102 Fountain Street South Cambridge, ON Transportation Impact Study and Parking Study

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Paradigm Transportation Solutions Limited

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Project Summary

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Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) and Parking Study (PS) for a proposed mixed-use development located at 102 Fountain Street South in the City of Cambridge, Region of Waterloo.

This report includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for a five-year horizon from the date of TIS submission (2028), an assessment of traffic impacts with recommendations to accommodate the proposed development as appropriate, and parking review.

Development Concept

The subject site is located on the west side of Fountain Street opposite of King Street West. The proposed development consists of three high-rise buildings including a 26, 24, and 22-storey mixed-use building with a total of 753 residential units and 420 m^2 (4,523 sq. ft.) of retail Gross Floor Area (GFA).

A total supply of 682 parking spaces is proposed on-site.

Vehicular access is proposed via three connections to Fountain Street:

- In/out access opposite of King Street West;
- Right-in access north of King Street West; and
- Right-out access south of King Street West.

Conclusions

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

Transportation Impact Assessment

- **Existing Traffic Conditions:** The intersection of Fountain Street and King Street West is operating with acceptable levels of service. The southbound left-turn movement is operating with 95th percentile queues exceeding the available storage length during the PM peak hour.
- **Development Trip Generation:** The development is forecast to generate 198 and 233 trips during the AM and PM peak hours, respectively.

- **2028 Background Traffic Conditions:** The intersection of Fountain Street and King Street West is forecast to operate within acceptable levels of service. The southbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage length during the PM peak hour.
- **2028 Total Traffic Conditions:** The study area intersections are forecast to operate within acceptable levels of service except for the following movements at the intersection of Fountain Street and King Street West during the PM peak hour:
  - The eastbound shared movements, westbound left-turn and through movements, northbound left-turn and through movements, and southbound left-turn movements are forecast to operate at LOS E or F during the PM peak hour; and
  - The southbound left-turn movement 95th percentile queues are forecast to exceed the available storage length by 68 metres.

Parking Study

- **Zoning By-law Requirements:** Based on the current in-force Zoning By-Law requirements, the proposed development requires 761 spaces resulting in a technical shortfall of 82 spaces. The 2019 Draft Zoning By-Law indicates a requirement of 955 spaces resulting in a technical shortfall of 276 spaces.
- **Estimated Parking Demand:** Based on ITE parking rates, auto ownership rates reported by the Transportation Tomorrow Survey, and parking demand data observed at similar developments, the estimated average parking demand for the site could be less than the amount of parking proposed by the subject development.
- **Proposed TDM Measures:** The following TDM measures are proposed at the development or are located nearby:
  - Unbundling all parking spaces to support tenants who choose not to own a vehicle and are not required to purchase a parking spot;
  - The development incorporates functional building entrances that are oriented to public space or to locations where pedestrians and transit users arrive from such a street, square, park or plaza;
  - The development is located within 600 m of a bus service with headways of 15 min or less;

- The development provides no more than the minimum number of parking spaces, as required by applicable Zoning By-Law;
- Parking is not located on major street frontage or between a road right of way and the building façade;
- 75% of parking or more is located underground or in a structure; and
- The development includes mixed uses (i.e., retail, commercial or food services, daycares, or other complementary uses) on-site or located within 400 metres.

Additional TDM Measures: In addition to the above strategies, the following TDM measures could be considered on-site:

- Delegating a TDM coordinator, either an interested individual or property manager, to support all on-site TDM programs; and
- Consideration given to offering transit and active transportation information in a welcome package to new tenants and posting the information in a central location to further support all alternative modes.

Recommendations

Based on the findings of this study, it is recommended that the developer commits to the TDM measures listed herein to support a residential parking rate of 0.89 spaces per unit.

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Appendices

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Tables

1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited has been retained to conduct this Transportation Impact Study (TIS) and Parking Study (PS) for a proposed mixed-use development located at 102 Fountain Street South in the City of Cambridge, Region of Waterloo. **Figure 1.1** illustrates the subject development location.

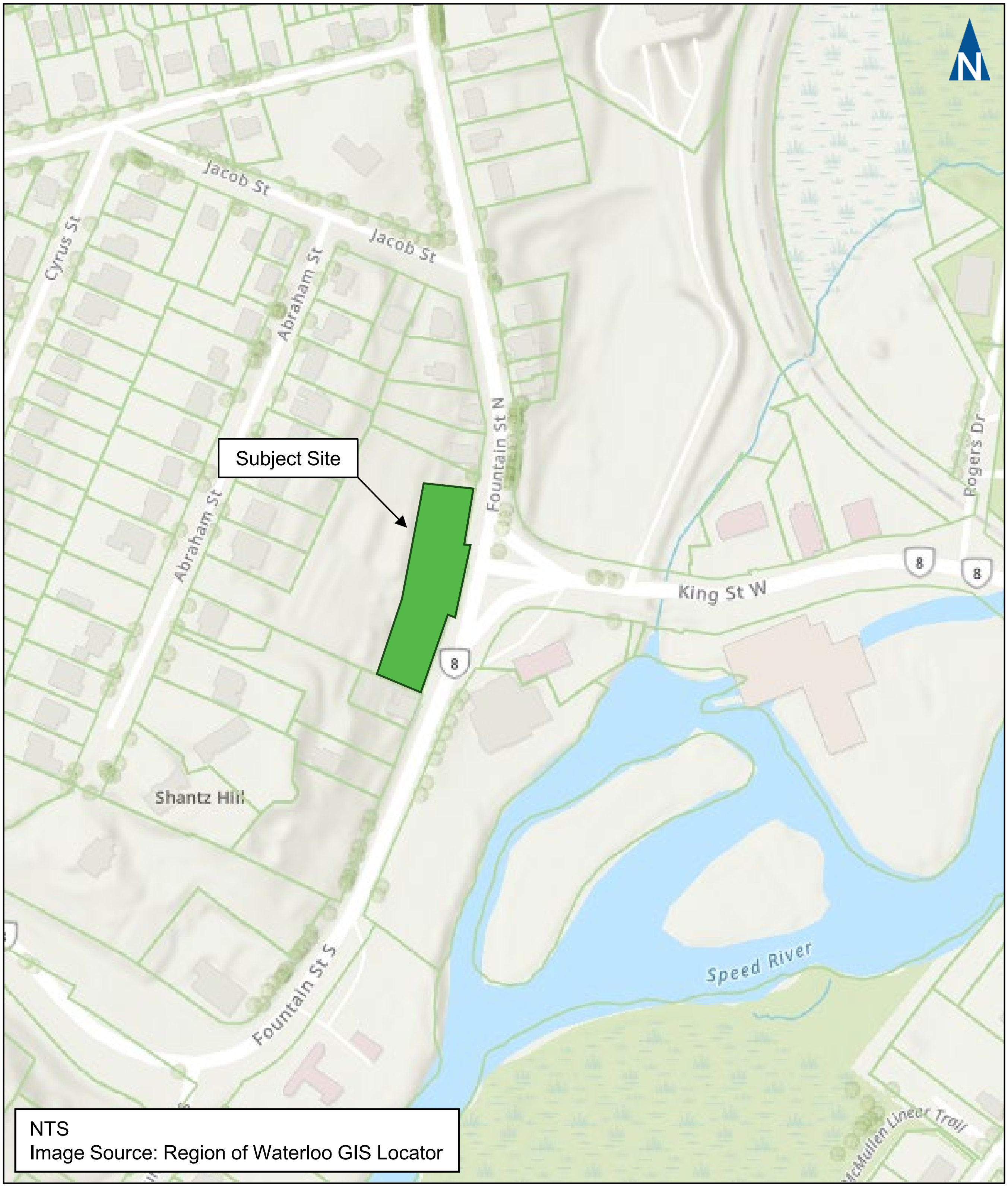
1.2 Purpose and Scope

The purpose of this report is to identify and assess the potential traffic impact resulting from the proposed development. The scope of the study includes:

- Assessment of the current traffic and site conditions within the study area;
- Estimates of background traffic growth for a five-year horizon from date of TIS (2028);
- Estimates of additional traffic generated by the subject site;
- Analyses of the impact of future traffic on the surrounding road network, including the following study area intersections:
  - Fountain Street and King Street West/Site Access;
  - Fountain Street North and Right-In Driveway; and
  - Fountain Street South and Right-Out Driveway.
- Recommendations necessary to mitigate the site generated traffic in a satisfactory manner.
- An analysis of the proposed parking supply.

This study has been prepared in accordance with the requirements detailed by the Region of Waterloo (the Region) Transportation Impact Study Guidelines[1] and the requirements of the City of Cambridge for the Parking Study.

[1] Region of Waterloo, *Transportation Impact Study Guidelines,* 2014.



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Location of Subject Site

Figure 1.1

2 Existing Conditions

2.1 Existing Roadways

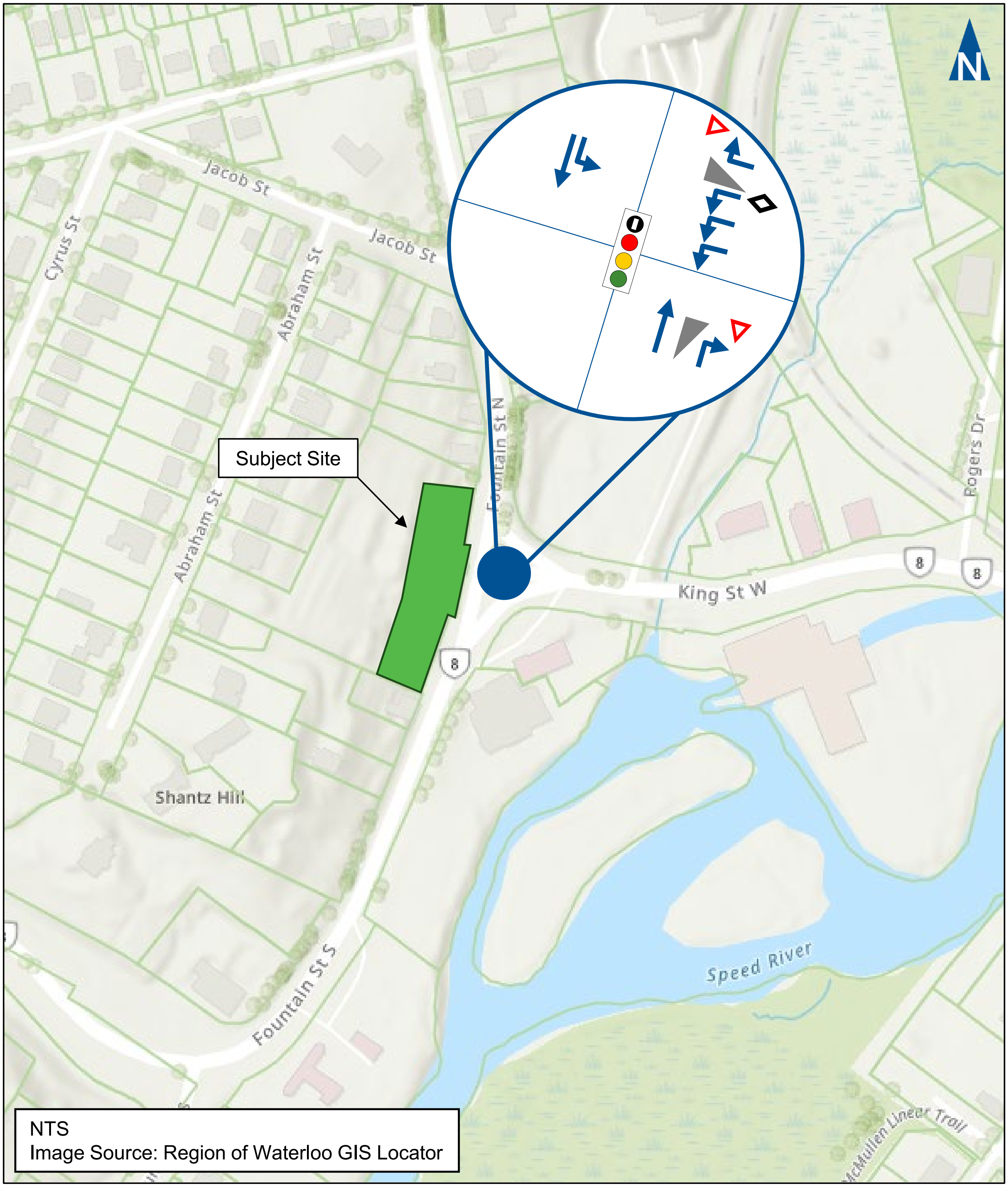
The main roadways near the subject site considered in assessing the traffic impacts of the development include:

- **Fountain Street (Regional Road 8 and 17)** is a Regional Road[2] with a three-lane cross section, east of King Street West and a four-lane cross section, west of King Street West. The roadway operates with a posted speed limit of 50 km/h. Sidewalks are provided on both sides of the roadway, east of King Street while a multi-use path is provided on the south side of the roadway, west of King Street.
- **King Street West (Regional Road 8)** is a Regional Road with a five-lane cross section within the study area and an assumed speed limit of 50 km/h. A multi-use path is provided on the north side of the roadway while a sidewalk is provided on the south.

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

For the purposes of this study, Fountain Street is considered to run north-south and King Street is considered to run east-west.

[2] IBI Group, *City of Cambridge Transportation Master Plan*, May 2019.



Existing Lane Configuration and Traffic Control

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Figure 2.1

2.2 Transit Service

Grand River Transit operates three routes within the surrounding area. **Figure 2.2** illustrates the existing transit service. The three routes include:

- **Route 206 iXpress Coronation** operates between Fairway Station and Southwood/Cedar. This route operates Monday to Friday (5:30 AM to 12:30 AM) with 15 to 30-minute headways, Saturdays (6:00 AM to 12:30 AM) with 30-minute headways and Sunday/Holidays (7:15 AM to 12:30 AM) with 30-minute headways.
- **Route 61 Fountain** operates between Conestoga College Doon Campus and Cambridge Centre Station. This route operates Monday to Friday (6:00 AM to 12:00 AM) with 15 to 30-minute headways, Saturdays (6:30 AM to 12:15 AM) with 30-minute headways and Sunday/Holidays (8:00 AM to 11:00 PM) with 30-minute headways.
- **Route 67 Eagle-Pinebush** operates between Sportsworld Station and Cambridge Centre Station. This route operates Monday to Friday (6:00 AM to 12:00 AM) with 30-minute headways. No Saturday/Sunday/Holiday service is provided.

Figure 2.2 illustrates the existing transit route.

2.2.1 Future ION Service

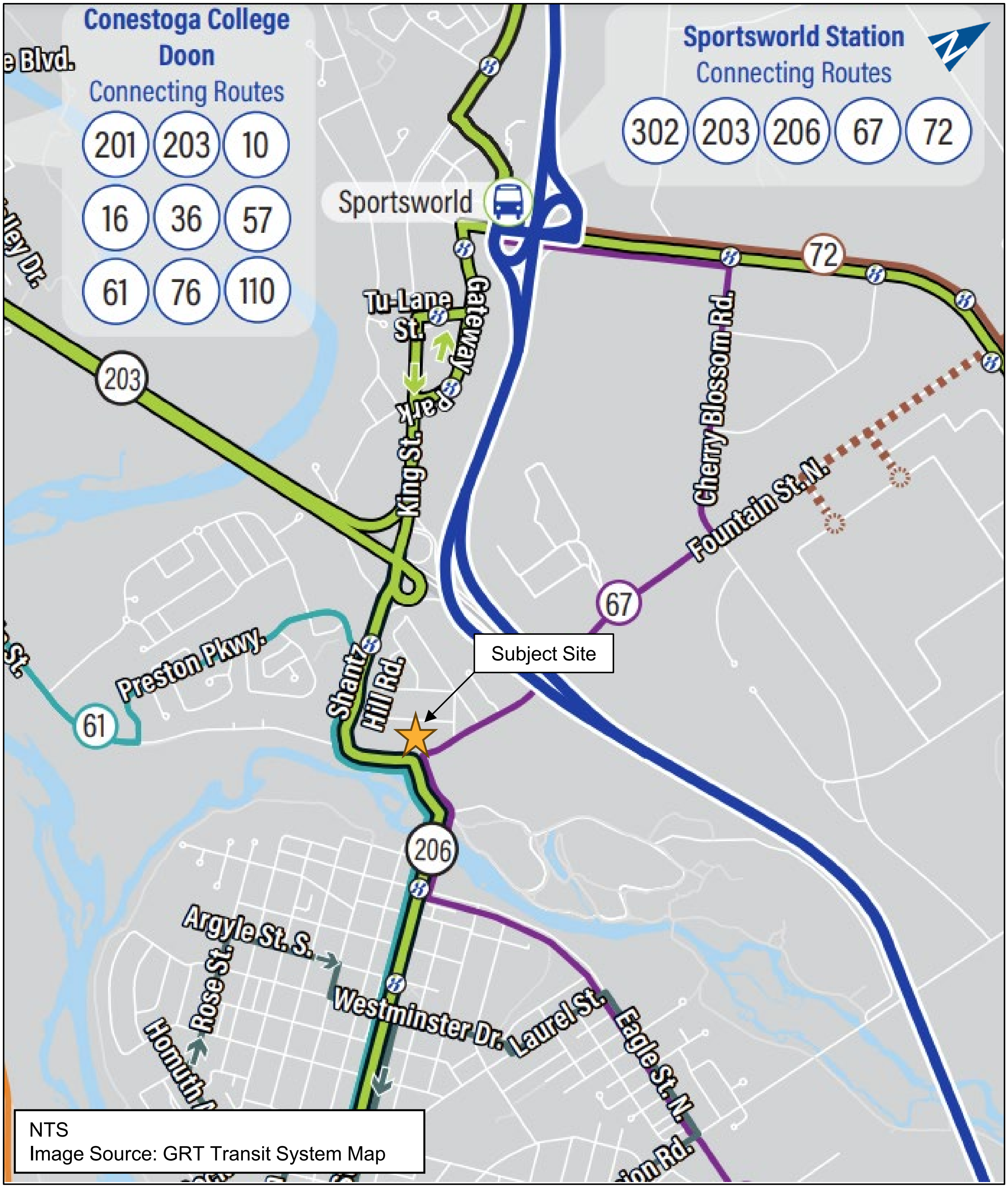
Phase 2 of the ION LRT system in Waterloo region is planned to have a stop within 800 metres of the subject development at the intersection of King Street West and Eagle Street.

2.3 Traffic Volumes

Turning movement counts were obtained from the Region of Waterloo and were collected on 13 April 2022.

Figure 2.3 illustrates the existing AM (7:30 AM – 8:30 AM) and PM (4:15 PM – 5:15 PM) weekday peak hour traffic volumes.

Appendix A contains the detailed traffic counts and signal timings for the intersection of Fountain Street and King Street West.



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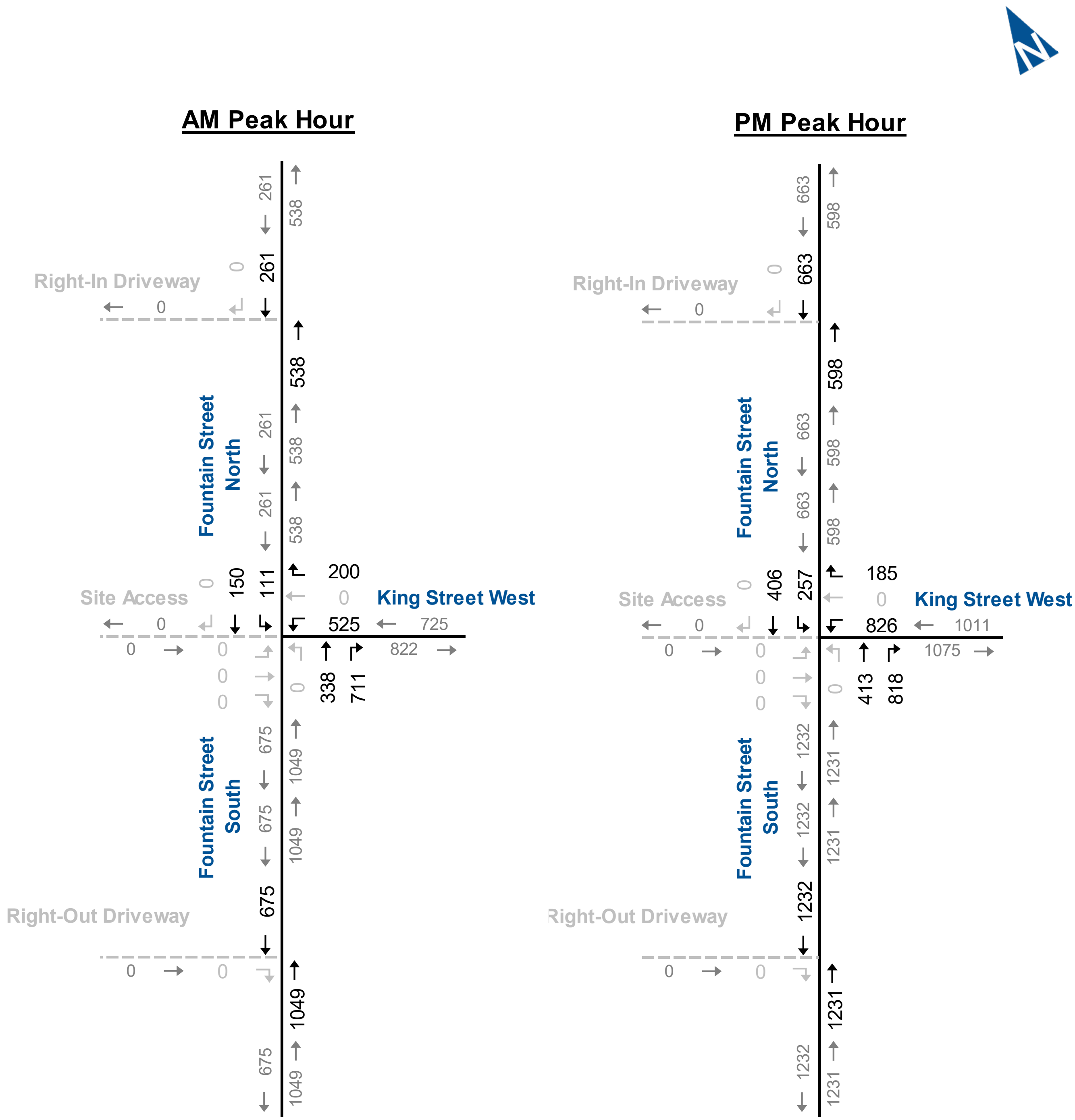
Existing Transit Network

Figure 2.2



Existing Traffic Volumes

Figure 2.3

2.4 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

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

The operations at the study area intersections have been assessed using Synchro 11. The criteria, as defined by the Region, 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.
- As well, the criteria for identifying individual "critical" movements are:
  - the average control delay for individual movements is greater that 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 modes.

Table 2.2 summarizes the results of the intersection operational analysis under existing conditions, including the AM and PM peak hour LOS, v/c ratios, and 95th percentile queues.

The results indicate that the study area intersections are operating with acceptable levels of service.

The southbound left-turn movement is operating with 95th percentile queues exceeding the available storage length by 7 metres during the PM peak hour.

Appendix B contains the detailed Synchro 11 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	Fountain Street South /Fountain Street North & King Street West	TCS	LOS					B		A	**B**		C	A	**B**	B	A		**B**	**B**
			Delay					18		4	**14**		23	8	**13**	12	10		**11**	**13**
			V/C					0.41		0.29			0.56	0.75		0.32	0.18			
			Q					52		14			66	26		16	20			
			Stor.					-		120			-	-		45	-			
			Avail.					-		106			-	-		29	-			
PM Peak Hour	Fountain Street South /Fountain Street North & King Street West	TCS	LOS					C		A	**C**		D	A	**B**	C	B		**B**	**B**
			Delay					27		4	**22**		36	10	**19**	24	16		**19**	**20**
			V/C					0.67		0.28			0.72	0.81		0.69	0.42			
			Q					96		14			119	45		52	79			
			Stor.					-		120			-	-		45	-			
			Avail.					-		106			-	-		-7	-			

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)
Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
< / > - Shared with through movement

3 Development Concept

3.1 Development Description

The subject site is located on the west side of Fountain Street opposite of King Street West. The proposed development consists of three high-rise buildings including a 26-, 24-, and 22-storey mixed-use building with a total of 753 residential units and 420 m^2 (4,523 sq. ft.) of retail Gross Floor Area (GFA).

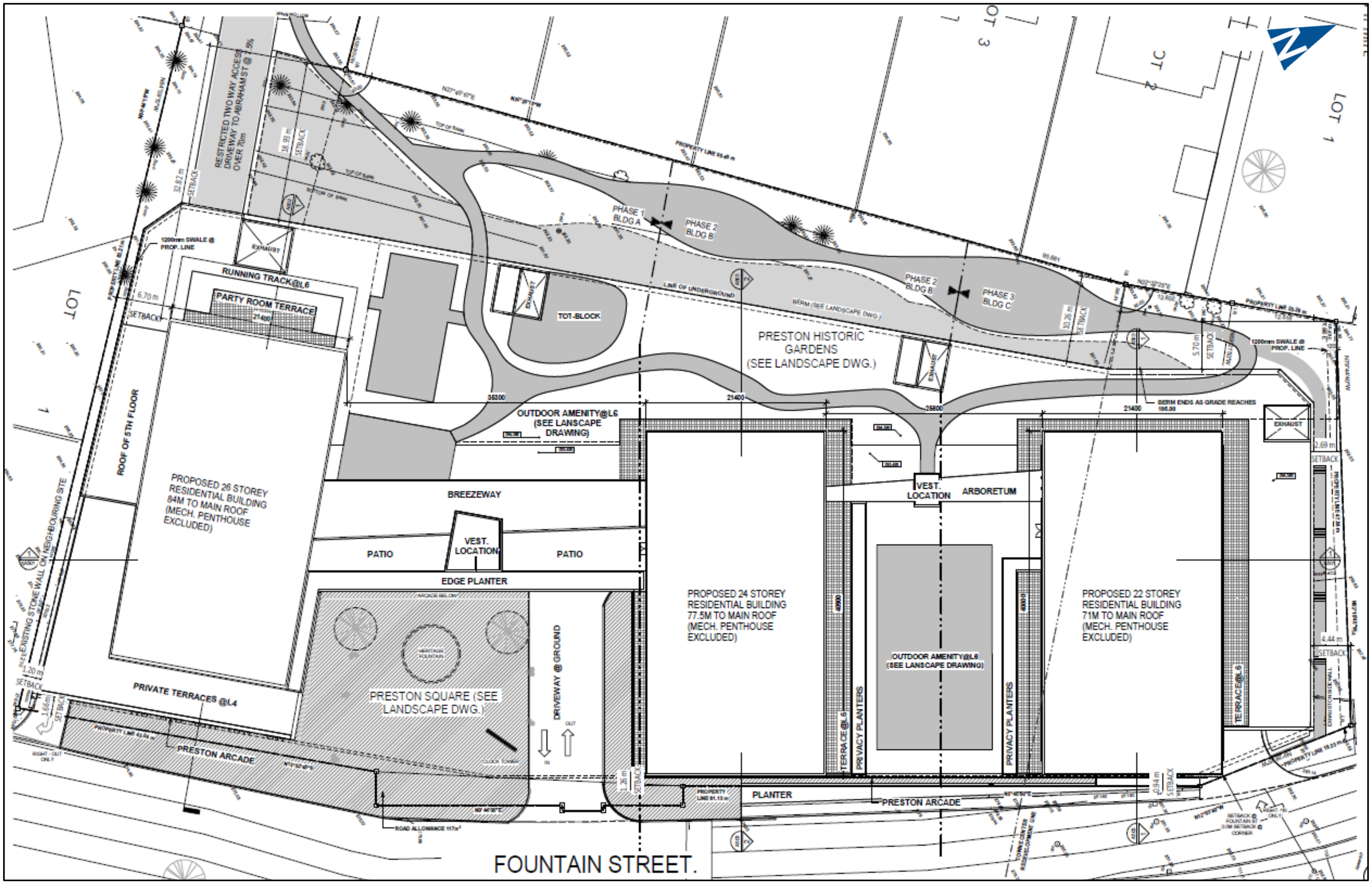
A total supply of 682 parking spaces is proposed on-site.

Vehicular access is proposed via three connections to Fountain Street:

- In/out access opposite of King Street West;
- Right-in access north of King Street West; and
- Right-out access south of King Street West.

All resident traffic will regularly use the accesses onto Fountain Street. An accessway to Abraham Street will be constructed, but will be restricted to temporary and controlled usage when the Fountain Street accesses are unavailable.

Figure 3.1 shows the development concept.



Proposed Site Plan

Figure 3.1

3.2 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual[3] provides rates and equations used to estimate the peak hour traffic volumes generated by the Land Use Codes (LUC) of this development:

- LUC 222 (Multifamily Housing, High Rise); and
- LUC 822 (Strip Retail Plaza (<40k)).

The ITE Trip Generation Manual provides average pass-by rates for certain land use codes. Pass-by rates for LUC 821 (Shopping Plaza (40-150k) were applied to the estimated trips generated by the commercial land uses as pass-by rates are not provided for LUC 822. Pass-by trips were assigned to the site access based on the existing volume distribution along Fountain Street and King Street West.

Table 3.1 summarizes the forecast number of net new trips generated by the proposed development.

TABLE 3.1: TRIP GENERATION

Land Use	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 222 - Multifamily Housing (High-Rise)	753	Eqn[1]	48	137	**185**	Eqn[1]	136	83	**219**
Internal Capture		*1%*	*1*	*1*	***2***	*4%*	*6*	*2*	***8***
LUC 822 - Strip Retail Plaza <40k (1,000 sq.ft.)	4.5	Eqn[2]	10	7	**17**	Eqn[2]	22	22	**44**
Internal Capture		*12%*	*1*	*1*	***2***	*18%*	*2*	*6*	***8***
Pass-by (LUC 821)		*0%*	*0*	*0*	***0***	*40%*	*7*	*7*	***14***
Total Trip Generation			**58**	**144**	**202**		**158**	**105**	**263**
Total Internal Capture		*2%*	*2*	*2*	*4*	*6%*	*8*	*8*	*16*
Total Pass-by		*0%*	*0*	*0*	*0*	*40%*	*7*	*7*	*14*
Net Trip Generation			**56**	**142**	**198**		**143**	**90**	**233**

LUC 222 - AM: T = 0.22(X) + 18.85 | PM: T = 0.26(X) + 23.12

LUC 822 - AM: Ln(T) = 0.66 Ln(X) + 1.84 | PM: Ln(T) = 0.71 Ln(X) + 2.72

3.3 Development Trip Distribution and Assignment

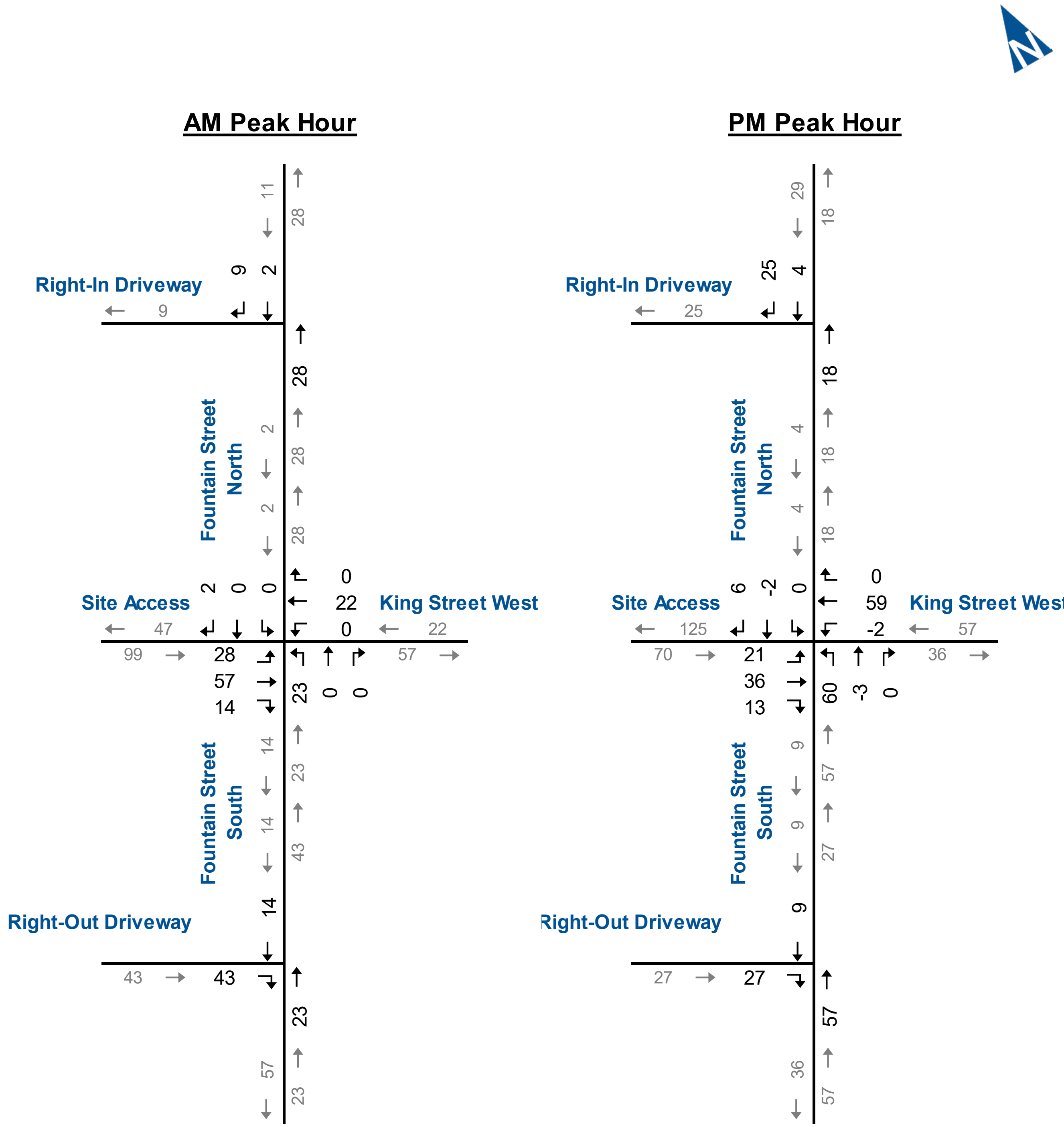
The trip distribution was determined based on existing travel patterns within the study area and likely origins/destinations relative to the subject development. **Table 3.2** displays the breakdown of trip distributions used in this study.

[3] Institute of Transportation Engineers Trip Generation Manual 11th Edition, 2021.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

Origin/Destination	Percentage
North via Fountain Street	20%
South via Fountain Street	40%
East via King Street West	40%
Total	**100%**

Figure 3.2 illustrate the site-generated traffic volumes for the AM and PM peak hours.



Site Generated Traffic Volumes

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Figure 3.2

4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions in this section includes estimates of future background and total traffic volumes, and the analyses for the 2028 horizon.

4.1 Background Traffic Forecasts

To derive the 2028 generalized background traffic volumes, a growth rate of 2% was applied to the existing roadway traffic volumes.

4.2 2028 Background Traffic Operations

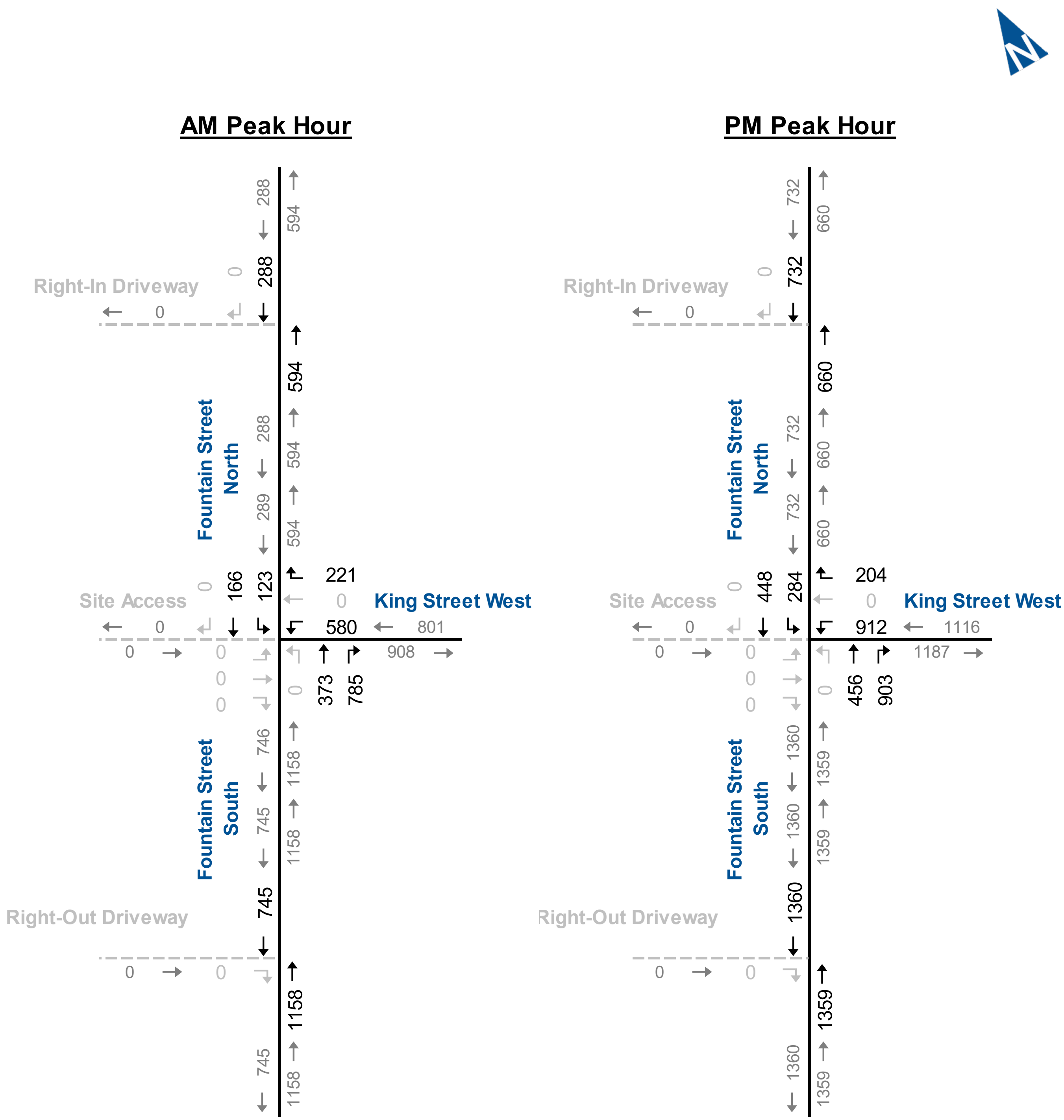
Figure 4.1 illustrate the 2028 background traffic volumes, including road traffic growth.

The 2028 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions.

Table 4.1 summarizes the results of the 2028 background traffic operations. The results indicate that the intersection of Fountain Street and King Street West is forecast to operate with acceptable levels of service during the AM and PM peak hours.

The southbound left-turn movement is operating with 95th percentile queues exceeding the available storage length by 35 metres during the PM peak hour.

Appendix C contains the supporting detailed Synchro 11 reports.



2028 Background Traffic Volumes

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Figure 4.1

TABLE 4.1: 2028 BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Eastbound Left	Eastbound Through	Eastbound Right	Eastbound Approach	Westbound Left	Westbound Through	Westbound Right	Westbound Approach	Northbound Left	Northbound Through	Northbound Right	Northbound Approach	Southbound Left	Southbound Through	Southbound Right	Southbound Approach	Overall
AM Peak Hour	Fountain Street South /Fountain Street North & King Street West	TCS	LOS					B		A	**B**		C	A	**B**	B	B		**B**	**B**
			Delay					20		4	**16**		25	8	**14**	13	10		**11**	**14**
			V/C					0.47		0.32			0.60	0.78		0.36	0.19			
			Q					59		15			81	32		19	24			
			Stor.					-		120			-	-		45	-			
			Avail.					-		105			-	-		26	-			
PM Peak Hour	Fountain Street South /Fountain Street North & King Street West	TCS	LOS					C		A	**C**		D	B	**C**	D	B		**C**	**C**
			Delay					30		4	**25**		42	16	**25**	36	17		**24**	**25**
			V/C					0.74		0.30			0.78	0.89		0.80	0.46			
			Q					110		14			143	125		80	89			
			Stor.					-		120			-	-		45	-			
			Avail.					-		106			-	-		-35	-			

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)
Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
< / > - Shared with through movement

4.3 2028 Total Traffic Operations

Figure 4.2 illustrate the 2028 total traffic volumes, including trips generated by the proposed development.

The 2028 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions.

As the proposed access to the subject development adds a fourth leg to the intersection of Fountain Street and King Street West, the following assumptions were made for the future design:

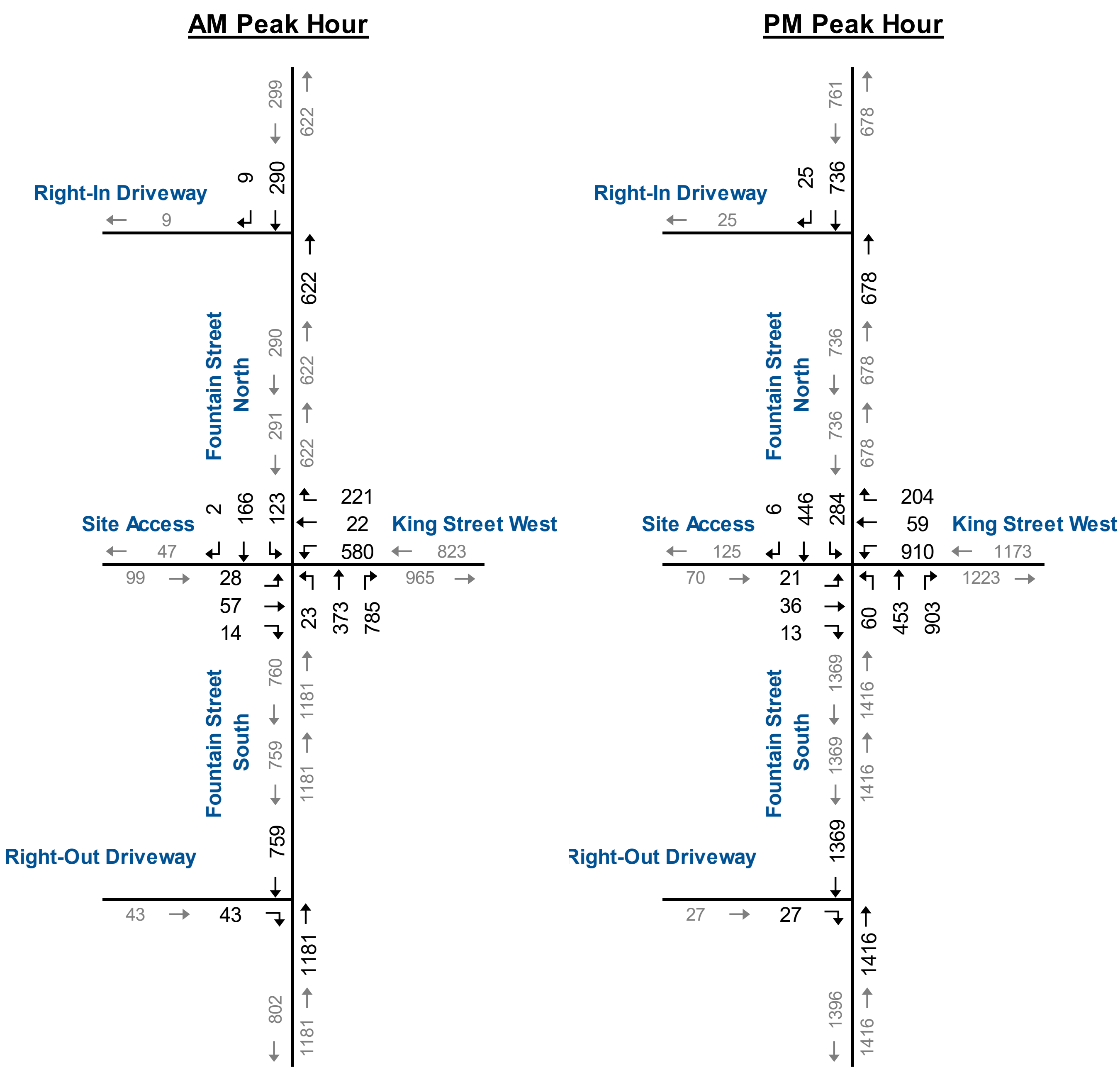
- The east and west phases will run as split phasing;
- The westbound through movement will be shared with the outside left-turn lane; and
- The northbound left-turn movement (entering the development) will be a shared through / left-turn lane due to geometric constraints.

Signal timings have been optimized based on the assumptions above.

Table 4.2 summarizes the results of the 2028 total traffic operations. The results indicate that the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours, except for the following movements at the intersection of Fountain Street and King Street West/Site Access during the PM peak hour:

- The eastbound shared movements, westbound left-turn and through movements, northbound left-turn and through movements, and southbound left-turn movements are forecast to operate at LOS E or F during the PM peak hour; and
- The southbound left-turn movement 95th percentile queues are forecast to exceed the available storage length by 68 metres.

Appendix D contains the supporting detailed Synchro 11 reports.



2028 Total Traffic Volumes

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Figure 4.2

TABLE 4.2: 2028 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	Fountain Street South /Fountain Street North & Site Access/King Street West	TCS	LOS	<	D	>	**D**	C	C	A	**C**	<	D	B	**C**	D	B	>	**C**	**C**
			Delay	<	40	>	**40**	26	28	5	**21**	<	53	10	**25**	36	18	>	**26**	**24**
			V/C	<	0.49	>		0.56	0.60	0.35		<	0.89	0.81		0.65	0.27	>		
			Q	<	29	>		69	70	14		<	115	70		32	32	>		
			Stor.	<	-	>		-	-	120		<	-	-		45	-	>		
			Avail.	<	-	>		-	-	106		<	-	-		13	-	>		
	Fountain Street South & Right-Out Driveway	TWSC	LOS			B	**B**						A		**A**		A		**A**	
			Delay			11	**11**						0		**0**		0		**0**	
			V/C			0.07							0.00				0.00			
			Q			2							0				0			
PM Peak Hour	Fountain Street South /Fountain Street North & Site Access/King Street West	TCS	LOS	<	E	>	**E**	E	E	A	**E**	<	E	B	**C**	F	C	>	**E**	**D**
			Delay	<	62	>	**62**	62	76	6	**58**	<	59	11	**28**	137	24	>	**68**	**48**
			V/C	<	0.52	>		0.92	0.98	0.33		<	0.93	0.83		1.17	0.57	>		
			Q	<	32	>		197	207	17		<	189	65		113	111	>		
			Stor.	<	-	>		-	-	120		<	-	-		45	-	>		
			Avail.	<	-	>		-	-	103		<	-	-		-68	-	>		
	Fountain Street South & Right-Out Driveway	TWSC	LOS			B	**B**						A		**A**		A		**A**	
			Delay			15	**15**						0		**0**		0		**0**	
			V/C			0.07							0.00				0.00			
			Q			2							0				0			

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
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Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
< / > - Shared with through movement

5 Parking Justification

5.1 Proposed Parking Supply

A total of 682 parking spaces is proposed for the subject site. Of the 682 spaces, 14 spaces are allocated for retail use while the remaining 668 spaces are allocated for residential use. With 753 units proposed, this results in a residential parking rate of 0.89 spaces per unit.

5.2 Zoning By-Law Requirements

The City of Cambridge *Zoning By-Law 150-85* is the current in-force Zoning By-Law.

Although not yet applicable to the subject development, the City recently completed a Zoning By-Law review and produced a draft Zoning By-Law in 2019. This latter document includes updated parking rates.

This section of the report outlines the parking requirements under both by-laws.

5.2.1 Zoning By-Law 150-85

It is noted that the proposed development is located within the Preston Town Centre where "required non-residential parking may be reduced by 25% and residential visitor parking does not have to be provided[4]". Therefore, the proposed development is subject to the following minimum parking requirements contained in the City of Cambridge Zoning By-law 150-85[5]:

- Apartment house: 1 space per dwelling unit for residents (753 spaces); and
- All other retail commercial establishments: 2.5 spaces per 100 m^2 of gross leasable commercial floor area (8 spaces).

Therefore, a total of 761 parking spaces is required under Zoning By-Law 150-85. The provision of 14 parking spaces for retail land uses exceeds the minimum parking requirements contained in the Zoning By-Law. With 668 parking spaces proposed for residential use, this results in a technical shortfall of 85 spaces.

[4] The City of Cambridge, Special Regulations in the Preston Town Centre – Map No. Z5,

[5] Corporation of the City of Cambridge, *City of Cambridge Zoning By-Law No. 150-85 Section 2.2 Off-Street Parking*, January 2012 Consolidation, Page 64.

5.2.2 2019 Draft Zoning By-Law

The proposed mixed-use development is subject to the following minimum parking requirements contained in the 2019 Draft Zoning By-Law[6]:

- Apartment dwelling unit: 1 space per unit plus 0.25 spaces per unit for visitors (941 spaces); and
- Retail store: 1/30 square metres in first storey (14 spaces).

Therefore, a total of 955 parking spaces is required under the 2019 Draft Zoning By-Law. The proposed parking supply of 14 spaces for retail land uses meets the requirements contained in the Draft By-Law. With 668 parking spaces proposed for residential uses, this results in a technical shortfall of 273 spaces.

5.2.3 Other Municipalities

In recent years, some Canadian municipalities have reviewed and updated the vehicle parking requirements implemented under their respective zoning by-laws. These updates reflect the growth of sustainable transportation options and their impacts on parking rates. Some notable examples of these new zoning by-law requirements are discussed in this section.

These updates demonstrate that the relaxing and/or removal of minimum parking requirements for new developments in non-downtown and downtown areas is becoming an increasingly common practice for Canadian municipalities.

Table 6.1 summarizes parking requirements for two Ontario cities with similar land uses that have significantly reduce parking requirements.

TABLE 5.1: PARKING REQUIREMENTS IN OTHER MUNICIPALITIES

Municipality	Land Use	Rate
London[1]	Apartment	0.5 per unit
Ottawa[2]	Dwelling units in a mixed-use building, all other cases	0.5 per dwelling unit

[1] City of London Zoning By-Law Z.-1, Section 4.19.

[2] City of Ottawa Zoning By-Law 2008-250 "Area B: Outer Urban/Inner Suburban", Section 101.

[6] Meridian Planning, *City of Cambridge Zoning By-Law Draft Section 5 Parking and Loading Standards, May 2010, Page 57.*

Applying the above rates to the proposed development results in a parking requirement of 377 residential spaces. This is 376 spaces less than the City's in-force Zoning By-Law requirement of 753 spaces.

5.3 Estimated Parking Demand

5.3.1 ITE Parking Demand

The Institute of Transportation Engineers (ITE) Parking Generation Manual[7] (5th Edition) provides data on surveys across the USA and Canada of peak parking demand for different land uses.

The parking demand for the subject site has been estimated using the average rates for Land Use Code (LUC) 222 (Multifamily Housing High-Rise) and LUC 820 (Shopping Center). As the subject site is in an area with access to frequent transit and good pedestrian connectivity, the location/setting of Dense Multi-Use Urban (no nearby rail transit) was used.

TABLE 5.2: ITE PARKING DEMAND

Land Use	Number of Units	Parking	
		Rate	Demand
LUC 222 - Multifamily Housing (High-Rise)	753	0.55	414
LUC 820 - Shopping Center	4.5	2.76	12
Estimated Total Parking Demand			**426**

According to ITE rates, a total demand of 426 parking spaces is forecast. Therefore, the proposed supply of 682 parking spaces exceeds the anticipated parking demand by 256 spaces.

5.3.2 Area Specific Vehicle Ownership and Mode Split

Auto ownership rates and use of non-auto modes of transportation are important consideration in determining parking needs. The most recent Transportation Tomorrow Survey (TTS)[8] (a household travel survey conducted within the Greater Golden Horseshoe by the Data Management Group at the University of Toronto) provides data with respect to the number of vehicles owned by private households within Waterloo Region in 2016.

A review of auto ownership statistics in the surrounding area (TTS Zones 7302, 7324, 7301, 7325) suggests that the rate of auto ownership in the study area is approximately 1.14 vehicles per

[7] Institute of Transportation Engineers Parking Generation Manual 5th Edition, 2019.
[8] Transportation Tomorrow Survey (TTS), University of Toronto, 2016.

household in apartment units, and that 19% of households do not own a vehicle. Applied to the 753 residential units proposed, this results in a potential parking demand of 858 spaces for residential units.

Similarly, a review of travel characteristics indicates that approximately 11% of travel is undertaken using non-auto modes (4% via transit and 7% walking).

Appendix E contains the TTS Data.

5.3.3 Proxy Site Parking Demand

To better understand the actual parking demand that can be expected for the development, parking utilization surveys were reviewed at two sites in Cambridge and Kitchener with similar land uses to the proposed development.

Appendix F contains the proxy site parking demand data.

150 & 180 Greenbrier Road

The existing development at 150 and 180 Greenbrier Road is located at the southwest corner of Myers Road and Greenbrier Road in Cambridge. The development includes two 6-storey apartment buildings containing 153 units. Parking is provided at a rate of 1.14 spaces per unit (175 spaces).

The development has access to two transit routes within 150 metres. Sidewalks are provided along both sides of Myers Road and Greenbrier Road allowing residents to easily access these routes.

Spot counts conducted in August 2023 indicates a peak parking demand of 141 vehicles (0.92 vehicles per unit).

Applying the peak parking demand at 150 and 180 Greenbrier Road to the proposed 753 units results in a parking demand of 693 spaces.

45 Country Hill Drive

The existing development at 45 Country Hill Drive is located at the southwest corner of Block Line Road and Country Hill Drive in Kitchener. The development comprises of 104 residential units and 125 parking spaces.

The development has access to three transit routes within 250 metres. Sidewalks are provided along both sides of Country Hill Drive while multi-use trails are provided along both sides of Block Line Road allowing residents to easily access these routes.

Spot counts conducted in July 2018 indicates a peak parking demand of 82 vehicles (0.79 spaces per unit).

Applying the peak parking demand at 45 Country Hill Drive results in a parking demand of 595 spaces.

5.3.4 Summary of Parking Demand Forecasts

Considering the analysis of parking demand included above, the rate of parking demand across the various measures ranges from 0.55 spaces per unit to 1.14 spaces per unit. These results average to a rate of 0.85 spaces per unit.

5.4 Transportation Demand Management

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

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

- **Pre-occupancy**: measures that need to be implemented while a development is being designed and built; and
- **Post-occupancy**: measures that can be implemented once the development is occupied.

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

After the development is built, incentives can be offered, but those incentives will not work as well if the site and its surroundings are oriented to cars.

5.4.1 Pre-Occupancy Strategies

The following strategies and tools already exist in the surrounding area, including existing pedestrian and transit facilities, or can be implemented into the site design to support the reduced parking supply and encourage the use of alternative modes of transportation.

- **Walking:** The pedestrian accessibility of a development is essential in helping to ensure that those that can walk, have access to pedestrian connections.

  Sidewalks are provided on both sides of Fountain Street, north of King Street West while a multi-use path is provided on the east side of the road, south of King Street West. A multi-use path is also provided on the north side of King Street West while a sidewalk is provided on the south.

  The site plan indicates internal connections to the existing municipal sidewalk along Fountain Street. The signalized intersection of Fountain Street and King Street provides a location for crossing.

  The subject site is located approximately 1 kilometre (13-minute walk) from the Preston Towne Centre where there are grocery stores, restaurants, and other retail establishments such as pharmacies and banks along King Street West.

- **Cycling:** The City of Cambridge *Cycling Master Plan*[9] indicates the following bicycle parking requirements:

  - Multiple Dwelling:
    - Long-Term: 0.3 spaces per dwelling unit (226 spaces).
    - Short-Term: 0.05 spaces per dwelling unit to a maximum of 12 or minimum of 2 (12 spaces).
  - Industrial/Other:
    - Long-Term: 5% of required motor vehicle parking for the first 15,000 m^2 (1 space).
    - Short-Term: 2 spaces.

  Short-term bicycle parking includes bicycle racks located in public areas, generally located in convenient locations and as close to destinations as possible (less than 15 metres from the intended building entrance or no further than the nearest motor vehicle parking space, whichever is closer).

  Long-term bicycle parking consists of lockers, bicycle rooms, bicycle cages, full-service stations, or secure areas. This type of

9 City of Cambridge, *Bike Your City Cycling Master Plan*, March 2020.

parking is generally geared towards users that need to park a bicycle for a longer period of time.

The total requirement for the site is 14 short-term and 227 long-term bicycle parking spaces. The developer is proposing a supply of 62 short-term and 518 long-term bicycle parking spaces, exceeding the minimum bicycle parking requirements.

- **Transit:** The availability of convenient and desirable transit options can reduce the number of person automobile trips. As discussed in **Section 2.2**, public transportation is provided via GRT bus route 61, 67 and 206.

  The nearest bus stops for routes 61 and 67 are located approximately 150 metres (2-minute walk) from the subject site at the intersection of Fountain Street and King Street West. The nearest bus stop for iXpress bus route 206 is located approximately 550 metres (8-minute walk) from the subject site at the intersection of King Street West and Eagle Street.

  The ION Light Rail Transit (LRT) system will also be available to residents as the Region is moving towards implementing Stage 2 ION. Stage 2 ION is the extension of the existing LRT system to downtown Cambridge. Of the eight new stations, Preston Station will be located at the southwest corner of King Street and Eagle Street, approximately 550 metres (8-minute walk) from the subject site.

  The existing GRT routes supplemented by the anticipated Preston Station will provide future residents with good connectivity to the broader network and key destinations within the Region including malls, Downtown Kitchener, Uptown Waterloo and universities/colleges.

- **Parking Management:** Most apartment buildings and condominium complexes include the price of parking in the rent or purchase price of the unit, a practice known as bundled parking. This practice assumes that all residents have the same demand for parking, and they all bear the cost through their rent or purchase. This practice fails to reward those who do not own a car and who provide social benefits by their non-auto travel choice. When parking is unbundled, the price of the parking space(s) is separated from the rent or purchase price and allows residents to pay only for parking that they need. Unbundling means that parking is rented or sold separately, rather than automatically included with building space.

5.4.2 TDM Checklist

The City of Cambridge TDM checklist is used to assess whether developments are planned in such a manner to support the overall objectives of the City to increase transit use and to reduce single occupant vehicle (SOV) travel.

The development is considered TDM supportive based on the following TDM measures:

- The development incorporates functional building entrances that are oriented to public space or to locations where pedestrians and transit users arrive from such a street, square, park or plaza;
- The development is located within 600 m of a bus service with headways of 15 min or less;
- The development provides no more than the minimum number of parking spaces, as required by applicable Zoning By-Law;
- Parking is not located on major street frontage or between a road right of way and the building façade;
- 75% of parking or more is located underground or in a structure;
- The building owner/occupant agrees to charge for parking as an unbundled cost to occupants; and
- The development includes mixed uses (i.e., retail, commercial or food services, daycares, or other complementary uses) on-site or located within 400 metres.

Appendix G contains the TDM checklist.

5.5 Parking and TDM Summary

The following summarizes the findings of the Parking Study:

- A review of Zoning By-Laws in other municipalities indicates that reductions of on-site parking for developments outside of downtown areas is becoming an increasingly common practice.
- Based on ITE parking rates, a parking demand of 414 spaces is anticipated for residential land uses and 12 spaces for retail land uses.
- A review of TTS auto ownership statistics for the surrounding zones of the subject site indicates a rate of 1.14 spaces per household in apartment units, resulting in a demand of 858 parking spaces for the 753 residential units. Similarly, 11% of travel in the area is undertaken using non-auto modes.

- The proxy site data reviewed at two sites with similar land uses provides an indicator of the parking demand that can be expected at the subject site. The proxy site data at 150 & 180 Greenbrier Road and 45 Country Hill Drive indicate rates between 0.92 and 0.79 spaces per unit (693 and 595 spaces), respectively.

Given the results of ITE parking rates, auto ownership rates and parking demand data in similar developments, the average forecast parking demand for residential land uses is 0.85 spaces per unit (640 spaces).

To further support the use of alternative modes of transportation and reduce the parking demand on site, the cost of parking spaces will be unbundled from the cost of the residential units, to support tenants who choose not to own a vehicle and do not require a parking space. The following additional TDM action should also be considered:

- Delegating a TDM coordinator, either an interested individual or property manager, to support all on-site TDM programs; and
- Consideration given to offering transit and active transportation information in a welcome package to new tenants and posting the information in a central location to further support all alternative modes.

Finally, the subject development is located within 800 metres of the future ION LRT Phase 2 station at King Street and Eagle Street, which will enable more utilization of the transit network.

Therefore, given that parking demand for similar developments have shown to be lower than what is currently required by the zoning by-law, that parking will be sold at a cost separate from the cost of units, and that Phase 2 of the ION LRT will be accessible from the subject development, the proposed parking rate of 0.89 spaces per unit is supportable.

6 Conclusions and Recommendations

6.1 Conclusions

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

Transportation Impact Assessment

- **Existing Traffic Conditions:** The intersection of Fountain Street and King Street West is operating with acceptable levels of service. The southbound left-turn movement is operating with 95th percentile queues exceeding the available storage length during the PM peak hour.
- **Development Trip Generation:** The development is forecast to generate 198 and 233 trips during the AM and PM peak hours, respectively.
- **2028 Background Traffic Conditions:** The intersection of Fountain Street and King Street West is forecast to operate within acceptable levels of service. The southbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage length during the PM peak hour.
- **2028 Total Traffic Conditions:** The study area intersections are forecast to operate within acceptable levels of service except for the following movements at the intersection of Fountain Street and King Street West during the PM peak hour:
  - The eastbound shared movements, westbound left-turn and through movements, northbound left-turn and through movements, and southbound left-turn movements are forecast to operate at LOS E or F during the PM peak hour; and
  - The southbound left-turn movement 95th percentile queues are forecast to exceed the available storage length by 68 metres.

Parking Study

- **Zoning By-law Requirements:** Based on the current in-force Zoning By-Law requirements, the proposed development requires 761 spaces resulting in a technical shortfall of 79 spaces. The 2019 Draft Zoning By-Law indicates a requirement of 955 spaces resulting in a technical shortfall of 273 spaces.
- **Estimated Parking Demand:** Based on ITE parking rates, auto ownership rates reported by the Transportation Tomorrow

Survey, and parking demand data observed at similar developments, the estimated average parking demand for the site could be less than the amount of parking proposed by the subject development.

- **Proposed TDM Measures:** The following TDM measures are proposed at the development or are located nearby:
  - Unbundling all parking spaces to support tenants who choose not to own a vehicle and are not required to purchase a parking spot;
  - The development incorporates functional building entrances that are oriented to public space or to locations where pedestrians and transit users arrive from such a street, square, park or plaza;
  - The development is located within 600 m of a bus service with headways of 15 min or less;
  - The development provides no more than the minimum number of parking spaces, as required by applicable Zoning By-Law;
  - Parking is not located on major street frontage or between a road right of way and the building façade;
  - 75% of parking or more is located underground or in a structure; and
  - The development includes mixed uses (i.e., retail, commercial or food services, daycares, or other complementary uses) on-site or located within 400 metres.

  Additional TDM Measures: In addition to the above strategies, the following TDM measures could be considered on-site:
  - Delegating a TDM coordinator, either an interested individual or property manager, to support all on-site TDM programs; and
  - Consideration given to offering transit and active transportation information in a welcome package to new tenants and posting the information in a central location to further support all alternative modes.

6.2 Recommendations

Based on the findings of this study, it is recommended that the developer commits to the TDM measures listed herein to support a residential parking rate of 0.89 spaces per unit.

Appendix A

Existing Traffic Data

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:30 AM
To: 8:30 AM

Municipality: Cambridge
Intersection: King St @ Fountain St
Control: Signalized
Major Road: Fountain St

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

GeoID: 17349
Count Date: Wednesday, 13-Apr-22

North Leg Total: 799
North Entering: 261
North Peds: 0
Peds Cross: ⋈

% Trks	0%	5%	13%	
Heavys	0	5	11	16
Trucks	0	3	3	6
Cars	0	142	97	239
Total	0	150	111	

Heavys	16
Trucks	5
Cars	517
Total	538

East Leg Total: 1,547
East Entering: 725
East Peds: 0
Peds Cross: ⧖

Fountain St

Heavys	Trucks	Cars	Total
0	0	0	0

Total	Cars	Trucks	Heavys	% Trks
200	189	4	7	6%
0	0	0	0	0%
525	502	4	19	4%
	691	8	26	

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King St

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

Cars	Trucks	Heavys	Total
779	14	29	822

Fountain St

Peds Cross: ⧖
West Peds: 0
West Entering: 0
West leg Total: 0

Heavys	24
Trucks	7
Cars	644
Total	675

Total	0	338	711	
Cars	0	328	682	1,010
Trucks	0	1	11	12
Heavys	0	9	18	27
% Trks	0%	3%	4%	

Peds Cross: ⋈
South Peds: 0
South Entering: 1,049
South leg Total: 1,724

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **2,035**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **0**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 12:30 PM
To: 1:30 PM

Municipality: Cambridge
Intersection: King St @ Fountain St
Control: Signalized
Major Road: Fountain St

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

GeoID: 17349
Count Date: Wednesday, 13-Apr-22

North Leg Total: 581
North Entering: 266
North Peds: 0
Peds Cross: ⋈

% Trks	0%	5%	5%	
Heavys	0	2	4	6
Trucks	0	5	2	7
Cars	0	133	120	253
Total	0	140	126	

Heavys	11
Trucks	9
Cars	295
Total	315

East Leg Total: 1,534
East Entering: 763
East Peds: 0
Peds Cross: ⧖

Fountain St

Heavys	Trucks	Cars	Total
0	0	0	0

Total	Cars	Trucks	Heavys	% Trks
154	147	2	5	5%
0	0	0	0	0%
609	581	10	18	5%
	728	12	23	

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King St

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

Cars	Trucks	Heavys	Total
732	15	24	771

Fountain St

Peds Cross: ⧖
West Peds: 0
West Entering: 0
West leg Total: 0

Heavys	20
Trucks	15
Cars	714
Total	749

Total	0	161	645	
Cars	0	148	612	760
Trucks	0	7	13	20
Heavys	0	6	20	26
% Trks	0%	8%	5%	

Peds Cross: ⋈
South Peds: 0
South Entering: 806
South leg Total: 1,555

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,835**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **0**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:15 PM
To: 5:15 PM

Municipality: Cambridge
Intersection: King St @ Fountain St
Control: Signalized
Major Road: Fountain St

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

GeoID: 17349
Count Date: Wednesday, 13-Apr-22

North Leg Total: 1,261
North Entering: 663
North Peds: 2
Peds Cross: ⋈

% Trks	0%	1%	4%	
Heavys	0	4	11	15
Trucks	0	2	0	2
Cars	0	400	246	646
Total	0	406	257	

Heavys	8
Trucks	10
Cars	580
Total	598

East Leg Total: 2,086
East Entering: 1,011
East Peds: 3
Peds Cross: ⧖

Fountain St

Heavys	Trucks	Cars	Total
0	0	0	0

Total	Cars	Trucks	Heavys	% Trks
185	179	3	3	3%
0	0	0	0	0%
826	805	6	15	3%
	984	9	18	

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King St

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

Cars	Trucks	Heavys	Total
1,047	6	22	1,075

Fountain St

Peds Cross: ⧖
West Peds: 0
West Entering: 0
West leg Total: 0

Heavys	19
Trucks	8
Cars	1,205
Total	1,232

Total	0	413	818	
Cars	0	401	801	1,202
Trucks	0	7	6	13
Heavys	0	5	11	16
% Trks	0%	3%	2%	

Peds Cross: ⋈
South Peds: 0
South Entering: 1,231
South leg Total: 2,463

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **2,905**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **0**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Cambridge
Intersection: King St @ Fountain St
Control: Signalized
Major Road: Fountain St

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 17349
Count Date: Wednesday, 13-Apr-22

North Leg Total:	6,175
North Entering:	3,127
North Peds:	2
Peds Cross:	⋈
Bicycles Entering:	4
Buggies Entering:	0

% Trks	0%	4%	6%	
Heavys	0	31	59	90
Trucks	0	33	20	53
Cars	0	1,733	1,251	2,984
Total	0	1,797	1,330	

Heavys	91
Trucks	61
Cars	2,896
Total	3,048

East Leg Total:	13,177
East Entering:	6,419
East Peds:	16
Peds Cross:	⧖
Bicycles Entering:	7
Buggies Entering:	0

Fountain St

Heavys	Trucks	Cars	Total
0	0	0	0

Total	Cars	Trucks	Heavys	% Trks
1,262	1,196	19	47	5%
0	0	0	0	0%
5,157	4,963	56	138	4%
	6,159	75	185	

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King St

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

Cars	Trucks	Heavys	Total
6,463	92	203	6,758

Fountain St

Peds Cross:	⧖
West Peds:	0
West Entering:	0
West leg Total:	0
Bicycles Entering:	0
Buggies Entering:	0

Heavys	169
Trucks	89
Cars	6,696
Total	6,954

Total	0	1,786	5,428	
Cars	0	1,700	5,212	6,912
Trucks	0	42	72	114
Heavys	0	44	144	188
% Trks	0%	5%	4%	

Peds Cross:	⋈
South Peds:	1
South Entering:	7,214
South leg Total:	14,168
Bicycles Entering:	6
Buggies Entering:	0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **16,760**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **0**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Cambridge
Intersection: King St @ Fountain St
Control: Signalized
Major Road: Fountain St

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 17349
Count Date: Wednesday, 13-Apr-22

North Leg Total: 10,745
North Entering: 5,441
North Peds: N/A
Peds Cross: ⋈

% Trks	0%	4%	6%	
Heavys	0	54	103	157
Trucks	0	57	35	92
Cars	0	3,015	2,177	5,192
Total	0	3,127	2,314	

North exiting:

Heavys	158
Trucks	106
Cars	5,039
Total	5304

East Leg Total: 22,928
East Entering: 11,169
East Peds: N/A
Peds Cross: ⧖

Fountain St

Heavys	Trucks	Cars	Total
0	0	0	0

Total	Cars	Trucks	Heavys	% Trks
2,196	2,081	33	82	5%
0	0	0	0	0%
8,973	8,636	97	240	4%
	10,717	131	322	

na

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King St

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

Cars	Trucks	Heavys	Total
11,246	160	353	11,759

Fountain St

Peds Cross: ⧖
West Peds: N/A
West Entering: 0
West leg Total: 0

Heavys	294
Trucks	155
Cars	11,651
Total	12,100

Total	0	3,108	9,445	
Cars	0	2,958	9,069	12,027
Trucks	0	73	125	198
Heavys	0	77	251	327
% Trks	0%	5%	4%	

Peds Cross: ⋈
South Peds: N/A
South Entering: 12,552
South leg Total: 24,652

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: (West leg total + South leg total + East leg total + North leg total) / 2 ***EDT = 29,162***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Cambridge
Intersection: King St @ Fountain St
Control: Signalized
Major Road: Fountain St

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 17349
Count Date: Wednesday, 13-Apr-22

North Approach PHF

AM Peak:	0.86
Mid-day Peak:	0.83
PM Peak:	0.83

East Approach PHF

AM Peak:	0.97
Mid-day Peak:	0.92
PM Peak:	0.97

North approach (Fountain St) – Movement

PM	0.00	0.77	0.87
MID	0.00	0.90	0.77
AM	0.00	0.78	0.84

Fountain St

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

East approach – Movement

AM	MID	PM
0.81	0.84	0.87
0.00	0.00	0.00
0.97	0.95	0.97

N

W E

S

na

West approach – Movement

PM	MID	AM
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00

King St

Fountain St

South approach – Movement

0.00	0.87	0.80	AM
0.00	0.84	0.96	MID
0.00	0.88	0.95	PM

West Approach PHF

AM Peak:	0.00
Mid-day Peak:	0.00
PM Peak:	0.00

South Approach PHF

AM Peak:	0.82
Mid-day Peak:	0.96
PM Peak:	0.93

Comments

Intersection: King St @ Fountain St
GeoID: 17349
Municipality: Cambridge
Major Road: Fountain St

Intersection Control: Signalized
Date: Wednesday, 13-Apr-22
Name: Cam
Weather: Cloudy/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND				
Approach Control			*N/A*			*Signalized*			*Signalized*			*Signalized*			TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	124	0	62	0	78	158	19	42	0	483	
7:45	to	8:00	0	0	0	136	0	50	0	97	223	33	31	0	570	
8:00	to	8:15	0	0	0	135	0	48	0	87	154	31	29	0	484	
8:15	to	8:30	0	0	0	130	0	40	0	76	176	28	48	0	498	2,035
8:30	to	8:45	0	0	0	136	0	31	0	67	162	27	37	0	460	2,012
8:45	to	9:00	0	0	0	124	0	36	0	57	191	34	26	0	468	1,910
9:00	to	9:15	0	0	0	128	0	27	0	41	159	37	31	0	423	1,849
9:15	to	9:30	0	0	0	146	0	38	0	32	126	24	20	0	386	1,737
9:30	to	9:45	0	0	0	106	0	28	0	22	139	24	24	0	343	1,620
9:45	to	10:00	0	0	0	109	0	28	0	40	120	25	26	0	348	1,500
10:00	to	10:15	0	0	0	113	0	31	0	35	122	23	32	0	356	1,433
10:15	to	10:30	0	0	0	120	0	25	0	45	134	37	26	0	387	1,434
AM Peak Hour																
7:30	**to**	**8:30**	**0**	**0**	**0**	**525**	**0**	**200**	**0**	**338**	**711**	**111**	**150**	**0**	**2,035**	
# of trucks in peak			0	0	0	4	0	4	0	1	11	3	3	0	26	
# of heavies in peak			0	0	0	19	0	7	0	9	18	11	5	0	69	
% heavies (Total)			0%	0%	0%	4%	0%	6%	0%	3%	4%	13%	5%	0%	5%	

12:00	to	12:15	0	0	0	158	0	37	0	34	147	32	36	0	444	
12:15	to	12:30	0	0	0	155	0	34	0	23	131	46	32	0	421	
12:30	to	12:45	0	0	0	161	0	46	0	48	155	41	39	0	490	
12:45	to	13:00	0	0	0	154	0	39	0	38	167	32	38	0	468	1,823
13:00	to	13:15	0	0	0	144	0	39	0	41	168	25	31	0	448	1,827
13:15	to	13:30	0	0	0	150	0	30	0	34	155	28	32	0	429	1,835
13:30	to	13:45	0	0	0	146	0	34	0	32	179	33	23	0	447	1,792
13:45	to	14:00	0	0	0	184	0	35	0	42	175	31	38	0	505	1,829
Midday Peak Hour																
12:30	**to**	**13:30**	**0**	**0**	**0**	**609**	**0**	**154**	**0**	**161**	**645**	**126**	**140**	**0**	**1,835**	
# of trucks in peak			0	0	0	10	0	2	0	7	13	2	5	0	39	
# of heavies in peak			0	0	0	18	0	5	0	6	20	4	2	0	55	
% heavies (Total)			0%	0%	0%	5%	0%	5%	0%	8%	5%	5%	5%	0%	5%	

15:00	to	15:15	0	0	0	202	0	43	0	52	179	68	97	0	641	
15:15	to	15:30	0	0	0	172	0	42	0	53	181	67	91	0	606	
15:30	to	15:45	0	0	0	210	0	38	0	42	184	57	100	0	631	
15:45	to	16:00	0	0	0	205	0	50	0	47	211	74	137	0	724	2,602
16:00	to	16:15	0	0	0	216	0	52	0	64	176	79	116	0	703	2,664
16:15	to	16:30	0	0	0	212	0	40	0	95	200	74	97	0	718	2,776
16:30	to	16:45	0	0	0	204	0	44	0	83	189	55	83	0	658	2,803
16:45	to	17:00	0	0	0	208	0	53	0	118	214	60	94	0	747	2,826
17:00	to	17:15	0	0	0	202	0	48	0	117	215	68	132	0	782	2,905
17:15	to	17:30	0	0	0	235	0	45	0	67	201	45	71	0	664	2,851
17:30	to	17:45	0	0	0	178	0	32	0	40	190	42	89	0	571	2,764
17:45	to	18:00	0	0	0	154	0	37	0	39	147	31	49	0	457	2,474
PM Peak Hour																
16:15	**to**	**17:15**	**0**	**0**	**0**	**826**	**0**	**185**	**0**	**413**	**818**	**257**	**406**	**0**	**2,905**	
# of trucks in peak			0	0	0	6	0	3	0	7	6	0	2	0	24	
# of heavies in peak			0	0	0	15	0	3	0	5	11	11	4	0	49	
% heavies (Total)			0%	0%	0%	3%	0%	3%	0%	3%	2%	4%	1%	0%	3%	

Intersection: King St @ Fountain St
GeoID: 17349
Municipality: Cambridge
Major Road: Fountain St

Intersection Control: Signalized
Date: Wednesday, 13-Apr-22
Name: Cam
Weather: Cloudy/Dry

PEDESTRIAN CROSSING

Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	0	0	0
8:45	to	9:00	0	0	0	0	0	0
9:00	to	9:15	0	0	0	0	0	0
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	0	0	0	0	0	0
9:45	to	10:00	1	0	0	0	1	1
10:00	to	10:15	1	0	0	0	1	2
10:15	to	10:30	0	0	0	0	0	2
AM Peak Hour							**2**	
7:30	**to**	**8:30**	**0**	**0**	**0**	**0**	**0**	

12:00	to	12:15	1	0	0	0	1	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	1
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**1**	
12:30	**to**	**13:30**	0	0	0	0	**0**	

15:00	to	15:15	1	0	0	1	2	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	1	0	0	0	1	
15:45	to	16:00	1	0	0	0	1	4
16:00	to	16:15	1	0	0	0	1	3
16:15	to	16:30	0	0	1	0	1	4
16:30	to	16:45	1	0	0	0	1	4
16:45	to	17:00	2	0	0	0	2	5
17:00	to	17:15	0	0	1	0	1	5
17:15	to	17:30	5	0	0	0	5	9
17:30	to	17:45	1	0	0	0	1	9
17:45	to	18:00	0	0	0	0	0	7
PM Peak Hour							**16**	
16:15	**to**	**17:15**	3	0	2	0	**5**	

CURRENT TRAFFIC SIGNAL TIMING

INT # **939** **KING STREET @ Fountain Street** T08-50/ **32C**

Date Prepared: **September 13, 2023**

Mode of Control **Fully-Actuated**

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

Signal rests in King Street walk
WB King Street Bus Queue jump runs after Fountain Street - when a bus is present

Max 1 5:30-22:00 Monday-Friday, 6:00-21:00 Sat, 6:00-20:00 Sun

KING STREET

WB Bus Queue Jump	Min	8.0	seconds			
	Ext	3.0	seconds			
	Max	12.0	seconds			
WB Clearance		6.0	seconds			
				Pedestrian Call		
Green	Min	25.0	seconds	Green/Walk	20.0	seconds
	Ext	4.0	seconds	Green/FDW	5.0	seconds
	Max	43.0	seconds	Green/SDW	18.0	seconds
Amber		4.0	seconds	Amber	4.0	seconds
All Red		2.0	seconds	All Red	2.0	seconds

Fountain Street

SBL Green Arrow	Min	5.0	seconds			
	Ext	3.0	seconds			
	Max	18.0	seconds			
SBL Amber Arrow		3.0	seconds			
All Red		1.0	seconds			
				Pedestrian Call		
Green	Min	12.0	seconds	Green/Walk	10.0	seconds
	Ext	3.0	seconds	Green/FDW	9.0	seconds
	Max	32.0	seconds	Green/SDW	13.0	seconds
Amber		3.3	seconds	Amber	3.3	seconds
All Red		3.1	seconds	All Red	3.1	seconds

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

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

Appendix B

Existing Traffic Operations Reports

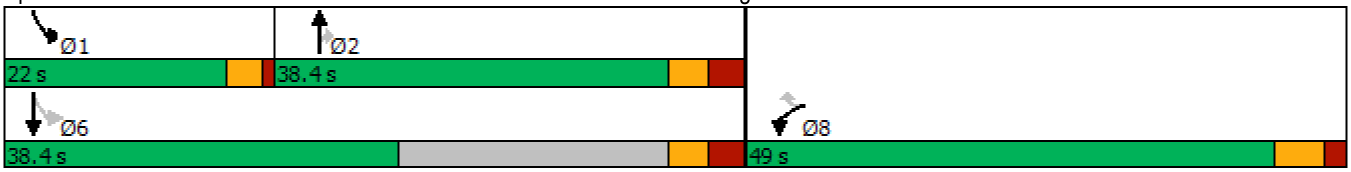
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	525	200	338	711	111	150
Future Volume (vph)	525	200	338	711	111	150
Ideal Flow (vphpl)	1775	1750	1900	1750	1775	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	120.0		0.0	45.0	
Storage Lanes	2	1		1	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3111	1388	1824	1414	1476	1789
Flt Permitted	0.950				0.310	
Satd. Flow (perm)	3111	1388	1824	1414	482	1789
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		200		711		
Link Speed (k/h)	50		50			50
Link Distance (m)	261.0		210.6			208.0
Travel Time (s)	18.8		15.2			15.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	6%	3%	4%	13%	5%
Adj. Flow (vph)	525	200	338	711	111	150
Shared Lane Traffic (%)						
Lane Group Flow (vph)	525	200	338	711	111	150
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.11	1.13	1.01	1.13	1.11	1.01
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	25.0	25.0	12.0	12.0	5.0	12.0
Minimum Split (s)	31.0	31.0	18.4	18.4	9.0	18.4
Total Split (s)	49.0	49.0	38.4	38.4	22.0	38.4
Total Split (%)	44.8%	44.8%	35.1%	35.1%	20.1%	35.1%
Maximum Green (s)	43.0	43.0	32.0	32.0	18.0	32.0
Yellow Time (s)	4.0	4.0	3.3	3.3	3.0	3.3
All-Red Time (s)	2.0	2.0	3.1	3.1	1.0	3.1
Lost Time Adjust (s)	-2.0	-2.0	-2.4	-2.4	0.0	-2.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None
Walk Time (s)	20.0	20.0	10.0	10.0		10.0
Flash Dont Walk (s)	5.0	5.0	9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	28.2	28.2	22.8	22.8	32.6	32.6
Actuated g/C Ratio	0.41	0.41	0.33	0.33	0.47	0.47
v/c Ratio	0.41	0.29	0.56	0.75	0.32	0.18
Control Delay	18.4	4.5	23.4	7.5	11.7	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	4.5	23.4	7.5	11.7	9.9
LOS	B	A	C	A	B	A
Approach Delay	14.5		12.6			10.7
Approach LOS	B		B			B
Queue Length 50th (m)	26.3	0.0	38.1	0.0	7.7	10.6
Queue Length 95th (m)	52.2	14.3	66.5	25.5	16.0	20.1
Internal Link Dist (m)	237.0		186.6			184.0
Turn Bay Length (m)		120.0			45.0	
Base Capacity (vph)	2094	999	938	1072	500	1465
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.20	0.36	0.66	0.22	0.10

Intersection Summary

Area Type: Other
Cycle Length: 109.4
Actuated Cycle Length: 69
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 13.1 Intersection LOS: B
Intersection Capacity Utilization 61.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Fountain Street South /Fountain Street North & King Street West



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	826	185	413	818	257	406
Future Volume (vph)	826	185	413	818	257	406
Ideal Flow (vphpl)	1775	1750	1900	1750	1775	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	120.0		0.0	45.0	
Storage Lanes	2	1		1	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98		0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3141	1428	1824	1442	1603	1860
Flt Permitted	0.950				0.208	
Satd. Flow (perm)	3141	1393	1824	1418	351	1860
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		185		818		
Link Speed (k/h)	50		50			50
Link Distance (m)	261.0		210.6			208.0
Travel Time (s)	18.8		15.2			15.0
Confl. Peds. (#/hr)		2		3	3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	2%	4%	1%
Adj. Flow (vph)	826	185	413	818	257	406
Shared Lane Traffic (%)						
Lane Group Flow (vph)	826	185	413	818	257	406
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.11	1.13	1.01	1.13	1.11	1.01
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	25.0	25.0	12.0	12.0	5.0	12.0
Minimum Split (s)	31.0	31.0	18.4	18.4	9.0	18.4
Total Split (s)	49.0	49.0	38.4	38.4	22.0	38.4
Total Split (%)	44.8%	44.8%	35.1%	35.1%	20.1%	35.1%
Maximum Green (s)	43.0	43.0	32.0	32.0	18.0	32.0
Yellow Time (s)	4.0	4.0	3.3	3.3	3.0	3.3
All-Red Time (s)	2.0	2.0	3.1	3.1	1.0	3.1
Lost Time Adjust (s)	-2.0	-2.0	-2.4	-2.4	0.0	-2.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None
Walk Time (s)	20.0	20.0	10.0	10.0		10.0
Flash Dont Walk (s)	5.0	5.0	9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	34.8	34.8	28.2	28.2	45.9	45.9
Actuated g/C Ratio	0.39	0.39	0.32	0.32	0.52	0.52
v/c Ratio	0.67	0.28	0.72	0.81	0.69	0.42
Control Delay	26.6	4.3	36.1	9.8	24.1	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	4.3	36.1	9.8	24.1	15.5
LOS	C	A	D	A	C	B
Approach Delay	22.5		18.6			18.8
Approach LOS	C		B			B
Queue Length 50th (m)	64.5	0.0	63.8	0.0	24.6	41.6
Queue Length 95th (m)	96.3	13.6	119.2	44.8	51.5	78.7
Internal Link Dist (m)	237.0		186.6			184.0
Turn Bay Length (m)		120.0			45.0	
Base Capacity (vph)	1643	817	729	1058	442	1219
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.23	0.57	0.77	0.58	0.33

Intersection Summary

Area Type: Other

Cycle Length: 109.4

Actuated Cycle Length: 89

Natural Cycle: 65

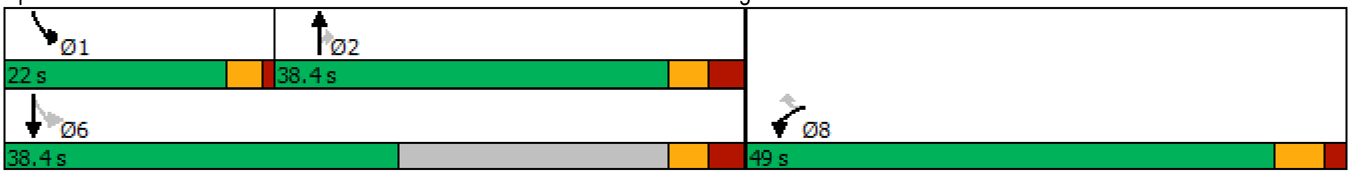
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 20.0 Intersection LOS: C

Intersection Capacity Utilization 77.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Fountain Street South /Fountain Street North & King Street West



Appendix C

2028 Background Traffic Operations Reports

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	580	221	373	785	123	166
Future Volume (vph)	580	221	373	785	123	166
Ideal Flow (vphpl)	1775	1750	1900	1750	1775	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	120.0		0.0	45.0	
Storage Lanes	2	1		1	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3111	1388	1824	1414	1476	1789
Flt Permitted	0.950				0.282	
Satd. Flow (perm)	3111	1388	1824	1414	438	1789
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		221		785		
Link Speed (k/h)	50		50			50
Link Distance (m)	261.0		210.6			208.0
Travel Time (s)	18.8		15.2			15.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	6%	3%	4%	13%	5%
Adj. Flow (vph)	580	221	373	785	123	166
Shared Lane Traffic (%)						
Lane Group Flow (vph)	580	221	373	785	123	166
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.11	1.13	1.01	1.13	1.11	1.01
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	25.0	25.0	12.0	12.0	5.0	12.0
Minimum Split (s)	31.0	31.0	18.4	18.4	9.0	18.4
Total Split (s)	49.0	49.0	38.4	38.4	22.0	38.4
Total Split (%)	44.8%	44.8%	35.1%	35.1%	20.1%	35.1%
Maximum Green (s)	43.0	43.0	32.0	32.0	18.0	32.0
Yellow Time (s)	4.0	4.0	3.3	3.3	3.0	3.3
All-Red Time (s)	2.0	2.0	3.1	3.1	1.0	3.1
Lost Time Adjust (s)	-2.0	-2.0	-2.4	-2.4	0.0	-2.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None
Walk Time (s)	20.0	20.0	10.0	10.0		10.0
Flash Dont Walk (s)	5.0	5.0	9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	28.8	28.8	24.7	24.7	34.8	34.8
Actuated g/C Ratio	0.40	0.40	0.34	0.34	0.48	0.48
v/c Ratio	0.47	0.32	0.60	0.78	0.36	0.19
Control Delay	19.8	4.5	24.8	8.2	12.6	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	4.5	24.8	8.2	12.6	10.3
LOS	B	A	C	A	B	B
Approach Delay	15.6		13.6			11.3
Approach LOS	B		B			B
Queue Length 50th (m)	32.2	0.0	43.4	0.0	8.7	11.8
Queue Length 95th (m)	59.0	14.9	80.7	32.1	19.1	24.2
Internal Link Dist (m)	237.0		186.6			184.0
Turn Bay Length (m)		120.0			45.0	
Base Capacity (vph)	2017	977	904	1096	484	1417
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.23	0.41	0.72	0.25	0.12

Intersection Summary

Area Type: Other

Cycle Length: 109.4

Actuated Cycle Length: 71.9

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

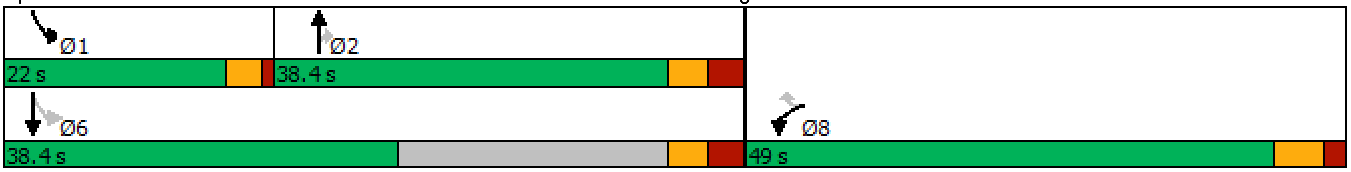
Maximum v/c Ratio: 0.78

Intersection Signal Delay: 14.0 — Intersection LOS: B

Intersection Capacity Utilization 66.7% — ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Fountain Street South /Fountain Street North & King Street West



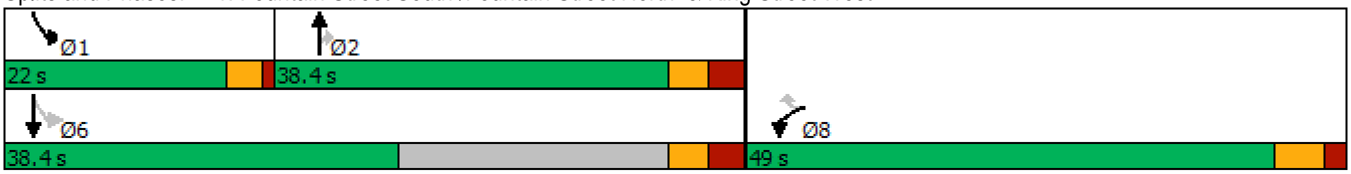
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	912	204	456	903	284	448
Future Volume (vph)	912	204	456	903	284	448
Ideal Flow (vphpl)	1775	1750	1900	1750	1775	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	120.0		0.0	45.0	
Storage Lanes	2	1		1	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98		0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3141	1428	1824	1442	1603	1860
Flt Permitted	0.950				0.160	
Satd. Flow (perm)	3141	1393	1824	1418	270	1860
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		204		830		
Link Speed (k/h)	50		50			50
Link Distance (m)	261.0		210.6			208.0
Travel Time (s)	18.8		15.2			15.0
Confl. Peds. (#/hr)		2		3	3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	2%	4%	1%
Adj. Flow (vph)	912	204	456	903	284	448
Shared Lane Traffic (%)						
Lane Group Flow (vph)	912	204	456	903	284	448
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.0		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.11	1.13	1.01	1.13	1.11	1.01
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	25.0	25.0	12.0	12.0	5.0	12.0
Minimum Split (s)	31.0	31.0	18.4	18.4	9.0	18.4
Total Split (s)	49.0	49.0	38.4	38.4	22.0	38.4
Total Split (%)	44.8%	44.8%	35.1%	35.1%	20.1%	35.1%
Maximum Green (s)	43.0	43.0	32.0	32.0	18.0	32.0
Yellow Time (s)	4.0	4.0	3.3	3.3	3.0	3.3
All-Red Time (s)	2.0	2.0	3.1	3.1	1.0	3.1
Lost Time Adjust (s)	-2.0	-2.0	-2.4	-2.4	0.0	-2.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None
Walk Time (s)	20.0	20.0	10.0	10.0		10.0
Flash Dont Walk (s)	5.0	5.0	9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	37.9	37.9	31.0	31.0	50.7	50.7
Actuated g/C Ratio	0.39	0.39	0.32	0.32	0.52	0.52
v/c Ratio	0.74	0.30	0.78	0.89	0.80	0.46
Control Delay	30.2	4.2	42.0	16.1	36.3	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	4.2	42.0	16.1	36.3	17.1
LOS	C	A	D	B	D	B
Approach Delay	25.4		24.8			24.5
Approach LOS	C		C			C
Queue Length 50th (m)	86.0	0.0	85.9	10.9	33.4	54.6
Queue Length 95th (m)	109.7	14.1	#143.1	#124.9	#80.3	88.7
Internal Link Dist (m)	237.0		186.6			184.0
Turn Bay Length (m)		120.0			45.0	
Base Capacity (vph)	1499	771	665	1044	396	1112
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.26	0.69	0.86	0.72	0.40

Intersection Summary	
Area Type:	Other
Cycle Length: 109.4	
Actuated Cycle Length: 96.8	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 25.0	Intersection LOS: C

Intersection Capacity Utilization 84.5% 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: 1: Fountain Street South /Fountain Street North & King Street West



Appendix D

2028 Total Traffic Operations Reports

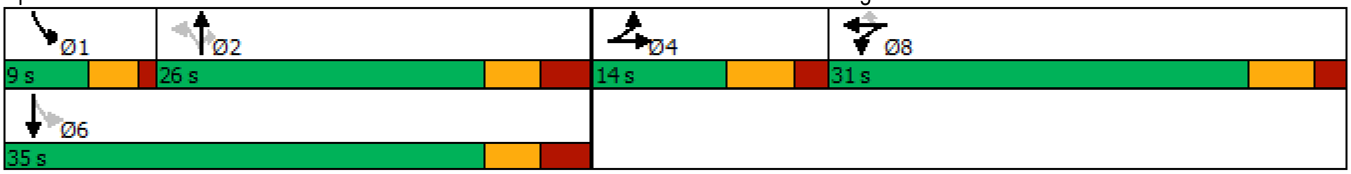
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	57	14	580	22	221	23	373	785	123	166	2
Future Volume (vph)	28	57	14	580	22	221	23	373	785	123	166	2
Ideal Flow (vphpl)	1550	1550	1550	1775	1650	1750	1650	1650	1750	1775	1650	1650
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		120.0	0.0		0.0	45.0		0.0
Storage Lanes	0		0	1		1	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			45.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981				0.850			0.850		0.998	
Flt Protected		0.986		0.950	0.956			0.997		0.950		
Satd. Flow (prot)	0	1483	0	1523	1429	1388	0	1582	1414	1476	1552	0
Flt Permitted		0.986		0.950	0.956			0.976		0.174		
Satd. Flow (perm)	0	1483	0	1523	1429	1388	0	1549	1414	270	1552	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				221			785		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.0			264.6			74.5			76.9	
Travel Time (s)		10.3			19.1			5.4			5.5	
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%	4%	0%	6%	0%	3%	4%	13%	5%	0%
Adj. Flow (vph)	28	57	14	580	22	221	23	373	785	123	166	2
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	99	0	302	300	221	0	396	785	123	168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.31	1.31	1.31	1.11	1.21	1.13	1.21	1.21	1.13	1.11	1.21	1.21
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases						8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		25.0	25.0	25.0	12.0	12.0	12.0	5.0	12.0	
Minimum Split (s)	14.0	14.0		31.0	31.0	31.0	18.4	18.4	18.4	9.0	18.4	
Total Split (s)	14.0	14.0		31.0	31.0	31.0	26.0	26.0	26.0	9.0	35.0	
Total Split (%)	17.5%	17.5%		38.8%	38.8%	38.8%	32.5%	32.5%	32.5%	11.3%	43.8%	
Maximum Green (s)	8.0	8.0		25.0	25.0	25.0	19.6	19.6	19.6	5.0	28.6	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.3	3.3	3.3	3.0	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	3.1	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)		-2.0		-2.0	-2.0	-2.0		-2.4	-2.4	0.0	-2.4	
Total Lost Time (s)		4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	None	None	None	None	
Walk Time (s)				20.0	20.0	20.0	10.0	10.0	10.0		10.0	
Flash Dont Walk (s)				5.0	5.0	5.0	9.0	9.0	9.0		9.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)		10.1		27.2	27.2	27.2		22.1	22.1	31.2	31.2	
Actuated g/C Ratio		0.13		0.35	0.35	0.35		0.29	0.29	0.40	0.40	
v/c Ratio		0.49		0.56	0.60	0.35		0.89	0.81	0.65	0.27	
Control Delay		39.6		26.3	27.6	4.7		53.3	10.5	36.4	17.9	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		39.6		26.3	27.6	4.7		53.3	10.5	36.4	17.9	
LOS		D		C	C	A		D	B	D	B	
Approach Delay		39.6			21.0			24.8			25.8	
Approach LOS		D			C			C			C	
Queue Length 50th (m)		13.8		41.4	41.6	0.0		61.6	0.0	12.8	17.9	
Queue Length 95th (m)		29.2		69.0	70.3	14.5		#115.3	#70.1	#32.4	32.5	
Internal Link Dist (m)		119.0			240.6			50.5			52.9	
Turn Bay Length (m)						120.0				45.0		
Base Capacity (vph)		200		536	503	631		443	965	188	628	
Starvation Cap Reductn		0		0	0	0		0	0	0	0	
Spillback Cap Reductn		0		0	0	0		0	0	0	0	
Storage Cap Reductn		0		0	0	0		0	0	0	0	
Reduced v/c Ratio		0.49		0.56	0.60	0.35		0.89	0.81	0.65	0.27	

Intersection Summary	
Area Type: Other	
Cycle Length: 80	
Actuated Cycle Length: 77.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 24.2	Intersection LOS: C
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 1: Fountain Street South /Fountain Street North & Site Access/King Street West



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↱	
Traffic Volume (vph)	0	0	0	622	290	9
Future Volume (vph)	0	0	0	622	290	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1650	1650
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.996	
Flt Protected						
Satd. Flow (prot)	0	0	0	1807	1508	0
Flt Permitted						
Satd. Flow (perm)	0	0	0	1807	1508	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	74.3			76.9	123.5	
Travel Time (s)	5.3			5.5	8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	8%	0%
Adj. Flow (vph)	0	0	0	622	290	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	622	299	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.21	1.21
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 36.1%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	43	0	1181	759	0
Future Volume (vph)	0	43	0	1181	759	0
Ideal Flow (vphpl)	1900	1750	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1497	0	3433	3400	0
Flt Permitted						
Satd. Flow (perm)	0	1497	0	3433	3400	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	78.5			141.0	74.5	
Travel Time (s)	5.7			10.2	5.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	0%
Adj. Flow (vph)	0	43	0	1181	759	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	43	0	1181	759	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.01	1.13	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

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

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	43	0	1181	759	0
Future Vol, veh/h	0	43	0	1181	759	0
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	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	4	5	0
Mvmt Flow	0	43	0	1181	759	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	380	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	624	0	-	-	0
Stage 1	0	-	0	-	-	0
Stage 2	0	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	-	624	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	624	-
HCM Lane V/C Ratio	-	0.069	-
HCM Control Delay (s)	-	11.2	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	36	13	910	59	204	60	453	903	284	446	6
Future Volume (vph)	21	36	13	910	59	204	60	453	903	284	446	6
Ideal Flow (vphpl)	1550	1550	1550	1775	1650	1750	1650	1650	1750	1775	1650	1650
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		120.0	0.0		0.0	45.0		0.0
Storage Lanes	0		0	1		1	0		1	1		0
Taper Length (m)	7.5			7.5			7.5			45.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00				0.98			0.98			
Frt		0.975				0.850			0.850		0.998	
Flt Protected		0.985		0.950	0.958			0.994		0.950		
Satd. Flow (prot)	0	1472	0	1538	1447	1428	0	1580	1442	1603	1612	0
Flt Permitted		0.985		0.950	0.958			0.898		0.182		
Satd. Flow (perm)	0	1471	0	1538	1447	1393	0	1427	1417	307	1612	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				204			869		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		143.0			264.6			74.5			76.9	
Travel Time (s)		10.3			19.1			5.4			5.5	
Confl. Peds. (#/hr)	2					2			3	3		
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%	3%	0%	3%	0%	3%	2%	4%	1%	0%
Adj. Flow (vph)	21	36	13	910	59	204	60	453	903	284	446	6
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	70	0	482	487	204	0	513	903	284	452	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.31	1.31	1.31	1.11	1.21	1.13	1.21	1.21	1.13	1.11	1.21	1.21
Turning Speed (k/h)	100		100	25		15	100		15	25		100
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases						8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		25.0	25.0	25.0	12.0	12.0	12.0	5.0	12.0	
Minimum Split (s)	14.0	14.0		31.0	31.0	31.0	18.4	18.4	18.4	9.0	18.4	
Total Split (s)	14.0	14.0		43.0	43.0	43.0	51.0	51.0	51.0	12.0	63.0	
Total Split (%)	11.7%	11.7%		35.8%	35.8%	35.8%	42.5%	42.5%	42.5%	10.0%	52.5%	
Maximum Green (s)	8.0	8.0		37.0	37.0	37.0	44.6	44.6	44.6	8.0	56.6	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.3	3.3	3.3	3.0	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	3.1	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)		-2.0		-2.0	-2.0	-2.0		-2.4	-2.4	0.0	-2.4	
Total Lost Time (s)		4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	None	None	None	None	
Walk Time (s)				20.0	20.0	20.0	10.0	10.0	10.0		10.0	
Flash Dont Walk (s)				5.0	5.0	5.0	9.0	9.0	9.0		9.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)		10.1		39.4	39.4	39.4		44.7	44.7	56.8	56.8	
Actuated g/C Ratio		0.09		0.34	0.34	0.34		0.39	0.39	0.49	0.49	
v/c Ratio		0.52		0.92	0.98	0.33		0.93	0.83	1.17	0.57	
Control Delay		62.1		62.1	76.5	5.6		58.6	10.7	136.7	24.4	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		62.1		62.1	76.5	5.6		58.6	10.7	136.7	24.4	
LOS		E		E	E	A		E	B	F	C	
Approach Delay		62.1			58.3			28.1			67.7	
Approach LOS		E			E			C			E	
Queue Length 50th (m)		15.2		123.1	~136.7	0.0		119.3	5.2	~55.8	76.7	
Queue Length 95th (m)		#32.0		#196.6	#207.3	17.2		#188.6	65.1	#112.7	110.7	
Internal Link Dist (m)		119.0			240.6			50.5			52.9	
Turn Bay Length (m)						120.0				45.0		
Base Capacity (vph)		135		526	495	610		588	1094	242	835	
Starvation Cap Reductn		0		0	0	0		0	0	0	0	
Spillback Cap Reductn		0		0	0	0		0	0	0	0	
Storage Cap Reductn		0		0	0	0		0	0	0	0	
Reduced v/c Ratio		0.52		0.92	0.98	0.33		0.87	0.83	1.17	0.54	

Intersection Summary

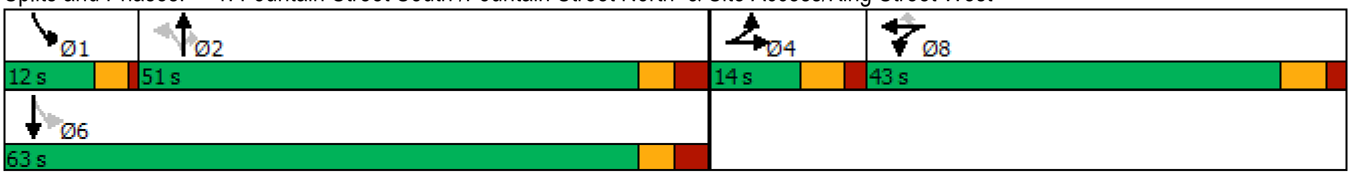
Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 115
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.17
Intersection Signal Delay: 47.8 Intersection LOS: D

Intersection Capacity Utilization 106.2%	ICU Level of Service G
Analysis Period (min) 15	

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

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

Splits and Phases: 1: Fountain Street South /Fountain Street North & Site Access/King Street West



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	678	736	25
Future Volume (vph)	0	0	0	678	736	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1650	1650
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.996	
Flt Protected						
Satd. Flow (prot)	0	0	0	1824	1579	0
Flt Permitted						
Satd. Flow (perm)	0	0	0	1824	1579	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	74.3			76.9	123.5	
Travel Time (s)	5.3			5.5	8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	0%
Adj. Flow (vph)	0	0	0	678	736	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	678	761	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.21	1.21
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	

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

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	27	0	1416	1369	0
Future Volume (vph)	0	27	0	1416	1369	0
Ideal Flow (vphpl)	1900	1750	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1497	0	3500	3500	0
Flt Permitted						
Satd. Flow (perm)	0	1497	0	3500	3500	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	78.5			141.0	74.5	
Travel Time (s)	5.7			10.2	5.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%
Adj. Flow (vph)	0	27	0	1416	1369	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	27	0	1416	1369	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.01	1.13	1.01	1.01	1.01	1.01
Turning Speed (k/h)	100	100	100			100
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 47.8% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	0	1416	1369	0
Future Vol, veh/h	0	27	0	1416	1369	0
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	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	2	2	0
Mvmt Flow	0	27	0	1416	1369	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	685	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	395	0	-	-	0
Stage 1	0	-	0	-	-	0
Stage 2	0	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	-	395	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	395	-
HCM Lane V/C Ratio	-	0.068	-
HCM Control Delay (s)	-	14.8	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	0.2	-

Appendix E

TTS Data

Wed Oct 11 2023 18:33:08 GMT-0400 (Eastern Daylight Time) - Run Time: 576ms

Cross Tabulation Query Form - Household - 2016 v1.1

Row: Type of dwelling unit - dwell_type
Column: No. of vehicles in household - n_vehicle

Filters:
Type of dwelling unit - dwell_type In 2
and
2006 GTA zone of household - gta06_hhld In 7302,7324,7301,7325

Household 2016
ROW : dwell_type
COLUMN : n_vehicle

dwell_type	n_vehicle	total
2	0	187
2	1	480
2	2	278
2	3	24

	# of Veh in Household					
Dwelling Ty	0	1	2	3	**Total**	0 veh
Apartment	187	480	278	24	**969**	19%

	# of Vehicles				
Dwelling Ty	0	1	2	3	**Total**
Apartment	0	480	556	72	**1108**

Auto Ownership **1.14**

Wed Oct 11 2023 18:39:45 GMT-0400 (Eastern Daylight Time) - Run Time: 2043ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: Primary travel mode of trip - mode_prime

Filters:
2006 GTA zone of origin - gta06_orig In 7302,7324,7301,7325
and
Type of dwelling unit - dwell_type In 2

Transit excluding GO rail	4%
Cycle	0%
Auto Driver	72%
Auto Passenger	16%
Walk	7%
Taxi	1%
School Bus	1%
	100%
Mode Split	11%

Trip 2016
ROW : gta06_orig
COLUMN : mode_prime

gta06_orig	mode_prim	total
7301	B	70
7301	D	361
7301	P	76
7301	T	20
7301	W	61
7302	D	401
7302	P	146
7324	B	17
7324	D	607
7324	P	96
7324	W	29
7325	D	321
7325	P	59
7325	S	13
7325	W	86
		2363

Mon Oct 16 2023 18:20:19 GMT-0400 (Eastern Daylight Time) - Run Time: 1829ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: Primary travel mode of trip - mode_prime

Filters:
2006 GTA zone of destination - gta06_dest In 7302,7324,7301,7325
and
Type of dwelling unit - dwell_type In 2

Transit excluding GO rail	4%
Cycle	0%
Auto Driver	73%
Auto Passenger	15%
Walk	7%
Taxi	1%
School Bus	1%
	100%
Mode Split	11%

Trip 2016
ROW : gta06_dest
COLUMN : mode_prime

gta06_dest	mode_prim	total
7301	B	70
7301	D	410
7301	P	76
7301	T	20
7301	W	61
7302	D	401
7302	P	146
7324	B	17
7324	D	626
7324	P	78
7324	W	29
7325	D	321
7325	P	59
7325	S	13
7325	W	86
		2413

Appendix F

Parking Demand Data

Address: **150 & 180 Greenbrier Road**
Surveyor: LC
Date: 2023-08-17
# of Units: 153
Available Spaces: Res: 169 Vis: 6

Time	Demand		
	Resident	Visitor	Total
6:10 AM	141	0	141
11:30 AM	91	4	95
8:30 PM	138	0	138

max parking demand	141
max parking rate	0.92

45 Country Hill Drive

Start 42 @ 3:29PM

Thursday

05-Jul-18

Entering Site (Summarized Raw)

Time	Exiting N D/W	Exiting S D/W	Exiting Tot	Entering D/W N	Entering D/W S	Entering D/W Tot	Occupied Spaces	North D/W Thru	North D/W Left	North D/W Right	South D/W Left	South D/W Right
3:00 PM	1	0	1	5	1	6	34	0	0	5	1	0
3:15 PM	1	4	5	6	4	10	39	0	0	6	0	4
3:30 PM	2	4	6	5	3	8	44	0	0	5	2	1
3:45 PM	5	1	6	4	2	6	44	0	0	4	2	0
4:00 PM	0	0	0	4	1	5	49	0	1	3	0	1
4:15 PM	3	1	4	4	1	5	50	0	1	3	0	1
4:30 PM	2	1	3	3	0	3	50	0	1	2	0	0
4:45 PM	2	1	3	5	2	7	54	0	0	5	0	2
5:00 PM	0	0	0	1	0	1	55	0	0	1	0	0
5:15 PM	0	2	2	7	2	9	62	0	1	6	0	2
5:30 PM	2	2	4	5	2	7	65	0	0	5	0	2
5:45 PM	2	0	2	2	1	3	66	0	0	2	1	0
6:00 PM	4	2	6	2	0	2	62	0	0	2	0	0
6:15 PM	2	2	4	0	3	3	61	0	0	0	2	1
6:30 PM	1	1	2	3	0	3	62	0	1	2	0	0
6:45 PM	1	3	4	3	3	6	64	0	0	3	1	2
7:00 PM	2	1	3	3	0	3	64	0	0	3	0	0
7:15 PM	0	1	1	2	2	4	67	0	0	2	1	1
7:30 PM	0	3	3	1	1	2	66	0	0	1	1	0
7:45 PM	0	5	5	3	2	5	66	0	0	3	2	0
8:00 PM	1	0	1	2	0	2	67	0	0	2	0	0
8:15 PM	0	0	0	2	0	2	69	0	0	2	0	0
8:30 PM	2	1	3	4	0	4	70	0	0	4	0	0
8:45 PM	1	1	2	0	2	2	70	0	0	0	1	1
9:00 PM	2	0	2	2	0	2	70	1	0	1	0	0
9:15 PM	2	0	2	2	2	4	72	0	0	2	1	1
9:30 PM	1	1	2	5	0	5	75	0	0	5	0	0
9:45 PM	3	4	7	1	1	2	70	0	1	0	1	0
10:00 PM	1	2	3	3	0	3	70	0	0	3	0	0
10:15 PM	0	1	1	3	0	3	72	0	0	3	0	0
10:30 PM	2	2	4	6	1	7	75	0	0	6	1	0
10:45 PM	1	1	2	1	0	1	74	0	0	1	0	0
11:00 PM	2	0	2	4	0	4	76	0	0	4	0	0
11:15 PM	2	0	2	2	0	2	76	0	0	2	0	0
11:30 PM	1	0	1	1	0	1	76	0	0	1	0	0
11:45 PM	1	0	1	1	0	1	76	0	0	1	0	0
12:00 AM	0	0	0	0	0	0	76	0	0	0	0	0
12:15 AM	0	0	0	1	0	1	77	0	0	1	0	0
12:30 AM	0	0	0	1	1	2	79	0	0	1	1	0
12:45 AM	0	0	0	0	0	0	79	0	0	0	0	0
1:00 AM	1	0	1	0	0	0	78	0	0	0	0	0
1:15 AM	1	0	1	2	0	2	79	0	0	2	0	0
1:30 AM	0	0	0	0	0	0	79	0	0	0	0	0
1:45 AM	0	0	0	1	1	2	81	0	0	1	1	0
2:00 AM	0	0	0	1	0	1	82	0	0	1	0	0
2:15 AM	1	0	1	0	0	0	81	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	81	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	81	0	0	0	0	0
3:00 AM	0	1	1	0	0	0	80	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	80	0	0	0	0	0
3:30 AM	1	1	2	0	0	0	78	0	0	0	0	0
3:45 AM	0	1	1	0	0	0	77	0	0	0	0	0
							Max: 82	1	6	106	19	19
							Average: 68.3					

Entering

Exiting

45 Country Hill Drive

Start 51 @ 3:01PM

Saturday 07-Jul-18	Exiting			Entering D/W			Occupied Spaces
	N D/W	S D/W	Tot	N	S	Tot	
3:00 PM	2	2	4	3	1	4	51
3:15 PM	3	0	3	4	1	5	53
3:30 PM	1	0	1	1	1	2	54
3:45 PM	1	0	1	1	0	1	54
4:00 PM	2	0	2	7	0	7	59
4:15 PM	4	0	4	1	0	1	56
4:30 PM	5	1	6	4	2	6	56
4:45 PM	4	3	7	3	1	4	53
5:00 PM	5	1	6	1	0	1	48
5:15 PM	1	4	5	4	0	4	47
5:30 PM	2	0	2	3	2	5	50
5:45 PM	1	1	2	1	2	3	51
6:00 PM	1	1	2	2	2	4	53
6:15 PM	1	2	3	3	3	6	56
6:30 PM	2	1	3	3	0	3	56
6:45 PM	2	1	3	4	1	5	58
7:00 PM	1	0	1	4	0	4	61
7:15 PM	0	0	0	3	4	7	68
7:30 PM	2	3	5	1	0	1	64
7:45 PM	1	1	2	2	1	3	65
8:00 PM	2	0	2	3	1	4	67
8:15 PM	3	1	4	1	0	1	64
8:30 PM	3	1	4	3	1	4	64
8:45 PM	0	2	2	2	0	2	64
9:00 PM	2	1	3	1	0	1	62
9:15 PM	2	0	2	7	0	7	67
9:30 PM	0	3	3	1	1	2	66
9:45 PM	2	1	3	2	2	4	67
10:00 PM	2	0	2	5	2	7	72
10:15 PM	0	2	2	2	2	4	74
10:30 PM	2	0	2	2	0	2	74
10:45 PM	1	0	1	4	0	4	77
11:00 PM	1	0	1	2	0	2	78
11:15 PM	0	1	1	0	0	0	77
11:30 PM	1	0	1	0	2	2	78
11:45 PM	2	2	4	1	0	1	75
12:00 AM	0	1	1	1	0	1	75
12:15 AM	1	0	1	2	0	2	76
12:30 AM	0	0	0	1	0	1	77
12:45 AM	1	0	1	0	0	0	76
1:00 AM	0	0	0	0	0	0	76
1:15 AM	1	1	2	1	2	3	77
1:30 AM	1	1	2	1	0	1	76
1:45 AM	0	0	0	0	0	0	76
2:00 AM	1	0	1	1	0	1	76
2:15 AM	1	0	1	0	0	0	75
2:30 AM	0	0	0	1	1	2	77
2:45 AM	1	1	2	0	0	0	75
3:00 AM	0	0	0	0	0	0	75
3:15 AM	0	0	0	1	0	1	76
3:30 AM	1	0	1	0	1	1	76
3:45 AM	0	0	0	0	1	1	77
Total	72	39				**Max: 78**	
					Average: 66.4		

Entering Site (Summarized Raw)

Time	North D/W			South D/W	
	Thru	Left	Right	Left	Right
3:00 PM	0	0	3	1	0
3:15 PM	0	1	3	0	1
3:30 PM	0	0	1	1	0
3:45 PM	0	0	1	0	0
4:00 PM	0	0	7	0	0
4:15 PM	0	0	1	0	0
4:30 PM	0	0	4	2	0
4:45 PM	0	1	2	0	1
5:00 PM	0	0	1	0	0
5:15 PM	0	0	4	0	0
5:30 PM	0	0	3	2	0
5:45 PM	0	1	0	2	0
6:00 PM	0	0	2	1	1
6:15 PM	0	0	3	0	3
6:30 PM	0	0	3	0	0
6:45 PM	0	0	4	1	0
7:00 PM	0	0	4	0	0
7:15 PM	0	0	3	3	1
7:30 PM	0	0	1	0	0
7:45 PM	0	0	2	1	0
8:00 PM	0	1	2	1	0
8:15 PM	0	0	1	0	0
8:30 PM	0	1	2	0	1
8:45 PM	0	1	1	0	0
9:00 PM	0	0	1	0	0
9:15 PM	0	0	7	0	0
9:30 PM	0	0	1	0	1
9:45 PM	0	0	2	0	2
10:00 PM	0	0	5	0	2
10:15 PM	0	0	2	1	1
10:30 PM	0	0	2	0	0
10:45 PM	0	0	4	0	0
11:00 PM	0	0	2	0	0
11:15 PM	0	0	0	0	0
11:30 PM	0	0	0	1	1
11:45 PM	0	0	1	0	0
12:00 AM	0	0	1	0	0
12:15 AM	0	0	2	0	0
12:30 AM	0	0	1	0	0
12:45 AM	0	0	0	0	0
1:00 AM	0	0	0	0	0
1:15 AM	0	0	1	1	1
1:30 AM	0	0	1	0	0
1:45 AM	0	0	0	0	0
2:00 AM	0	0	1	0	0
2:15 AM	0	0	0	0	0
2:30 AM	0	0	1	0	1
2:45 AM	0	0	0	0	0
3:00 AM	0	0	0	0	0
3:15 AM	0	0	1	0	0
3:30 AM	0	0	0	0	1
3:45 AM	0	0	0	0	1
Total	0	6	94	18	19

Appendix G

TDM Checklist

FORM 1: TDM CHECKLIST

Site Address: 102 Fountain Street South **Site Context:** ______

Date: 2023-10-12 **ZBL Parking Requirement:** ______

Applicable Parking Reduction: ______

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.	**X**	
A2	**1**	External to site: Continuous sidewalks (1.5m min. width) are provided along both sides of all adjacent public streets (over and above requirement) Internal to site: Pedestrian walkways (1.5m min width) are provided through large parking areas to link the building with the public street sidewalk system (over and above requirement)		
A3	**3**	Non-residential: development provides secure bike storage for 4% of the building occupants.		
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.		
Category Max =	10	**Total Points Applicable =** 10	**Score =**	2

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 Grand Rapid Transit (GRT) or transportation provider		
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		
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.**	**X**	
B3c	**1**	Located within 400 m 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.**		
Category Max =	5	**Total Points Applicable =** 5	**Score =**	3

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 a 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 or includes allowances for shared parking in mixed use zones. **Note: Points are awarded for either C1 or C2 only. Please choose whichever applies** after consulting with the Area Municipal planning authority**.**		
C2	**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 or C2 only. Please choose whichever applies.**	**X**	
C3	**10**	Implements paid parking on part or all of the site (e.g. parking permits, paid parking zones near main entrances)		
C4	**3**	Provides priority parking for carpooling/vanpooling participants equivalent to 5% of employee spaces		
C5	**5**	Commercial Uses: Provide car-share spaces equivalent to 2% of building occupants		
C6	**3**	Parking is not located on major street frontage or between a road right of way and the building	**X**	

		facade.		
C7	**5**	25% to 50% of parking is located underground or in a structure		
C8	**10**	50% to 75% of parking is located underground or in a structure		
C9	**15**	75% of parking or more is located underground or in a structure	**X**	
C10	**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

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**	**Yes**	**N/A**
D1	**2**	The building owner/occupant will provide a ride matching service for car/vanpooling		
D2	**2**	The building owner/occupant will provide emergency ride home options		
D3	**5**	The building owner/occupant will provide 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	**X**	
D5	**2**	The building owner/occupant agrees to provide reduced cost for users of car/van pool, bicycle, moped/motorcycle spaces		
D6	**10**	The building owner/occupant has prepared a TDM plan 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	**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.	**X**	
Category Max = 25		**Total Points Applicable =** 25	**Score =**	7

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 Appli cable**	**Points Scored**	**Comments**
Pedestrian & Cyclist Orientation	24	10	2	
Public Transit Access		5	3	
Parking		25	25	
SUB-TOTAL		**40**	**30**	
Trip Reduction Incentives		*25*	*7*	
OVERALL TOTAL	***65***	***65***	**37**	

TABLE F **Scoring Summary**

FINAL SCORE	**RATING**		
50 - 65	****		**TDM SUPPORTIVE DEVELOPMENT**
40 -49	***		
30 - 39	**	**X**	
24 - 29	*		

0 - 23			Non-TDM Supportive Development