Flow (vph)	358	952	131	0	0	0	0	312	42	132	405	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1441	0	0	0	0	0	354	0	132	405	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Detector Phase	4	4						2		1	6	
Switch Phase												
Minimum Initial (s)	34.8	34.8						23.6		5.0	23.6	
Minimum Split (s)	46.8	46.8						35.6		9.0	35.6	
Total Split (s)	46.8	46.8						35.6		9.6	39.2	
Total Split (%)	50.9%	50.9%						38.7%		10.4%	42.6%	
Maximum Green (s)	40.8	40.8						29.6		5.6	33.2	
Yellow Time (s)	4.0	4.0						4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0						2.0		1.0	2.0	
Lost Time Adjust (s)		0.0						0.0		0.0	0.0	
Total Lost Time (s)		6.0						6.0		4.0	6.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	Max	Max						Max		None	Max	
Walk Time (s)	29.8	29.8						18.6			18.6	
Flash Dont Walk (s)	5.0	5.0						5.0			5.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effect Green (s)		40.8						29.6		41.2	39.2	
Actuated g/C Ratio		0.44						0.32		0.45	0.43	
v/c Ratio		1.03						0.72		0.41	0.53	

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

	↖	→	↗	↘	←	↖	↗	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		59.7						36.8		19.6	22.6	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		59.7						36.8		19.6	22.6	
LOS		E						D		B	C	
Approach Delay		59.7						36.8			21.9	
Approach LOS		E						D			C	
Queue Length 50th (m)		~152.5						56.5		14.3	54.3	
Queue Length 95th (m)		#196.3						#90.9		25.9	82.5	
Internal Link Dist (m)		41.5				73.6		102.2			47.9	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1394						490		320	771	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		1.03						0.72		0.41	0.53	

Intersection Summary

Area Type: Other

Cycle Length: 92

Actuated Cycle Length: 92

Natural Cycle: 95

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 47.5

Intersection LOS: D

Intersection Capacity Utilization 91.8%

ICU Level of Service F

Analysis Period (min) 15

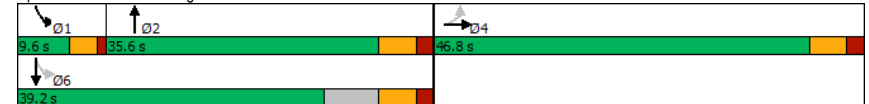
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: King Street N & Erb Street E



HCM 6th Signalized Intersection Summary
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔		
Traffic Volume (veh/h)	358	952	131	0	0	0	0	312	42	132	405	0
Future Volume (veh/h)	358	952	131	0	0	0	0	312	42	132	405	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		0.94	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No					No			No		
Adj Sat Flow, veh/h/ln	1735	1721	1721				0	1560	1611	1761	1826	0
Adj Flow Rate, veh/h	358	952	131				0	312	42	132	405	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1				0	7	3	1	5	0
Cap, veh/h	351	983	140				0	429	58	291	778	0
Arrive On Green	0.44	0.44	0.44				0.00	0.32	0.32	0.06	0.43	0.00
Sat Flow, veh/h	791	2217	316				0	1335	180	1677	1826	0
Grp Volume(v), veh/h	761	0	680				0	0	354	132	405	0
Grp Sat Flow(s),veh/h/ln	1682	0	1643				0	0	1514	1677	1826	0
Q Serve(g_s), s	40.8	0.0	36.2				0.0	0.0	19.0	4.7	15.0	0.0
Cycle Q Clear(g_c), s	40.8	0.0	36.2				0.0	0.0	19.0	4.7	15.0	0.0
Prop In Lane	0.47		0.19				0.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h	746	0	728				0	0	487	291	778	0
V/C Ratio(X)	1.02	0.00	0.93				0.00	0.00	0.73	0.45	0.52	0.00
Avail Cap(c_a), veh/h	746	0	728				0	0	487	291	778	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.6	0.0	24.3				0.0	0.0	27.6	20.5	19.5	0.0
Incr Delay (d2), s/veh	38.2	0.0	20.5				0.0	0.0	9.1	1.1	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	0.0	8.4				0.0	0.0	4.4	0.8	2.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.8	0.0	44.9				0.0	0.0	36.8	21.6	22.0	0.0
LnGrp LOS	F	A	D				A	A	D	C	C	A
Approach Vol, veh/h	1441						354			537		
Approach Delay, s/veh	54.8						36.8			21.9		
Approach LOS	D						D			C		
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.6	35.6		46.8		45.2						
Change Period (Y+Rc), s	4.0	6.0		6.0		6.0						
Max Green Setting (Gmax), s	5.6	29.6		40.8		33.2						
Max Q Clear Time (g_c+I1), s	6.7	21.0		42.8		17.0						
Green Ext Time (p_c), s	0.0	1.6		0.0		2.6						
Intersection Summary												
HCM 6th Ctrl Delay	44.5											
HCM 6th LOS	D											

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔		
Traffic Volume (vph)	61	846	28	0	0	0	0	246	276	224	292	0
Future Volume (vph)	61	846	28	0	0	0	0	246	276	224	292	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1900	1750	1650	1650	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00							0.97		1.00	
Frt		0.996							0.850			
Flt Protected		0.997									0.979	
Satd. Flow (prot)	0	3236	0	0	0	0	0	1900	1473	0	1599	0
Flt Permitted		0.997									0.541	
Satd. Flow (perm)	0	3230	0	0	0	0	0	1900	1433	0	880	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5							95			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.6			163.4			98.3			91.2	
Travel Time (s)		7.0			11.8			7.1			6.6	
Confl. Peds. (#/hr)	29		54	54		29	28		14	14		28
Peak Hour 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
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%	0%
Adj. Flow (vph)	61	846	28	0	0	0	0	246	276	224	292	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	935	0	0	0	0	0	246	276	0	516	0
Turn Type	Perm	NA						NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4							2				
Minimum Split (s)	41.6	41.6						28.0	28.0	9.0	28.0	
Total Split (s)	41.6	41.6						28.0	28.0	10.4	38.4	
Total Split (%)	52.0%	52.0%						35.0%	35.0%	13.0%	48.0%	
Maximum Green (s)	35.6	35.6						22.0	22.0	6.4	32.4	
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	1.0	2.0	
Lost Time Adjust (s)		0.0						0.0	0.0		0.0	
Total Lost Time (s)		6.0						6.0	6.0		6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?		Yes						Yes	Yes	Yes		
Walk Time (s)	28.6	28.6						17.0	17.0		17.0	
Flash Dont Walk (s)	7.0	7.0						5.0	5.0		5.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effect Green (s)		35.6						22.0	22.0		4.4	
Actuated g/C Ratio		0.44						0.28	0.28		0.06	
v/c Ratio		0.65						0.47	0.60		5.93	
Control Delay		19.9						27.8	22.4		2253.1	
Queue Delay		4.9						0.0	0.0		0.0	
Total Delay		24.7						27.8	22.4		2253.1	
LOS		C						C	C		F	
Approach Delay		24.7						24.9			2253.1	

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			F	
Queue Length 50th (m)		58.7						32.7	24.4		~159.6	
Queue Length 95th (m)		79.3						54.3	49.9		#218.4	
Internal Link Dist (m)		73.6			139.4			74.3			67.2	
Turn Bay Length (m)								30.0				
Base Capacity (vph)		1440						522	462		87	
Starvation Cap Reductn		428						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		0.92						0.47	0.60		5.93	

Intersection Summary

Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	
Maximum v/c Ratio: 5.93	
Intersection Signal Delay: 607.6	Intersection LOS: F
Intersection Capacity Utilization 97.3%	ICU Level of Service F
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Regina Street N & Erb Street E

Ø1	Ø2 (R)	Ø4
10.4 s	28 s	41.6 s
Ø6 (R)		
38.4 s		

HCM 6th Signalized Intersection Summary
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↑	↗		↖	
Traffic Volume (veh/h)	61	846	28	0	0	0	0	246	276	224	292	0
Future Volume (veh/h)	61	846	28	0	0	0	0	246	276	224	292	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No					No				No	
Adj Sat Flow, veh/h/ln	1735	1721	1735				0	1900	1736	1637	1637	0
Adj Flow Rate, veh/h	61	846	28				0	246	276	224	292	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	0				0	0	1	1	1	0
Cap, veh/h	94	1373	48				0	522	398	0	663	0
Arrive On Green	0.44	0.44	0.44				0.00	0.28	0.28	0.08	0.41	0.00
Sat Flow, veh/h	212	3086	107				0	1900	1449	0	1637	0
Grp Volume(v), veh/h	492	0	443				0	246	276	0	292	0
Grp Sat Flow(s),veh/h/ln	1711	0	1694				0	1900	1449	0	1637	0
Q Serve(g_s), s	17.9	0.0	15.7				0.0	8.6	13.6	0.0	10.3	0.0
Cycle Q Clear(g_c), s	17.9	0.0	15.7				0.0	8.6	13.6	0.0	10.3	0.0
Prop In Lane	0.12		0.06				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	761	0	754				0	523	398	0	663	0
V/C Ratio(X)	0.65	0.00	0.59				0.00	0.47	0.69	0.00	0.44	0.00
Avail Cap(c_a), veh/h	761	0	754				0	523	398	0	663	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	17.3	0.0	16.7				0.0	24.2	26.0	0.0	17.2	0.0
Incr Delay (d2), s/veh	4.2	0.0	3.3				0.0	3.0	9.5	0.0	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	1.8				0.0	2.0	2.9	0.0	1.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.5	0.0	20.0				0.0	27.2	35.5	0.0	19.4	0.0
LnGrp LOS	C	A	C				A	C	D	A	B	A
Approach Vol, veh/h		935						522			292	
Approach Delay, s/veh		20.8						31.6			19.4	
Approach LOS		C						C			B	
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	10.4	28.0		41.6			38.4					
Change Period (Y+Rc), s	4.0	6.0		6.0			6.0					
Max Green Setting (Gmax), s	6.4	22.0		35.6			32.4					
Max Q Clear Time (g_c+I1), s	0.0	15.6		19.9			12.3					
Green Ext Time (p_c), s	0.0	1.7		6.4			1.9					
Intersection Summary												
HCM 6th Ctrl Delay			23.8									
HCM 6th LOS			C									

Lanes, Volumes, Timings
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕			↕	
Traffic Volume (vph)	24	1311	31	0	0	0	0	10	46	222	21	0
Future Volume (vph)	24	1311	31	0	0	0	0	10	46	222	21	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1650	1650	0
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997						0.889				
Flt Protected		0.999									0.956	
Satd. Flow (prot)	0	3252	0	0	0	0	0	1467	0	0	1577	0
Flt Permitted		0.999									0.956	
Satd. Flow (perm)	0	3252	0	0	0	0	0	1467	0	0	1577	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		19.4			67.1			41.5			87.0	
Travel Time (s)		1.4			4.8			3.0			6.3	
Confl. Peds. (#/hr)	14		13	13		14	48		2	2		48
Peak Hour 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
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	24	1311	31	0	0	0	0	10	46	222	21	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1366	0	0	0	0	0	56	0	0	243	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 73.7%	ICU Level of Service D											
Analysis Period (min) 15												

HCM 6th TWSC
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

Intersection												
Int Delay, s/veh	18.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔			↔	
Traffic Vol, veh/h	24	1311	31	0	0	0	0	10	46	222	21	0
Future Vol, veh/h	24	1311	31	0	0	0	0	10	46	222	21	0
Conflicting Peds, #/hr	14	0	13	13	0	14	48	0	2	2	0	48
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	24	1311	31	0	0	0	0	10	46	222	21	0
Major/Minor												
	Major1			Minor1			Minor2					
Conflicting Flow All	14	0	0	-	1402	686	725	1417	-			
Stage 1	-	-	-	-	1388	-	14	14	-			
Stage 2	-	-	-	-	14	-	711	1403	-			
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.5	6.5	-			
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-			
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-			
Pot Cap-1 Maneuver	1617	-	-	-	0	141	395	317	138	0		
Stage 1	-	-	-	-	0	212	-	-	-	0		
Stage 2	-	-	-	-	0	-	-	395	208	0		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	1598	-	-	-	-	130	391	248	127	-		
Mov Cap-2 Maneuver	-	-	-	-	-	130	-	248	127	-		
Stage 1	-	-	-	-	-	197	-	-	-	-		
Stage 2	-	-	-	-	-	-	-	311	193	-		
Approach	EB			NB			SB					
HCM Control Delay, s	0.3			20.5			122.2					
HCM LOS				C			F					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR SBLn1								
Capacity (veh/h)	288	1598	-	- 229								
HCM Lane V/C Ratio	0.194	0.015	-	- 1.061								
HCM Control Delay (s)	20.5	7.3	0.2	- 122.2								
HCM Lane LOS	C	A	A	- F								
HCM 95th %tile Q(veh)	0.7	0	-	- 10.5								

Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

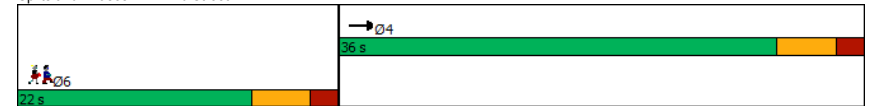
	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Lane Configurations		↑↑					
Traffic Volume (vph)	0	1368	0	0	0	0	
Future Volume (vph)	0	1368	0	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt							
Flt Protected							
Satd. Flow (prot)	0	3539	0	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	3539	0	0	0	0	
Right Turn on Red	Yes		Yes	Yes	Yes		
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		163.4	19.4		22.3		
Travel Time (s)		11.8	1.4		1.6		
Confl. Peds. (#/hr)	14			14	2	48	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	1368	0	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	1368	0	0	0	0	
Turn Type		NA					
Protected Phases		4				6	
Permitted Phases							
Detector Phase		4					
Switch Phase							
Minimum Initial (s)		30.0				10.0	
Minimum Split (s)		36.0				16.0	
Total Split (s)		36.0				22.0	
Total Split (%)		62.1%				38%	
Maximum Green (s)		30.0				16.0	
Yellow Time (s)		4.0				4.0	
All-Red Time (s)		2.0				2.0	
Lost Time Adjust (s)		0.0					
Total Lost Time (s)		6.0					
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0				3.0	
Recall Mode		Max				None	
Walk Time (s)		25.0				10.0	
Flash Dont Walk (s)		5.0				6.0	
Pedestrian Calls (#/hr)		0				0	
Act Effct Green (s)		51.0					
Actuated g/C Ratio		1.00					
v/c Ratio		0.39					
Control Delay		0.3					
Queue Delay		0.0					
Total Delay		0.3					
LOS		A					

Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
2026 Background PM Peak Hour

							
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Approach Delay		0.3					
Approach LOS		A					
Queue Length 50th (m)		0.0					
Queue Length 95th (m)		0.0					
Internal Link Dist (m)		139.4	0.1		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		3539					
Starvation Cap Reductn		0					
Spillback Cap Reductn		0					
Storage Cap Reductn		0					
Reduced v/c Ratio		0.39					
Intersection Summary							
Area Type:	Other						
Cycle Length: 58							
Actuated Cycle Length: 51							
Natural Cycle: 55							
Control Type: Semi Act-Uncoord							
Maximum v/c Ratio: 0.39							
Intersection Signal Delay: 0.3				Intersection LOS: A			
Intersection Capacity Utilization 57.5%				ICU Level of Service B			
Analysis Period (min) 15							

Splits and Phases: 7: Erb Street E



HCM 6th Edition methodology does not support exclusive ped or hold phases.

Appendix E

2027 Total Synchro Reports



Lanes, Volumes, Timings

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

2026 Total AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	5	9	12	7	24	7	147	35	31	463	3
Future Volume (vph)	2	5	9	12	7	24	7	147	35	31	463	3
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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		0.924			0.925			0.975			0.999	
Flt Protected		0.994			0.986			0.998			0.997	
Satd. Flow (prot)	0	1340	0	0	1414	0	0	1497	0	0	1516	0
Flt Permitted		0.994			0.986			0.998			0.997	
Satd. Flow (perm)	0	1340	0	0	1414	0	0	1497	0	0	1516	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		42.7			64.4			49.3			31.3	
Travel Time (s)		3.1			4.6			3.5			2.3	
Confl. Peds. (#/hr)	4		4	4		4	13		11	11		13
Peak Hour 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
Heavy Vehicles (%)	50%	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%
Adj. Flow (vph)	2	5	9	12	7	24	7	147	35	31	463	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	43	0	0	189	0	0	497	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 59.0%

ICU Level of Service B

Analysis Period (min) 15

HCM 6th TWSC

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

2026 Total AM Peak Hour

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	5	9	12	7	24	7	147	35	31	463	3
Future Vol, veh/h	2	5	9	12	7	24	7	147	35	31	463	3
Conflicting Peds, #/hr	4	0	4	4	0	4	13	0	11	11	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	50	0	0	0	0	0	0	1	0	0	2	0
Mvmt Flow	2	5	9	12	7	24	7	147	35	31	463	3

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	738	747	482	728	731	180	479	0	0	193	0	0
Stage 1	540	540	-	190	190	-	-	-	-	-	-	-
Stage 2	198	207	-	538	541	-	-	-	-	-	-	-
Critical Hdwy	7.6	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.6	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.6	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.95	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	280	344	588	341	351	868	1094	-	-	1392	-	-
Stage 1	449	524	-	816	747	-	-	-	-	-	-	-
Stage 2	705	734	-	531	524	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	256	325	580	318	331	857	1082	-	-	1379	-	-
Mov Cap-2 Maneuver	256	325	-	318	331	-	-	-	-	-	-	-
Stage 1	441	503	-	803	735	-	-	-	-	-	-	-
Stage 2	672	722	-	500	503	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.1	13	0.3	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1082	-	-	413	495	1379	-	-
HCM Lane V/C Ratio	0.006	-	-	0.039	0.087	0.022	-	-
HCM Control Delay (s)	8.3	0	-	14.1	13	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0.1	-	-

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖↗						↖		↖	↖	
Traffic Volume (vph)	464	808	39	0	0	0	0	324	16	162	420	0
Future Volume (vph)	464	808	39	0	0	0	0	324	16	162	420	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1775	1900	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5		7.5			7.5			15.0			
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98						1.00		0.98		
Frt		0.996						0.994				
Flt Protected		0.983								0.950		
Satd. Flow (prot)	0	3133	0	0	0	0	0	1499	0	1653	1792	0
Flt Permitted		0.983								0.377		
Satd. Flow (perm)	0	3081	0	0	0	0	0	1499	0	644	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4						3				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		67.6			97.6			126.2			71.9	
Travel Time (s)		4.9			7.0			9.1			5.2	
Confl. Peds. (#/hr)	36		13	13		36	66		42	42		66
Peak Hour 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
Heavy Vehicles (%)	1%	4%	3%	0%	0%	0%	0%	9%	13%	2%	6%	0%
Adj. Flow (vph)	464	808	39	0	0	0	0	324	16	162	420	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1311	0	0	0	0	0	340	0	162	420	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases		4								6		
Detector Phase		4	4					2		1	6	
Switch Phase												
Minimum Initial (s)	30.8	30.8						27.6		5.0	27.6	
Minimum Split (s)	36.8	36.8						33.6		9.0	33.6	
Total Split (s)	36.8	36.8						33.6		9.6	43.2	
Total Split (%)	46.0%	46.0%						42.0%		12.0%	54.0%	
Maximum Green (s)	30.8	30.8						27.6		5.6	37.2	
Yellow Time (s)	4.0	4.0						4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0						2.0		1.0	2.0	
Lost Time Adjust (s)		0.0						0.0		0.0	0.0	
Total Lost Time (s)		6.0						6.0		4.0	6.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	Max	Max						Max		None	Max	
Walk Time (s)	25.8	25.8						22.6		22.6		
Flash Dont Walk (s)	5.0	5.0						5.0		5.0		
Pedestrian Calls (#/hr)	0	0						0		0		
Act Effct Green (s)		30.8						27.6		39.2	37.2	
Actuated g/C Ratio		0.38						0.34		0.49	0.46	
v/c Ratio		1.10						0.66		0.42	0.50	

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		85.1						29.1		15.3	17.6	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		85.1						29.1		15.3	17.6	
LOS		F						C		B	B	
Approach Delay		85.1						29.1			17.0	
Approach LOS		F						C			B	
Queue Length 50th (m)		~127.8						44.9		13.9	45.0	
Queue Length 95th (m)		#169.6						74.4		25.2	70.4	
Internal Link Dist (m)		43.6			73.6			102.2			47.9	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1188						519		386	833	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		1.10						0.66		0.42	0.50	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 58.8

Intersection LOS: E

Intersection Capacity Utilization 89.8%

ICU Level of Service E

Analysis Period (min) 15

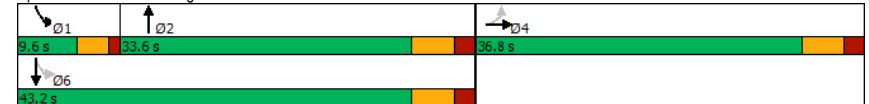
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: King Street N & Erb Street E



HCM 6th Signalized Intersection Summary
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	464	808	39	0	0	0	0	324	16	162	420	0
Future Volume (veh/h)	464	808	39	0	0	0	0	324	16	162	420	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				1.00		0.96	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1721	1681	1694				0	1534	1483	1747	1811	0
Adj Flow Rate, veh/h	464	808	39				0	324	16	162	420	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	3				0	9	13	2	6	0
Cap, veh/h	426	798	39				0	499	25	356	842	0
Arrive On Green	0.38	0.38	0.38				0.00	0.34	0.34	0.07	0.47	0.00
Sat Flow, veh/h	1108	2072	103				0	1447	71	1664	1811	0
Grp Volume(v), veh/h	681	0	630				0	0	340	162	420	0
Grp Sat Flow(s),veh/h/ln	1625	0	1656				0	0	1518	1664	1811	0
Q Serve(g_s), s	30.8	0.0	30.2				0.0	0.0	15.1	4.8	12.9	0.0
Cycle Q Clear(g_c), s	30.8	0.0	30.2				0.0	0.0	15.1	4.8	12.9	0.0
Prop In Lane	0.68		0.06				0.00		0.05	1.00		0.00
Lane Grp Cap(c), veh/h	626	0	638				0	0	524	356	842	0
V/C Ratio(X)	1.09	0.00	0.99				0.00	0.00	0.65	0.45	0.50	0.00
Avail Cap(c_a), veh/h	626	0	638				0	0	524	356	842	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.6	0.0	24.4				0.0	0.0	22.1	16.1	14.9	0.0
Incr Delay (d2), s/veh	62.3	0.0	32.8				0.0	0.0	6.1	0.9	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.0	0.0	9.0				0.0	0.0	2.6	0.4	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	86.9	0.0	57.2				0.0	0.0	28.2	17.0	17.0	0.0
LnGrp LOS	F	A	E				A	A	C	B	B	A
Approach Vol, veh/h	1311						340			582		
Approach Delay, s/veh	72.6						28.2			17.0		
Approach LOS	E						C			B		
Timer - Assigned Phs	1	2	4		6							
Phs Duration (G+Y+Rc), s	9.6	33.6	36.8		43.2							
Change Period (Y+Rc), s	4.0	6.0	6.0		6.0							
Max Green Setting (Gmax), s	5.6	27.6	30.8		37.2							
Max Q Clear Time (g_c+I1), s	6.8	17.1	32.8		14.9							
Green Ext Time (p_c), s	0.0	1.7	0.0		3.1							
Intersection Summary												
HCM 6th Ctrl Delay	51.4											
HCM 6th LOS	D											

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔		
Traffic Volume (vph)	38	592	37	0	0	0	0	148	74	98	382	0
Future Volume (vph)	38	592	37	0	0	0	0	148	74	98	382	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1900	1750	1650	1650	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99							0.97		1.00	
Frt		0.992							0.850			
Flt Protected		0.997									0.990	
Satd. Flow (prot)	0	3127	0	0	0	0	0	1881	1458	0	1611	0
Flt Permitted		0.997									0.800	
Satd. Flow (perm)	0	3122	0	0	0	0	0	1881	1410	0	1298	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10							95			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.6			68.0			74.2			41.8	
Travel Time (s)		7.0			4.9			5.3			3.0	
Confl. Peds. (#/hr)	12		22	22		12	13		16	16		13
Peak Hour 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
Heavy Vehicles (%)	0%	4%	6%	0%	0%	0%	0%	1%	2%	3%	1%	0%
Adj. Flow (vph)	38	592	37	0	0	0	0	148	74	98	382	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	667	0	0	0	0	0	148	74	0	480	0
Turn Type	Perm	NA						NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4								2			
Minimum Split (s)	44.0	44.0						26.4	26.4	9.0	26.4	
Total Split (s)	44.0	44.0						26.4	26.4	9.6	36.0	
Total Split (%)	55.0%	55.0%						33.0%	33.0%	12.0%	45.0%	
Maximum Green (s)	38.0	38.0						20.4	20.4	5.6	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	1.0	2.0	
Lost Time Adjust (s)		0.0						0.0	0.0		0.0	
Total Lost Time (s)		6.0						6.0	6.0		6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?		Yes						Yes	Yes	Yes		
Walk Time (s)	7.0	7.0						7.0	7.0		7.0	
Flash Dont Walk (s)	11.0	11.0						11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effect Green (s)		38.0						20.4	20.4		3.6	
Actuated g/C Ratio		0.48						0.26	0.26		0.04	
v/c Ratio		0.45						0.31	0.17		6.67	
Control Delay		15.0						26.3	4.7		2587.6	
Queue Delay		0.9						0.0	0.0		0.0	
Total Delay		15.9						26.3	4.7		2587.6	
LOS		B						C	A		F	
Approach Delay		15.9						19.1			2587.6	

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B						B			F	
Queue Length 50th (m)		35.1						19.1	0.0		~150.0	
Queue Length 95th (m)		49.1						35.0	7.1		#207.5	
Internal Link Dist (m)		73.6			44.0			50.2			17.8	
Turn Bay Length (m)								30.0				
Base Capacity (vph)		1488						479	430		72	
Starvation Cap Reductn		512						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		0.68						0.31	0.17		6.67	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 6.67

Intersection Signal Delay: 918.1

Intersection LOS: F

Intersection Capacity Utilization 93.1%

ICU Level of Service F

Analysis Period (min) 15

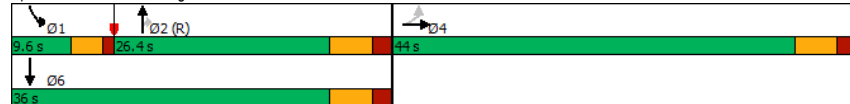
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Regina Street N & Erb Street E



HCM 6th Signalized Intersection Summary
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↑	↗		↘	
Traffic Volume (veh/h)	38	592	37	0	0	0	0	148	74	98	382	0
Future Volume (veh/h)	38	592	37	0	0	0	0	148	74	98	382	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No					No				No	
Adj Sat Flow, veh/h/ln	1735	1681	1654				0	1885	1723	1611	1637	0
Adj Flow Rate, veh/h	38	592	37				0	148	74	98	382	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	6				0	1	2	3	1	0
Cap, veh/h	86	1396	92				0	481	365	0	614	0
Arrive On Green	0.47	0.47	0.47				0.00	0.25	0.25	0.07	0.38	0.00
Sat Flow, veh/h	180	2939	193				0	1885	1432	0	1637	0
Grp Volume(v), veh/h	352	0	315				0	148	74	0	382	0
Grp Sat Flow(s),veh/h/ln	1672	0	1641				0	1885	1432	0	1637	0
Q Serve(g_s), s	11.2	0.0	10.0				0.0	5.1	3.2	0.0	15.2	0.0
Cycle Q Clear(g_c), s	11.2	0.0	10.0				0.0	5.1	3.2	0.0	15.2	0.0
Prop In Lane	0.11		0.12				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	794	0	779				0	481	365	0	614	0
V/C Ratio(X)	0.44	0.00	0.40				0.00	0.31	0.20	0.00	0.62	0.00
Avail Cap(c_a), veh/h	794	0	779				0	481	365	0	614	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	14.0	0.0	13.6				0.0	24.1	23.4	0.0	20.4	0.0
Incr Delay (d2), s/veh	1.8	0.0	1.6				0.0	1.7	1.2	0.0	4.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.8				0.0	1.2	0.6	0.0	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	0.0	15.2				0.0	25.7	24.7	0.0	25.1	0.0
LnGrp LOS	B	A	B				A	C	C	A	C	A
Approach Vol, veh/h	667						222				382	
Approach Delay, s/veh	15.5						25.4				25.1	
Approach LOS	B						C				C	
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	9.6	26.4		44.0			36.0					
Change Period (Y+Rc), s	4.0	6.0		6.0			6.0					
Max Green Setting (Gmax), s	5.6	20.4		38.0			30.0					
Max Q Clear Time (g_c+I1), s	0.0	7.1		13.2			17.2					
Green Ext Time (p_c), s	0.0	1.0		5.2			2.2					
Intersection Summary												
HCM 6th Ctrl Delay		20.1										
HCM 6th LOS		C										

Lanes, Volumes, Timings
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕			↕	
Traffic Volume (vph)	24	724	11	0	0	0	0	1	4	161	4	0
Future Volume (vph)	24	724	11	0	0	0	0	1	4	161	4	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1650	1650	0
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998						0.892				
Flt Protected		0.998									0.953	
Satd. Flow (prot)	0	3163	0	0	0	0	0	1472	0	0	1572	0
Flt Permitted		0.998									0.953	
Satd. Flow (perm)	0	3163	0	0	0	0	0	1472	0	0	1572	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		19.4			67.1			41.5			87.0	
Travel Time (s)		1.4			4.8			3.0			6.3	
Confl. Peds. (#/hr)	5		5	5		5	52		4	4		52
Peak Hour 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
Heavy Vehicles (%)	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	24	724	11	0	0	0	0	1	4	161	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	759	0	0	0	0	0	5	0	0	165	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	50.2%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM 6th TWSC
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔			↔	
Traffic Vol, veh/h	24	724	11	0	0	0	0	1	4	161	4	0
Future Vol, veh/h	24	724	11	0	0	0	0	1	4	161	4	0
Conflicting Peds, #/hr	5	0	5	5	0	5	52	0	4	4	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	4	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	24	724	11	0	0	0	0	1	4	161	4	0
Major/Minor												
	Major1			Minor1			Minor2					
Conflicting Flow All	5	0	0	-	788	377	420	793	-			
Stage 1	-	-	-	-	783	-	5	5	-			
Stage 2	-	-	-	-	5	-	415	788	-			
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.5	6.5	-			
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-			
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-			
Pot Cap-1 Maneuver	1630	-	-	-	0	326	626	522	323	0		
Stage 1	-	-	-	-	0	407	-	-	-	0		
Stage 2	-	-	-	-	0	-	-	591	405	0		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	1623	-	-	-	-	315	623	505	312	-		
Mov Cap-2 Maneuver	-	-	-	-	-	315	-	505	312	-		
Stage 1	-	-	-	-	-	395	-	-	-	-		
Stage 2	-	-	-	-	-	-	-	571	393	-		
Approach												
	EB			NB			SB					
HCM Control Delay, s	0.3			12			15.8					
HCM LOS				B			C					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR SBLn1								
Capacity (veh/h)	521	1623	-	- 498								
HCM Lane V/C Ratio	0.01	0.015	-	- 0.331								
HCM Control Delay (s)	12	7.3	0.1	- 15.8								
HCM Lane LOS	B	A	A	- C								
HCM 95th %tile Q(veh)	0	0	-	- 1.4								

Lanes, Volumes, Timings

5: Regina Street N & North Driveway

(210574) 24, 28 & 34 Erb

2026 Total AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		N		S	
Traffic Volume (vph)	15	14	176	10	17	465
Future Volume (vph)	15	14	176	10	17	465
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	0.935		0.993			
Flt Protected	0.975					0.998
Satd. Flow (prot)	1698	0	1850	0	0	1859
Flt Permitted	0.975					0.998
Satd. Flow (perm)	1698	0	1850	0	0	1859
Link Speed (k/h)	50		50			50
Link Distance (m)	30.5		41.8			49.3
Travel Time (s)	2.2		3.0			3.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	15	191	11	18	505
Shared Lane Traffic (%)						
Lane Group Flow (vph)	31	0	202	0	0	523
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 48.2%

ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC

5: Regina Street N & North Driveway

(210574) 24, 28 & 34 Erb

2026 Total AM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		N		S	
Traffic Vol, veh/h	15	14	176	10	17	465
Future Vol, veh/h	15	14	176	10	17	465
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	15	191	11	18	505

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	738	197	0	0	202
Stage 1	197	-	-	-	-
Stage 2	541	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	385	844	-	-	1370
Stage 1	836	-	-	-	-
Stage 2	583	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	378	844	-	-	1370
Mov Cap-2 Maneuver	378	-	-	-	-
Stage 1	836	-	-	-	-
Stage 2	573	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	515	1370
HCM Lane V/C Ratio	-	-	0.061	0.013
HCM Control Delay (s)	-	-	12.4	7.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Lanes, Volumes, Timings
6: Erb Street E & East Driveway

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	752	0	0	3	0
Future Volume (vph)	5	752	0	0	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Flt						
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	0	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	0	0	1770	0
Link Speed (k/h)		50		50		50
Link Distance (m)		68.0		95.4		38.2
Travel Time (s)		4.9		6.9		2.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	817	0	0	3	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	822	0	0	3	0
Sign Control		Free		Free		Stop

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 30.9%
Analysis Period (min) 15

HCM 6th TWSC
6: Erb Street E & East Driveway

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	752	0	0	3	0
Future Vol, veh/h	5	752	0	0	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	16979	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	817	0	0	3	0

Major/Minor	Major1	Minor2
Conflicting Flow All	0	0
Stage 1	-	-
Stage 2	-	-
Critical Hdwy	4.14	-
Critical Hdwy Stg 1	-	-
Critical Hdwy Stg 2	-	-
Follow-up Hdwy	2.22	-
Pot Cap-1 Maneuver	-	-
Stage 1	-	-
Stage 2	-	-
Platoon blocked, %	-	-
Mov Cap-1 Maneuver	-	-
Mov Cap-2 Maneuver	-	-
Stage 1	-	-
Stage 2	-	-

Approach	EB	SB
HCM Control Delay, s		11.4
HCM LOS		B

Minor Lane/Major Mvmt	EBL	EBT	SBLn1
Capacity (veh/h)	-	-	562
HCM Lane V/C Ratio	-	-	0.006
HCM Control Delay (s)	-	-	11.4
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0

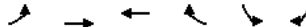
Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Lane Configurations		↑↑					
Traffic Volume (vph)	0	760	0	0	0	0	
Future Volume (vph)	0	760	0	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt							
Flt Protected							
Satd. Flow (prot)	0	3539	0	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	3539	0	0	0	0	
Right Turn on Red	Yes			Yes	Yes	Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		95.4	19.4		22.3		
Travel Time (s)		6.9	1.4		1.6		
Confl. Peds. (#/hr)	5			5	4	52	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	760	0	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	760	0	0	0	0	
Turn Type		NA					
Protected Phases		4				6	
Permitted Phases							
Detector Phase		4					
Switch Phase							
Minimum Initial (s)		30.0				10.0	
Minimum Split (s)		36.0				16.0	
Total Split (s)		36.0				22.0	
Total Split (%)		62.1%				38%	
Maximum Green (s)		30.0				16.0	
Yellow Time (s)		4.0				4.0	
All-Red Time (s)		2.0				2.0	
Lost Time Adjust (s)		0.0					
Total Lost Time (s)		6.0					
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0				3.0	
Recall Mode		Max				None	
Walk Time (s)		25.0				10.0	
Flash Dont Walk (s)		5.0				6.0	
Pedestrian Calls (#/hr)		0				0	
Act Effct Green (s)		51.0					
Actuated g/C Ratio		1.00					
v/c Ratio		0.21					
Control Delay		0.1					
Queue Delay		0.0					
Total Delay		0.1					
LOS		A					

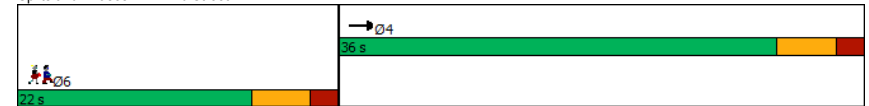
Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Approach Delay		0.1					
Approach LOS		A					
Queue Length 50th (m)		0.0					
Queue Length 95th (m)		0.0					
Internal Link Dist (m)		71.4	0.1		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		3539					
Starvation Cap Reductn		0					
Spillback Cap Reductn		0					
Storage Cap Reductn		0					
Reduced v/c Ratio		0.21					
Intersection Summary							
Area Type:	Other						
Cycle Length:	58						
Actuated Cycle Length:	51						
Natural Cycle:	55						
Control Type:	Semi Act-Uncoord						
Maximum v/c Ratio:	0.21						
Intersection Signal Delay:	0.1			Intersection LOS: A			
Intersection Capacity Utilization	44.9%			ICU Level of Service A			
Analysis Period (min)	15						

Splits and Phases: 7: Erb Street E



HCM 6th Edition methodology does not support exclusive ped or hold phases.

Lanes, Volumes, Timings

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

2026 Total PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	14	38	21	6	35	11	293	20	39	486	15
Future Volume (vph)	11	14	38	21	6	35	11	293	20	39	486	15
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
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		0.919			0.924			0.992			0.996	
Flt Protected		0.991			0.983			0.998			0.996	
Satd. Flow (prot)	0	1412	0	0	1408	0	0	1535	0	0	1524	0
Flt Permitted		0.991			0.983			0.998			0.996	
Satd. Flow (perm)	0	1412	0	0	1408	0	0	1535	0	0	1524	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		42.7			64.4			51.2			31.3	
Travel Time (s)		3.1			4.6			3.7			2.3	
Confl. Peds. (#/hr)	15		9	9		15	17		14	14		17
Peak Hour 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
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	11	14	38	21	6	35	11	293	20	39	486	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	62	0	0	324	0	0	540	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

HCM 6th TWSC

1: Regina Street N & Dupont Street E

(210574) 24, 28 & 34 Erb

2026 Total PM Peak Hour

Intersection

Int Delay, s/veh 2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	14	38	21	6	35	11	293	20	39	486	15
Future Vol, veh/h	11	14	38	21	6	35	11	293	20	39	486	15
Conflicting Peds, #/hr	15	0	9	9	0	15	17	0	14	14	0	17
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	1	0
Mvmt Flow	11	14	38	21	6	35	11	293	20	39	486	15

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	950	938	520	946	935	332	518	0	0	327	0	0
Stage 1	589	589	-	339	339	-	-	-	-	-	-	-
Stage 2	361	349	-	607	596	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	242	266	560	243	267	714	1058	-	-	1244	-	-
Stage 1	498	499	-	680	643	-	-	-	-	-	-	-
Stage 2	662	637	-	487	495	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	210	244	548	203	245	697	1043	-	-	1229	-	-
Mov Cap-2 Maneuver	210	244	-	203	245	-	-	-	-	-	-	-
Stage 1	485	471	-	663	627	-	-	-	-	-	-	-
Stage 2	607	621	-	417	467	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.4	17.6	0.3	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1043	-	-	352	348	1229	-	-
HCM Lane V/C Ratio	0.011	-	-	0.179	0.178	0.032	-	-
HCM Control Delay (s)	8.5	0	-	17.4	17.6	8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.6	0.1	-	-

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

	←	→	↙	↘	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Volume (vph)	358	957	131	0	0	0	0	312	42	132	405	0
Future Volume (vph)	358	957	131	0	0	0	0	312	42	132	405	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1775	1900	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5		7.5			7.5			15.0			
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98						0.99		0.97		
Frt		0.986						0.984				
Flt Protected		0.988							0.950			
Satd. Flow (prot)	0	3176	0	0	0	0	0	1509	0	1670	1810	0
Flt Permitted		0.988							0.332			
Satd. Flow (perm)	0	3125	0	0	0	0	0	1509	0	565	1810	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15						8				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		65.5			97.6			126.2			71.9	
Travel Time (s)		4.7			7.0			9.1			5.2	
Confl. Peds. (#/hr)	49		14	14		49	147		63	63		147
Peak Hour 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
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%	0%	7%	3%	1%	5%	0%
Adj. Flow (vph)	358	957	131	0	0	0	0	312	42	132	405	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1446	0	0	0	0	0	354	0	132	405	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Detector Phase	4	4						2		1	6	
Switch Phase												
Minimum Initial (s)	34.8	34.8						23.6		5.0	23.6	
Minimum Split (s)	46.8	46.8						35.6		9.0	35.6	
Total Split (s)	46.8	46.8						35.6		9.6	39.2	
Total Split (%)	50.9%	50.9%						38.7%		10.4%	42.6%	
Maximum Green (s)	40.8	40.8						29.6		5.6	33.2	
Yellow Time (s)	4.0	4.0						4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0						2.0		1.0	2.0	
Lost Time Adjust (s)		0.0						0.0		0.0	0.0	
Total Lost Time (s)		6.0						6.0		4.0	6.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	Max	Max						Max		None	Max	
Walk Time (s)	29.8	29.8						18.6			18.6	
Flash Dont Walk (s)	5.0	5.0						5.0			5.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		40.8						29.6		41.2	39.2	
Actuated g/C Ratio		0.44						0.32		0.45	0.43	
v/c Ratio		1.04						0.72		0.41	0.53	

Lanes, Volumes, Timings
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

	←	→	↙	↘	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		60.8						36.8		19.6	22.6	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		60.8						36.8		19.6	22.6	
LOS		E						D		B	C	
Approach Delay		60.8						36.8			21.9	
Approach LOS		E						D			C	
Queue Length 50th (m)		~153.5						56.5		14.3	54.3	
Queue Length 95th (m)		#197.2						#90.9		25.9	82.5	
Internal Link Dist (m)		41.5			73.6			102.2			47.9	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1394						490		320	771	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		1.04						0.72		0.41	0.53	

Intersection Summary

Area Type: Other

Cycle Length: 92

Actuated Cycle Length: 92

Natural Cycle: 95

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 48.2

Intersection LOS: D

Intersection Capacity Utilization 91.9%

ICU Level of Service F

Analysis Period (min) 15

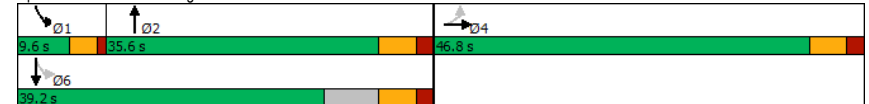
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: King Street N & Erb Street E



HCM 6th Signalized Intersection Summary
2: King Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	358	957	131	0	0	0	0	312	42	132	405	0
Future Volume (veh/h)	358	957	131	0	0	0	0	312	42	132	405	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		0.94	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1735	1721	1721				0	1560	1611	1761	1826	0
Adj Flow Rate, veh/h	358	957	131				0	312	42	132	405	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1				0	7	3	1	5	0
Cap, veh/h	350	985	140				0	429	58	291	778	0
Arrive On Green	0.44	0.44	0.44				0.00	0.32	0.32	0.06	0.43	0.00
Sat Flow, veh/h	789	2221	315				0	1335	180	1677	1826	0
Grp Volume(v), veh/h	764	0	682				0	0	354	132	405	0
Grp Sat Flow(s),veh/h/ln	1682	0	1643				0	0	1514	1677	1826	0
Q Serve(g_s), s	40.8	0.0	36.4				0.0	0.0	19.0	4.7	15.0	0.0
Cycle Q Clear(g_c), s	40.8	0.0	36.4				0.0	0.0	19.0	4.7	15.0	0.0
Prop In Lane	0.47		0.19				0.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h	746	0	729				0	0	487	291	778	0
V/C Ratio(X)	1.02	0.00	0.94				0.00	0.00	0.73	0.45	0.52	0.00
Avail Cap(c_a), veh/h	746	0	729				0	0	487	291	778	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.6	0.0	24.4				0.0	0.0	27.6	20.5	19.5	0.0
Incr Delay (d2), s/veh	39.1	0.0	21.0				0.0	0.0	9.1	1.1	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.0	0.0	8.5				0.0	0.0	4.4	0.8	2.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.7	0.0	45.4				0.0	0.0	36.8	21.6	22.0	0.0
LnGrp LOS	F	A	D				A	A	D	C	C	A
Approach Vol, veh/h	1446						354			537		
Approach Delay, s/veh	55.6						36.8			21.9		
Approach LOS	E						D			C		
Timer - Assigned Phs	1	2	4		6							
Phs Duration (G+Y+Rc), s	9.6	35.6	46.8		45.2							
Change Period (Y+Rc), s	4.0	6.0	6.0		6.0							
Max Green Setting (Gmax), s	5.6	29.6	40.8		33.2							
Max Q Clear Time (g_c+I1), s	6.7	21.0	42.8		17.0							
Green Ext Time (p_c), s	0.0	1.6	0.0		2.6							
Intersection Summary												
HCM 6th Ctrl Delay	45.0											
HCM 6th LOS	D											

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔		
Traffic Volume (vph)	65	848	28	0	0	0	0	251	278	244	296	0
Future Volume (vph)	65	848	28	0	0	0	0	251	278	244	296	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1900	1750	1650	1650	0
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00							0.97		1.00	
Frt		0.996							0.850			
Flt Protected		0.997									0.978	
Satd. Flow (prot)	0	3237	0	0	0	0	0	1900	1473	0	1598	0
Flt Permitted		0.997									0.527	
Satd. Flow (perm)	0	3229	0	0	0	0	0	1900	1433	0	857	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5							95			
Link Speed (k/h)		50			50				50			50
Link Distance (m)		97.6			57.2				98.3			40.0
Travel Time (s)		7.0			4.1				7.1			2.9
Confl. Peds. (#/hr)	29		54	54		29	28		14	14		28
Peak Hour 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
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%	0%
Adj. Flow (vph)	65	848	28	0	0	0	0	251	278	244	296	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	941	0	0	0	0	0	251	278	0	540	0
Turn Type	Perm	NA						NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4							2				
Minimum Split (s)	41.6	41.6						28.0	28.0	9.0	28.0	
Total Split (s)	41.6	41.6						28.0	28.0	10.4	38.4	
Total Split (%)	52.0%	52.0%						35.0%	35.0%	13.0%	48.0%	
Maximum Green (s)	35.6	35.6						22.0	22.0	6.4	32.4	
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	1.0	2.0	
Lost Time Adjust (s)		0.0						0.0	0.0		0.0	
Total Lost Time (s)		6.0						6.0	6.0		6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?		Yes						Yes	Yes	Yes		
Walk Time (s)	28.6	28.6						17.0	17.0		17.0	
Flash Dont Walk (s)	7.0	7.0						5.0	5.0		5.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)		35.6						22.0	22.0		4.4	
Actuated g/C Ratio		0.44						0.28	0.28		0.06	
v/c Ratio		0.65						0.48	0.60		6.21	
Control Delay		20.0						27.9	22.6		2376.6	
Queue Delay		5.2						0.0	0.0		0.0	
Total Delay		25.1						27.9	22.6		2376.6	
LOS		C						C	C		F	
Approach Delay		25.1						25.1			2376.6	

Lanes, Volumes, Timings
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C						C			F	
Queue Length 50th (m)		59.3						33.5	24.7		~167.7	
Queue Length 95th (m)		80.1						55.5	50.6		#227.2	
Internal Link Dist (m)		73.6			33.2			74.3			16.0	
Turn Bay Length (m)								30.0				
Base Capacity (vph)		1439						522	462		87	
Starvation Cap Reductn		426						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		0.93						0.48	0.60		6.21	

Intersection Summary

Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	
Maximum v/c Ratio: 6.21	
Intersection Signal Delay: 656.9	Intersection LOS: F
Intersection Capacity Utilization 99.0%	ICU Level of Service F
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Regina Street N & Erb Street E

Ø1	Ø2 (R)	Ø4
10.4 s	28 s	41.6 s
Ø6 (R)		
38.4 s		

HCM 6th Signalized Intersection Summary
3: Regina Street N & Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↑	↗		↖	
Traffic Volume (veh/h)	65	848	28	0	0	0	0	251	278	244	296	0
Future Volume (veh/h)	65	848	28	0	0	0	0	251	278	244	296	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1735	1721	1735				0	1900	1736	1637	1637	0
Adj Flow Rate, veh/h	65	848	28				0	251	278	244	296	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	0				0	0	1	1	1	0
Cap, veh/h	100	1368	47				0	522	398	0	663	0
Arrive On Green	0.44	0.44	0.44				0.00	0.28	0.28	0.08	0.41	0.00
Sat Flow, veh/h	225	3073	106				0	1900	1449	0	1637	0
Grp Volume(v), veh/h	495	0	446				0	251	278	0	296	0
Grp Sat Flow(s),veh/h/ln	1710	0	1694				0	1900	1449	0	1637	0
Q Serve(g_s), s	18.1	0.0	15.9				0.0	8.8	13.8	0.0	10.5	0.0
Cycle Q Clear(g_c), s	18.1	0.0	15.9				0.0	8.8	13.8	0.0	10.5	0.0
Prop In Lane	0.13		0.06				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	761	0	754				0	523	398	0	663	0
V/C Ratio(X)	0.65	0.00	0.59				0.00	0.48	0.70	0.00	0.45	0.00
Avail Cap(c_a), veh/h	761	0	754				0	523	398	0	663	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	17.3	0.0	16.7				0.0	24.2	26.0	0.0	17.3	0.0
Incr Delay (d2), s/veh	4.3	0.0	3.4				0.0	3.1	9.7	0.0	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	1.8				0.0	2.1	3.0	0.0	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	20.1				0.0	27.4	35.7	0.0	19.5	0.0
LnGrp LOS	C	A	C				A	C	D	A	B	A
Approach Vol, veh/h		941						529			296	
Approach Delay, s/veh		20.9						31.8			19.5	
Approach LOS		C						C			B	
Timer - Assigned Phs	1	2		4			6					
Phs Duration (G+Y+Rc), s	10.4	28.0		41.6			38.4					
Change Period (Y+Rc), s	4.0	6.0		6.0			6.0					
Max Green Setting (Gmax), s	6.4	22.0		35.6			32.4					
Max Q Clear Time (g_c+I1), s	0.0	15.8		20.1			12.5					
Green Ext Time (p_c), s	0.0	1.7		6.4			2.0					
Intersection Summary												
HCM 6th Ctrl Delay		23.9										
HCM 6th LOS		C										

Lanes, Volumes, Timings
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕			↕	
Traffic Volume (vph)	27	1331	31	0	0	0	0	10	46	222	21	0
Future Volume (vph)	27	1331	31	0	0	0	0	10	46	222	21	0
Ideal Flow (vphpl)	1735	1735	1735	0	0	0	0	1650	1650	1650	1650	0
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997						0.889				
Flt Protected		0.999								0.956		
Satd. Flow (prot)	0	3252	0	0	0	0	0	1467	0	0	1577	0
Flt Permitted		0.999								0.956		
Satd. Flow (perm)	0	3252	0	0	0	0	0	1467	0	0	1577	0
Link Speed (k/h)		50			50			50		50		
Link Distance (m)		19.4			67.1			41.5		87.0		
Travel Time (s)		1.4			4.8			3.0		6.3		
Confl. Peds. (#/hr)	14		13	13		14	48		2	2		48
Peak Hour 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
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	27	1331	31	0	0	0	0	10	46	222	21	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1389	0	0	0	0	0	56	0	0	243	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	74.4%											
ICU Level of Service	D											
Analysis Period (min)	15											

HCM 6th TWSC
4: Erb Street E & Peppler Street

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

Intersection												
Int Delay, s/veh	20.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔			↔	
Traffic Vol, veh/h	27	1331	31	0	0	0	0	10	46	222	21	0
Future Vol, veh/h	27	1331	31	0	0	0	0	10	46	222	21	0
Conflicting Peds, #/hr	14	0	13	13	0	14	48	0	2	2	0	48
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	27	1331	31	0	0	0	0	10	46	222	21	0
Major/Minor												
	Major1			Minor1			Minor2					
Conflicting Flow All	14	0	0	-	1428	696	741	1443	-			
Stage 1	-	-	-	-	1414	-	14	14	-			
Stage 2	-	-	-	-	14	-	727	1429	-			
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.5	6.5	-			
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-			
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-			
Pot Cap-1 Maneuver	1617	-	-	-	0	136	389	308	133	0		
Stage 1	-	-	-	-	0	206	-	-	-	0		
Stage 2	-	-	-	-	0	-	-	386	202	0		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	1598	-	-	-	-	124	385	238	121	-		
Mov Cap-2 Maneuver	-	-	-	-	-	124	-	238	121	-		
Stage 1	-	-	-	-	-	190	-	-	-	-		
Stage 2	-	-	-	-	-	-	-	299	186	-		
Approach												
	EB			NB			SB					
HCM Control Delay, s	0.3			21			138.1					
HCM LOS				C			F					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR SBLn1								
Capacity (veh/h)	280	1598	-	220								
HCM Lane V/C Ratio	0.2	0.017	-	1.105								
HCM Control Delay (s)	21	7.3	0.2	138.1								
HCM Lane LOS	C	A	A	F								
HCM 95th %tile Q(veh)	0.7	0.1	-	11.1								

5: Regina Street N & North Driveway

2026 Total PM Peak Hour

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.8%
ICU Level of Service	A
Analysis Period (min)	15

5: Regina Street N & North Driveway

2026 Total PM Peak Hour

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	929	345	0	0	349	0
Stage 1	345	-	-	-	-	-
Stage 2	584	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	297	698	-	-	1210	-
Stage 1	717	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	294	698	-	-	1210	-
Mov Cap-2 Maneuver	294	-	-	-	-	-
Stage 1	717	-	-	-	-	-
Stage 2	551	-	-	-	-	-

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	370	1210
HCM Lane V/C Ratio	-	-	0.091	0.007
HCM Control Delay (s)	-	-	15.7	8
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.3	0

Lanes, Volumes, Timings
6: Erb Street E & East Driveway

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕			↕	
Traffic Volume (vph)	11	1383	0	0	10	0
Future Volume (vph)	11	1383	0	0	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt						
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	0	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	0	0	1770	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.2	106.2		28.7	
Travel Time (s)		4.1	7.6		2.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1503	0	0	11	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1515	0	0	11	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 48.5%
Analysis Period (min) 15

HCM 6th TWSC
6: Erb Street E & East Driveway

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕			↕	
Traffic Vol, veh/h	11	1383	0	0	10	0
Future Vol, veh/h	11	1383	0	0	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	16979	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	1503	0	0	11	0

Major/Minor	Major1	Minor2
Conflicting Flow All	0	0
Stage 1	-	-
Stage 2	-	-
Critical Hdwy	4.14	-
Critical Hdwy Stg 1	-	-
Critical Hdwy Stg 2	-	-
Follow-up Hdwy	2.22	-
Pot Cap-1 Maneuver	-	-
Stage 1	-	-
Stage 2	-	-
Platoon blocked, %	-	-
Mov Cap-1 Maneuver	-	-
Mov Cap-2 Maneuver	-	-
Stage 1	-	-
Stage 2	-	-

Approach	EB	SB
HCM Control Delay, s		16.1
HCM LOS		C

Minor Lane/Major Mvmt	EBL	EBT SBLn1
Capacity (veh/h)	-	- 334
HCM Lane V/C Ratio	-	- 0.033
HCM Control Delay (s)	-	- 16.1
HCM Lane LOS	-	- C
HCM 95th %tile Q(veh)	-	- 0.1

Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

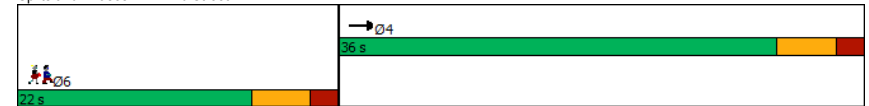
	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Lane Configurations		↑↑					
Traffic Volume (vph)	0	1390	0	0	0	0	
Future Volume (vph)	0	1390	0	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt							
Flt Protected							
Satd. Flow (prot)	0	3539	0	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	3539	0	0	0	0	
Right Turn on Red	Yes			Yes	Yes	Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		106.2	19.4		22.3		
Travel Time (s)		7.6	1.4		1.6		
Confl. Peds. (#/hr)	14			14	2	48	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	1390	0	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	1390	0	0	0	0	
Turn Type		NA					
Protected Phases		4				6	
Permitted Phases							
Detector Phase		4					
Switch Phase							
Minimum Initial (s)		30.0				10.0	
Minimum Split (s)		36.0				16.0	
Total Split (s)		36.0				22.0	
Total Split (%)		62.1%				38%	
Maximum Green (s)		30.0				16.0	
Yellow Time (s)		4.0				4.0	
All-Red Time (s)		2.0				2.0	
Lost Time Adjust (s)		0.0					
Total Lost Time (s)		6.0					
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0				3.0	
Recall Mode		Max				None	
Walk Time (s)		25.0				10.0	
Flash Dont Walk (s)		5.0				6.0	
Pedestrian Calls (#/hr)		0				0	
Act Effct Green (s)		51.0					
Actuated g/C Ratio		1.00					
v/c Ratio		0.39					
Control Delay		0.3					
Queue Delay		0.0					
Total Delay		0.3					
LOS		A					

Lanes, Volumes, Timings
7: Erb Street E

(210574) 24, 28 & 34 Erb
2026 Total PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR	Ø6
Lane Group							
Approach Delay		0.3					
Approach LOS		A					
Queue Length 50th (m)		0.0					
Queue Length 95th (m)		0.0					
Internal Link Dist (m)		82.2	0.1		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		3539					
Starvation Cap Reductn		0					
Spillback Cap Reductn		0					
Storage Cap Reductn		0					
Reduced v/c Ratio		0.39					
Intersection Summary							
Area Type:		Other					
Cycle Length:		58					
Actuated Cycle Length:		51					
Natural Cycle:		55					
Control Type:		Semi Act-Uncoord					
Maximum v/c Ratio:		0.39					
Intersection Signal Delay:		0.3					
Intersection LOS:		A					
Intersection Capacity Utilization		58.1%					
ICU Level of Service		B					
Analysis Period (min)		15					

Splits and Phases: 7: Erb Street E



HCM 6th Edition methodology does not support exclusive ped or hold phases.

Appendix F

TDM Worksheet





Travel Demand Management (TDM) Implementation Checklist

Version 9/18/2013

Appendix A1

Case Study:	<u>Regina & Erb</u>	Site Context:	<u>Mixed-Use Development</u>
TDM Checklist No:	<u>1</u>	ZBL Parking Requirement:	<u>186</u>
Date:	<u>2022-03</u>	Applicable Parking Reduction:	<u></u>

The Transportation Demand Management (TDM) Checklist and Parking Management Worksheet are not designed for residential properties, but can be used to inform mixed-use developments.

TABLE A		Site Access		
In creating an environment that supports pedestrian and cycling activity, the public realm must be accessible, safe, and comfortable to encourage movement on the street and in the surrounding area(s). These facilities and features should encourage walking and cycling.				
Points		Features	Yes	N/A
A1	2	Development incorporates functional building entrances that are oriented to public space or to locations where pedestrians and transit users arrive from such as a street, square, park or plaza.	2	
A2	1	External to site: Continuous sidewalks (consistent with AODA Accessible Built Environment Standard) are provided along both sides of all adjacent public streets (over and above requirement) AND Internal to site: Pedestrian walkways (consistent with AODA Accessible Built Environment Standard e.g.1.8m min width) are provided through large parking areas to link the building with the public street sidewalk system	1	
A3	3	Non-residential: development provides secure bike storage for 5% of the building occupants. Consistent with LEED requirements.	3	
A4	4	Shower and change facilities for employees provided on-site consistent with LEED requirements.		
A5	2	Provision of active uses at-grade along street frontages (e.g. retail).	2	
Category Max =		10	Total Points Applicable =	10
			Score =	8

TABLE B		Public Transportation Access		
The availability and proximity of convenient public transit service with direct pedestrian linkages to the building will provide viable travel options for employees, visitors and residents.				
Points		Features	Yes	N/A
B1	1	Bus shelters with seating are provided at the transit stop immediately adjacent to the development in consultation with Transportation Planning at the Region of Waterloo		
B2	1	Information regarding public transit routes, schedules and fares are provided in an accessible and visible location on site and in adjacent bus stops		
B3a	5	Located within 800m of a Rapid Transit Station	5	
B3b	3	Located within 600 m of a bus service with headways of 15 min or less or is located in a designated mixed use corridor or node. Note: Points are awarded for either B3a, B3b or B3c only. Please choose whichever represents the highest order of transit.		
B3c	1	Located within 400 m of a bus service with headways of 16 min to 30 min. Note: Points are awarded for either B3a, B3b or B3c only. Please choose whichever represents the highest order of transit.		
Category Max =		5	Total Points Applicable = 5	Score = 5

TABLE C		Parking		
Vehicle parking facilities can affect the character, travel mode and cost of a development. Reducing parking supply to match expected demand can have a positive influence on the selection of alternative travel modes.				
Points		Features	Yes	N/A
C1	24	Utilizes reduced parking supply consistent with the TDM Parking Management Worksheet. Contact your Area Municipal planning authority to determine whether the Worksheet is applicable to your development. Note: Points are awarded for either C1, C2, or C3 only. Please choose whichever applies with the highest value.	24	
C2	24	Includes allowances for shared parking in mixed-use zones. Note: Points are awarded for C1, C2, or C3 only. Please choose whichever applies after consulting with the Area Municipal planning authority.		
C3	15	Provides no more than the minimum number of parking spaces, as required by applicable Zoning By-Law. Note: Points are awarded for either C1, C2, or C3 only. Please choose whichever applies.		
C4	10	Implements paid parking on part or all of the site (e.g. parking permits, paid parking zones near main entrances)	10	
C5	3	Provides priority parking for carpooling/vanpooling participants equivalent to 5% of employee spaces		
C6	5	Commercial Uses: Provide car-share spaces equivalent to 2% of building occupants		
C7	3	Parking is not located on major street frontage or between a road right of way and the building facade.	3	
C8	5	25% to 50% of parking is located underground or in a structure		

C9	10	50% to 75% of parking is located underground or in a structure		
C10	15	75% of parking or more is located underground or in a structure	15	
C11	3	Parking spaces provided off-site on a lot within 300 metres of the lot containing such use.		
Category Max =		25	Total Points Applicable =	25
			Score =	25



Region of Waterloo TDM Checklist v2.0

FORM-1

Case Study: Regina & Erb Checklist No: 1
Date: 2022-03 Site Context: Mixed-Use Development

TABLE D		Trip Reduction Incentives			
A formal TDM plan will identify specific initiatives that will be initiated in order to encourage reduced single occupant vehicle travel.					
Points		Features			N/A
D1	2	The building owner/occupant will make available a ride matching service for car/vanpooling			
D2	2	The building owner/occupant will make available emergency ride home options			
D3	5	The building owner/occupant will make available subsidized transit passes for all occupants for a period of two years			
D4	5	The building owner/occupant agrees to charge for parking as an unbundled cost to occupants	5		
D5	2	The building owner/occupant agrees to provide reduced cost parking for users of car/van pool, bicycle, moped/motorcycle spaces			
D6	10	The building owner/occupant has prepared a TDM plan to the satisfaction of the Region of Waterloo and the Area Municipality that targets a 10% reduction in peak hour trips using forecast trip generation with status quo travel characteristics			
D7	5	The employer has provided flexible working hours, telework or shift work arrangements.			
D8	14	The development agrees to join Travelwise (TMA) that provides the same services outlined under items D1, D2, D6			
D9	5	The building owner/occupant will make available car sharing services			
D10	2	The development includes mixed uses (i.e. retail, commercial or food services, daycares, or other complementary uses) on-site or located within 400 metres.	2		
Category Max =		25	Total Points Applicable =	25	Score =
					5

TABLE E		Checklist Summary		
For each item, a "Yes" answer is equivalent to the points as indicated in the section. N/A sections should be explained in an attachment to this table. The score for each section is reflected as a percentage and calculated by dividing the points by the "Total Applicable".				
Category	Minimum Requirement	Total Applicable	Points Scored	Comments
Pedestrian & Cyclist Orientation	24	10	8	
Public Transit Access		5	5	
Parking		25	25	
SUB-TOTAL		40	38	
Trip Reduction Incentives		25	5	
OVERALL TOTAL		65	43	

TABLE F		Scoring Summary		
FINAL SCORE	RATING (check one)			
50 - 65	****		TDM SUPPORTIVE DEVELOPMENT	
40 - 49	***	X		
30 - 39	**			
24 - 29	*			
0 - 23			Non-TDM Supportive Development (Review and upgrade TDM elements to pass)	

Comments:



Case Study: Regina & Erb **Site Context:** Mixed-Use Development
Date: 2022-03 **Reduction Worksheet No:** 1

"Urban Growth Centres" (UGC) area classification includes the Downtown / Uptown and RT Station Areas of Kitchener, Waterloo and Cambridge.

"Intensification Corridor" (IC) classification is applied to sites within 800 metres of the future CTC line

"Other" classification applies to all other sites

Please highlight the cell percentages applicable to your development under the appropriate classification. Please note that the Parking Management Worksheet and the Transportation Demand Management (TDM) Checklist are not designed for residential properties, but can be used for mixed-use developments. Local municipalities are the decision-making bodies with respect to consideration of parking reductions below Zoning By-law requirements.

TABLE A	Pedestrian and Cyclist Orientation			
In creating an environment that supports pedestrian and cycling activity, the public realm must be accessible, safe, and comfortable to encourage movement on the street and in the surrounding area(s). These facilities and features should encourage walking and cycling.				
	Features	UGC	IC	Other
A1	Development incorporates functional building entrances that are oriented to public space or to locations where pedestrians and transit users arrive from such as a street, square, park or plaza.	1%	1%	1%
A2	Continuous sidewalks (1.5m min. width) are provided along both sides of all adjacent public streets and pedestrian walkways (1.5m min width) are provided through large parking areas to link the building with the public street sidewalk system	0%	0%	1%
A3	Non-Residential: Development provides secure bike storage for 4% of the building occupants	2%	2%	1%
A4	Shower and change facilities provided on-site consistent with LEED requirements.	1%	1%	1%
A5	Provision of active uses at-grade along street frontages.	1%	1%	1%
	Category Maximum	4%	4%	4%
	Available Parking Reduction	4%		

TABLE B	Public Transportation Access			
The availability and proximity of convenient public transit service with direct pedestrian linkages to the building will provide viable travel options for employees, visitors and residents.				
	Features	UGC	IC	Other
B1	Bus shelters with seating are provided at the transit stop immediately adjacent to the development, in consultation with Transportation Planning at the Region of Waterloo	0%	0%	1%
B2	Information regarding public transit routes, schedules and fares are provided in an accessible and visible location on site and in adjacent bus stops	0%	0%	1%
B3a	Located in an UGC or within 800 m of a future Rapid Transit Station	24%	12%	0%
B3b	Located within 600m a transit route with 15 minute headways (or less) or is located in a designated mixed use corridor or node. Note: Points are awarded for either B3a, B3b or B3c only. Please choose whichever represents the highest order of transit.	-	-	3%
B3c	Located within 400 metres of a bus service with headways of 15 min to 30 min. Note: Points are awarded for either B3a, B3b or B3c only. Please choose whichever represents the highest order of transit.	-	-	1%
	Category Maximum	24%	12%	5%
	Available Parking Reduction	24%		

TABLE C	Parking			
Vehicle parking facilities can affect the character, travel mode and cost of a development. Reducing parking supply to match expected demand can have a positive influence on the selection of alternative travel modes.				
	Features	UGC	IC	Other
C1	Provides priority parking for carpooling/vanpooling participants equivalent to 5% of employee spaces	0%	0%	5%
C2	Commercial Uses: Provide car-share spaces equivalent to 2% of building occupants	2%	2%	0%
C3	Implements paid parking system on all or part of the site (e.g. parking permits, paid parking zones near main entrances)	2%	2%	1%
C4	Parking is not located on major street frontage.	0%	0%	1%
C5	25% to 50% of parking is located underground or in a structure	2%	1%	0%
C6	50% to 75% of parking is located underground or in a structure	4%	2%	0%
C7	75% of parking or more is located underground or in a structure	5%	3%	0%
	Category Maximum	6%	4%	6%
	Available Parking Reduction	6%		



Case Study: Regina & Erb Site Context: Mixed-Use Development
Date: 2022-03 Worksheet No: 1

TABLE D	Trip Reduction Incentives			
A formal TDM plan will identify specific initiatives that will be initiated in order to encourage reduced single occupant vehicle travel.				
	Features	UGC	IC	Other
D1	The building owner/occupant will provide a ride matching service for car/vanpooling	0%	0%	1%
D2	The building owner/occupant will provide emergency ride home options	3%	2%	1%
D3	The building owner/occupant will provide subsidized transit passes for all occupants for a period of two years	10%	4%	2%
D4	The building owner/occupant agrees to charge for parking as a separate cost to occupants	10%	5%	2%
D5	The building owner/occupant agrees to provide reduced cost for users of car/van pool, bicycle, moped/motorcycle spaces	0%	0%	1%
D6	The development agrees to join Travelwise (TMA) that provides the same services outlined under items D1 and D2	9%	6%	4%
	Category Maximum	23%	11%	7%
	Available Parking Reduction	10%		

TABLE E	Parking Reduction Summary				
Please indicate the total reduction available based upon Tables A through D above.					
Category	Reduction Achieved	Maximum Achievable Reduction			Comments
		UGC	IC	Other	
Pedestrian & Cyclist Orientation	4%	4%	4%	4%	
Public Transit Access	24%	24%	12%	5%	
Parking	6%	6%	4%	6%	
Trip Reduction Incentives	10%	23%	11%	7%	
TOTAL	44%	57%	31%	22%	

TABLE F	TOTAL REDUCTION ACHIEVED	44%
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Comments:
